TL37J PARTS MANUAL

TL37J PARTS MANUAL

GENERAL INFORMATION

REPAIR PARTS

MAINTENANCE

SCHEMATICS

snorkel

TL37J

CE

RA/PG

PARTS & SERVICES

MANUAL

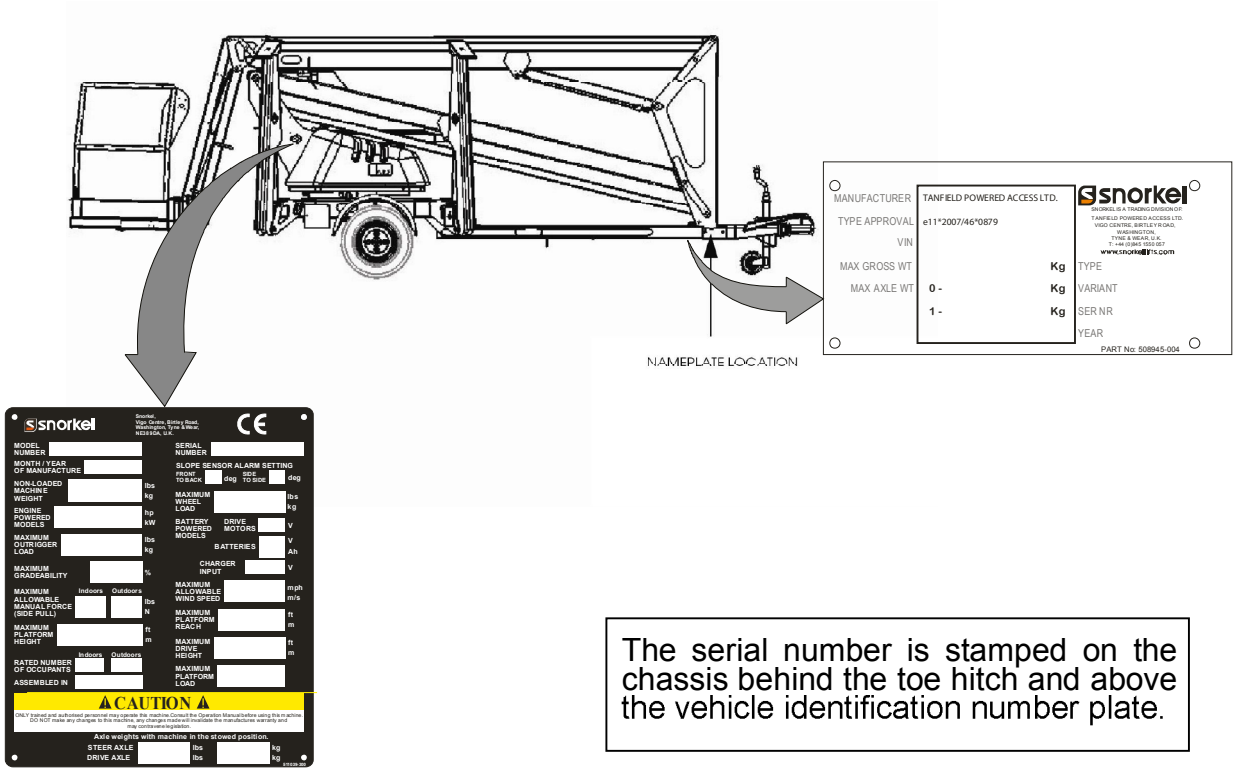
Part Number 511116-201
December 2017

Serial Number TL37-01-007625 and after

TL37J

ENGLISH

When contacting Snorkel for service or parts information, be sure to include the model and serial numbers from the equipment name plate. Should the name plate be missing, the serial number is also stamped on top of the chassis above the front axle pivot.



The serial number is stamped on the chassis behind the toe hitch and above the vehicle identification number plate.

USA

TEL: +1 (559)443 6600
FAX: +1 (559)268 2433

Europe

TEL: +44 (0) 1952 200
FAX: +44 (0) 1952 229

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TL37J SERVICE AND PARTS MANUAL

FOREWORD

This manual is divided into five sections namely;

SECTION 1: INTRODUCTION

General description and machine specifications.

SECTION 2: OPERATION AND SPECIFICATION

Information on how to operate the work platform and how to prepare it for operation.

SECTION 3: SERVICE AND REPAIR

Preventative maintenance and service information.

SECTION 4: TROUBLESHOOTING

Causes and solutions to typical problems.

SECTION 5: ILLUSTRATED PARTS BREAKDOWN / SCHEMATICS

Complete parts list with illustrations, Schematics and valve block diagrams.

SPECIAL INFORMATION

NOTE: **Provides helpful information.**

WORKSHOP PROCEDURES

All information contained in this manual is based on the latest product information available at the time of printing. We reserve the right to make changes at any time without notice.

CAUTION

Detailed prescriptions of standard workshop procedures, safety principles and service operations are not included.

Please note that this manual contains warnings and cautions against some specific service methods which could cause personal injury or could damage a machine or make it unsafe.

Please understand that these warnings cannot cover all conceivable ways in which service, whether or not recommended by Snorkel, might be carried out, or of the possible hazardous consequences of each conceivable way, nor could snorkel investigate all such ways.

Anyone using service procedures or tools whether or not recommended by Snorkel must satisfy themselves thoroughly that neither personal saftey nor machine safety will be jeopardized.

INTRODUCTION

PURPOSE

The purpose of this service and parts manual is to provide instructions and illustrations for the operation and maintenance of this work platform manufactured by Snorkel.

SCOPE

The manual includes procedures for proper operation, specifications, service and repair of this product as well as recommended maintenance schedules, troubleshooting, schematics and illustrated parts breakdown.

GENERAL DESCRIPTION

The work platform consists of the platform, upper and lower controls, elevating assembly, outriggers and a chassis.

WARNING

DO NOT *use the maintenance platform without guardrails properly assembled and in place*

Features of the TL37J is shown in Figure 1-1.

1. Platform
2. Upper controls
3. Elevating assembly
4. Lower controls
5. Outriggers
6. Chassis

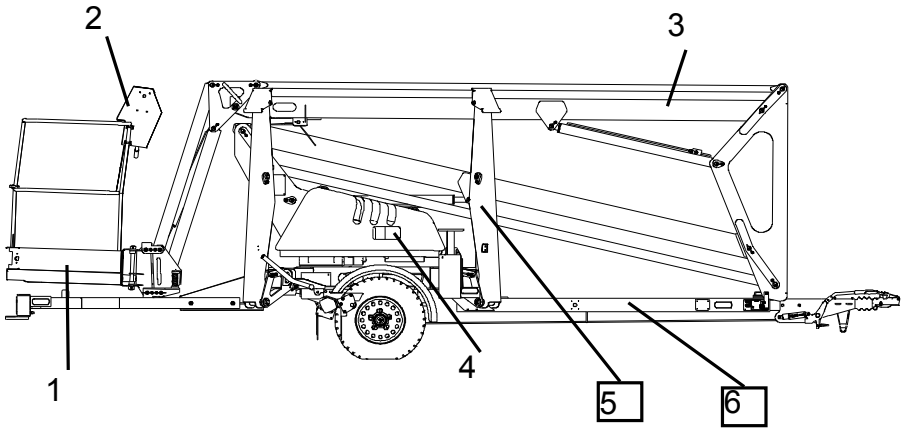


Figure 1-1: Work platform

INTRODUCTION

PLATFORM

The platform consists of guardrails which prevents personnel from falling of the platform. The guardrail system consists of the top rail, mid rail, lock rail strap and toeboards around the sides of the platform.

UPPER & LOWER CONTROLS

These are controls located on the chassis and platform and used to operate the machine. A complete explanation of control functions can be found in section 2.

ELEVATING ASSEMBLY

The platform is raised and lowered by the elevating assembly. The hydraulic pump driven by the engine, powers the 3 - stage lift cylinders.

CHASSIS

The chassis is a structural frame that supports all the components of the TL37J work platform.

PURPOSE OF EQUIPMENT

The objective of the work platform is to provide a quickly deployable, variable height work platform to elevate personnel and materials to overhead work areas.

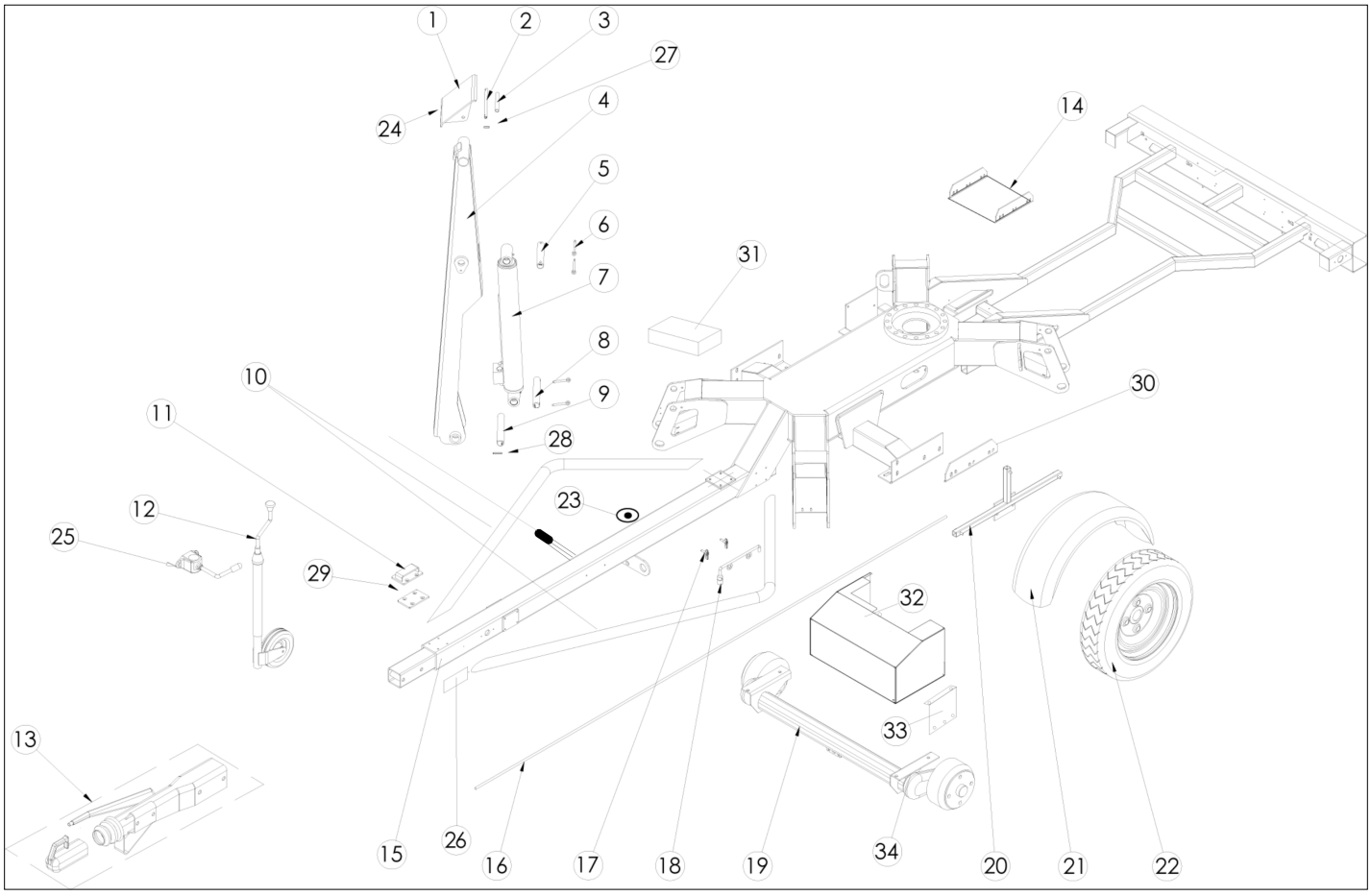
SPECIAL LIMITATIONS

Elevating of the work platform is limited to firm, even surfaces only.

DANGER

*The elevating function shall **ONLY** be used when the work platform is level and on a a firm surface.*

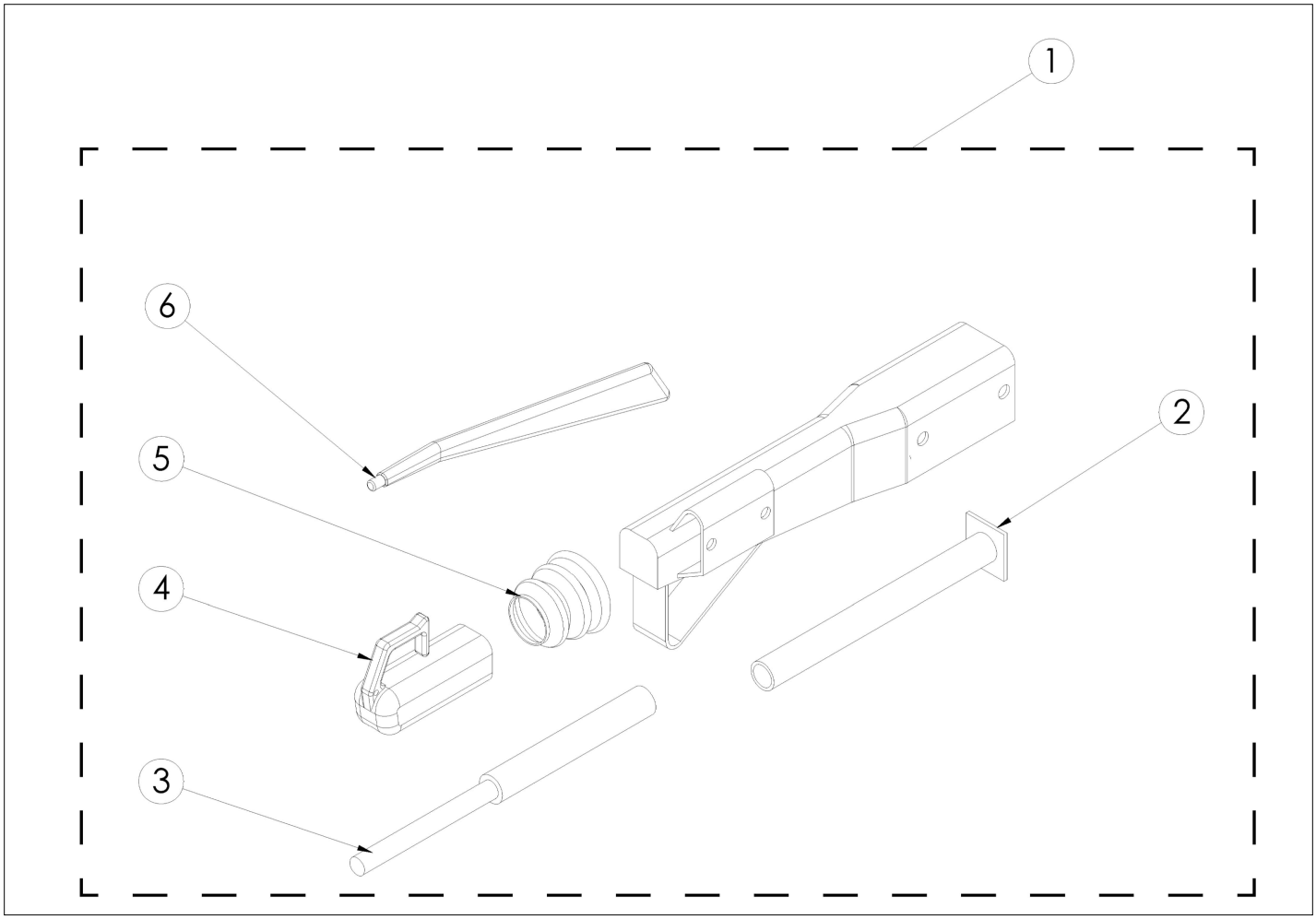
REPAIR PARTS



アイテム	部品番号	名前	数量	UOM
1	22-5828	OUTRIGGER FOOT OUTRIGGER	4	EA
2	SP-012E218	FOOT PIN	4	EA
3	12-3116	HOSE	4	EA
4	10-5260	OUTRIGGER LEG	4	EA
5	SP-030D167	OUTRIGGER RAM/OUTRIGGER PIVOT PIN	4	EA
6	10-2672	RETAINING PEG	16	EA
7	508180-000	OUTRIGGER RAM	4	EA
8	SP-030B198	TOP TIE BAR/QUADRANT PIVOT PIN	4	EA
9	SP-030K211	Pin	4	EA
10	10-5395	BOLT-ON CYCLE GUARDS RIGHT (OPTIONAL)	2	EA
11	10-4974	BOOM HOLDING BRACKET	1	EA
12	25-0325	JOCKEY WHEEL (CE)	1	EA
12	508684-000	JOCKEY WHEEL (ANSI)	1	EA
13	510301-000	COUPLING ASSEMBLY (CE)	1	EA
13	508679-000	Tow Coupling	1	EA
13	508680-000	CHAIN PEERLESS 5/16 X 36 SAFETY (ANSI), NOT ILLUSTRATED	1	EA
13	508680-000	CHAIN PEERLESS 5/16 X 36 SAFETY (ANSI), NOT ILLUSTRATED	1	EA
14	513667-004	ENCLOSURE BRACKET	1	EA
15	513697-000	CHASSIS ASSEMBLY	1	EA
16	22-4922	BRAKE ROD	1	EA
17	11-3313	ANTI-LUCE FASTENER	2	EA
18	510553-000	EMERGENCY SLEW HANDLE	1	EA
19	513466-000	AXLE, 1900kg RUBBER TORSION	1	EA
20	0130358	MUDGUARD MOUNTING BRACKET (ANSI), NOT ILLUSTRATED	2	EA

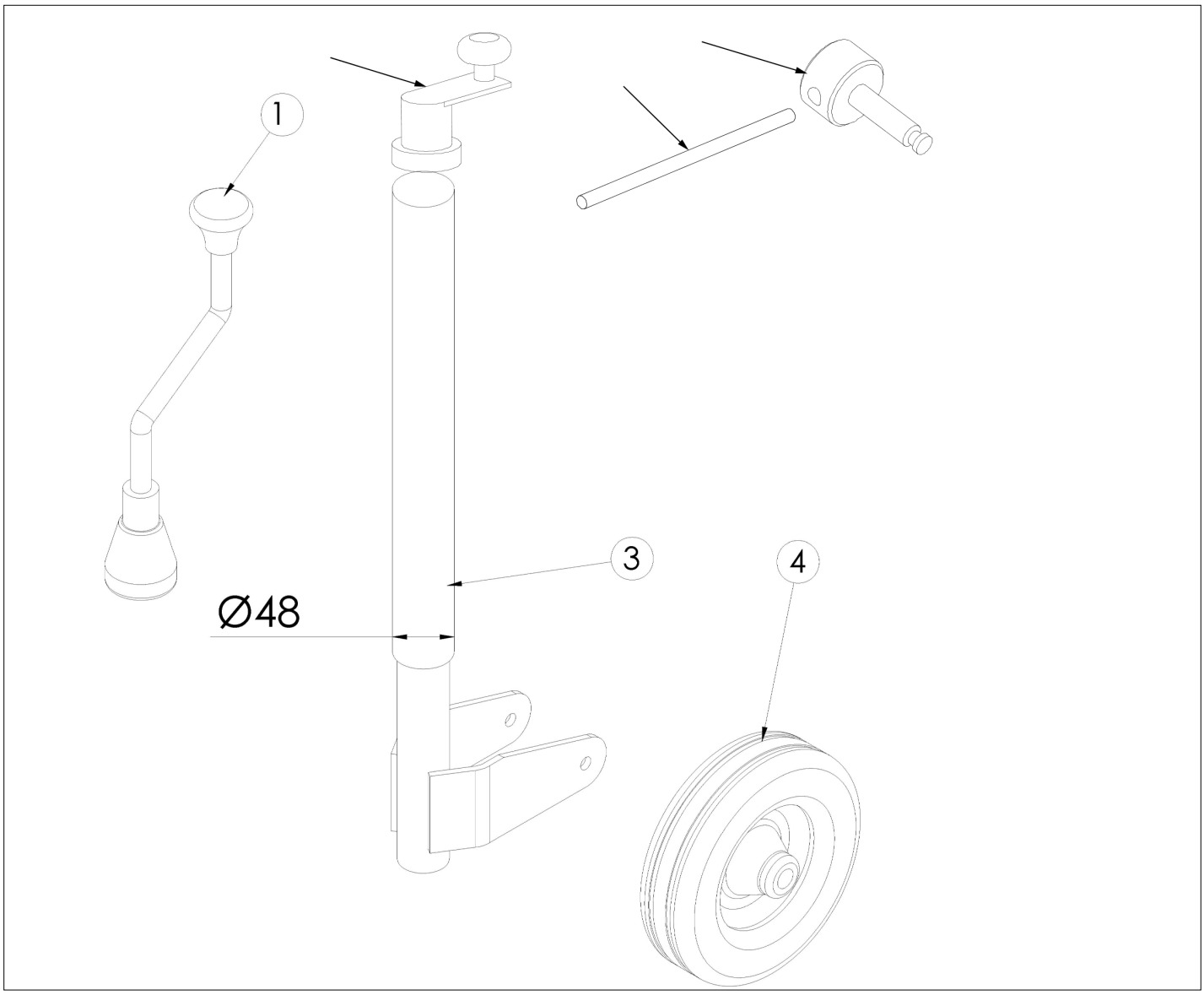
アイテム	部品番号	名前	数量	UOM
20	10-4675	MUDGUARD MOUNTING BRACKET	2	EA
21	513491-000	MUDGUARD (CE), Ansi version 508707-000	2	EA
22	510300-000	WHEEL ASSEMBLY (CE)	2	EA
22	508678-000	WHEEL ASSEMBLY (ANSI)	2	EA
23	25-0239	SPIRIT LEVEL SMALL	1	EA
24	SM-M0026	BLACK EDGE TRIM	2.6	EA
25	PART OF ITEM 12	JOCKEY HANDLE	1	EA
26	508945-006	Nameplate, Trailer VIN plate "	1	EA
27	510062-100	ROLL PIN 6DIA. 30LONG	8	EA
28	510061-000	ROLL PIN 10DIA. 50LONG	8	EA
29	15-0875_10	VERTICAL BOOMPAD 10mm	1	EA
29	15-0875_20	VERTICAL BOOMPAD 20mm	1	EA
29	15-0875_5	VERTICAL BOOMPAD 10mm	1	EA
30	8210244	PLATE, AXLE ADAPTOR (ANSI ONLY)	2	EA
31	514451-000	DRAWBAR BALLAST WEIGHT(NON ENGINE MACHINE ONLY)	1	EA
32	515229-000	ENGINE COVER	1	EA
33	515229-004	SUPPORT ANGLE	2	EA
34	821083	AXLE SPACER TUBE (ANSI ONLY)	2	EA
35	8210291	PARKING BRAKE ASSY (ANSI)	1	EA
--	8210290	DECAL,PARKING BRAKE (ANSI)	1	EA
--	8210295	DECAL, PARK BREAK WARNING (ANSI)	1	EA

REPAIR PARTS



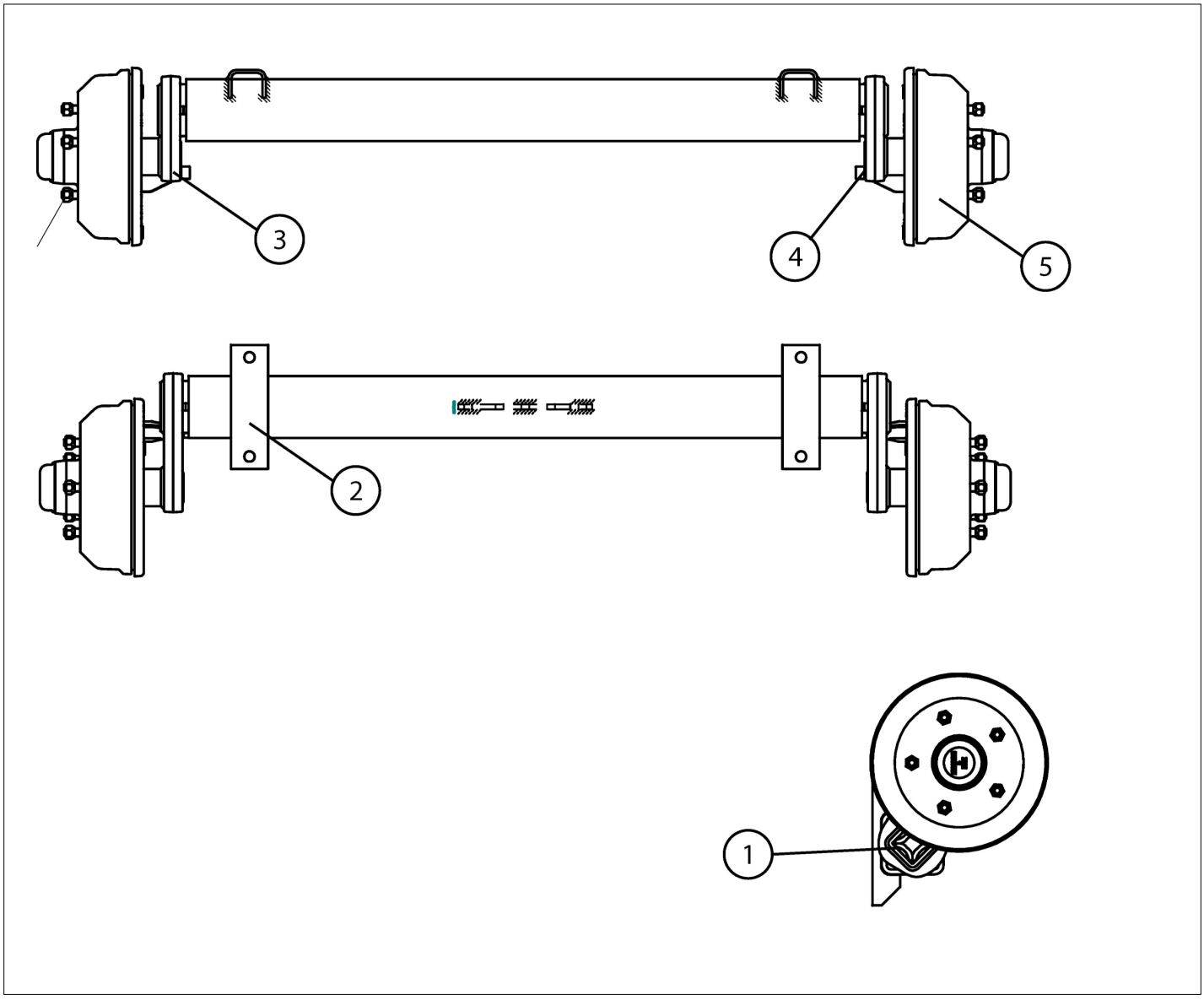
アイテム	部品番号	名前	数量	UOM
No.	Part No.	Description	Qty.	EA
1	510301-000	COUPLING ASSEMBLY (CE)	1	EA
2	510301-000_2	DRAWTUBE	1	EA
3	510301-000_3	DAMPER	1	EA
4	510301-000_4	COUPLING HEAD	1	EA
5	510301-000_5	GAITER	1	EA
6	510301-000_6	HAND BRAKE ASSEMBLY	1	EA
--	508679-000	Tow Coupling	1	EA
--	1450217	CHAIN PEERLESS 5/16 X 36 SAFETY	1	EA
--	508680-000	CHAIN PEERLESS 5/16 X 36 SAFETY (ANSI), NOT ILLUSTRATED	1	EA
--	508681-000	KICK STAND	1	EA
--	508682-000	PLATE COUPLER	1	EA
--	508683-000	LEVER ARM	1	EA
--	7500016	SPACER .500 SCH-40 X 1.00	3	EA
--	7500017	SPACER .50 SCH-40 X .50	2	EA

REPAIR PARTS



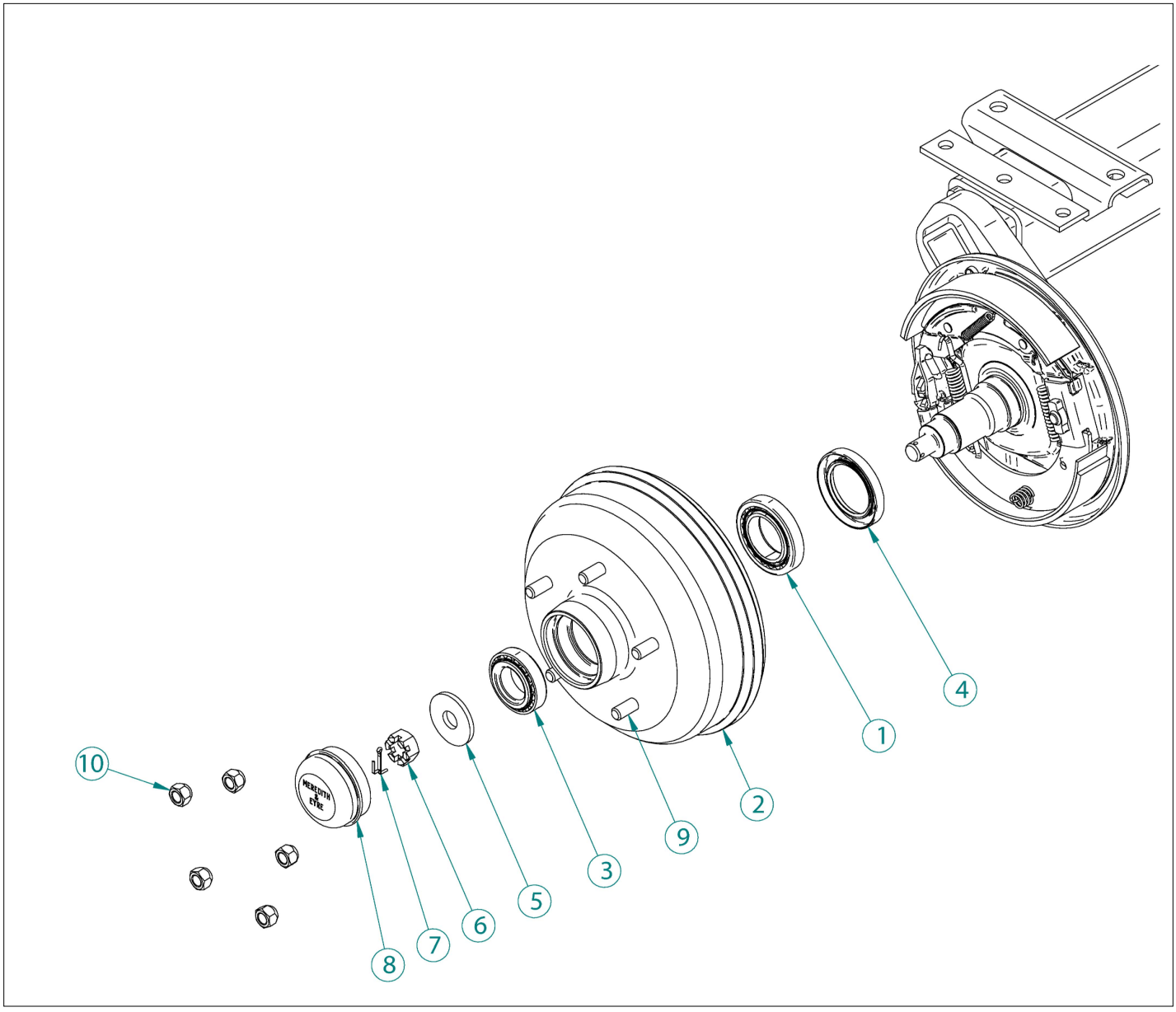
アイテム	部品番号	名前	数量	UOM
1	25-0325/1	HANDLE	1	EA
--	N/A AS SPARE	SPINDLE	1	EA
3	N/A AS SPARE	SPINDLE	1	EA
4	25-0325/3	WHEEL 205 X 60	1	EA
5	24-4268	JOCKEY WHEEL CLAMP	1	EA
6	24-4269	HANDLE FOR CLAMP	1	EA
7	513931-001	HANDLE	1	EA
not illustrated	25-0337	JOCKEY WHEEL HD DOUBLE ASSY	1	EA

REPAIR PARTS



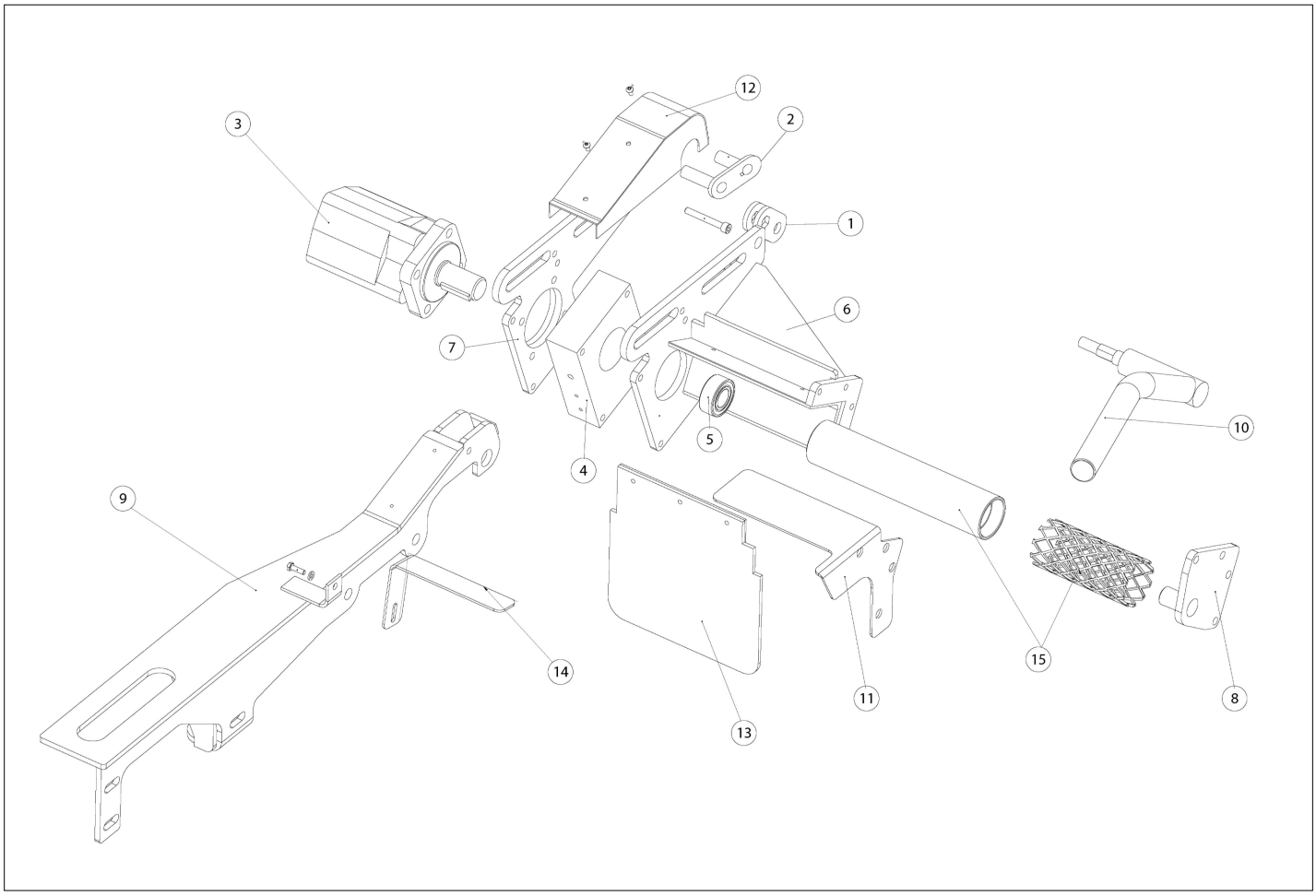
アイテム	部品番号	名前	数量	UOM
1	1289444	RUBBER ASSEMBLY SAMPLE	1	EA
2	104528	AXLE PAD	2	EA
2	8210184	SPACER (ANSI ONLY)	2	EA
3	1029219	L.H. TRAILING ARMWELD ASSY	1	EA
4	1029220	R.H. TRAILING ARMWELD ASSY	1	EA
5	513466-000	AXLE, 1900kg RUBBER TORSION	1	EA
5	508677-000	AXLE Assembly (ANSI), SN: To 01-007825, NOT ILLUSTRATED	1	EA
5	514904-000	AXLE Assembly (ANSI), SN: From 01-007826, NOT ILLUSTRATED	1	EA
6	5563987	CONE WHEEL NUT 1/2-20 (ANSI ONLY)	8	EA

REPAIR PARTS



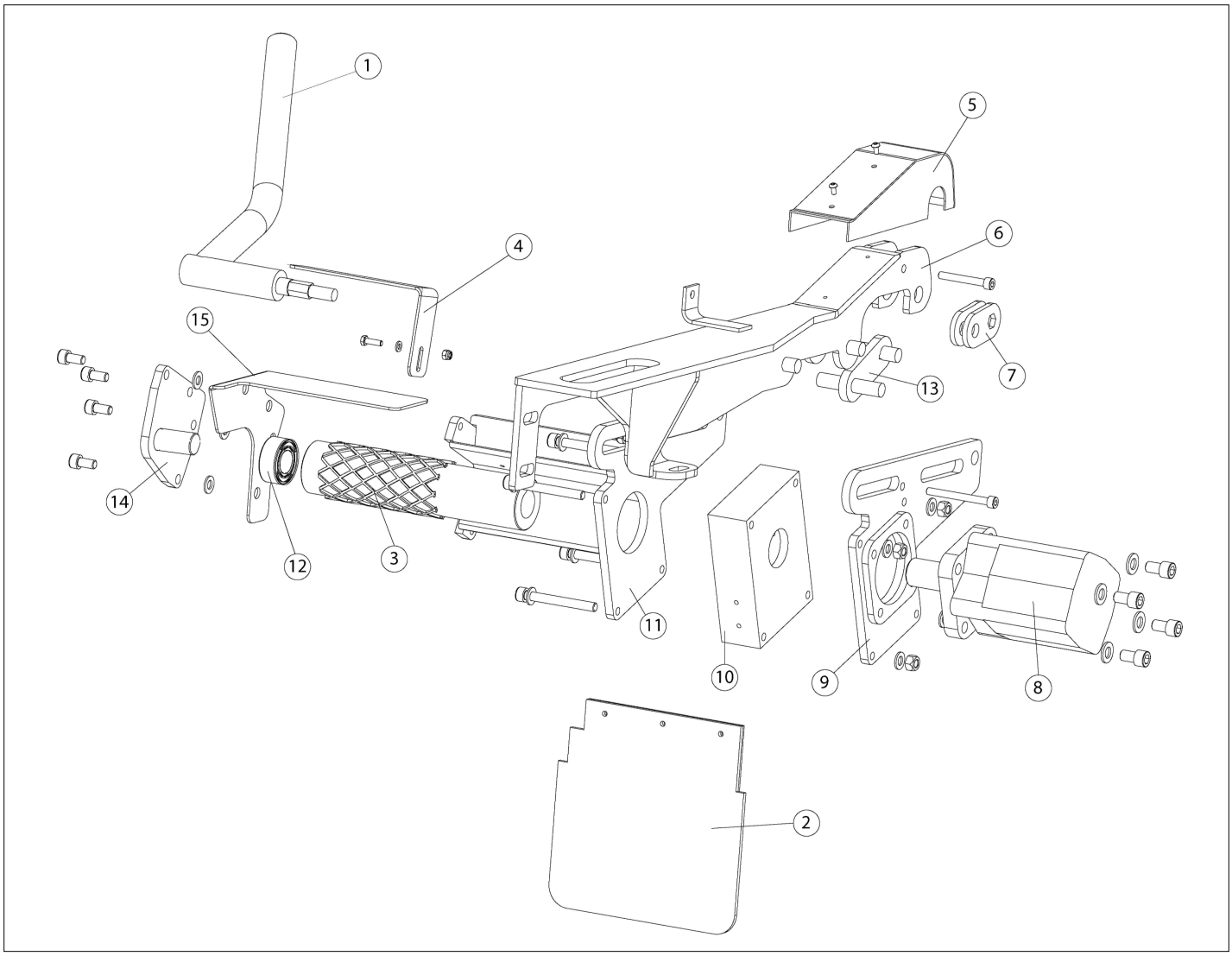
アイテム	部品番号	名前	数量	UOM
1	18690/18620	BEARING, TAPER ROLLER	2	EA
2	1159 67	HUB DRILLING 5- STUD x 1/2 UNF x 6" P.C.D	2	EA
--	7220068	TL37 AXLE HUB-DRUM KIT	2	EA
3	LM48548/LM48510	BEARING, TAPER ROLLER	2	EA
4	OILSEAL206318	OILSEAL 206318	2	EA
5	1053 03	LOAD WASHER 55 DIA	2	EA
6	--	null	2	EA
7	--	null	2	EA
8	1061 07	HUB CAP	2	EA
9	1026 15	WHEEL STUD, 1/2 UNF x 40 mm LONG	10	EA
10	1027 07	WHEEL NUT 1/2 UNF x 30 °	10	EA
11	7200033	LH BRAKE LINING	2	EA
12	7200034	RH BRAKE LINING	2	EA

REPAIR PARTS



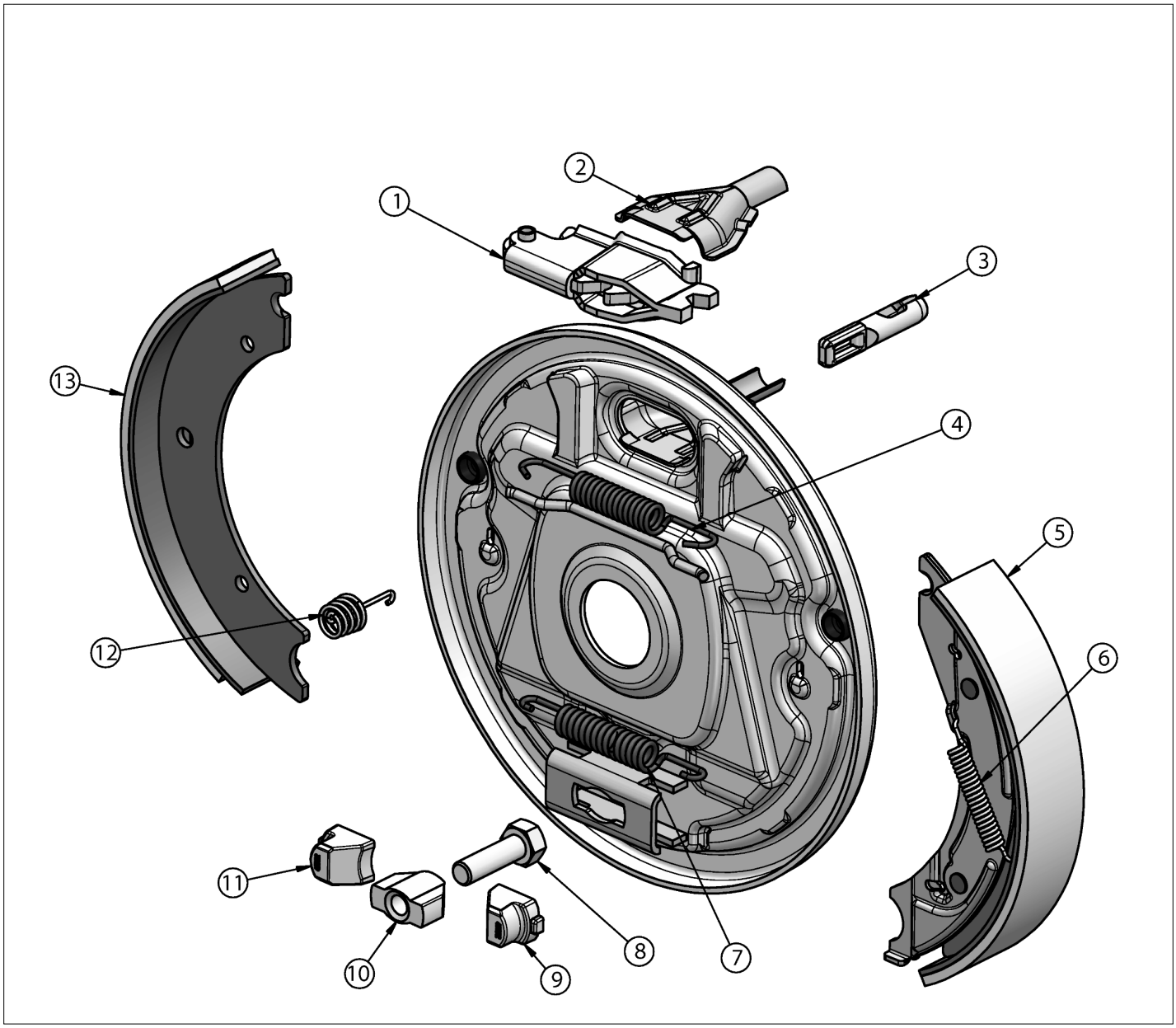
アイテム	部品番号	名前	数量	UOM
1	512761-001	Link Plate	1	EA
2	512762-000	Link Plate	1	EA
3	13-3906	HYDRAULIC MOTOR	1	EA
4	15-0911	SPACER BLOCK	1	EA
5	513246-000	BEARING	1	EA
6	513493-000	MOUNTING PLATE	1	EA
7	24-4152	8 THK PLATE	1	EA
8	10-5406	10 THK PLATE	1	EA
9	513935-000	FRICTION DRIVE SUPPORT WELDMENT - PLATE C	1	EA
10	512765-000	Handle, LH	1	EA
11	513488-000	SPRAY GUARD - RIGHT	1	EA
12	513935-013	FRICTION DRIVE COVER - TOP PLATE	1	EA
13	513515-000	TL37 FRICTION DRIVE MUDFLAP BRACES	1	EA
14	513935-025	FRICTION DRIVE RESTRAINT HANDLE	1	EA
15	10-5409	REVOLVE ROLLER	1	EA

REPAIR PARTS



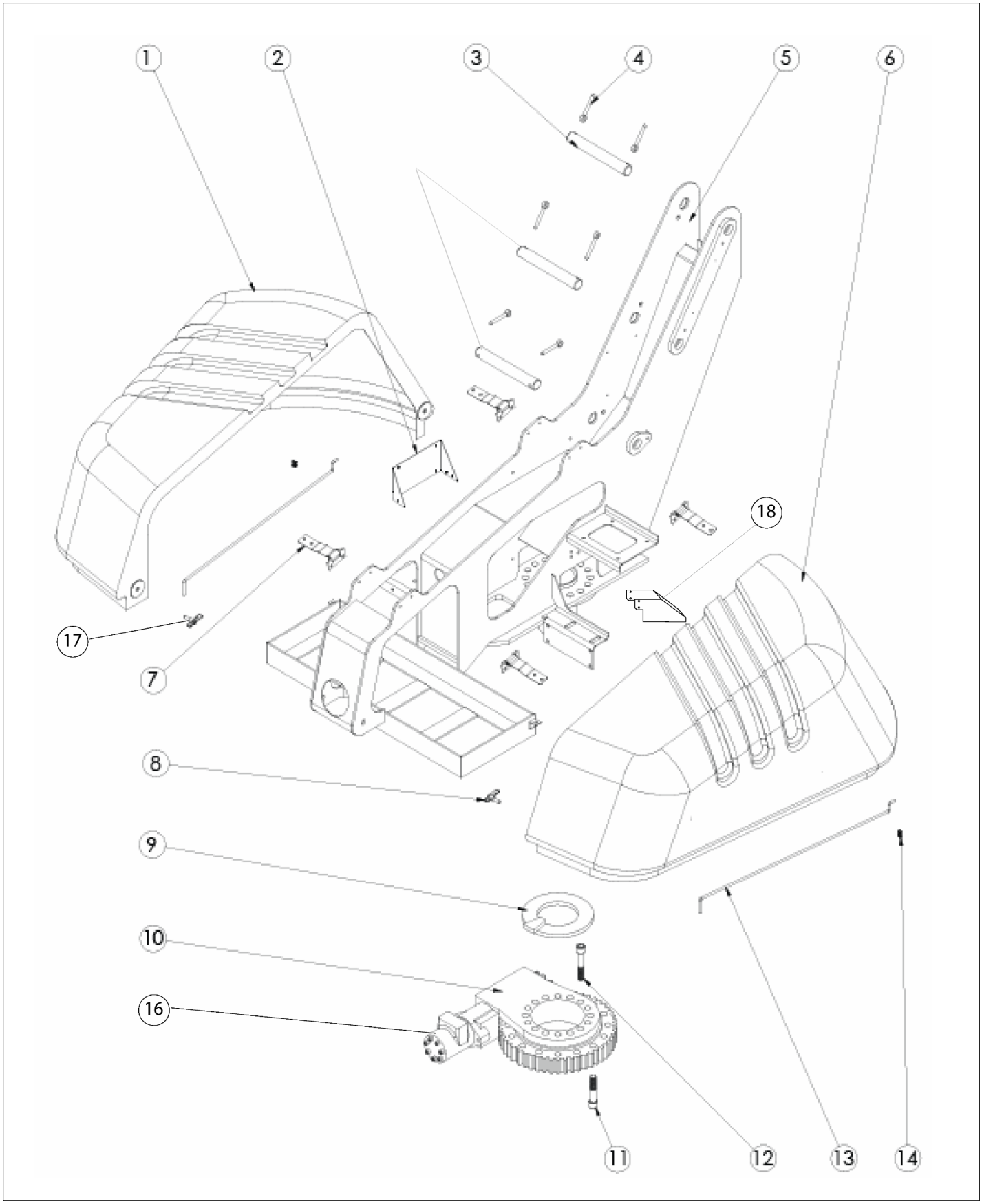
アイテム	部品番号	名前	数量	UOM
1	512758-000	LEVER RH	1	EA
2	513515-000	TL37 FRICTION DRIVE MUDFLAP BRACES	1	EA
3	10-5409	REVOLVE ROLLER	1	EA
4	513935-025	FRICTION DRIVE RESTRAINT HANDLE	1	EA
5	513935-013	FRICTION DRIVE COVER - TOP PLATE	1	EA
6	513935-020	FRICTION DRIVE WELDMENT, RH	1	EA
7	512762-000	Link Plate	1	EA
8	13-3906	HYDRAULIC MOTOR	1	EA
9	512760-000	MOTOR MOUNTING ASSY, RH	1	EA
10	15-0911	SPACER BLOCK	1	EA
11	513492-000	ROLLER BRACKET RH	1	EA
12	513246-000	BEARING	1	EA
13	512761-000	LINK ASSY.	1	EA
14	10-5406	10 THK PLATE	1	EA
15	513484-000	Spray Suppresion Guard Left.	1	EA

REPAIR PARTS



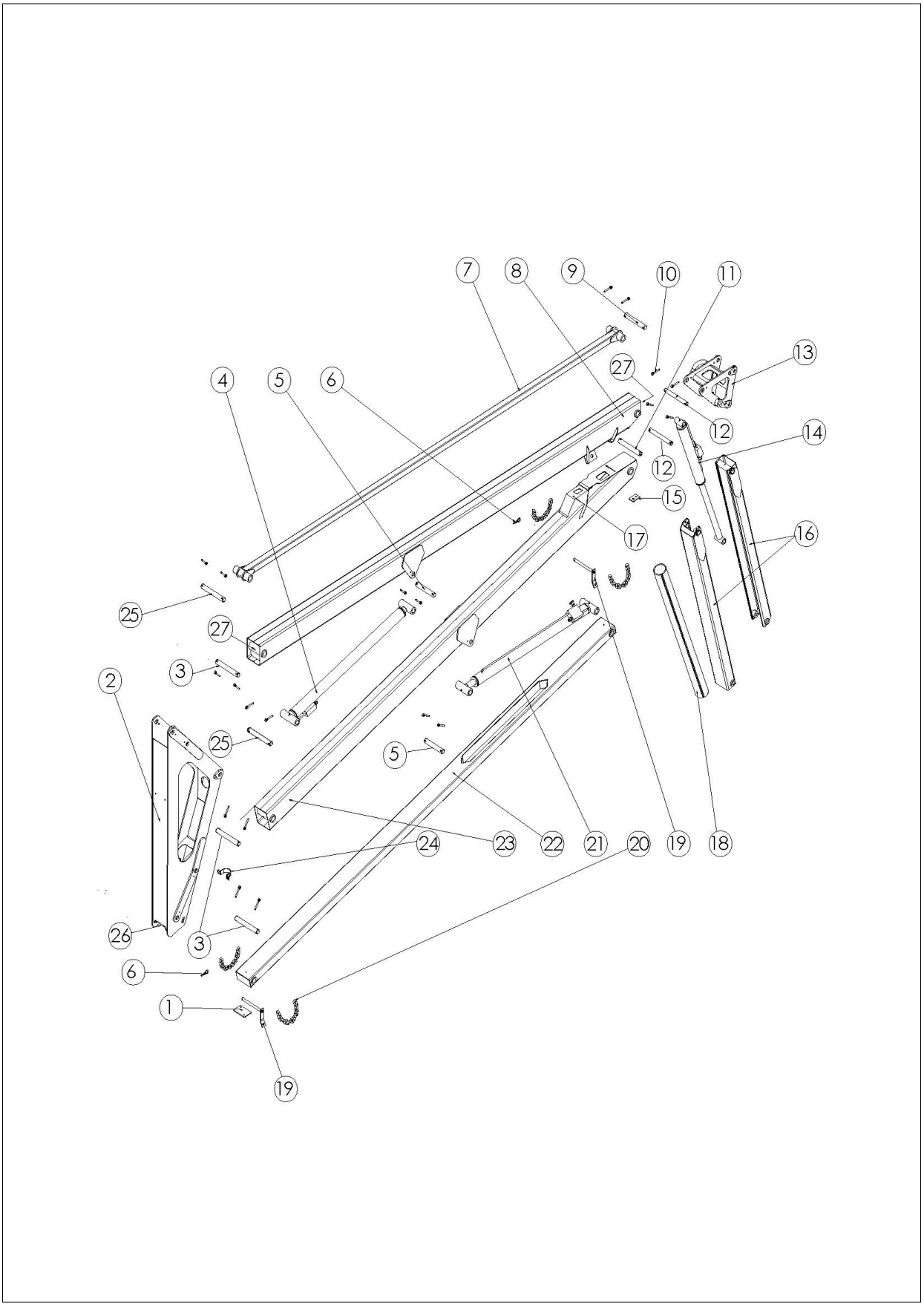
アイテム	部品番号	名前	数量	UOM
1	45309	Expander (200x50 - 250x40)		EA
2	36341	Half Shell 200x50, 203x40		EA
3	45207	Eyelet (160x35 - 250x40)		EA
4	41628	Spring Tension Spreadlever		EA
5	25772.05	Brake Shoe 250x40 Sliding Knott		EA
6	42904	Tension Spring (spr/lever)		EA
7	43150	Spring Tension Spreadlever		EA
8	45523	Bolt Adjuster Hex Head M12		EA
9	45352	Adjuster Shoe Post (250x40)		EA
10	45351	Readjustment Wedge 250x40		EA
11	45352	Adjuster Shoe Post (250x40)		EA
12	42861.01	Shoe Steady Spring 160, 203, 250		EA
13	25689.06	Brake Shoe 250x40 Fixed Knott		EA

REPAIR PARTS



アイテム	部品番号	名前	数量	UOM
1	16-0159	SLEW COVER - R H (Aerial Colour 16-0135)	1	EA
2	22-4945	LCB MOUNTING BRACKET(To SN 007624)	1	EA
2	513589-000	LCB MOUNTING BRACKET(SN 007625+)	1	EA
3	SP-030D211	PIN	2	EA
4	10-2672	RETAINING PEG	6	EA
5	10-5404	SLEW (BATTERY)	1	EA
6	16-0158	SLEW COVER - LH (Aerial Colour 16-0134)	1	EA
7	15-0858	HINGE	4	EA
8	11-3313	ANTI-LUCE FASTENER	2	EA
9	10-4962	SLEW STOP RING	1	EA
10	500284-000	SLEW DRIVE	1	EA
11	514164-070	Bolt, SktCapScrew DIN912 M16 x 70mm 12.9 Dacromet	15	EA
12	514165-070	Bolt, HexBolt DIN931 M16 x 70mm 12.9 Dacromet	16	EA
13	22-4920	CABINET STAY	2	EA
14	15-0861	STAY CLIP	2	EA
15	SP-030B210	PIN	1	EA
16	500285-000	SLEW MOTOR	1	EA
17	8210250	STIFFNER PLATE	1	EA
18	514673-000	CONTROL BOX COVER	1	EA

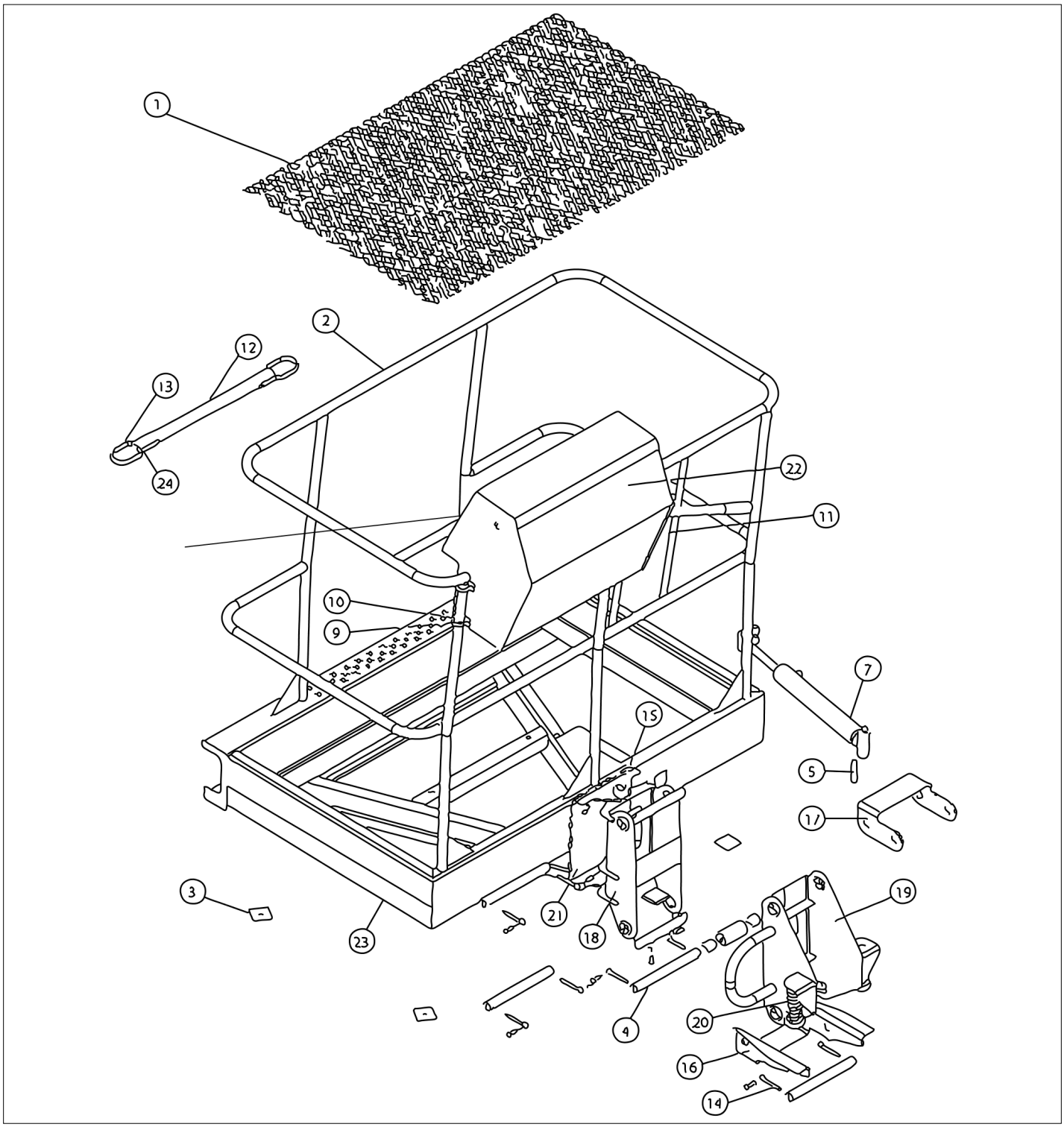
REPAIR PARTS



アイテム	部品番号	名前	数量	UOM
Not Shown	506302-000	BOOM ASSEMBLY PARTS		EA
1*	15-0905	LOWER BOOM REST PAD (21mm)	*	EA
1*	15-0910	UPPER BOOM REST PAD (13mm)	*	EA
2	10-4408	VERTICAL BOOM	1	EA
3	SP-030D221	MAIN BOOM PIN	3	EA
4	508177-000	TOP RAM	1	EA
5	SP-030B171	BOTTOM & TOP RAM PIVOT PIN	2	EA
6	15-0025	R CLIP	2	EA
7	10-4419	TOP TIE BAR	1	EA
8	10-4415	TOP BOOM	1	EA
9	SP-030B198	TOP TIE BAR/QUADRANT PIVOT PIN	1	EA
10	10-2672	RETAINING PEG	20	EA
11	SP-030K224	QUADRANT PIVOT PIN	1	EA
12	SP-025B203	DROPNOSE/QUADRANT PIVOT PIN	2	EA
13	10-5420	QUADRANT	1	EA
14	508181-000	DROPNOSE RAM	1	EA
15	15-0489	Location pad	1	EA
16	10-5078	DROPNOSE BOOM	2	EA
17	22-5825	LIMIT SWITCH BRACKET	1	EA
18	15-0859	GAITER	1	EA
19	10-3473	BOOM RETAINING PIN	2	EA
20	508495-000	RETAINING CHAIN	4	EA
21	508176-000	BOTTOM RAM	1	EA
22	10-4420	BOTTOM TIE BAR	1	EA
23	10-4416	BOTTOM BOOM	1	EA
24	15-0867	P-CLIP	1	EA
25	SP-030B120	PIN	2	EA

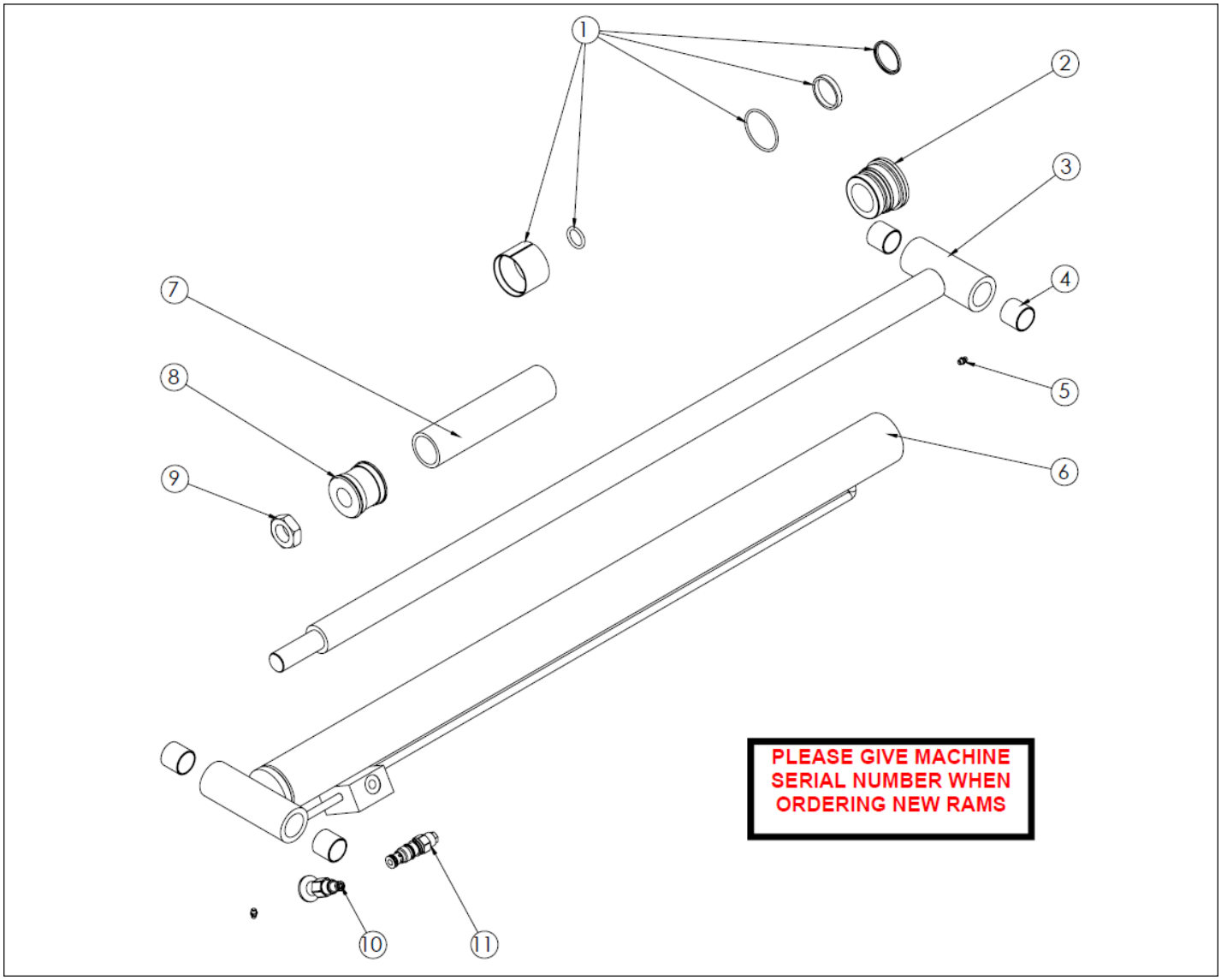
アイテム	部品番号	名前	数量	UOM
26*	15-0873/10	BOOM HOLDING PACKER (10mm)	1	EA
26*	15-0873/20	BOOM HOLDING PACKER (20mm)	1	EA
26*	15-0873/5	BOOM BRKT PACKER (5 mm)	1	EA
27	14-0003	1/4UNF GREASE NIPPLE	2	EA

REPAIR PARTS



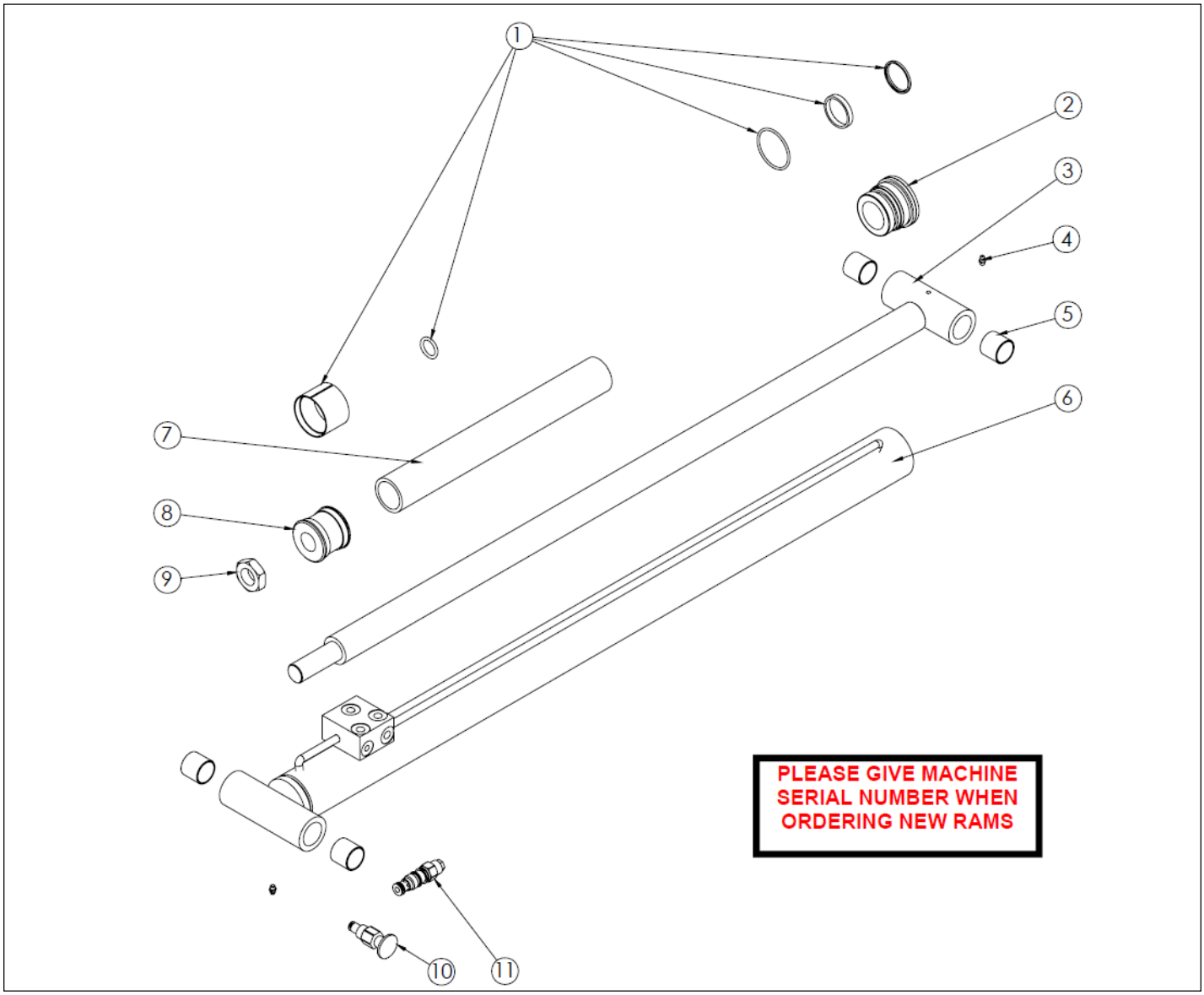
アイテム	部品番号	名前	数量	UOM
1	22-5065	STEEL MESH FLOOR	1	EA
2	513475-000	CAGE	1	EA
3	T.B.A	WASHER	5	EA
4	SP025-D235	PIN	4	EA
5	SP016B108	PIN	1	EA
6	----------	----------	-----	EA
7	508179-000	SLEWING BASKET RAM	1	EA
8	----------	----------	-----	EA
9	22-5849	PACKER FOR U BOLT	12	EA
10	11-3433	U BOLT	4	EA
11	513590-000	Control support (To Jan 2019)	1	EA
11	515414-000	Control support (From Feb 2019)	1	EA
12	508934-000	ACCESS BAR	1	EA
13	508932-000	U BRACKET	2	EA
14	10-2672	RETAINING PEG	8	EA
15	SP-025D326	PIN	1	EA
16	10-5229	SEE-SAW BRACKET (LOW)	1	EA
17	10-5230	UPPER LINK BRACKET	1	EA
18	10-5231	PIVOT SUPPORT	1	EA
19	10-5232	PICOT SUPPORT	1	EA
20	23-0031	SPRING	2	EA
21	513477-000	ADJUSTABLE BASKET PIVOT PLAT	E 1	EA
22	22-5370	CONTROL SUPPORT BACK	1	EA
23	SE-S1004	RED / WHITE TAPE	0.2m	EA
24	058557-002	PLASTIC PLUG (DIA 30mm) MOSS	2	EA
25	0081384	DECAL, TILT LAMP (From SN TL37J-01-00291)	1	EA

REPAIR PARTS



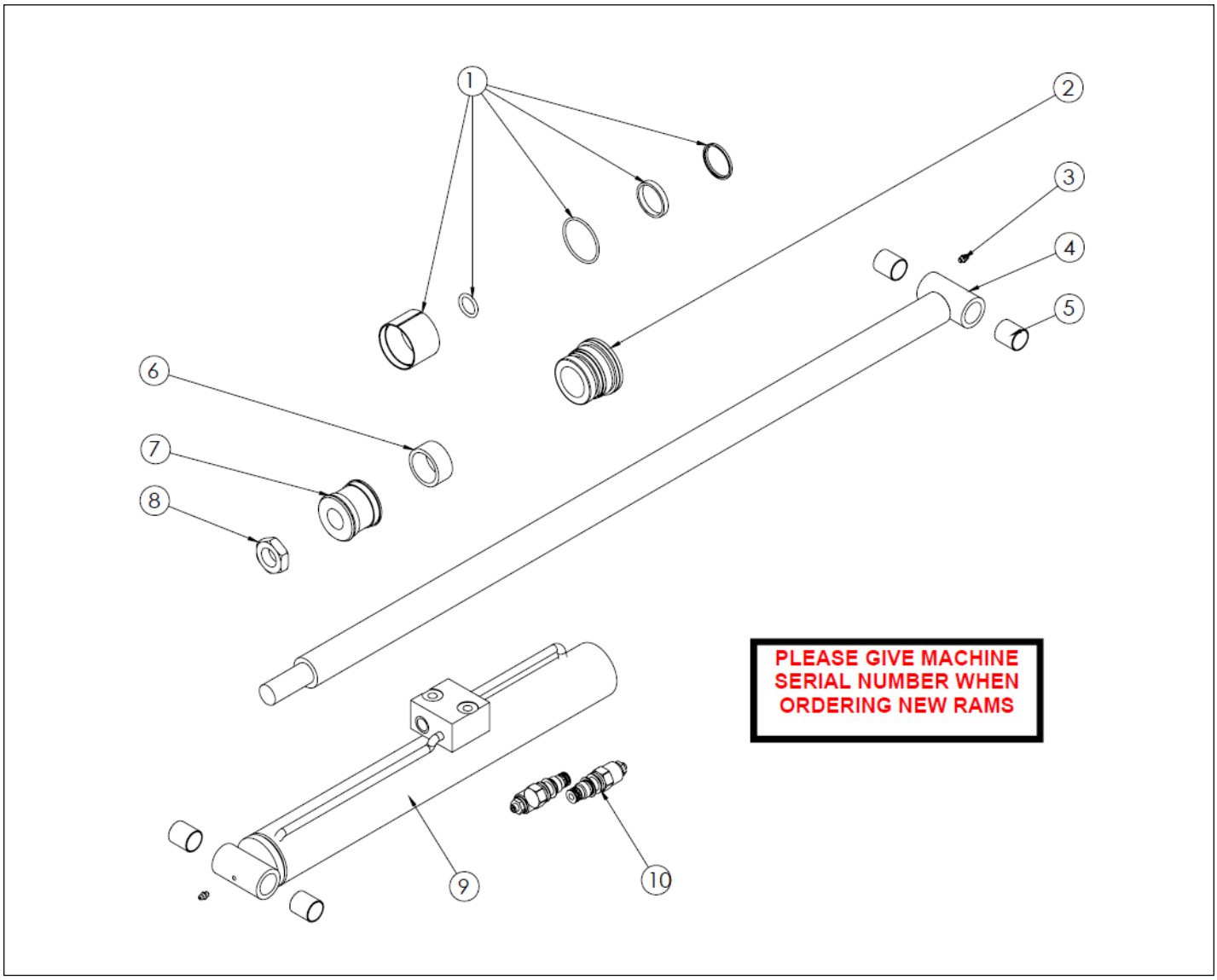
アイテム	部品番号	名前	数量	UOM
Not Shown	508176-000	BOTTOM RAM		EA
1	REF	SEAL KIT	1	EA
2	13-1061	HEAD BUSH	1	EA
3	13-2400-1	ROD ASSEMBLY	1	EA
4	SB-030030	Bush	4	EA
5	14-0001	GREASE NIPPLE	2	EA
6	13-2400-2	TUBE ASSEMBLY	1	EA
7	SS-0400214	RAM SPACER	1	EA
8	13-1064	PISTON	1	EA
9	13-1049	LOCKNUT	1	EA
10	REF	EMERGENCY LOWER CARTRIDGE	1	EA
11	REF	OVER CENTRE VALVE CARTRIDGE	1	EA

REPAIR PARTS



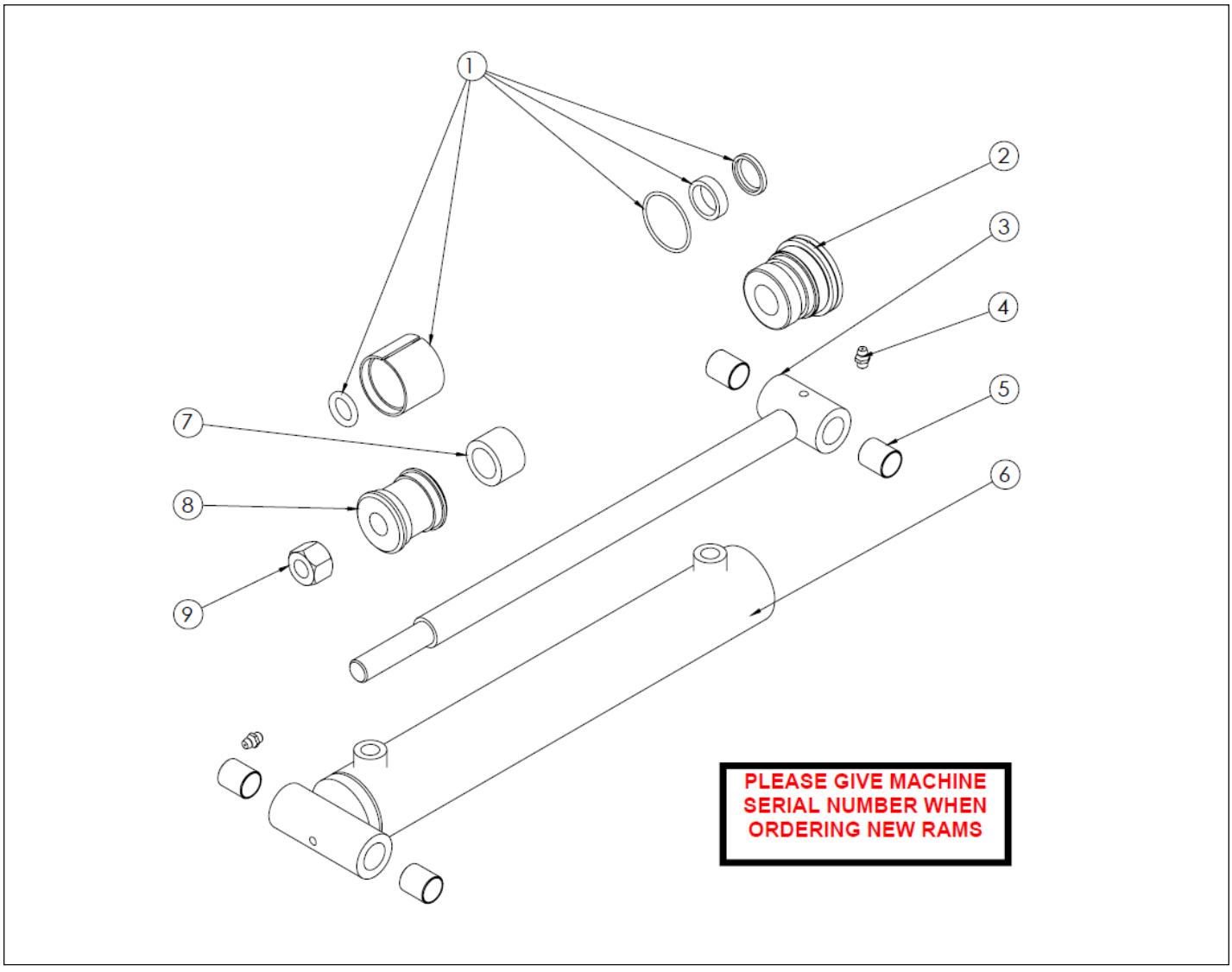
アイテム	部品番号	名前	数量	UOM
Not Shown	508177-000	TOP RAM		EA
1	REF	SEAL KIT	1	EA
2	13-1061	HEAD BUSH	1	EA
3	13-2401-1	ROD ASSEMBLY	1	EA
4	14-0001	GREASE NIPPLE	2	EA
5	SB-030030	Bush	4	EA
6	13-2401-2	TUBE ASSEMBLY	1	EA
7	SS-0400390	RAM SPACER	1	EA
8	13-1064	PISTON	1	EA
9	13-0973	LOCKNUT	1	EA
10	REF	EMERGENCY LOWER CARTRIDGE	1	EA
11	REF	OVER CENTRE VALVE CARTRIDGE	1	EA

REPAIR PARTS



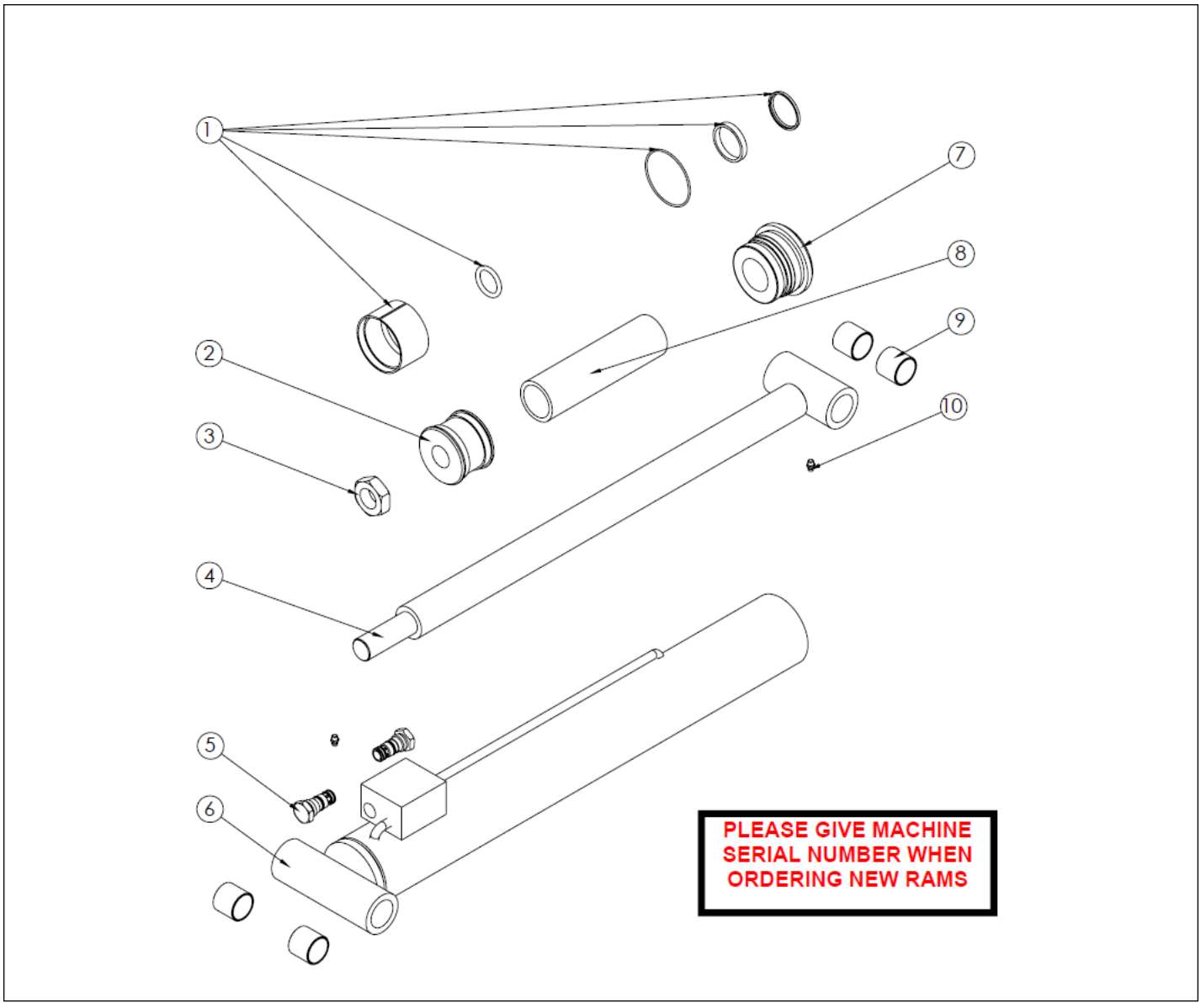
アイテム	部品番号	名前	数量	UOM
Not Shown	508181-000	DROPNOSE RAM		EA
1	REF	SEAL KIT	1	EA
2	13-1061	HEAD BUSH	1	EA
3	14-0001	GREASE NIPPLE	2	EA
4	13-3602-2	ROD ASSEMBLY	1	EA
5	SB-025030	BUSH	4	EA
6	13-3602-3	RAM SPACER	1	EA
7	13-1064	PISTON	1	EA
8	13-0973	LOCKNUT	1	EA
9	13-3602-1	TUBE ASSEMBLY	1	EA
10	REF	OVER CENTRE VALVE CARTRIDGE	2	EA

REPAIR PARTS



アイテム	部品番号	名前	数量	UOM
Not Shown	508179-000	SLEWING BASKET RAM		EA
1	REF	SEAL KIT	1	EA
2	13-0988	HEAD BUSH	1	EA
3	13-2403-1	ROD ASSEMBLY	1	EA
4	14-0001	GREASE NIPPLE	2	EA
5	SB-016020	BUSH	4	EA
6	13-2403-2	TUBE ASSEMBLY	1	EA
7	SS-0200020	RAM SPACER	1	EA
8	13-0992	PISTON	1	EA
9	13-0994	LOCKNUT	1	EA

REPAIR PARTS



アイテム	部品番号	名前	数量	UOM
Not Shown	508180-000	OUTRIGGER RAM		EA
1	13-2351	SEAL KIT	1	EA
2	13-1007	PISTON	1	EA
3	13-1049	LOCKNUT	1	EA
4	13-2408-1	ROD ASSEMBLY	1	EA
5	13-2483	CHECK VALVE	2	EA
6	13-2408-2	TUBE ASSEMBLY	1	EA
7	13-2437	HEAD BUSH	1	EA
8	SS-0400180	RAM SPACER	1	EA
9	SB-0300	BUSH	4	EA
10	14-0001	GREASE NIPPLE	2	EA

REPAIR PARTS

TOP & BOTTOM RAMS - WITH GROOVE

No.	Part No.	Description	Qty.
1	13-1061	END CAP	1
2	13-1065/1	SEAL KIT	1
3	13-3561	EMERGENCY LOWER CARTRIDGE	1
4	13-2489	OVERCENTRE VALVE CARTRIDGE	1

TOP & BOTTOM RAMS - WITHOUT GROOVE

No.	Part No.	Description	Qty.
1	13-1061	END CAP	1
2	13-1065	SEAL KIT	1
3	13-2228	EMERGENCY LOWER CARTRIDGE	1
4	13-0392	OVERCENTRE VALVE CARTRIDGE	1

DROPNOSE RAM - WITH GROOVE

No.	Part No.	Description	Qty.
1	13-1061	END CAP	1
2	13-1065/1	SEAL KIT	1
3	N/A		
4	13-2489	OVERCENTRE VALVE CARTRIDGE	2

DROPNOSE RAM - WITHOUT GROOVE

No.	Part No.	Description	Qty.
1	13-1061	END CAP	1
2	13-1065	SEAL KIT	1
3	N/A		
4	13-0392	OVERCENTRE VALVE CARTRIDGE	2

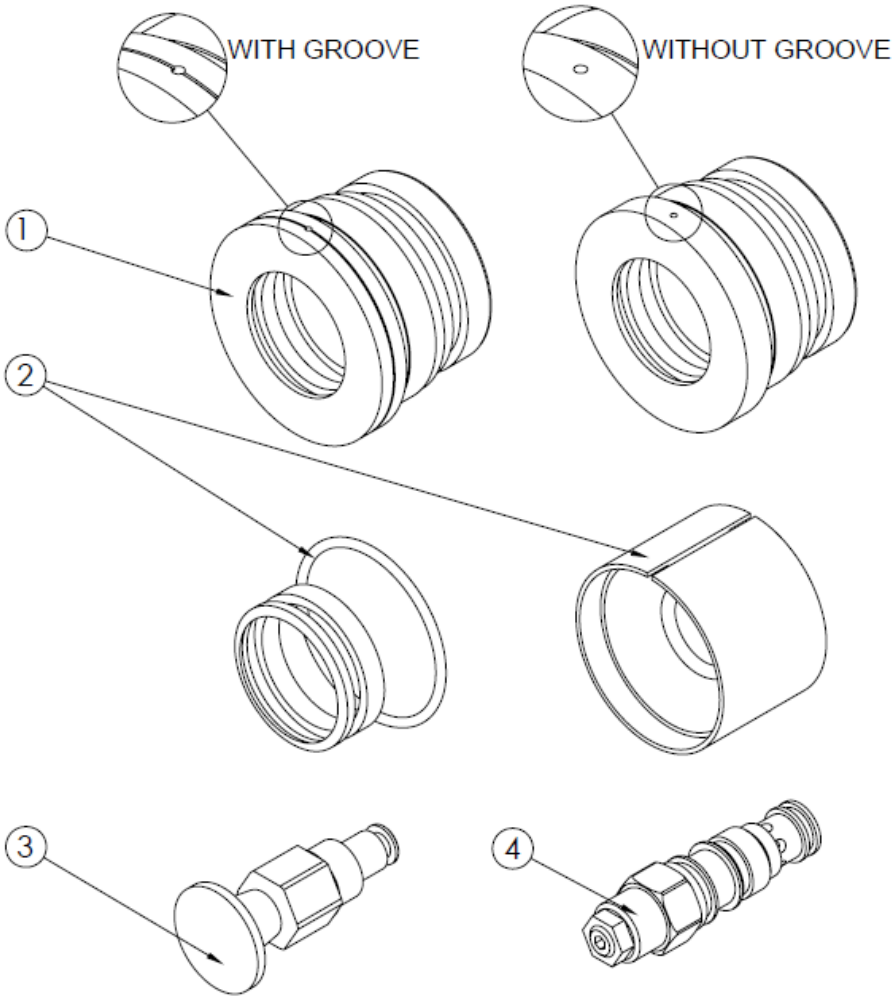
SLEWING BASKET RAM - WITH GROOVE

No.	Part No.	Description	Qty.
1	13-0988	END CAP	1
2	13-2522	SEAL KIT	1
3	N/A		
4	N/A		

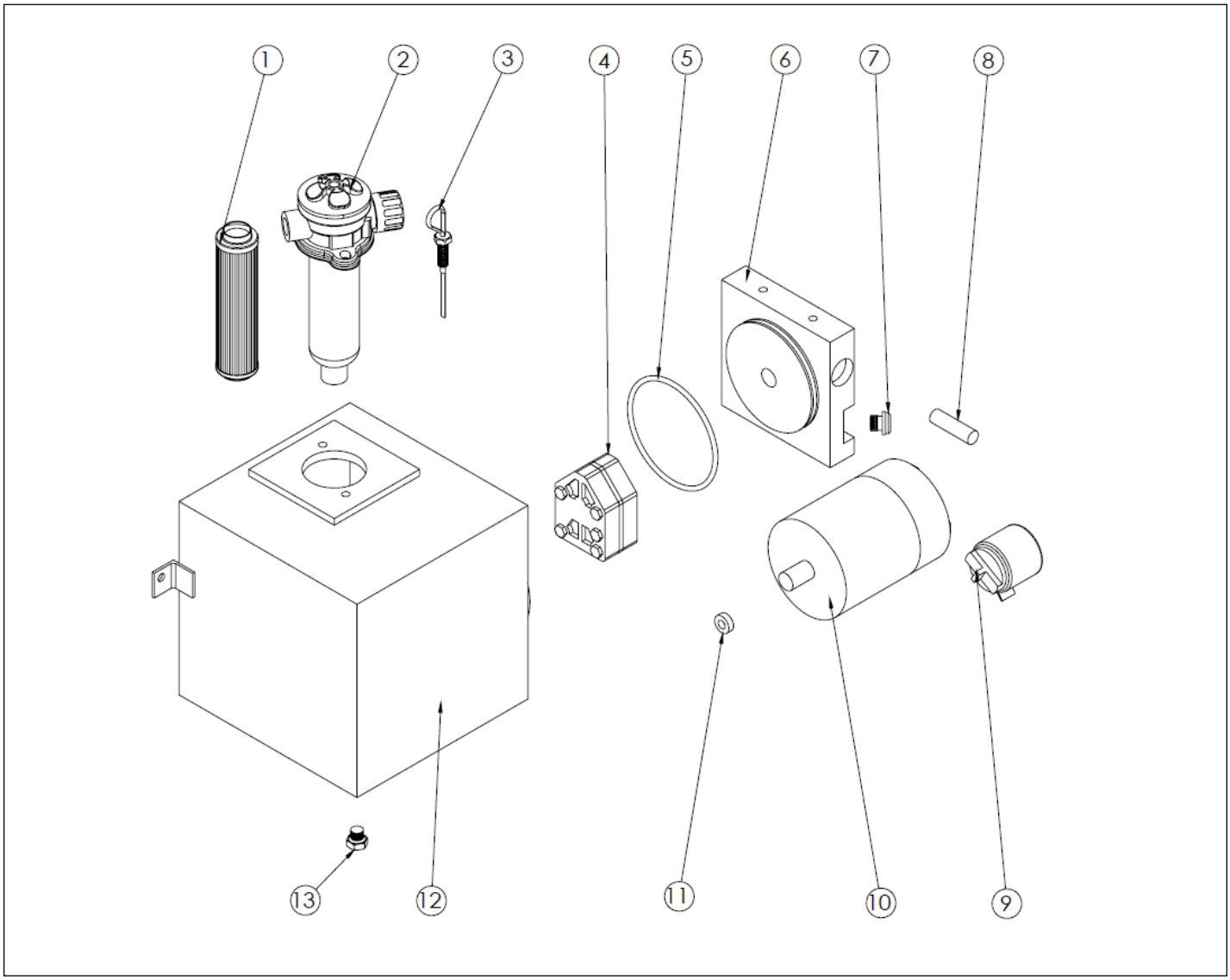
SLEWING BASKET RAM - WITHOUT GROOVE

No.	Part No.	Description	Qty.
1	13-0988	END CAP	1
2	13-0993	SEAL KIT	1
3	N/A		
4	N/A		

To identify correct Seal Kit & Cartridges, check end cap for circular groove.

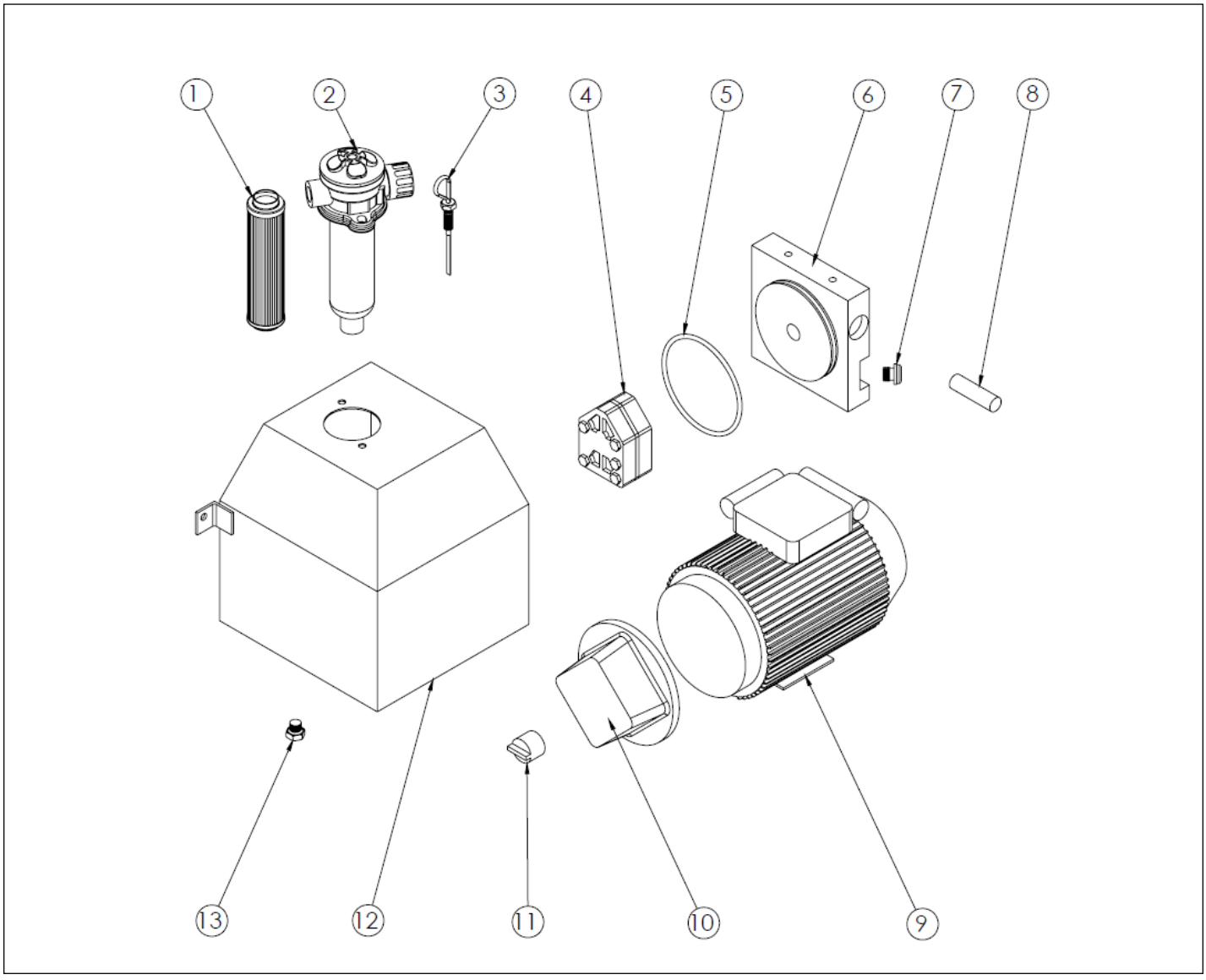


REPAIR PARTS



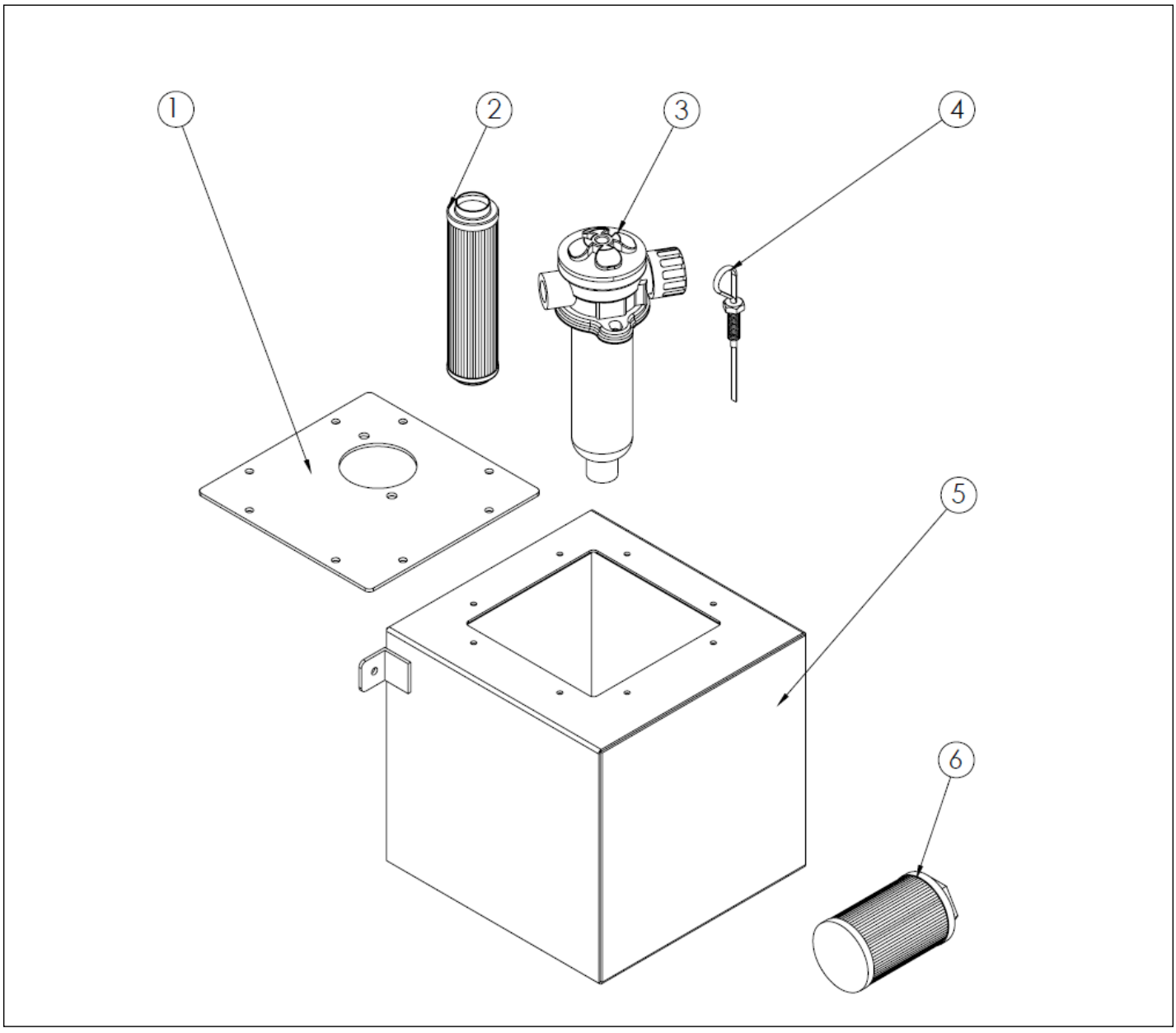
アイテム	部品番号	名前	数量	UOM
Not Shown	19-0158	BATTERY POWER PACK		EA
1	13-2543-1	RETURN LINE FILTER ELEMENT	1	EA
2	13-2543	RETURN LINE FILTER	1	EA
3	13-1695-8	DIPSTICK & BOLT	1	EA
4	13-2482	PUMP (1.1 cc/rev)	1	EA
5	13-3582	PORT PLATE O-RING	1	EA
6	13-3581	PUMP HOUSING	1	EA
7	12-2018	PLUG	1	EA
8	13-3550	RELIEF VALVE CARTRIDGE	1	EA
9	13-3551	24V CONTACTOR	1	EA
10	19-0158-2	24V MOTOR WITH CONTACTOR	1	EA
11	13-3583	OIL SEAL	1	EA
12	19-0147-1	TANK	1	EA
13	12-2004	PLUG	1	EA

REPAIR PARTS



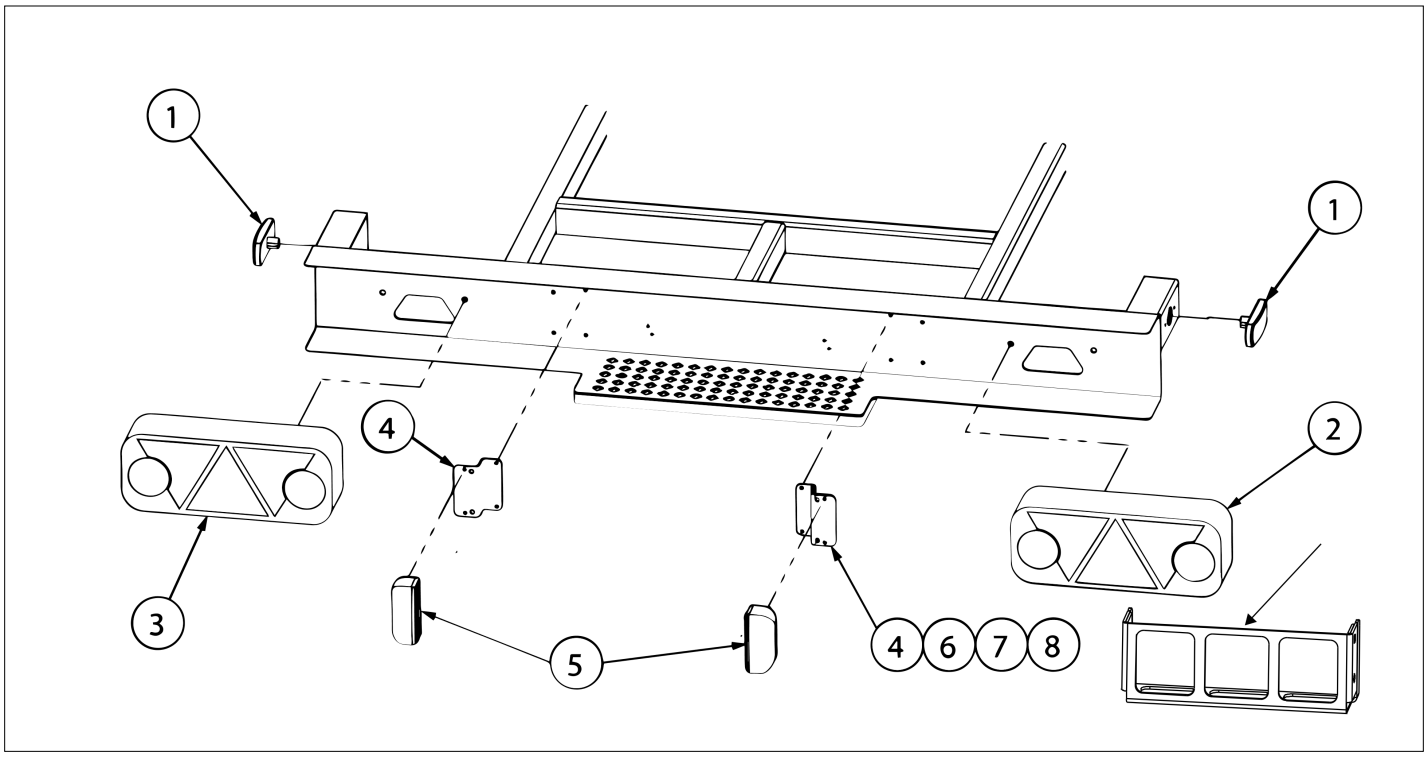
アイテム	部品番号	名前	数量	UOM
Not Shown	19-0135	MAINS POWER PACK		EA
1	13-2543-1	RETURN LINE FILTER ELEMENT	1	EA
2	13-2543	RETURN LINE FILTER	1	EA
3	13-1695-8	DIPSTICK & BOLT	1	EA
4	13-2482	PUMP (1.1 cc/rev)	1	EA
5	13-3582	PORT PLATE O-RING	1	EA
6	13-3581	PUMP HOUSING	1	EA
7	12-2018	PLUG	1	EA
8	13-3550	RELIEF VALVE CARTRIDGE	1	EA
9	19-0135-2	MOTOR	1	EA
10	19-0135-3	MOTOR FLANGE	1	EA
11	19-0135-4	OLDHAM COUPLING	1	EA
12	19-0135-1	TANK	1	EA
13	12-2004	PLUG	1	EA

REPAIR PARTS



アイテム	部品番号	名前	数量	UOM
1	22-4994	HYDRAULIC TANK LID	1	EA
2	13-2543-1	RETURN LINE FILTER ELEMENT	1	EA
3	13-2543	RETURN LINE FILTER	1	EA
4	13-1695/8	DIPSTICK & BOLT	1	EA
5	10-4996	HYDRAULIC TANK	1	EA
6	13-0339	SUCTION STRAINER	1	EA

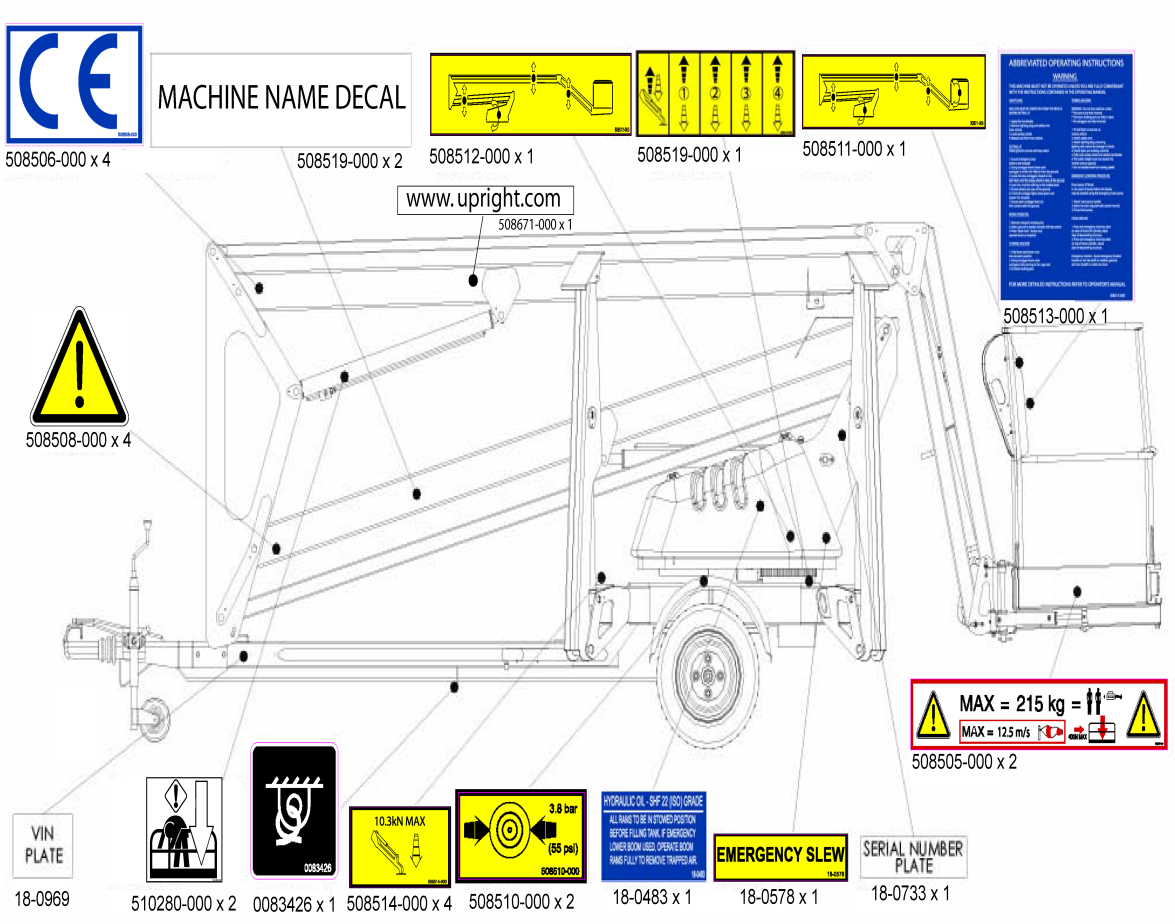
REPAIR PARTS



アイテム	部品番号	名前	数量	UOM
1	512492-000	Amber reflector	2	EA
2	513301-000	RH LIGHT CLUSTER	1	EA
3	513302-000	LH LIGHT CLUSTER	1	EA
4	513742-000	REGISTRATION LAMP MOUNTS	2	EA
5	513300-000	REGISTRATION LAMP	2	EA
6	058490-016	BOLT, HEXSETSCREW DIN 933 M5	4	EA
7	056069-005	Washer SteelFlatWasher DIN125A	8	EA
8	056066-005	Nut NylockNut DIN985 M5 8.0 Zi	8	EA
9	515390-000	Guard, Light Cluster	2	EA
Not Shown	513836-000	Harness, tow hitch to chassis	1	EA
Not Shown	513836-001	Harness, chassis to side marker lamps	1	EA
Not Shown	513839-000	Harness, rear light to registration lamp	2	EA
Not Shown	513838-000	Harness, rear light to side marker lamp	2	EA
Not Shown	513492-000	ROLLER BRACKET RH	6	EA
Not Shown	513403-000	White reflector	2	EA
Not Shown	512687-000	13 pin plug	1	EA
Not Shown	512689-000	8 core cable	10m	EA
Not Shown	508704-000	ANSI LIGHTING BOARD	1	EA

REPAIR PARTS

DECALS 506306-000 UK Kit. (German 506306-001)

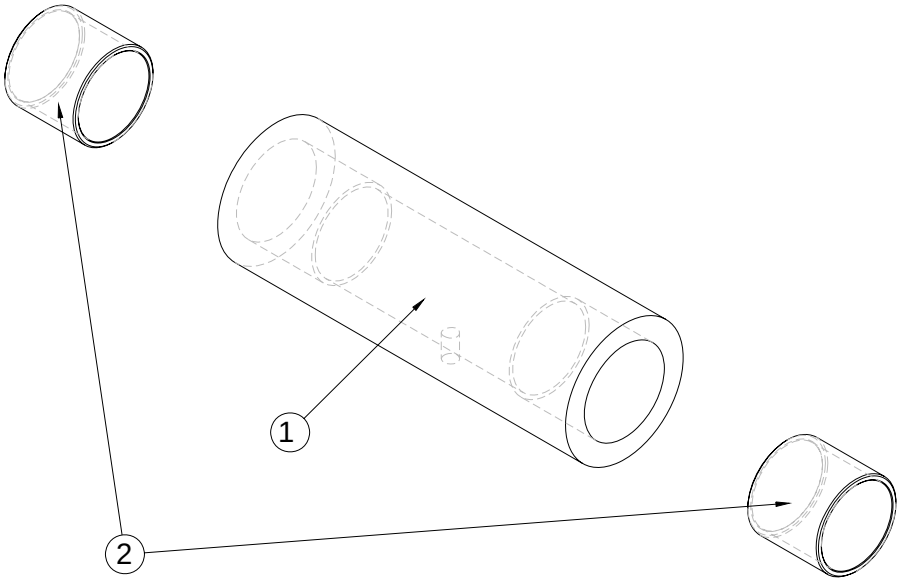


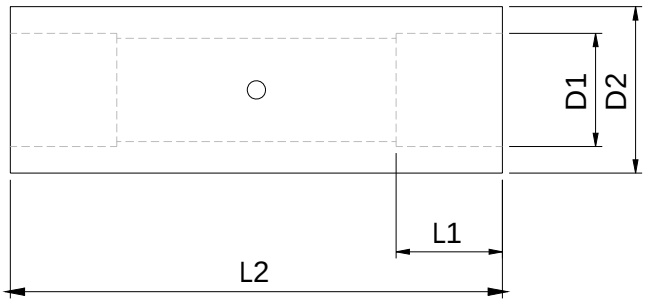
REPAIR PARTS

TL37 PIN KIT CE & ANSI

アイテム	部品番号	名前	数量	UOM
Not Shown	ANSI KIT	null		EA
1	513908-001	TL37J PIN ANSI KIT	1	EA
2	SP-012E218	FOOT PIN	4	EA
3	SP-016H090	STANDARD PIN	1	EA
4	SP-016B108	CAGE PIVOT - CAGE ROT/RAM	1	EA
5	SP-025B203	DROPNOSE/QUADRANT PIVOT PIN	2	EA
6	SP-025D200	LINKS - CAGE SLEW PIVOT	2	EA
7	SP-025D326	PIN	1	EA
8	SP-030B171	BOTTOM & TOP RAM PIVOT PIN	2	EA
9	SP-030B198	TOP TIE BAR/QUADRANT PIVOT PIN	5	EA
10	SP-030B210	PIN	3	EA
11	SP-030D167	OUTRIGGER RAM/OUTRIGGER PIVOT PIN	4	EA
12	SP-030D221	MAIN BOOM PIN	5	EA
13	SP-030K211	Pin	4	EA
14	SP-030K224	QUADRANT PIVOT PIN	1	EA
Not Shown	CE KIT	null		EA
1	513908-000	TL37J PIN CE KIT	1	EA
2	SP-012E218	FOOT PIN	4	EA
3	SP-016H090	STANDARD PIN	1	EA
4	SP-016B108	CAGE PIVOT - CAGE ROT/RAM	1	EA
5	SP-025B203	DROPNOSE/QUADRANT PIVOT PIN	2	EA
6	SP-025D235	LINKS - CAGE SLEW PIVOT	4	EA
7	SP-025D326	PIN	1	EA
8	SP-030B171	BOTTOM & TOP RAM PIVOT PIN	2	EA
9	SP-030B198	TOP TIE BAR/QUADRANT PIVOT PIN	5	EA

アイテム	部品番号	名前	数量	UOM
10	SP-030B210	PIN	3	EA
11	SP-030D167	OUTRIGGER RAM/OUTRIGGER PIVOT PIN	4	EA
12	SP-030D221	MAIN BOOM PIN	5	EA
13	SP-030K211	Pin	4	EA
14	SP-030K224	QUADRANT PIVOT PIN	1	EA





STANDARD BUSH CODE: SB-XXX XXX

e.g. SB-030040

L1 (MM)

D1 (MM)

THE BUSH MUST FILL THE COMPLETE LENGTH OF L1.
HOWEVER, IT IS ACCEPTABLE TO MAKE UP THR TOTAL LENGTH L1 BY USING MORE THAN ONE BUSH

ALWAYS USE GENERAL PURPOSE GREASE ON YELLOW SURFACE OF THE BUSH .

THE PIN MUST BE FREE FROM SCORES—IF IN DOUBT, REPLACE THE PIN

Bush Locations.

Outrigger	SB-030030 (2 off)
Bottom Tie Bar	SB-030030 (4 off)
Bottom Boom	SB-030030 (4 off)
Top Tie Bar	SB-030030 (4 off)
Top Boom	SB-030030 (4 off)
Dropnose Boom	SB-025025 (2 off, full boss), SB-025015 (4 off, short boss)
Cage Pivot	SB-025015 (2 off)
Bottom Ram	SB-030030 (4 off)
Top Ram	SB-030030 (4 off)
Dropnose Ram	SB-025025 (4 off)
Outrigger Ram	SB-030030 (4 off)
Slewing Basket Ram	SB-016025 (2 off, cylinder end), SB-016015 (2 off, rod end)

BATTERY MACHINE, KIT PN 13-3921			
REF NO.	QUANTITY OFF	LOCATION ON MACHINE	LENGTH
C9	1	Emergency hand pump - Pressure gauge v/v	550
C13	1	Pressure - O/r Valve	1700
C14	1	Tank Man. - O/r Valve Tank	1700
C15	2	O/r Valve - O/r ram '1'	1650
C16	2	O/r Valve - O/r ram '2'	1600
C17	2	O/r Valve - O/r ram '3'	1800
C18	2	O/r Valve - O/r ram '4'	1600
C19	1	Pump - Solenoid Valve	400
C21	1	Base Valve - Bottom ram	1330
C22	1	Base Valve - Bottom ram	1480
C23	1	Tank Man - Bottom Ram E. Lower	1300
C24	1	Base Valve - Top Ram	6700
C25	1	Base Valve - Top Ram	6700
C26	1	Tank Man - Top Ram E. Lower	6830
C28**	1	Base Valve - Tank Manifold	1000
C29	2	Base Valve - Slew	1150
C31*	1	Tank - Return Line Manifold	640
C47**	1	Cage - Tank	13530
C48	1	Base v/v Carry Over - Cage	13570
C49	2	Cage - Bottom Ram	13640
C50	1	Cage v/v - Top Ram	9140
C51	1	Cage v/v - Top Ram	9250
C52	2	Cage v/v - Slew Motor Tees	13300
C55	1	Cage v/v - Slewing Cage Ram	1940
C56	1	Cage v/v - Slewing Cage Ram	2160
C57	2	Base v/v - Tee P.Cage v/v (D/nose)	13640
C60	1	Emergency hand pump - Tank Cage v/v	565
C61	2	Cage v/v Tee - Dropnose Ram	4230
C62	1	Solenoid valve - Base Valve Press	500
C63	1	Solenoid 1 Port 3 - Solenoid 2 Port 2	400

HYDRAULIC HOSE LISTS - MAINS

MAINS MACHINE, KIT PN 13-3922			
REF NO.	QUANTITY OFF	LOCATION ON MACHINE	LENGTH
C9	1	Emer. H/pump – Pressure Cage v/v	550
C13	1	Pressure – O/r Valve	1700
C14	1	Tank Man. – O/r Valve Tank	1700
C15	2	O/r Valve – O/r Ram '1'	1500
C16	2	O/r Valve – O/r Ram '2'	1600
C17	2	O/r Valve – O/r Ram '3'	1800
C18	2	O/r Valve – O/r Ram '4'	1600
C19	1	Pump – Solenoid Valve	400
C21	1	Base Valve – Bottom Ram	1330
C22	1	Base Valve – Bottom Ram	1330
C23	1	Tank Man – Bottom Ram E. Lower	1300
C24	1	Base Valve – Top Ram	6700
C25	1	Base Valve – Top Ram	6700
C26	1	Tank Man. – Top Ram E. Lower	6830
C28†	1	Base Valve – Tank Manifold	1000
C29	2	Base Valve – Slew	1150
C30	1	Diverter v/v – Tank Manifold	650
C31*	1	Tank – Return Line Manifold	640
C32	1	Sol. 1, Port 1 – Base v/v Press.	580
C35	1	Press. Point Tee – Sol. 1, Port 3	320
C36	1	Sol. 1, Port 2 – Sol. 2, Port 3	400
C37	1	Sol. 2, Port 2 – Tank Manifold	1100
C46	1	Solenoid Valve – Base Valve Press	220
C47†	1	Cage – Tank	13530
C48	1	Base v/v Carry Over – Cage	13570
C49	2	Cage - Bottom Ram	13640
C50	1	Cage v/v - Top Ram	9140
C51	1	Cage v/v - Top Ram	9250
C52	2	Cage v/v - Slew Motor Tees	13300
C55	1	Cage v/v - Slewing Cage Ram	1940
C56	1	Cage v/v - Slewing Cage Ram	2160
C5?	2	Base v/v-Tee P. Cage v/v (D/nose)	13640
C60	1	Emer. H/pump - Tank Cage v/v	565
C61	2	Cage v/v Tee - Dropnose Ram	4230

ENGINE MACHINE, KIT PN 13-3923			
REF NO.	QUANTITY OFF	LOCATION ON MACHINE	LENGTH
C9	1	Emer. H/pump – Pressure Cage v/v	550
C14	1	Tank Man. – O/r Valve Tank	1700
C15	2	O/r Valve – O/r Ram '1'	1500
C16	2	O/r Valve – O/r Ram '2'	1600
C17	2	O/r Valve – O/r Ram '3'	1800
C18	2	O/r Valve – O/r Ram '4'	1600
C21	1	Base Valve – Bottom Ram	1330
C22	1	Base Valve – Bottom Ram	1330
C23	1	Tank Man – Bottom Ram E. Lower	1300
C24	1	Base Valve – Top Ram	6700
C25	1	Base Valve – Top Ram	6700
C26	1	Tank Man. – Top Ram E. Lower	6830
C28	1	Base Valve – Tank Manifold	1000
C29	2	Base Valve - Slew	1150
C31 *	1	Tank – Return Line Manifold	640
C32	1	Sol. 1, Port 1 – Base v/v Press.	580
C33	1	Engine Press. – Main Relief Tee	2550
C34	1	Main Relief – Tank Manifold	900
C35	1	Press. Point Tee – Sol. 1, Port 3	320
C36	1	Sol. 1, Port 2 – Sol. 2, Port 3	400
C37	1	Sol. 2, Port 2 – Tank Manifold	1100
C38	1	Sol. 2, Port 1 – Press. O/r Valve	2400
C39 **	1	Suction from Tank - Engine	2550
C47	1	Cage – Tank	13530
C48	1	Base v/v Carry Over – Cage	13570
C49	2	Cage – Bottom Ram	13640
C50	1	Cage v/v – Top Ram	9140
C51	1	Cage v/v – Top Ram	9250
C52	2	Cage v/v – Slew Motor Tees	13300
C55	1	Cage v/v – Slewing Cage Ram	1940
C56	1	Cage v/v – Slewing Cage Ram	2160
C57	2	Base v/v – Tee P. Cage v/v (D/nose)	13640
C60	1	Emer. H/pump – Tank Cage v/v	565
C61	2	Cage v/v Tee – Dropnose Ram	4230
C62	1	Pressure point tee to solenoid 1 port 3	500

HYDRAULIC HOSE LIST - BI-FUEL

BI-FUEL MACHINE, KIT PN 13-3924			
REF NO.	QUANTITY OFF	LOCATION ON MACHINE	LENGTH
C9	2	Emer. H/pump – Pressure Cage v/v	550
C14	1	Tank Man. – O/r Valve Tank	1700
C15	2	O/r Valve – O/r Ram '1'	1600
C16	2	O/r Valve – O/r Ram '2'	1600
C17	2	O/r Valve – O/r Ram '3'	1800
C18	2	O/r Valve – O/r Ram '4'	1600
C19	1	Pump – Solenoid Valve 1 Port 3	400
C21	1	Base Valve – Bottom Ram	1330
C22	1	Base Valve – Bottom Ram	1480
C23	1	Tank Man – Bottom Ram E. Lower	1300
C24	1	Base Valve – Top Ram	6700
C25	1	Base Valve – Top Ram	6700
C26	1	Tank Man. – Top Ram E. Lower	6830
C28	1	Base Valve – Tank Manifold	1000
C29	2	Base Valve – Slew & RV - Manifold	1150
C31	1	Tank – Return Line Manifold	640
C32	1	Sol. 1, Port 1 – Base v/v Press.	580
C33	1	Engine Press. – Main Relief Tee	2350
C34	1	Main Relief – Tank Manifold	900
C35	1	Sol 2 Port 2 – Sol. 3, Port 3	320
C36	1	Sol. 1, Port 2 – Sol. 2, Port 3	400
C37	1	Sol. 3, Port 2 – Tank Manifold	1100
C38	1	Sol. 3, Port 1 – Press. O/r Valve	2400
C39	1	Suction from Tank - Engine	2550
C47	1	Cage – Tank	13530
C48	1	Sol 2 Port 1 – Cage Valve P	13570
C49	2	Cage – Bottom Ram	13640
C50	1	Cage v/v – Top Ram	9140
C51	1	Cage v/v – Top Ram	9250
C52	2	Cage v/v – Slew Motor Tees	13300
C55	1	Cage v/v – Slewing Cage Ram	1940
C56	1	Cage v/v – Slewing Cage Ram	2160
C57	2	Base v/v – Tee P. Cage v/v (D/nose)	13640
C60	1	Emer. H/pump – Tank Cage v/v	565
C61	2	Cage v/v Tee – Dropnose Ram	4230

FITTING LIST :

TL37 Battery

PART N°	DESCRIPTION	QTY.
12-0901	¼" BSP Male x ¼" BSP Male Straight Adaptor	8
12-0902	3/8" BSP Male x 3/8" BSP Male Straight Adaptor	6
12-0903	½" BSP Male x ½" BSP Male Straight Adaptor	1
12-1001	**¼" BSP Male x 3/8" BSP Male Straight Adaptor**	**33**
12-1004	½" BSP Male x 3/8" BSP Male Straight Adaptor	1
12-1005	¼" BSP Male x ½" BSP Male Straight Adaptor	2
12-1011	¼" BSP Female Swivel x 3/8" BSP Male Straight Adaptor	1
12-1105	¼" BSP Male Equal Tee for bonded seal	1
12-1107	¼" BSP Equal Tee F.O.R	4
12-1118	¼" BSP Equal Tee F.O.B	2
12-1119	3/8" BSP Equal Tee F.O.R	1
12-1210	¼" BSP Male on the Branch x 3/8" BSP Male x 3/8" BSP Female Unequal Tee	1
12-1501	½" Dowty Washer	5
12-1502	**3/8" Dowty Washer**	**52**
12-1507	**¼" Dowty Washer**	**13**
12-1887	¼" BSP Male x ¼" BSP Male Pos. Elbow	13
12-2001	½" BSP Male Plug	2
12-2003	**3/8" BSP Male Plug**	**11**
12-2004	¼" BSP Male Plug	2
12-3017	¼" BSP Ferrule	1
12-3149	¼" BSP Pressure Test Point	1
12-3150	¼" BSP Male x 3/8" BSP Male x 1/32" Orifice Straight Adaptor	2
12-9000	¼" BSP Male x 3/8" BSP Male x 1.4mm Orifice Straight Adaptor	4
12-9013	¼" BSP Male x 1/2" BSP Male x 1.0mm Orifice Straight Adaptor	2

ISSUE	03	04	05	06	07	08	09	**10**	**11**		DRAWING N° : **13-3546**
C/N Num	2161	2174	2184	2190	2271	2357	**2366**	**25531**	**25725**		

HYDRAULIC FITTINGS LIST - ENGINE

FITTING LIST :

TL37 Petrol Only

PART N°	DESCRIPTION	QTY.
12-0901	¼" BSP Male x ¼" BSP Male Straight Adaptor	10
12-0902	3/8" BSP Male x 3/8" BSP Male Straight Adaptor	6
12-0903	½" BSP Male x ½" BSP Male Straight Adaptor	1
12-1001	¼" BSP Male x 3/8" BSP Male Straight Adaptor	36
12-1004	½" BSP Male x 3/8" BSP Male Straight Adaptor	2
12-1005	¼" BSP Male x ½" BSP Male Straight Adaptor	2
12-1011	¼" BSP Female Swivel x 3/8" BSP Male Straight Adaptor	1
12-1105	¼" BSP Male Equal Tee for bonded seal	1
12-1107	¼" BSP Equal Tee F.O.R	6
12-1118	¼" BSP Equal Tee F.O.B	2
12-1119	3/8" BSP Equal Tee F.O.R	1
12-1210	¼" BSP Male on the Branch x 3/8" BSP Male x 3/8" BSP Female Unequal Tee	1
12-1501	½" Dowty Washer	6
12-1502	3/8" Dowty Washer	51
12-1507	¼" Dowty Washer	20
12-1887	¼" BSP Male x ¼" BSP Male Pos. Elbow	13
12-2001	½" BSP Male Plug	2
12-2003	3/8" BSP Male Plug	11
12-2004	¼" BSP Male Plug	4
12-2010	½" BSP Female Plug	1
12-3017	¼" BSP Ferrule	1
12-3149	¼" BSP Pressure Test Point	1
12-3150	¼" BSP Male x 3/8" BSP Male x 1/32" Orifice Straight Adaptor	2
12-9000	¼" BSP Male x 3/8" BSP Male x 1.4mm Orifice Straight Adaptor	4
12-9013	¼" BSP Male x 1/2" BSP Male x 1.0mm Orifice Straight Adaptor	2

ISSUE	00	01	02	03	04	05					DRAWING N° : **13-3560**
C/N Num	0000	2174	2184	2271	25555	25725					

FITTING LIST :

TL37 Mains

PART N°	DESCRIPTION	QTY.
12-0901	¼" BSP Male x ¼" BSP Male Straight Adaptor	8
12-0902	3/8" BSP Male x 3/8" BSP Male Straight Adaptor	6
12-0903	½" BSP Male x ½" BSP Male Straight Adaptor	1
12-1001	¼" BSP Male x 3/8" BSP Male Straight Adaptor	37
12-1004	½" BSP Male x 3/8" BSP Male Straight Adaptor	1
12-1005	¼" BSP Male x ½" BSP Male Straight Adaptor	2
12-1011	¼" BSP Female Swivel x 3/8" BSP Male Straight Adaptor	1
12-1105	¼" BSP Male Equal Tee	1
12-1107	¼" BSP Equal Tee F.O.R	4
12-1118	¼" BSP Equal Tee F.O.B	2
12-1119	3/8" BSP Equal Tee F.O.R	1
12-1210	¼" BSP Male on the Branch x 3/8" BSP Male x 3/8" BSP Female Unequal Tee	1
12-1501	½" Dowty Washer	5
12-1502	3/8" Dowty Washer	55
12-1507	**¼" Dowty Washer**	**13**
12-1887	¼" BSP Male x ¼" BSP Male Pos. Elbow	13
12-2001	½" BSP Male Plug	2
12-2003	3/8" BSP Male Plug	11
12-2004	¼" BSP Male Plug	2
12-3017	¼" BSP Ferrule	1
12-3149	¼" BSP Pressure Test Point	1
12-3150	¼" BSP Male x 3/8" BSP Male x 1/32" Orifice Straight Adaptor	2
12-9000	¼" BSP Male x 3/8" BSP Male x 1.4mm Orifice Straight Adaptor	4

ISSUE	00	01	02	**03**	04						DRAWING N° : **13-3610**
C/N Num	0000	2271	2357	**2366**	25555						

HYDRAULIC FITTINGS LIST - BI-FUEL

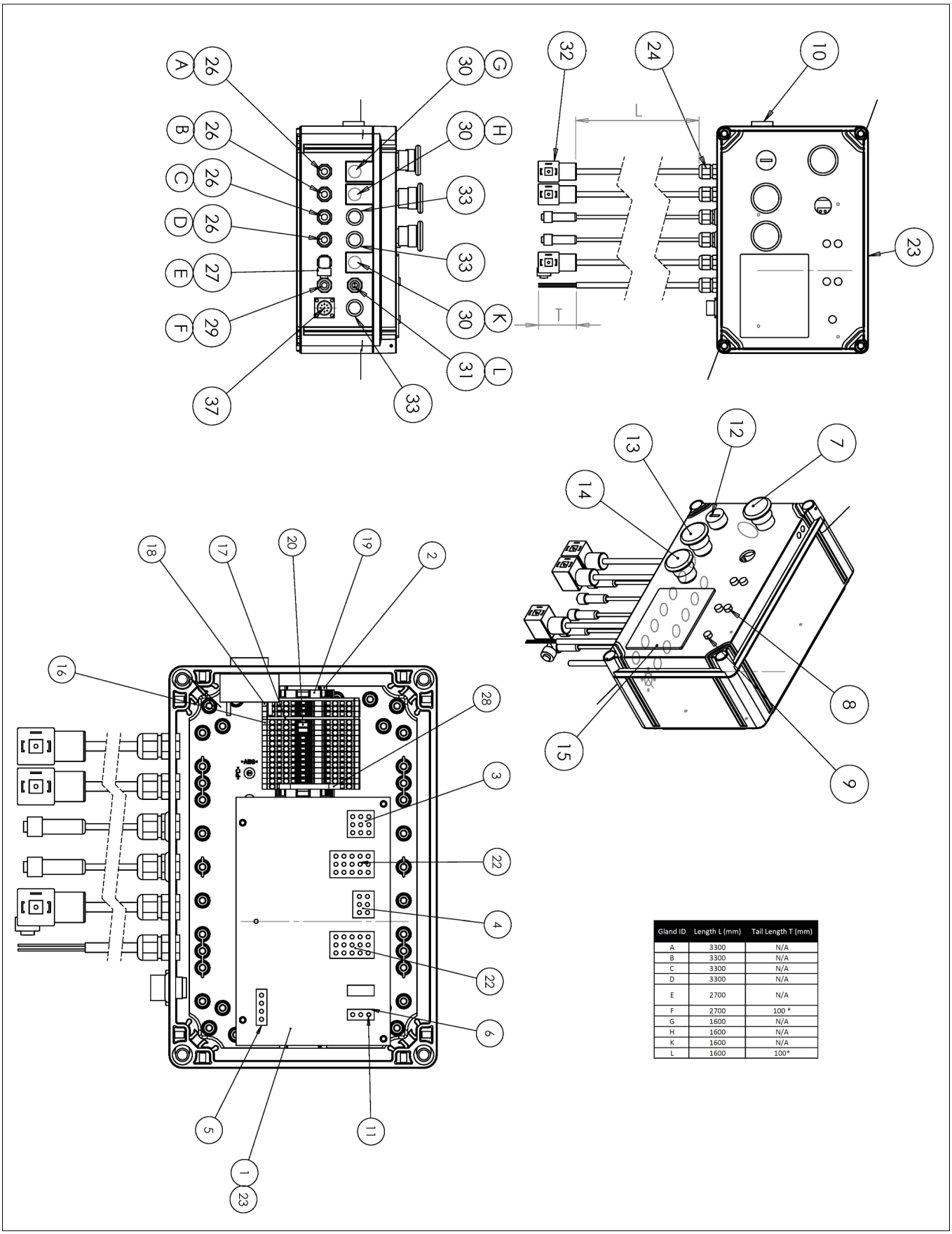
FITTING LIST :

TL37 Bi Fuel

PART N°	DESCRIPTION	QTY.
12-0901	**¼" BSP Male x ¼" BSP Male Straight Adaptor**	**11**
12-0902	$^{3}/_{8}$" BSP Male x $^{3}/_{8}$" BSP Male Straight Adaptor	6
12-0903	**½" BSP Male x ½" BSP Male Straight Adaptor**	**2**
12-1001	¼" BSP Male x $^{3}/_{8}$" BSP Male Straight Adaptor	37
12-1004	**½" BSP Male x $^{3}/_{8}$" BSP Male Straight Adaptor**	**1**
12-1005	¼" BSP Male x ½" BSP Male Straight Adaptor	2
12-1011	**¼" BSP Female Swivel x $^{3}/_{8}$" BSP Male Straight Adaptor**	**2**
12-1006	**3/4" BSP Male x ½" BSP Male Straight Adaptor**	**1**
12-1105	¼" BSP Male Equal Tee for bonded seal	1
12-1107	¼" BSP Equal Tee F.O.R	6
12-1118	¼" BSP Equal Tee F.O.B	2
12-1119	$^{3}/_{8}$" BSP Equal Tee F.O.R	2
12-1210	¼" BSP Male on the Branch x $^{3}/_{8}$" BSP Male x $^{3}/_{8}$" BSP Female Unequal Tee	1
12-1501	½" Dowty Washer	6
12-1502	**$^{3}/_{8}$" Dowty Washer**	**55**
12-1507	**¼" Dowty Washer**	**17**
12-1851	**½" BSP Male x ½" BSP Female Elbow**	**2**
12-1885	**¼" BSP Male x $^{3}/_{8}$" BSP Male Pos. Elbow**	**3**
12-1887	¼" BSP Male x ¼" BSP Male Pos. Elbow	13
12-1889	**¼" BSP Male x ¼" BSP Female Elbow**	**1**
12-2001	½" BSP Male Plug	2
12-2003	$^{3}/_{8}$" BSP Male Plug	11
12-2004	**¼" BSP Male Plug**	**2**
12-3017	**¼" BSP Ferrule**	**2**
12-3149	¼" BSP Pressure Test Point	2
12-3150	¼" BSP Male x $^{3}/_{8}$" BSP Male x $^{1}/_{32}$" Orifice Straight Adaptor	2
12-9000	¼" BSP Male x $^{3}/_{8}$" BSP Male x 1.4mm Orifice Straight Adaptor	4
509415-000	**½"** BSP Male x Female Rotary Coupling	1
12-9013	¼" BSP Male x $^{1}/_{2}$" BSP Male x 1.0mm Orifice Straight Adaptor	2

ISSUE	00	01	02	**03**	04	05	06	07			DRAWING N° : **13-3598**
C/N Num	00	2271	2357	**2366**	25270	25555	25725	26064			

REPAIR PARTS



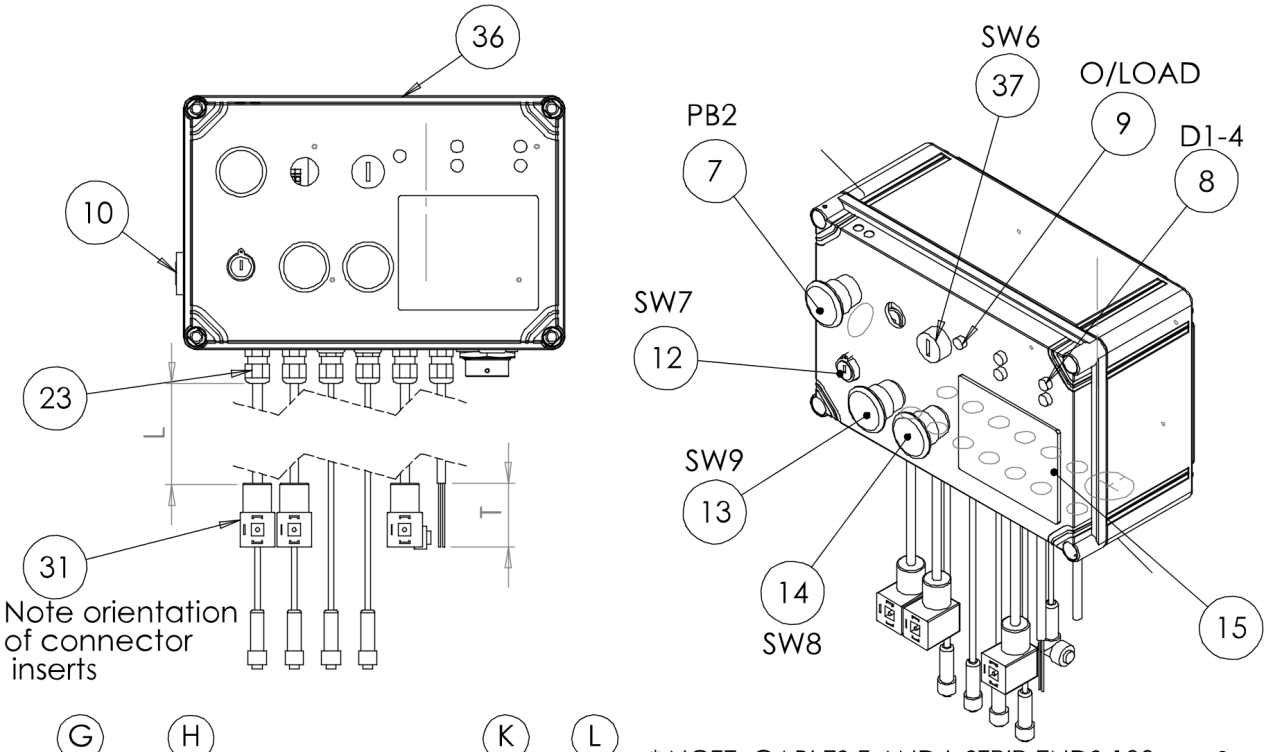
Gland ID	Length L (mm)	Tail Length T (mm)
A	3300	N/A
B	3300	N/A
C	3300	N/A
D	3300	N/A
E	2700	N/A
F	2700	100 *
G	1600	N/A
H	1600	N/A
K	1600	N/A
L	1600	100*

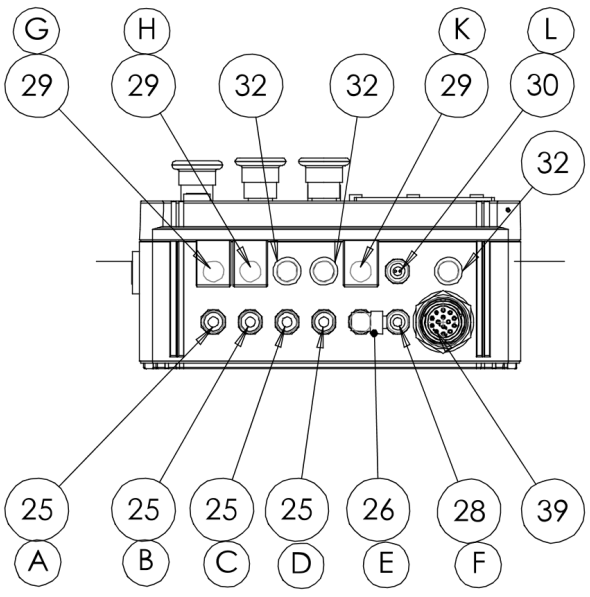
アイテム	部品番号	名前	数量	UOM
1	513316-000	GP450 I/F BOARD	1	EA
2	512368-000	DIN RAIL (170mm)	1	EA
3	510156-000	9WAY PANEL PLUG	1	EA
4	510154-000	6WAY PANEL PLUG	1	EA
5	512366-000	4 WAY PANEL PLUG	1	EA
6	510155-000	3WAY PANEL PLUG SW TWIST RELEASE E/STOP; SCHNEIDER	1	EA
7	510524-000	PUSH/PULL SW ASSY W/NC CONTACT	1	EA
8	512935-000	LED GREEN 12V	4	EA
9	512934-000	LED RED 12V	1	EA
10	502588-000	ALARM, ECCO BEEPING 6-28VDC	1	EA
11	510145-000	Mate-N-Lock PIN CONTACT	34	EA
12	512543-000	3 POS'N KEY SWITCH - STAYPUT	1	EA
12	515392-000	Blanking Plug (ANSI)	1	EA
13	513308-000	SWITCH PUSBUTTON BLACK MUSHROOM	1	EA
14	09-1918	40mm GREEN SWITCH	1	EA
15	3087803	EZCal Panel - Trionics	1	EA
16	513310-000	FEED THRU TERMINAL 4 WAY	12	EA
17	513312-000	END PLATE	2	EA
18	513311-000	FEED THRU TERMINAL 4 WAY GRND	3	EA
19	513314-000	TERMINAL END STOP	2	EA
20	513313-000	JUMPER	2	EA
21	513315-000	SPACER	4	EA
22	512817-000	15WAY PANEL PLUG	2	EA
23	513319-000	Lower control box - trailers	1	EA
24	510152-000	CABLE GLAND	10	EA
25	510153-000	CABLE GLAND	10	EA
26	09-2378	SWITCH CABLE	4	EA

アイテム	部品番号	名前	数量	UOM
27	09-2379	SWITCH CABLE	1	EA
28	09-2326	RELAY 24V DC	1	EA
29	513350-000	5-CORE CABLE	1	EA
30	508075-000	2-CORE CABLE	3	EA
31	513457-000	3-CORE CABLE	1	EA
32	508637-000	HIRSCHMANN CONNECTOR	3	EA
33	513351-000	BLANKING GROMMET	3	EA
34	509741-000	FUSE HOLDER	2	EA
35	509740-005	FUSE 7.5AMP	2	EA
36	513326-000	OVERLAY	1	EA
37	513949-000	9 way chassis socket	1	EA

REPAIR PARTS

LOWER CONTROL BOX

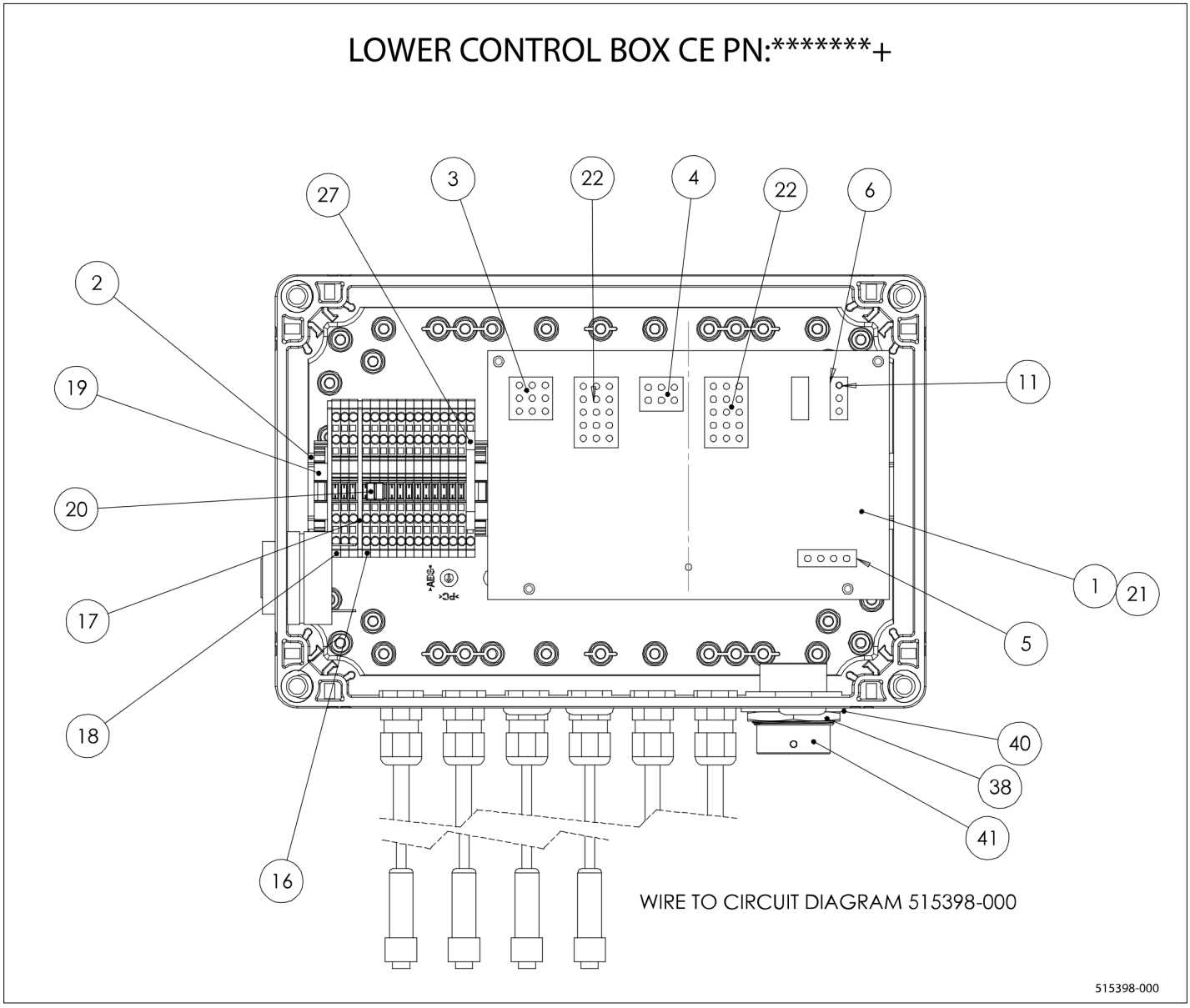




* NOTE: CABLES F AND L STRIP ENDS 100mm & TERMINATE WITH BOOTLACE FERRULES 510670-000& ID WITH CABLE MARKERS 510644-000 THRU 009

Gland ID	Length L (mm)	Tail Length T (mm)
A	3300	N/A
B	3300	N/A
C	3300	N/A
D	3300	N/A
E	2700	N/A
F	2700	100 *
G	1600	N/A
H	1600	N/A
K	1600	N/A
L	1600	100*

515398-000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27
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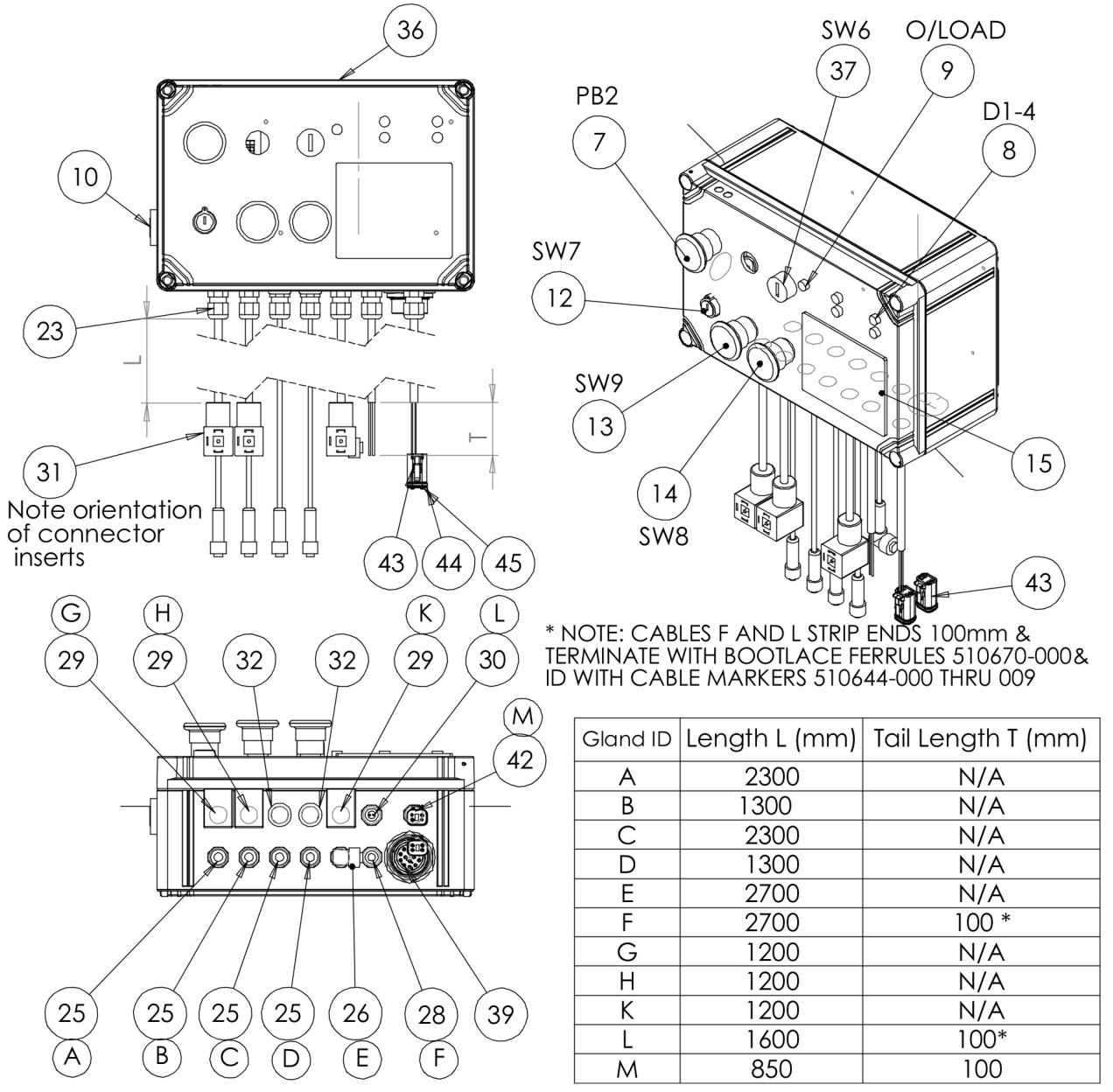
WIRE TO CIRCUIT DIAGRAM 515398-000
515398-000

アイテム	部品番号	名前	数量	UOM
1	513316-000	GP450 I/F BOARD	1	EA
2	512368-000	DIN RAIL (170mm)	1	EA
3	510156-000	9WAY PANEL PLUG	1	EA
4	510154-000	6WAY PANEL PLUG	1	EA
5	512366-000	4 WAY PANEL PLUG	1	EA
6	510155-000	3WAY PANEL PLUG SW TWIST RELEASE E/STOP; SCHNEIDER	1	EA
7	510524-000	PUSH/PULL SW ASSY W/NC CONTACT	1	EA
8	512935-000	LED GREEN 12V	4	EA
9	512934-000	LED RED 12V	1	EA
10	502588-000	ALARM, ECCO BEEPING 6-28VDC	1	EA
11	510145-000	Mate-N-Lock PIN CONTACT	34	EA
12	512543-000	3 POS'N KEY SWITCH - STAYPUT	1	EA
13	513308-000	SWITCH PUSBUTTON BLACK MUSHROOM	1	EA
14	09-1918	40mm GREEN SWITCH	1	EA
15	3087803	EZCal Panel - Trionics	1	EA
16	513310-000	FEED THRU TERMINAL 4 WAY	12	EA
17	513312-000	END PLATE	2	EA
18	513311-000	FEED THRU TERMINAL 4 WAY GRND	3	EA
19	513314-000	TERMINAL END STOP	2	EA
20	513313-000	JUMPER	2	EA
21	513315-000	SPACER	4	EA
22	512817-000	15WAY PANEL PLUG	2	EA
23	510152-000	CABLE GLAND	10	EA
24	510153-000	CABLE GLAND	10	EA
25	09-2378	SWITCH CABLE	4	EA
26	09-2379	SWITCH CABLE	1	EA
27	09-2326	RELAY 24V DC	1	EA

アイテム	部品番号	名前	数量	UOM
28	513350-000	5-CORE CABLE	1	EA
29	508075-000	2-CORE CABLE	3	EA
30	513457-000	3-CORE CABLE	1	EA
31	508637-000	HIRSCHMANN CONNECTOR	3	EA
32	513351-000	BLANKING GROMMET	3	EA
33	509741-000	FUSE HOLDER	2	EA
34	509740-005	FUSE 7.5AMP	2	EA
35	515405-000	OVERLAY(CE)	1	EA
35	515406-000	OVERLAY(ANSI)	1	EA
36	515403-000	LCB ENCLOSURE - TRAILERS	1	EA
37	513318-000	KEYSWITCH 2 POSITION SPRING RETURN	1	EA
38	514605-000	LOCKNUT DEUTSCH 114020-90	1	EA
39	100338-013	CRIMP PIN DEUTSCH	7	EA
40	514604-000	LOCKWASHER DEUTSCH 114021	1	EA
41	3049862	Receptacle, Flgd HD30, 14 Way	1	EA

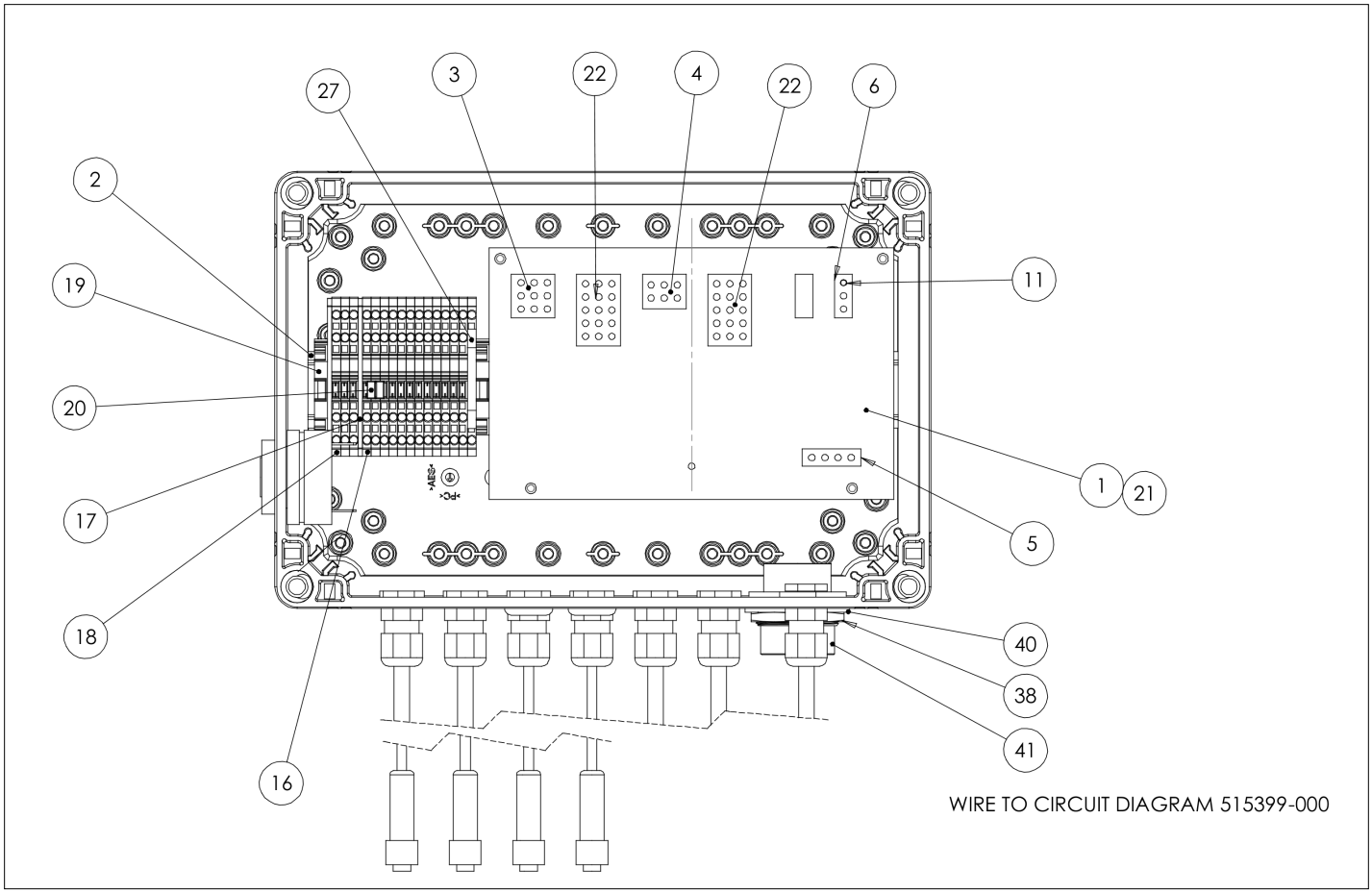
REPAIR PARTS

LOWER CONTROL BOX (ANSI)



* NOTE: CABLES F AND L STRIP ENDS 100mm & TERMINATE WITH BOOTLACE FERRULES 510670-000& ID WITH CABLE MARKERS 510644-000 THRU 009

Gland ID	Length L (mm)	Tail Length T (mm)
A	2300	N/A
B	1300	N/A
C	2300	N/A
D	1300	N/A
E	2700	N/A
F	2700	100 *
G	1200	N/A
H	1200	N/A
K	1200	N/A
L	1600	100*
M	850	100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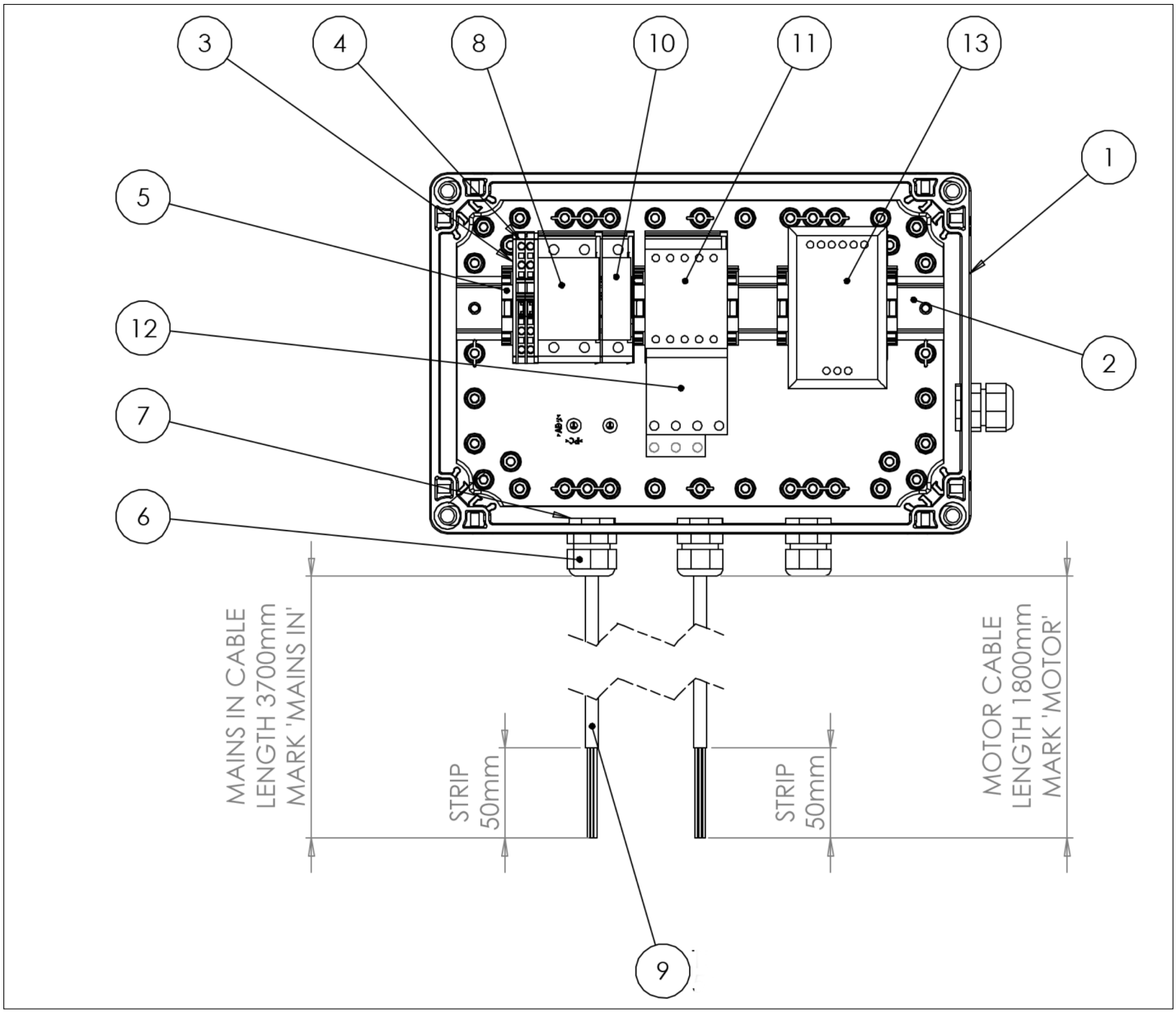
WIRE TO CIRCUIT DIAGRAM 515399-000

アイテム	部品番号	名前	数量	UOM
1	513316-000	GP450 I/F BOARD	1	EA
2	512368-000	DIN RAIL (170mm)	1	EA
3	510156-000	9WAY PANEL PLUG	1	EA
4	510154-000	6WAY PANEL PLUG	1	EA
5	512366-000	4 WAY PANEL PLUG	1	EA
6	510155-000	3WAY PANEL PLUG SW TWIST RELEASE E/STOP; SCHNEIDER	1	EA
7	3028810	PUSH/PULL EMERGENCY STOP	1	EA
8	512935-000	LED GREEN 12V	4	EA
9	512934-000	LED RED 12V	1	EA
10	502588-000	ALARM, ECCO BEEPING 6-28VDC	1	EA
11	510145-000	Mate-N-Lock PIN CONTACT	34	EA
12	512543-000	3 POS'N KEY SWITCH - STAYPUT	1	EA
13	513308-000	SWITCH PUSBUTTON BLACK MUSHROOM	1	EA
14	09-1918	40mm GREEN SWITCH	1	EA
15	3087803	EZCal Panel - Trionics	1	EA
16	513310-000	FEED THRU TERMINAL 4 WAY	12	EA
17	513312-000	END PLATE	2	EA
18	513311-000	FEED THRU TERMINAL 4 WAY GRND	3	EA
19	513314-000	TERMINAL END STOP	2	EA
20	513313-000	JUMPER	2	EA
21	513315-000	SPACER	4	EA
22	512817-000	15WAY PANEL PLUG	2	EA
23	510152-000	CABLE GLAND	11	EA
24	510153-000	CABLE GLAND	11	EA
25	09-2378	SWITCH CABLE	4	EA
26	09-2379	SWITCH CABLE	1	EA
27	09-2326	RELAY 24V DC	1	EA
28	513350-000	5-CORE CABLE	1	EA

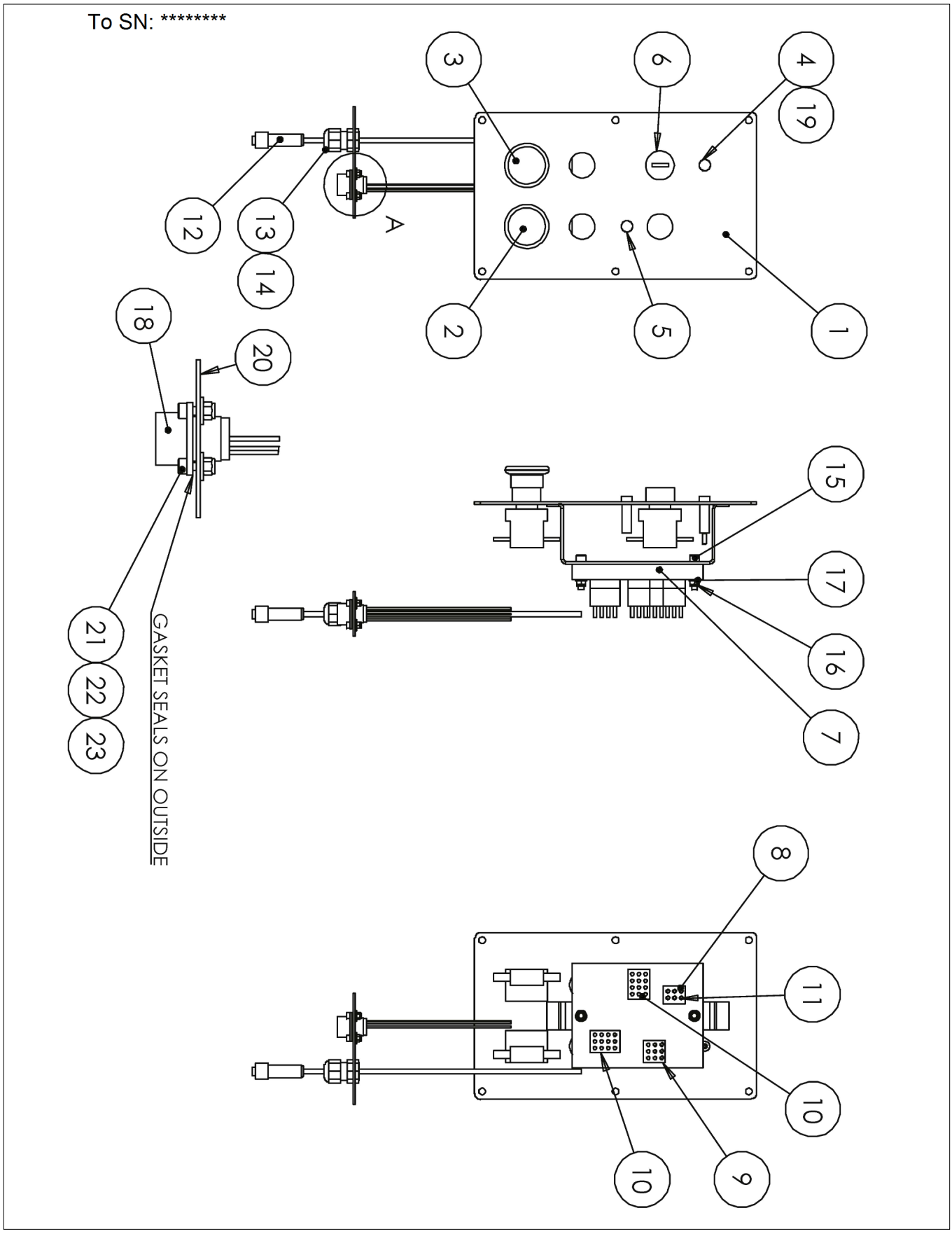
アイテム	部品番号	名前	数量	UOM
29	508075-000	2-CORE CABLE	3	EA
30	513457-000	3-CORE CABLE	1	EA
31	508637-000	HIRSCHMANN CONNECTOR	3	EA
32	513351-000	BLANKING GROMMET	2	EA
33	509741-000	FUSE HOLDER	2	EA
34	509740-005	FUSE 7.5AMP	2	EA
35	515406-000	OVERLAY(ANSI)	1	EA
36	515403-000	LCB ENCLOSURE - TRAILERS	1	EA
37	513318-000	KEYSWITCH 2 POSITION SPRING RETURN	1	EA
38	514605-000	LOCKNUT DEUTSCH 114020-90	1	EA
39	100338-013	CRIMP PIN DEUTSCH	7	EA
40	514604-000	LOCKWASHER DEUTSCH 114021	1	EA
41	3049862	Receptacle, Flgd HD30, 14 Way	1	EA
42	514051-000	7-CORE 0.75CSA LAPP OLFLEX CLASSIC100	1	EA
43	509747-000	PLUG 4 WAY DEUTSCH DT06-4S-P004	2	EA
44	509748-000	WEDGE DEUTSCH W4S	2	EA
45	100338-014	CRIMP SKT DEUTSCH 0462-201-1641	6	EA

REPAIR PARTS



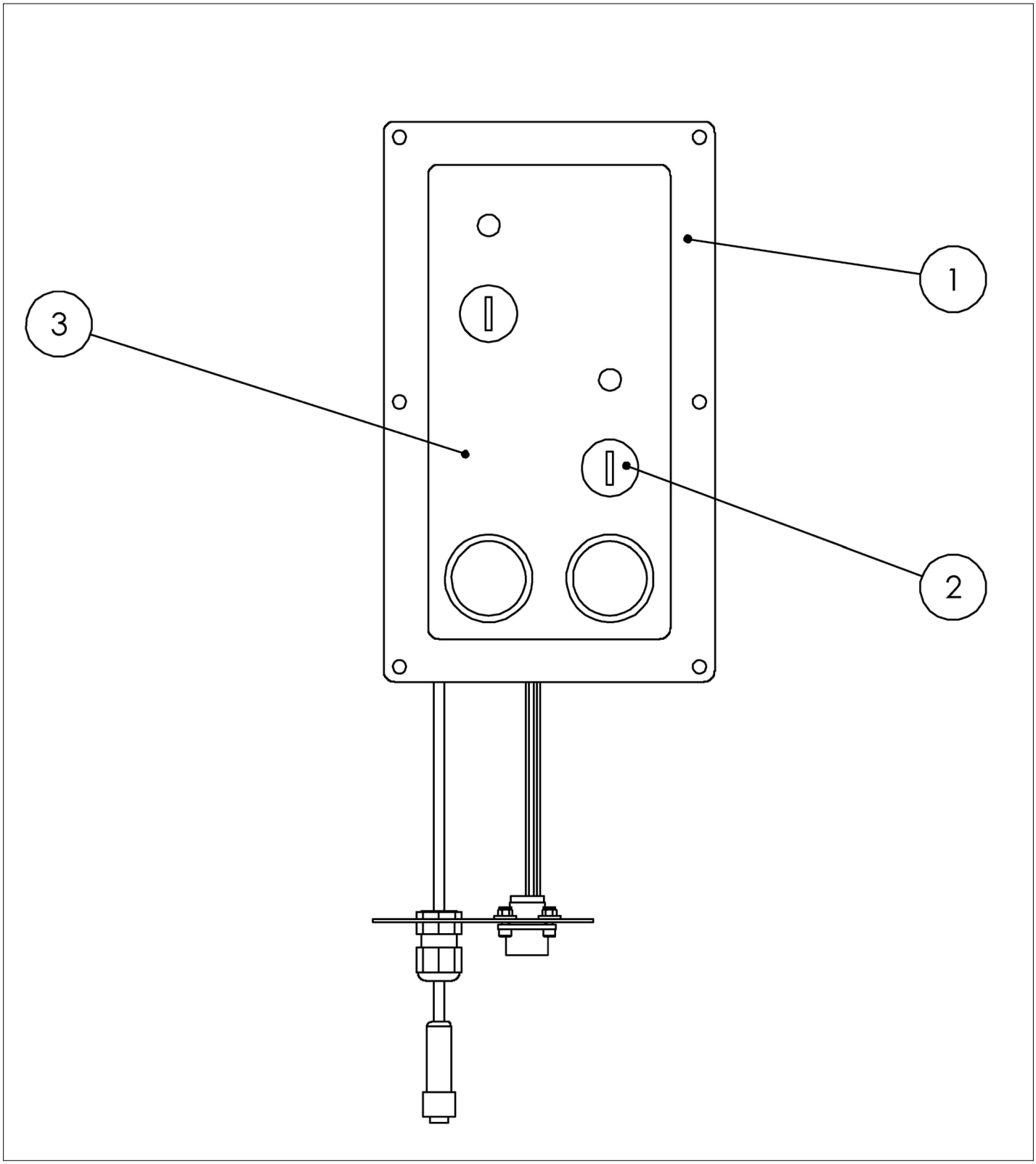
アイテム	部品番号	名前	数量	UOM
1	514000-000	Mains motor starter box	1	EA
2	512368-00b	DIN RAIL (170mm) 1	1	EA
3	513312-000	END PLATE	2	EA
4	514006-000	Feed through terminal 4 way ground 2.5 mm2	2	EA
5	513314-000	TERMINAL END STOP	5	EA
6	509440-000	Cable gland M20	4	EA
7	510146-000	Cable gland nut M20	4	EA
8	514001-000	RCD 16 A- 30 mA	1	EA
9	508077-000	3 - core cable 2.5mmCSA H07RN - F	6M	EA
10	514002-00	MCB 16Amp 1	1	EA
11	514003-00	Motor Start Contactor 12Vdc Coil 1	1	EA
12	514004-00	Overload Relay 1	1	EA
13	514005-00	PSU 230Vac to 12V dc 7.5Amp 1	1	EA
---	514007-00	DECAL 'ISOLATE SUPPLY' 1	1	EA
---	514008-00	CABLE 2.5mmCSA TRI-RATED BROWN 0.5mtrs	.5M	EA
---	514009-00	CABLE 2.5mmCSA TRI-RATED BLUE 0.5mtrs	.5M	EA
---	514010-00	17 514010-000 CABLE 2.5mmCSA TRI-RATED GREEN/YELLOW 0.5MTRS	.5M	EA
---	513067-00	18 513067-000 GREY BOOTLACE FERRULE 23	23	EA

REPAIR PARTS



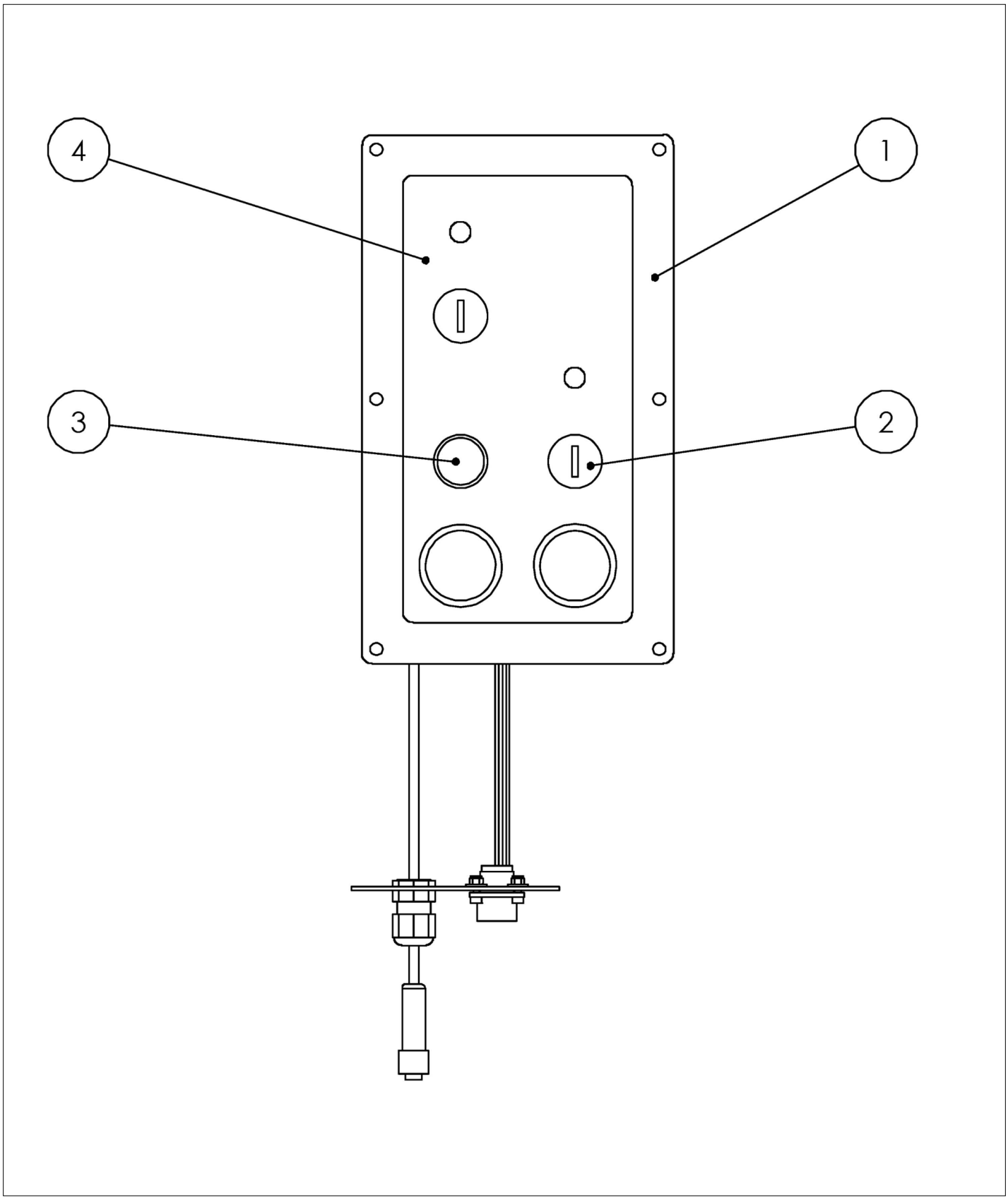
アイテム	部品番号	名前	数量	UOM
1	513327-000	Upper control panel	1	EA
2	510524-000	PUSH/PULL SW ASSY W/NC CONTACT	1	EA
3	09-1918	40mm GREEN SWITCH	1	EA
4	512934-000	LED RED 12V	1	EA
5	512935-000	LED GREEN 12V	1	EA
6	513318-000	KEYSWITCH 2 POSITION SPRING RETURN	1	EA
7	510472-000	Matrix board (Before SN SL30-01-XXXX00061 / SL26-01-XXXX000017)	1	EA
8	510154-000	6WAY PANEL PLUG	1	EA
9	510156-000	9WAY PANEL PLUG	1	EA
10	510157-000	12 way panel plug	2	EA
11	510145-000	Mate-N-Lock PIN CONTACT	14	EA
12	09-2378	SWITCH CABLE	1	EA
13	510152-000	CABLE GLAND	1	EA
14	510153-000	CABLE GLAND	1	EA
15	058501-025	M5 x 25 S.H.C.S. - GR 12.9	2	EA
16	056066-005	Nut NylockNut DIN985 M5 8.0 Zi	2	EA
17	056069-005	Washer SteelFlatWasher DIN125A	2	EA
18	513949-000	9 way chassis socket	1	EA
19	514327-000	Resistor 1 K 0.5 W 5%	1	EA
20	513590-002	Cable mounting plate	1	EA
21	512651-010	Socket HD capscrew - M3 x 10	4	EA
22	510561-003	Flat washer - M3	4	EA
23	510569-003	M3 nylock nut - stainless steel	4	EA

REPAIR PARTS



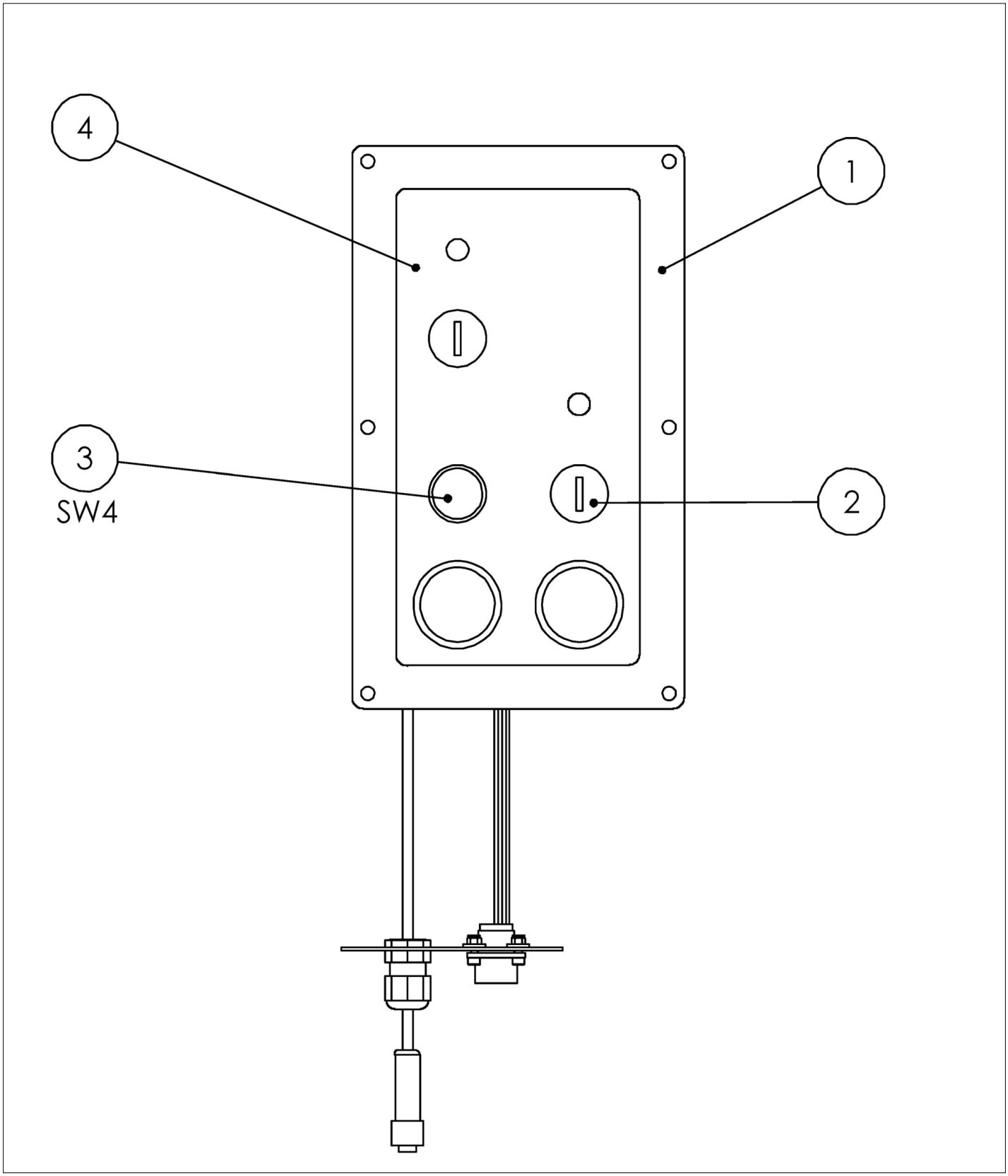
アイテム	部品番号	名前	数量	UOM
1	513321-000	Platform control panel (standard)	1	EA
2	512449-000	Keyswitch 2 position stayput	1	EA
3	513328-001	TL37 UCP OVERLAY BAT/MAINS	1	EA

REPAIR PARTS



アイテム	部品番号	名前	数量	UOM
1	513321-000	Platform control panel (standard)	1	EA
2	512449-000	Keyswitch 2 position stayput	1	EA
3	513317-000	Green push button	1	EA
4	513328-002	TL37 UCP OVERLAY ENGINE	1	EA

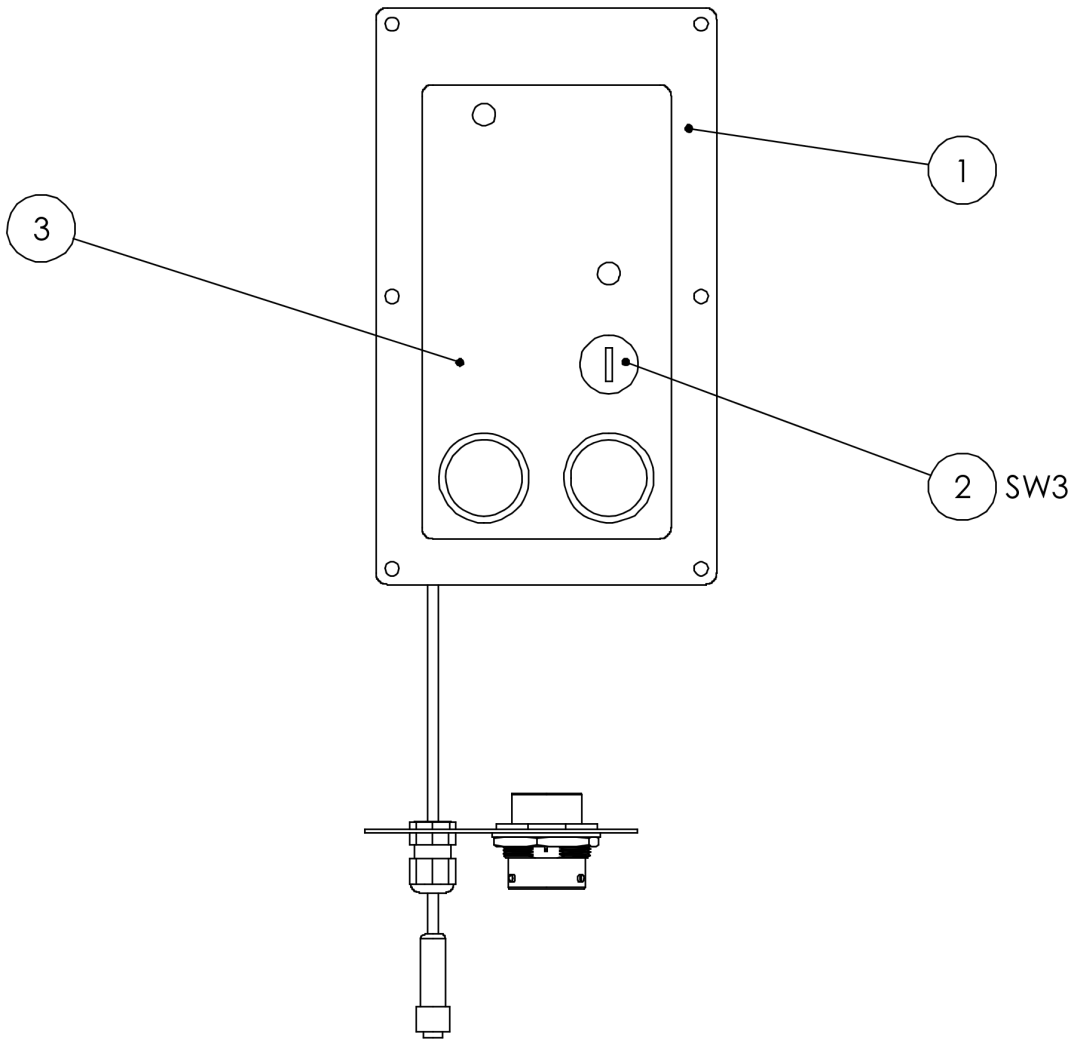
REPAIR PARTS



アイテム	部品番号	名前	数量	UOM
1	513321-000	Platform control panel (standard)	1	EA
2	512543-000	3 POS'N KEY SWITCH - STAYPUT	1	EA
3	513317-000	Green push button	1	EA
4	513328-003	TL37 UCP OVERLAY BI-FUEL	1	EA

REPAIR PARTS

UPPER CONTROL PANEL CE/ANSI (BATTERY/MAINS



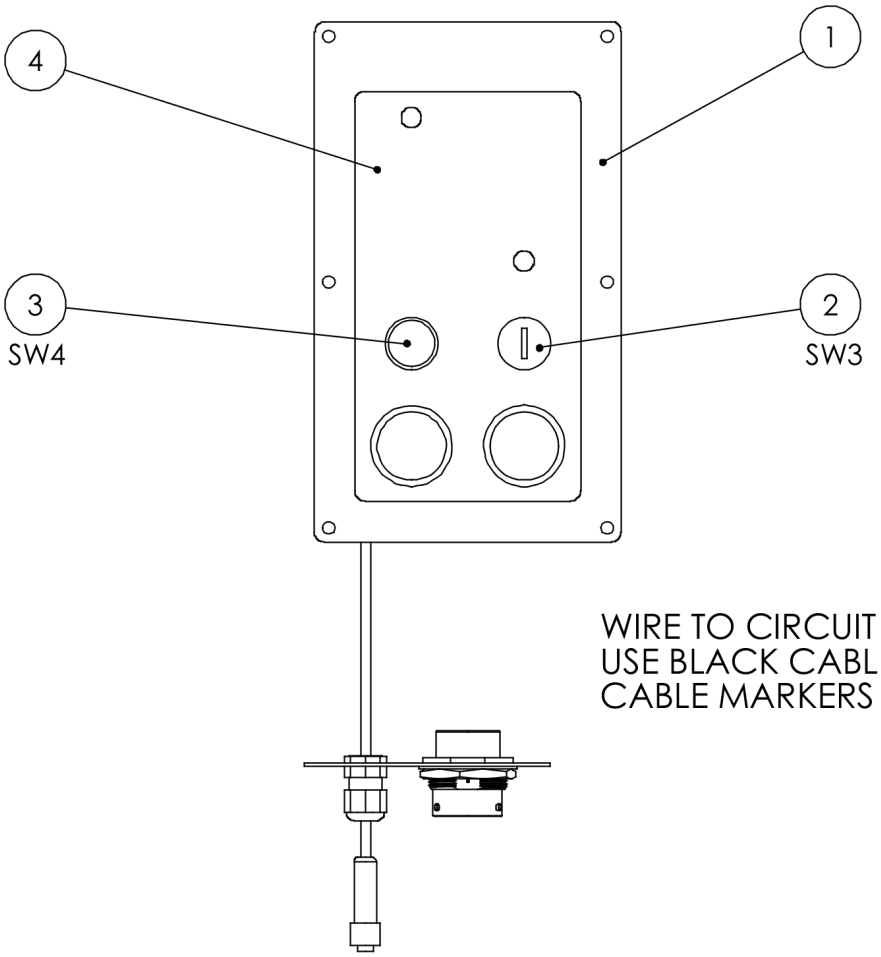
WIRE TO CIRCUIT DIAGRAM 515402-001
USE BLACK CABLE 1.0mm CSA 510671-000 &
CABLE MARKERS 510644-000 THRU 009.

515402-001

アイテム	部品番号	名前	数量	UOM
1	515402-000	TRAILER UPPER CONTROL PANEL(STANDARD)	1	EA
2	512449-000	Keyswitch 2 position stayput	1	EA
3	515412-001	TL37 UCP OVERLAY BAT/MAINS	1	EA

REPAIR PARTS

UPPER CONTROL PANEL (ENGINE POWER)

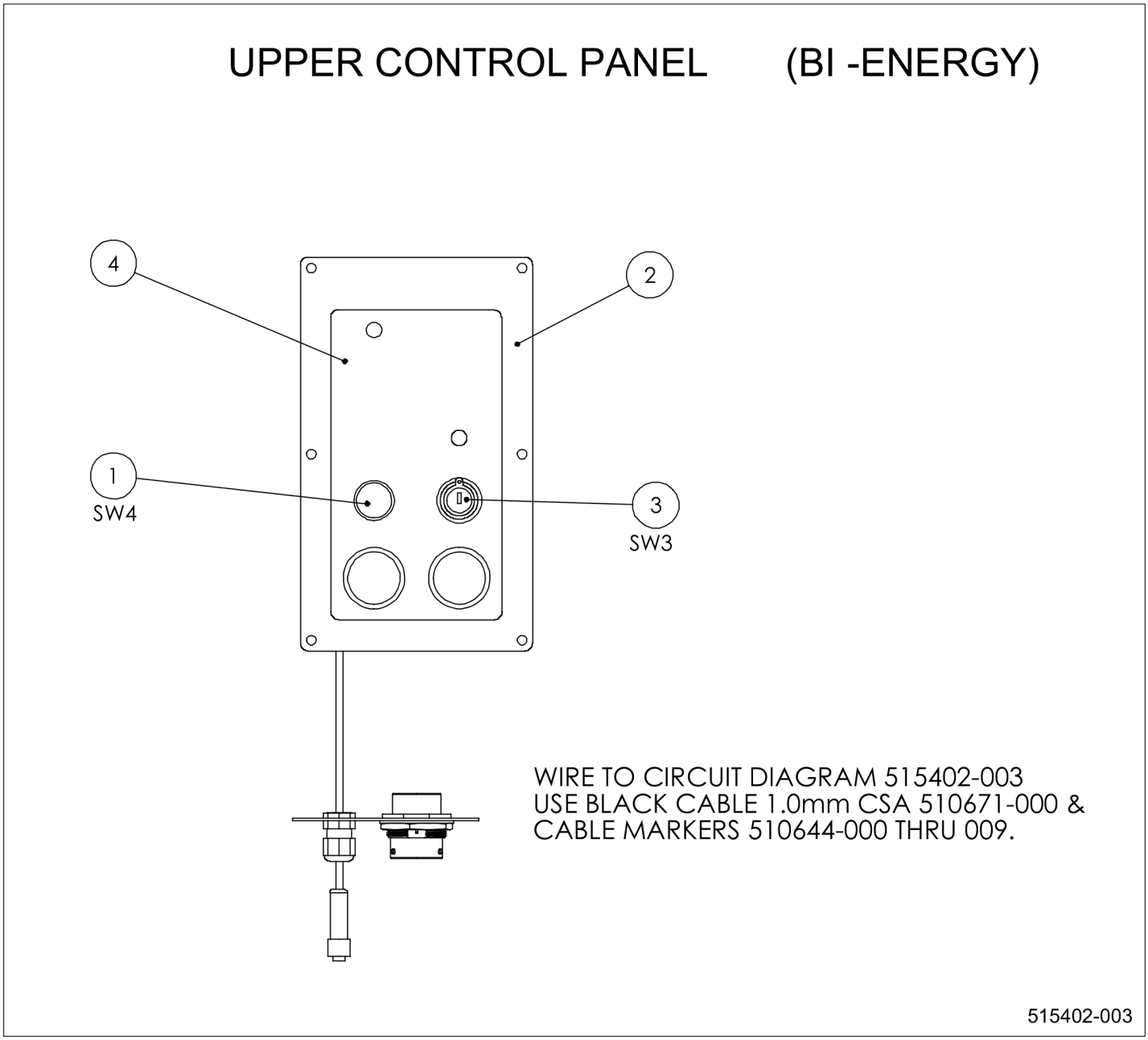


WIRE TO CIRCUIT DIAGRAM 515402-002
USE BLACK CABLE 1.0mm CSA 510671-000 &
CABLE MARKERS 510644-000 THRU 009.

515402-002

アイテム	部品番号	名前	数量	UOM
1	515402-000	TRAILER UPPER CONTROL PANEL(STANDARD)	1	EA
2	512449-000	Keyswitch 2 position stayput	1	EA
3	513317-000	Green push button	1	EA
4	515412-002	TL37 UCP OVERLAY ENGINE	1	EA

REPAIR PARTS



アイテム	部品番号	名前	数量	UOM
1	513317-000	Green push button	1	EA
2	515402-000	TRAILER UPPER CONTROL PANEL(STANDARD)	1	EA
3	512543-000	3 POS'N KEY SWITCH - STAYPUT	1	EA
4	515412-003	TL37 UCP OVERLAY BI-FUEL	1	EA

EXTERNAL COMPONENTS

External components - All variants.

PART #	DESCRIPTION	QTY
09-2088	Solenoid coil 12 V/22 W	2
13-3573	SOLENOID VALVE 3-WAY	3
02-2639/16	Overload switch	1
02-2639/22	Stabilizer switch	4
09-1961	Elevation switch	1
09-2355	Elevation switch connector	1
09-2389	Conduit	1

External components - All battery variants.

PART #	DESCRIPTION	QTY
502494-000	Fuse 175 A	1
501877-000	Fuse holder	1

External components - All mains variants.

PART #	DESCRIPTION	QTY
502494-000	Motor starter box assembly	1

CABLE ASSEMBLIES

Platform cable assembly.

PART #	DESCRIPTION	QTY
513322-000	Platform Cable TL37	1

Battery cable assembly.

PART #	DESCRIPTION	QTY
513324-000	Battery cable set TL37	1

Additional parts for ANSI machine

PART #	DESCRIPTION	QTY
3069522	FLANGE OUTLET 15A 125V	1
3040252	CIRCUIT BREAKER 15 AMP	1
3040624	-RECEPTICAL GFCI OUTLET 20AMP	1
3069521	INLET FLANGE	1
515149-000	T-TAP WIRE SPLICE CONN, 12AWG	4
515150-000	T-TAP WIRE SPLICE CONN, 18-14A	4
3040625	COVER AC GFCI OUTLET	1
508074-000	CABLE (7 CORE), POWER TO PLATFORM	22M

ELECTRICAL SWITCH VARIATIONS

Switch Variations.

ZB2

ZB4

PB22

There are three different variations of switches that may be fitted to the machine which can be identified by looking at the back of the switch head.

The three variations are shown in the diagram above.

Type ZB2, Type ZB4 and Type PB22

If you need to purchase spare parts then you can replace the switch head or switch body if you know which type of switch you have ie. if you have 2B2 then you can purchase a 2B2 switch body only to go on your existing switch head or vice versa. You cannot put a 2B4 or PB22 body on a 2B2 switch head.
If you do not know what type of switch is on your machine then you can replace the complete switch unit (Head and Body) with any of the 3 types.

Details of all the part numbers of switch heads, bodies and contact blocks are listed in the tables on the next page.

ELECTRICAL SWITCH VARIATIONS

To obtain the correct switch assembly use the table below while making reference to the switch head type (illustration on page 42). Also make reference Contact Block name (ie. PB4 / SW1). found on schematic diagrams (pages 28 to 34).

EMERGENCY STOP

Schematic Diagram Reference	Head Type	Switch Head	Switch Body + Contact Block
Location PB1 & PB4	TYPE ZB2	09-0208	09-0209 (N.C Contact Block)
Location PB1 & PB4	TYPE ZB4	09-1916	09-1931 (N.C Contact Block)
Location PB1 & PB4	TYPE PB22	09-2395	09-2396 (N.C Contact Block)

BLACK PUSH BUTTON

Schematic Diagram Reference	Head Type	Switch Head	Switch Body + Contact Block
Location PB2 & PB5	TYPE ZB2	09-0255	09-0121 (N.O Contact Block)
Location PB2 & PB5	TYPE ZB4	09-1917	09-1930 (N.O Contact Block)
Location PB2 & PB5	TYPE PB22	09-2398	09-2393 (N.O Contact Block)

GREEN PUSH BUTTON

Schematic Diagram Reference	Head Type	Switch Head	Switch Body + Contact Block
Location PB3	TYPE ZB2	09-0499	09-0121 (N.O Contact Block)
Location PB3	TYPE ZB4	09-1918	09-1930 (N.O Contact Block)
Location PB3	TYPE PB22	09-2394	09-2393 (N.O Contact Block)

3 POSITION KEY SWITCH

Schematic Diagram Reference	Head Type	Switch Head	Switch Body + Contact Block	..Contact Block #2
Location SW1	TYPE ZB2	09-0235	09-0209 (N.C Contact Block)	09-0122 (N.O Contact Block))
Location SW1	TYPE ZB4	09-1925	09-1931 (N.C Contact Block)	09-1932 (N.O Contact Block)
Location SW1	TYPE PB22	09-2391	09-2400 (N.O / N.C Contact Block)	N/A

2 POSITION KEY SWITCH

Schematic Diagram Reference	Head Type	Switch Head	Switch Body + Contact Block
Location SW9	TYPE ZB2	512449-001	09-0121 (N.O Contact Block)
Location SW9	TYPE ZB4	09-2205	09-1930 (N.O Contact Block)
Location SW9	TYPE PB22	09-2397	09-2393 (N.O Contact Block)

2 POSITION KEY SWITCH(BI-FUEL)

Schematic Diagram Reference	Head Type	Switch Head	Switch Body + Contact Block
Location SW9	TYPE ZB2	514492-000	09-0121 (N.O Contact Block)
Location SW9	TYPE ZB4	09-2281	09-1930 (N.O Contact Block)
Location SW9	TYPE PB22	09-2392	09-2393 (N.O Contact Block)

2 POSITION KEY SWITCH

Schematic Diagram Reference	Head Type	Switch Head	Switch Body + Contact Block
Location SW8	TYPE ZB2	514492-000	09-0121 (N.O Contact Block)
Location SW8	TYPE ZB4	09-2281	09-1930 (N.O Contact Block)
Location SW8	TYPE PB22	09-2392	09-2393 (N.O Contact Block)

SPARE KEY

Schematic Diagram Reference	Head Type	Switch Head
For SW1,SW8 & SW9	TYPE ZB2	09-1008
For SW1,SW8 & SW9	TYPE ZB4	09-1008
For SW1,SW8 & SW9	TYPE PB22	510351-000

ON OFF POWER SWITCH (BI-FUEL)

Schematic Diagram Reference	Head Type	Switch Head	Switch Body + Contact Block	..Contact Block #2	..Contact Block #3	..Contact Block #4
Location SW7	TYPE ZB2	512543-001	09-0121 (N.O Contact Block)	09-0122 (N.O Contact Block))	09-0122 (N.O Contact Block))	09-0122 (N.O Contact Block))
Location SW7	TYPE ZB4	09-1925	09-1915 (N.O Contact Block)	09-1932 (N.O Contact Block)	09-1932 (N.O Contact Block)	n/a
Location SW7	TYPE PB22	09-2391	09-2402 (N.O Contact Block)	09-2402 (N.O Contact Block)	n/a	n/a

GEN START SWITCH (MAINS, GEN SET & BI-FUEL)

Schematic Diagram Reference	Head Type	Switch Head	Switch Body + Contact Block
Location PB6	TYPE ZB2	09-0499	09-0121 (N.O Contact Block)
Location PB6	TYPE ZB4	09-1918	09-1930 (N.O Contact Block)
Location PB6	TYPE PB22	09-2394	09-2393 (N.O Contact Block)

GEN STOP SWITCH (MAINS, GEN SET)

Schematic Diagram Reference	Head Type	Switch Head	Switch Body + Contact Block
Location PB7	TYPE ZB2	09-0208	09-0121 (N.O Contact Block)
Location PB7	TYPE ZB4	09-1916	09-1930 (N.O Contact Block)
Location PB7	TYPE PB22	09-2395	09-2393 (N.O Contact Block)

ENGINE START BUTTON

Schematic Diagram Reference	Head Type	Switch Head	Switch Body + Contact Block
Location PB6	TYPE ZB2	513317-000	09-0121 (N.O Contact Block)
Location PB6	TYPE ZB4	09-2258	09-1930 (N.O Contact Block)
Location PB6	TYPE PB22	09-2403	09-2393 (N.O Contact Block)

ELECTRICAL PARTS LIST (Battery)

Electrical Parts , 02-2626

Part No.	Description	Reference	Qty.
09-2281	2 Position Key Spring To Off	SW8	1
09-1930	1 N/O Contact	PB2-3-5 & SW8-9	5
09-1918	40mm Mushroom Head Green Spring Button	PB3-5	2
09-1916	Emergency Stop Button	PB1-4	2
09-1931	1 N/C Contact	PB1-4	4
09-2205	2 Position Key Removal Off Position	SW9	1
09-1917	40mm Mushroom Head Black Spring Button	PB2	1
09-0605	2 Pos Stayput Key Remove Any Pos	SW1	1
09-1934	N/O And N/C Contacts	SW1	1
09-2025	Green L.E.D With Panel Mount Fitting	LP1 To 5	5
09-2259	Red Flashing L.E.D	LP6-7	1
09-2033	Buzzer	AWD	1
09-2266	SNO4062K Weiland Safety Relay	RL3-4	2
09-2326	Interface Relay Type P16	RL1-2	2
09-2277	MCB Circuit Breaker CPN MC104C	MCB1	1
09-2378	Limit Switch Cable Straight	-	5
09-2379	Limit Switch Cable 90 Degrees	-	1
09-2279	Solenoid Connection	-	2
09-0029	7 Core(6 Core 1mm+1x2mm)21M Cut Length	-	1
09-0242/1	3 Core 2.5mm Cable @18M	-	1
09-1839	18 Core 1.5mm Cable Cut @15200mm	-	1
09-2380	20 Way Connection Strip For P16	-	1
09-0177	2 Core 1mm Cable	-	1
09-2381	M/C Box PS111165.1 Hole	-	1
09-2170	Battery Power Connector	-	1
09-2382	Black 3360.30	-	1
09-2383	Red 3660.30	-	1
09-2384	K13 Control Junction Box	-	1
09-2385	K13 ABS Enclosure Machined	-	1
09-2386	Entrelec 2.5mm Double Dex Iso Terminals	-	23
09-1910	10 Way Jumper Bar	-	1
09-1124	M16 Gland Black	-	11
09-2263	M20 Gland Black	-	3
09-0993	16mm Black Nylon Locknut	-	11
09-2387	End Stop	-	2
09-2388	Entrelec Markers Sheet Of 100	-	1
18-0914	K13 Slew Box Label	-	1
18-0936	K13 Cage Control Label	-	1
09-2388	12 Way Terminal Block 15 Amp	-	1
09-2160	Hour Metre AC	-	1
09-2389	16mm Split Conduit 25M Coil	-	1
09-1961	6A 250 Volt AC With 391-8350-729 Actuator	SW2	1
09-2375	Blanking Plug	-	2
09-2030	LimitSw With Roller Turret (IMOFL1131-H9HOH1K50)	SW3 To 6	4
09-2320	LimitSw With Button Turret(IMOFL910-K50)	SW7	1

09-0168	BATTERY	-	4
069199-001	Platform Charge Module	-	1
09-1273	Plug Surface Mounted		1
09-1276	Socket Surface Mount		1
09-1393	Plug For Trailing Lead		1
09-1394	End Cap For Surface Mount		1
09-1989	7-Pin Socket Surface Mount		1
09-2048	Rubber Boot		2
15-0513	Dump Valve Packer		1
15-0862	5/8 Tool Clip Black		4
15-0863	25mm Tool Clip		2
15-0866	20x20 Bung EP700/LQ		6
508731-000	Black Round Top Cable Gland		1
508732-000	Black Round Top Cable Gland		1
SM-E0003	Spiroband 12mm Black		7m

TORQUE SPECIFICATIONS

HYDRAULIC COMPONENTS

NOTE: Always lubricate threads with clean hydraulic oil prior to installation

Use the following values to torque hydraulic components used on UpRight Work Platforms.

Torque Specifications for Hydraulic Components

Type: SAE Part Series	Cartridge Poppet		Fittings		Hoses	
	Ft/Lbs	Nm	Ft/Lbs	Nm	Ft/Lbs	Nm
#4	N/A	N/A	N/A	N/A	135-145	15-16
#6	N/A	N/A	10-20	14-27	215-245	24-28
#8	25-30	34-41	25-30	34-41	430-470	49-53
#10	35-40	47-54	35-40	47-54	680-750	77-85
#12	85-90	115-122	85-90	115-122	950-1050	107-119
#16	130-140	176-190	130-140	176-190	1300-1368	147-155

FASTENERS

This standard applies to the preloading of fasteners measured by installation torque.

NOTE: For other preloading methods or fasteners, consult UpRight Engineering Department.

This general standard applies to all SAE and Metric fasteners, unless otherwise specified.

THREAD CONDITION

- For lubed or zinc plated fasteners, use K = .15
- For dry unplated fasteners, use K = .20

TORQUE TABLES

Torque Specifications for SAE Fasteners

		SAE J429 Grade 5			SAE J429 Grade 8		
	Nominal Thread Size	Clamp Load	Tightening Torque		Clamp Load	Tightening Torque	
			K=.15	K=.20		K=.15	K=.20
		lbs.	in-lbs.	in-lbs.	lbs.	in-lbs.	in-lbs.
Unified Coarse Thread Series	1/4 -20	2,000	75	100	2850	107	143
	5/16 - 18	3,350	157	210	4700	220	305
		lbs.	ft-lbs.	ft-lbs.	lbs.	ft-lbs.	ft-lbs.
	3/8-16	4,950	23	31	6950	32.5	44
	7/16-14	6,800	37	50	9600	53	70
	1/2-13	9,050	57	75	12800	80	107
	9/16-12	11,600	82	109	16400	115	154
	5/8-11	14,500	113	151	20300	159	211
	3/4-10	21,300	200	266	30100	282	376
	7/8-9	29,435	321	430	41550	454	606
	1-8	38,600	483	640	54540	680	900

		SAE J429 Grade 5			SAE J429 Grade 8		
	Nominal Thread Size	Clamp Load	Tightening Torque		Clamp Load	Tightening Torque	
			K=.15	K=.20		K=.15	K=.20
		lbs.	in-lbs.	in-lbs.	lbs.	in-lbs.	in-lbs.
Unified Fine Thread Series	1/4 -28	2,300	85	115	3250	120	163
	5/16-24	3,700	173	230	5200	245	325
		lbs.	ft-lbs.	ft-lbs.	lbs.	ft-lbs.	ft-lbs.
	3/8-24	5,600	26	35	7900	37	50
	7/16-20	7,550	42	55	10700	59	78
	1/2-20	10,200	64	85	14400	90	120
	9/16-18	13,000	92	122	18300	129	172
	5/8-18	16,300	128	170	23000	180	240
	3/4-16	23,800	223	298	33600	315	420
	7/8-14	32,480	355	473	45855	500	668
	1-12	42,270	528	704	59670	745	995

Torque Specifications for Metric Fasteners, U.S. Customary Units

	8.8 Grade 8.8			10.9 Grade 10.9			12.9 Grade 12.9		
Nominal Thread Size	Clamp Load	Tightening Torque		Clamp Load	Tightening Torque		Clamp Load	Tightening Torque	
		K = .15	K = .20		K = .15	K = .20		K = .15	K = .20
mm	lbs.	in-lbs.	in-lbs.	lbs.	in-lbs.	in-lbs.	lbs.	in-lbs.	in-lbs.
3	-	-	-	-	-	-	823	14.6	19.5
3.5	-	-	-	-	-	-	1,109	22.9	30.5
4	-	-	-	-	-	-	1,436	33.9	45.2
5	1,389	41.0	19.5	1,987	58.7	19.5	2,322	68.6	91.2
6	1,966	69.7	28.3	2,813	100.0	28.3	3,287	116.8	155.8
7	2,826	116.8	37.2	4,044	167.3	37.2	4,727	195.6	260.2
		ft-lbs.	ft-lbs.		ft-lbs.	ft-lbs.		ft-lbs.	ft-lbs.
8	3,579	14.1	18.8	5,122	20.1	26.9	5,986	23.6	31.4
10	11,742	27.9	37.2	8,117	39.9	53.3	9,486	46.7	62.3
12	8,244	48.7	64.9	11,797	69.7	92.2	13,787	81.1	108.4
14	11,246	77.4	103.3	16,093	110.6	147.5	18,808	129.1	172.6
16	15,883	125.4	166.7	21,971	173.3	230.9	25,677	202.1	269.2
18	19,424	171.9	229.4	26,869	238.2	317.2	31,401	278.1	371.0
20	2,304	243.4	325.3	34,286	337.8	449.9	40,070	394.6	525.9
22	30,653	331.9	442.5	42,403	458.8	612.2	49,556	536.2	715.4
24	35,711	420.4	562.0	49,400	583.4	778.1	57,733	682.2	909.4
27	46,435	617.3	84.8	64,235	853.4	1138.1	75,069	997.2	1329.8
30	56,753	837.9	1117.4	78,509	1159.4	1545.2	91,751	1354.9	1807.0
33	70,208	1140.3	1520.1	97,121	1576.9	2102.8	113,503	1843.9	2457.5
36	82,651	1464.1	1952.3	114,334	2025.3	2700.9	133,620	2367.6	3156.0

Torque Specifications for Metric Fasteners, SI Units

	8.8 Grade 8.8			10.9 Grade 10.9			12.9 Grade 12.9		
Nominal Thread Size	Clamp Load	Tightening Torque		Clamp Load	Tightening Torque		Clamp Load	Tightening Torque	
		K = .15	K = .20		K = .15	K = .20		K = .15	K = .20
mm	N	N-m	N-m	N	N-m	N-m	N	N-m	N-m
3	-	-	-	-	-	-	3,660	1.65	2.2
3.5	-	-	-	-	-	-	4,932	2.59	3.45
4	-	-	-	-	-	-	6,387	3.83	5.11
5	6,177	4.63	2.2	8,840	6.63	2.2	10,330	7.75	10.3
6	8,743	7.87	3.2	12,512	11.3	3.2	14,623	13.2	17.6
7	12,570	13.2	4.2	17,990	18.9	4.2	21,025	22.1	29.4
8	15,921	19.1	25.5	22,784	27.3	36.5	26,626	32	42.6
10	25,230	37.8	50.5	36,105	54.1	72.2	42,195	63.3	84.4
12	36,670	66	88	52,475	94.5	125	61,328	110	147
14	50,025	105	140	71,587	150	200	83,663	175	234
16	70,650	170	226	97,732	235	313	114,218	274	365
18	86,400	233	311	119,520	323	430	139,680	377	503
20	10,250	330	441	152,513	458	610	178,238	535	713
22	136,350	450	600	188,618	622	830	220,433	727	970
24	158,850	570	762	219,743	791	1055	256,808	925	1233
27	206,550	837	115	285,728	1157	1543	333,923	1352	1803
30	252,450	1136	1515	349,223	1572	2095	408,128	1837	2450
33	312,300	1546	2061	432,015	2138	2851	504,885	2500	3332
36	367,650	1985	2647	508,582	2746	3662	594,368	3210	4279

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El Distribuidor local / Il Distributore locale

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snorkel
www.snorkellifts.com

INDEX OF FASTENERS

Component no	DESCRIPTION
056064-016	Nut NylockNut DIN985 M16 10.0 ZincPlated
056064-020	Nut, NylockNut DIN985 M20 10.0 ZincPlated
058494-035	Bolt, HexSetScrew DIN933 M12 x 35mm 8.8 ZincPlated
056069-016	WASHER STEELFLATWASHER DIN125A M16 ZincPlated
056069-020	Washer, SteelFlatWasher DIN125A M20 ZincPlated
058480-040	Bolt, HexBolt DIN931 M16 x 40mm 10.9 Dacromet
11-0838	M16 x 130mm H.T. HEX BOLT DIN 931 GRADE 10.9 ZINC PLATED
510558-012	Bolt, HexSetscrew DIN933 M6 x 12mm StainlessSteel
510558-016	Bolt, HexSetscrew DIN933 M6 x 16mm StainlessSteel
510558-020	Bolt, HexSetscrew DIN933 M6 x 20mm StainlessSteel
510558-040	Bolt, HexSetscrew DIN933 M6 x 40mm StainlessSteel
510559-020	Bolt, HexSetscrew DIN933 M8 x 20mm StainlessSteel
510559-025	Bolt, HexSetscrew DIN933 M8 x 25mm StainlessSteel
510559-030	Bolt, HexSetscrew DIN933 M8 x 30mm StainlessSteel
510560-035	Bolt, HexSetscrew DIN933 M10 x 35mm StainlessSteel
510561-003	Washer, SteelFlatWasher DIN125A M3 StainlessSteel
510561-004	Washer, SteelFlatWasher DIN125A M4 StainlessSteel
510561-005	Washer, SteelFlatWasher DIN125A M5 StainlessSteel
510561-006	Washer, SteelFlatWasher DIN125A M6 StainlessSteel
510561-008	Washer, SteelFlatWasher DIN125A M8 StainlessSteel
510561-010	Washer, SteelFlatWasher DIN125A M10 StainlessSteel
510561-012	Washer, SteelFlatWasher DIN125A M12 StainlessSteel
510561-030	Washer, SteelFlatWasher DIN125A M30 StainlessSteel
510561-033	Washer, SteelFlatWasher DIN125A M33 StainlessSteel
510562-010	Bolt, SktCapScrew DIN912 M3 x 10mm StainlessSteel
510562-012	Bolt, SktCapScrew DIN912 M3 x 12mm StainlessSteel
510563-016	Bolt, SktCapScrew DIN912 M4 x 16mm StainlessSteel
510564-020	Bolt, SktCapScrew DIN912 M5 x 20mm StainlessSteel
510565-016	Bolt, SktCapScrew DIN912 M6 x 16mm StainlessSteel
510565-020	Bolt, SktCapScrew DIN912 M6 x 20mm StainlessSteel
510565-040	Bolt, SktCapScrew DIN912 M6 x 40mm StainlessSteel
510565-045	Bolt, SktCapScrew DIN912 M6 x 45mm StainlessSteel
510565-075	Bolt, SktCapScrew DIN912 M6 x 75mm StainlessSteel
510565-090	Bolt, SktCapScrew DIN912 M6 x 90mm StainlessSteel
510566-050	Bolt, SktCapScrew DIN912 M8 x 50mm StainlessSteel
510566-055	Bolt, SktCapScrew DIN912 M8 x 55mm StainlessSteel
510566-060	Bolt, SktCapScrew DIN912 M8 x 60mm StainlessSteel
510566-090	Bolt, SktCapScrew DIN912 M8 x 90mm StainlessSteel
510567-010	Bolt, CskSktFltMachScrew DIN7991 M6 x 10mm StainlessSteel
510567-016	Bolt, CskSktFltMachScrew DIN7991 M6 x 16mm StainlessSteel
510567-020	Bolt, CskSktFltMachScrew DIN7991 M6 x 20mm StainlessSteel
510567-025	Bolt, CskSktFltMachScrew DIN7991 M6 x 25mm 10.9 Stainless
510567-030	Bolt, CskSktFltMachScrew DIN7991 M6 x 30mm StainlessSteel
510567-035	Bolt, CskSktFltMachScrew DIN7991 M6 x 35mm StainlessSteel
510567-040	Bolt, CskSktFltMachScrew DIN7991 M6 x 40mm StainlessSteel
510567-045	Bolt, CskSktFltMachScrew DIN7991 M6 x 45mm StainlessSteel
510567-055	Bolt, CskSktFltMachScrew DIN7991 M6 x 55mm StainlessSteel
510567-060	Bolt, CskSktFltMachScrew DIN7991 M6 x 60mm StainlessSteel
510567-070	Bolt, CskSktFltMachScrew DIN7991 M6 x 70mm StainlessSteel
510568-020	Bolt, CskSktFltMachScrew DIN7991 M8 x 20mm StainlessSteel
510568-040	Bolt, CskSktFltMachScrew DIN7991 M8 x 40mm StainlessSteel
510568-060	Bolt, CskSktFltMachScrew DIN7991 M8 x 60mm StainlessSteel
510569-003	Nut, NylockNut DIN985 M3 StainlessSteel

Component no	DESCRIPTION
510569-003	Nut, NylockNut DIN985 M3 StainlessSteel
510569-004	Nut, NylockNut DIN985 M4 StainlessSteel
510569-005	Nut, NylockNut DIN985 M5 StainlessSteel
510569-006	Nut, NylockNut DIN985 M6 StainlessSteel
510569-008	Nut, NylockNut DIN985 M8 StainlessSteel
510569-010	Nut, NylockNut DIN985 M10 StainlessSteel
510569-012	Nut, NylockNut DIN985 M12 StainlessSteel
510570-006	Washer, SpringWasher DIN127B M6 StainlessSteel
510570-012	Washer, SpringWasher DIN127B M12 StainlessSteel
510571-025	Bolt, HexBolt DIN931 M10 x 25mm StainlessSteel
510571-070	Bolt, HexBolt DIN931 M10 x 70mm StainlessSteel
510572-006	Nut, HexNut DIN934 M6 StainlessSteel
510572-010	Nut, HexNut DIN934 M10 StainlessSteel
510574-008	Washer, PennyWasher M8x25 StainlessSteel
510575-040	Bolt, CskSktFltMachScrew DIN7991 M4 x 40mm StainlessSteel
510576-020	Bolt, SktButCapScrew DIN9427 M8 x 20mm StainlessSteel
510581-035	Bolt, HexSetscrew DIN933 M12 x 35mm StainlessSteel
510584-170	Bolt, HexBolt DIN931 M12 x 170mm StainlessSteel
510684-045	Bolt, HexBolt DIN931 M20 x 45mm 8.8 ZincPlated
510955-006	Washer,PennyWasher,DIN9021,M6,20mm,StainlessSteel
512517-020	Bolt,SktButCapScrew DIN7380 M6 X 20mm StainlessSteel
512848-045	Bolt,HexBolt DIN933 M20 x 2.5, 45mm,10.9,ZincPlated
513282-030	Washer, PennyWasher M8x30 StainlessSteel
513595-016	Bolt,SktButCapScrew DIN7380 M10 X 16mm StainlessSteel
514077-025	Bolt, HexBolt DIN931 M6 x 25mm,Stainless
514145-006	RivNut, M6, StainlessSteel
514150-012	Bolt, SktCapScrew DIN912 M5 x 12mm StainlessSteel
514154-005	Washer,PennyWasher, DIN9021,M5 x 15mm StainlessSteel
514160-080	Bolt, HexBolt DIN931 M12 x 80mm 10.9 Dacromet
514164-070	bolt, SktCapScrew DIN912 M16 x 70mm 12.9 Dacromet
514165-070	Bolt, HexBolt DIN931 M16 x 70mm 12.9 Dacromet
5569940/S	1" TABLE 3 FLAT WASHER LIGHT Stainless Steel
510571-100	Bolt, HexBolt DIN931 M10 x 100mm StainlessSteel
057082-000	M6 x 300mm THREADED BAR CLAMP BOLT ASSY-BATTERY
058502-020	Bolt SktCapScrew DIN912 M6 x 20mm 12.9 ZincPlated
501253-012	Bolt SktButCapScrew DIN9427 M6 x 12mm 10.9 ZincPlated
510560-050	Bolt, HexSetscrew DIN933 M10 x 50mm StainlessSteel
510570-008	Washer, SpringWasher DIN127B M8 StainlessSteel
510844-012	M6X12 Grub Screw
514079-030	Bolt, CskSktFltMachScrew DIN7991 M10 x 30mm Stainless
056687-040	Bolt, HexBolt DIN931 M16 x 40mm 8.8 ZincPlated
510565-055	Bolt, SktCapScrew DIN912 M6 x 55mm StainlessSteel
510566-085	Bolt, SktCapScrew DIN912 M8 x 85mm StainlessSteel
510569-014	Nut, NylockNut DIN985 M14 StainlessSteel
510585-040	Bolt, SktCapScrew DIN912 M12 x 40mm StainlessSteel
510596-040	Bolt, SktCapScrew DIN 912 M10
513817-010	N0. 8X3/8" Self Tapping Screw
514080-016	Screw, SlotCheeseHead DIN85 M3 x 16mm Stainless

SERVICE AND REPAIR

CONTENTS

INTRODUCTION

The Snorkel TL37J is a versatile means of gaining access in difficult locations.

The access platform is safe in operation providing that basic rules are observed in the setting up of the machine. This manual focuses on the maintenance and repair of the machine. Please read the operators manual available from Snorkel or from your local distributor prior to operating the machine.

All operator's and service personnel should have read and understood the operator's manual and received full training in the safe use of the machine before attempting to use it or carrying out repairs.

Always quote your machine serial number and date of manufacture when ordering spare parts.

The part number for this manual is found on the front cover.

CONSTRUCTION STANDARDS

The TL37J machine complies fully with the requirements of European standard EN280:2013.

TECHNICAL CHARACTERISTICS

TRAILER/ STRUCTURE/OUTRIGGERS

This consists of a variety of welded and folded fabrications which where necessary, contain bushed stainless steel pivots with grease nipples. The main components are shot blasted and then powder coated. The cylinders are wet painted. The machine also includes a fully automatic running gear with auto reverse and an integrated trailer lighting. At the towing end of the machine, there is a heavy duty coupling head as well as a pneumatic jockey wheel. The maximum allowable load on the outriggers is 10.3 kN and the allowable sideway inclination is 5 degrees.

EQUIPMENT	INFORMATION
Bottom ram	Double acting: Bore Ø 60.0 mm Rod Ø 40.0 mm
Top ram	Double acting: Bore Ø 60.0 mm Rod Ø 40.0 mm
Dropnose ram	Double acting: Bore Ø 60.0 mm Rod Ø 40.0 mm
Stabilizer ram	Double acting: Bore Ø 70.0 mm Rod Ø 40.0 mm
Basket levelling ram	Double acting: Bore Ø 40.0 mm Rod Ø 20.0 mm
Bottom & Top ram lock valves	Pilot operated over centre valves
Control valve (Platform)	Monoblock unit consisting of five double acting spools
Control valve (Ground)	Monoblock unit consisting of four double acting spools
Control valve (Stabilizer)	Monoblock unit consisting of four double acting spools
Bushes	Acetol resin polymer with sintered bronze base (DX)
Pivot pins	Stainless steel bright bar to grade BS970 303 S31 CW
Tyres	185R14C

Table 3-1: A list of equipment on the trailer and its associated features.

POWER PACK - BATTERY POWER OR MAINS POWER

This is a fully integrated power pack consisting of a motor, pump, relief valve, non-return check valve and a return filter with a dip stick for checking oil level. The pump is fitted with an internal suction strainer. The return filter is fitted with a breather and is used for topping up oil if required. The tank is fitted with a drain plug on the bottom face. A quick release coupling for checking oil pressure is also fitted on top of the pressure port.

POWER PACK - ENGINE

The engine is fitted with a separate pump which is fitted with a return filter and dipstick. The return filter is fitted with a breather and is used for topping up oil if required. The tank is fitted with a drain plug on the bottom face. The relief valve is mounted independently in close proximity to the pump together with a quick release coupling for checking hydraulic pressure.

The engine is fitted with an electric starter with its own independent starter battery. The engine can be started from the engine's start/stop key switch and from the remote start/stop push button from the platform.

SAFETY SYSTEMS

This is a full fail-safe hydraulic and electric system as required by EN280 and the machinery directive.

Emergency Stop Buttons

Emergency stop buttons are fitted on the machine to stop operation in an emergency. There are two emergency stop buttons; one on the upper control panel and the other on the lower control panel

Note

The lower controls override the upper controls. If the upper control emergency stop button is engaged, the lower controls can still be used to operate the aerial platform.

Emergency Lowering Switch

The Emergency lowering switch can be used to lower the platform in situations where the boom levers malfunction.

Note
The emergency lowering switch relies on the electrical system. The switch will not function if the electrical system is faulty.

Outrigger Indicators

The LED lights at the lower control station are indicators for outrigger stability. The outriggers are pressure sensitive to prevent operating of the booms until the outriggers are in full contact with the ground. It is not possible to raise the outriggers when the booms are extended.

Emergency Slew

A 17 mm socket together with a lever or spanner may be used to move the platform if there is a malfunction in the hydraulic or electrical system.

In the event of a failure, the machine can be manually slewed by moving the slew platform clockwise or anticlockwise by inserting the slew lever and rotating the gearbox by moving upwards and downwards.

Emergency Lowering Valves

In the event of a power failure, the emergency lowering valves on the top and bottom rams can be used to lower the booms.

Emergency Lowering Hand Pump

The emergency hand pump lowering procedure is available from the lower control station.

Guardrails

The guardrails help protect personnel from falling off the platform.

OPERATING SPEEDS AND NOISE LEVEL

Due to oil viscosity and the fluctuating supply of power on a machine fitted with batteries and/or an engine as its power source, the following nominal operating speeds reached are indicated on table 3-2. All speeds have been taken with fully charged batteries and at an ambient temperature of +10 degrees. Significant speed differences will be experienced if operating in cold climates with batteries in a semi discharged state or if the engine is poorly maintained. All speeds have been taken from the platform with 1 person on board.

Note

Mains power powered machines have different speeds.

FUNCTION	SPEED TIME/SECONDS	TOLERANCE/SECONDS
Bottom boom - up	40	+/- 5
Bottom boom - down	22	+/- 5
Top boom - up	24	+/-5
Top boom - down	16	+/- 5
Dropnose boom - up	18	+/-1
Dropnose boom - down	11	+/-1
Slew - clockwise 180 degrees	39	+/-10
Slew - counter clockwise 180 degrees	39	+/-10
Platform rotation	6	+/- 2
Emergency decent - top boom	38	+/- 2
Emergency decent - Bottom boom	40	+/- 2

Table 3-2: A list of functions and their associated speed times.

DUTY CYCLES

The mains power pack and the engine are both continuously rated. The engine speed is fixed and must not be altered.

BATTERY

With well maintained batteries, you will be able to get the following operations from one full charge in a simulated working environment. For one cycle, lifting to full elevation and lowering can take place 10 times with a 5 minutes break. The cycle also includes lifting and lowering the outrigger at ground level once. A total of four cycles can be achieved from one full charge.

This will provide the operator under normal circumstances, a full days work. The charger can also be connected to the mains supply if re-charging is needed. The machine cannot be run directly from

the charger as the current drawn from the motor is higher than the output from the charger. It is important to cool the machine for 5 minutes to prevent the motor from being overloaded.

MAINTENANCE SCHEDULE

GENERAL

A well maintained machine will provide years of trouble free operation. It is important to carry out set out checks of the machine's structure and component prior to use or when set up for transportation.

Note
All machines operated in the UK must have a thorough inspection carried out every 6 months in accordance with LOLER regulations 1998 and a Certificate of Thorough Inspection produced by a competent person. Contact Snorkel for further details.

OPERATOR'S RESPONSIBILITY

It is the responsibility of the operator to ensure that the machine is safe to use. To do so, all the daily checks provided should be performed prior to operating the machine. The weekly and 6 monthly period checks should be performed for maintenance purposes.

The information on the maintenance schedule are set to cover most eventualities. If further advice is needed, contact Snorkel or its local representative.

Note
If this manual was not issued with the machine, check for updates and revisions from Snorkel or its local representative. Failure to maintain the machine as specified will invalidate the warranty.

WARNING

Always ensure the machine is in good, sound and undamaged condition. When carrying out maintenance and repairs. Always clean the machine thoroughly. Take care not to steam the batteries or the electrical components.

DAILY CHECKS	ACTION	NOTES
Hydraulic system	Ensure the machine is on level ground.	Use SHF22 oil or equivalent. Change oil and filter every 6 months.
	Top up the oil using the return line filter on top of the tank. Oil must be at the bottom mark on the dipstick.	
	Check out for oil leaks.	
Engine	Check oil, filter and fuel.	Refer to OEM manual for more information.
	Check for leaks.	
	Check battery.	
	Top up with distilled water only 6 mm above plates	
Level gauge	Check that the level gauge is present and secure	
Physical damage	Check for physical damage to the booms, tie bars, basket, slew and the chassis.	Do not use a damaged machine.
	Check that all warning labels are legible and in place.	
Nuts, bolts & fittings	Check for missing and loose nut and bolts.	Replace immediately
Locking pegs	Check that all locking pegs are present.	Broken peg = seized shaft.
	Check that no shafts are seized.	
Transport locks & lifting points	Check that all transport lock pins are present.	Do not transport machine without locking pin.
	Check for damaged lifting points.	
Battery & Charging	If fitted, check the operation of the charger.	
	Record specific gravity of each cell.	
	Clean top of the battery.	
	Clean and check terminals.	
Emergency stop	Check that all emergency stop switches are working.	Turn to release.
Electrical system	Check for correct operation of the complete electrical system.	
Electrical safety system	Check that the booms cannot be operated until the outriggers are down and in contact with the ground.	
	Check that the outriggers cannot be raised with the top or bottom boom elevated.	
Hydraulic safety system	Check that all emergency lowering valves work.	
	Check emergency slew	
	Check emergency hand pump.	

Wheels	Check tyres for damage.	55 PSI 3.8 Bar
	Check wheel nuts and tyre pressures	
Running gear	Check parking brake.	
	Check overrun device.	
	Check for damage.	
Trailer lights	Check for correct operation if towing.	

Table 3-3: Daily checklist.

WEEKLY CHECKS	ACTION	NOTES
Lubrication	All grease nipples. Depending on machine use and operating condition, different intervals may be acceptable.	
Slew gear	Check slew gear for excessive wear. Grease, if needed.	

Table 3-4: Weekly checklist.

MONTHLY CHECKS	ACTION	NOTES
DC motor	Check and replace motor brushes if the machine is used very frequently.	If 2/3 worn out, replace
Wheel bearings	Check for wear - Perform checks after every 3000 miles	

Table 3-5: Monthly checklist.

6 MONTHLY CHECKS	ACTION	NOTES
Thorough Inspection	Contact Snorkel or its local representative.	Change oil and filter.

Table 3-6: 6 Monthly checklist.

MAINTENANCE PROCEDURE

POWER PACK

The power pack consists of a fully integrated pump, tank, preset relief valve and a return filter. The biggest cause of hydraulic problems is due to contaminated oil and filter. The oil and filter needs changing at least every 6 months even though the hydraulic system is a closed system. The only access for external dirt is through the filter breather. Contamination will occur due to seal kit wear (black sludge in the bottom of the tank, mechanical wear from the gear pump, valve block and cartridges in addition to water contamination due to tank condensation). Refer to the power pack section for more details.

The hydraulic system is fully self contained. Oil tank capacity is 15 litres. When operating above 0°C, ISO22 grade hydraulic mineral oil (refer to health & safety guidelines supplied with the oil prior to handling) is recommended.

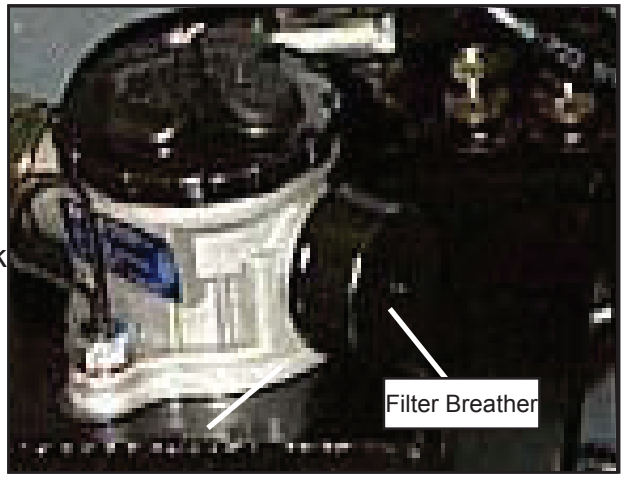


Figure 3-1: Filter breather location.

The main cause of hydraulic issues, sticking valves and leaking cylinders is due to contaminated oil. There is no need to replace the oil in the hose. Replace the oil in the tank and filter every 6 months.

Oil is not discharged from the system and as a result, if oil is required, this would indicate an oil leak which must be investigated prior to using the machine.

CORRECT OIL LEVEL

It is critical that the correct oil level is maintained. Too little oil will cause cavitation and failure of the pump. Too much oil will lead to oil leak through the return filter breather or a massive oil leak when using the emergency lower valves on the top and bottom boom. When using the emergency lower valves, enough space is required in the tank to accommodate oil which normally would be pumped into the annular side of the cylinder. If this should happen, clean up the oil spillage. Fully extend all rams and then close up all the rams to check for the amount of free space in the tank using the dip stick. The correct level expected is that at the bottom mark of the dipstick.

DC MOTOR & PUMP

The hydraulic pump is submerged in the tank. Oil is drawn in through a suction strainer protecting the pump. The DC motor is directly coupled to the pump shaft. On the AC motor, a small adaptor coupling is used between the motor and pump shaft. To replace the pump;

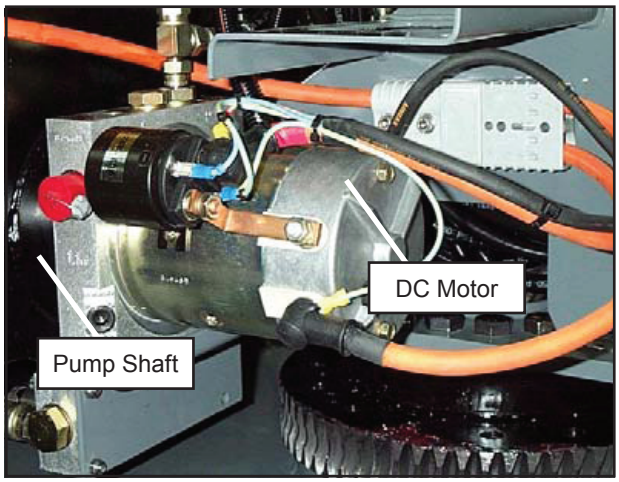


Figure 3-2: DC motor coupled to the pump shaft.

1. Remove the tank by removing the 4 bolts securing it in place.
2. Remove the power pack from the machine.
3. Remove the 4 fixing bolts securing the pump to the aluminium block.
4. With the pump removed, inspect the gears for wear.
5. If the gears are worn out or broken, replace the complete pump. The replacement pump is a unit consisting of the gears but without the strainer.
6. Torque the 4-5/16 hex fixing bolts evenly to 17.63 Nm (13 ft/lbs) to ensure correct operation of the pump. Do not overtighten.
7. Before re-fitting, thoroughly clean the tank and the magnet found inside.
8. De-grease and replace the large “O” ring and apply a small amount of silicone around the circumference of the de-greased tank neck.
9. Place the tank back on and secure with the 4 bolts removed earlier.

Note
The relief valve is factory set to 210 bar.

The DC motor can be removed without worrying about oil spillage.

1. Remove the 2 bolts shown in Figure 3-3 at the end of the motor.
2. Withdraw the motor taking care not to strain the wires.
3. For optimum performance of the DC motor, replace the motor brushes when they are 2/3 worn out. If the machine is used extensively, changes must be made at least every 6 months.
4. Fully remove the motor from the power pack to be able to replace the brushes.
5. Blow out dust on the brushes using compressed air before re-assembling the motor.
6. Check the motor shaft bearing and replace if worn out. Replacing the contactor is recommended at the same time as replacing the brushes. The unit is fully sealed and contains no serviceable parts.
7. Press on the platform raise/lower button. If the motor carries on running and there's no power at the contactor coil, the contactor needs replacing. To stop the motor in this situation, use the battery disconnect plug or lightly tap the contactor on its end with the handle of a large screw driver to free the internal contact points.

Note
The main relief valve is factory set to 210 bar and should not need adjusting. Breaking the seal during the warranty period will invalidate the warranty.

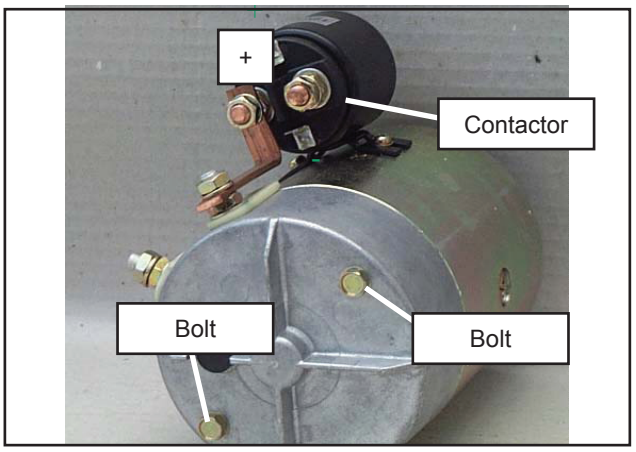


Figure 3-3: DC motor showing contactor and bolt location.

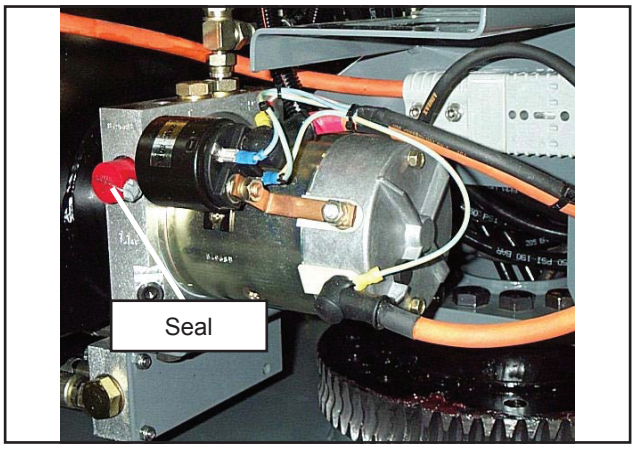


Figure 3-4: A view of the seal location.

SOL 1

The SOL 1 valve diverts oil from the outrigger control valve firstly to the ground control valve and then to the platform control valve. Never operate the coil unless it is on the valve cartridge. This risks burning out the coil.

GROUND CONTROL VALVE

The ground control valve provides full control over all functions apart from the platform slew. The adjustable relief valve is preset at the factory to approximately 190 bar. This setting is put in place to ensure only the safe working load (SWL) is lifted. The centre position is closed to prevent oil back feeding into the tank when operating the platform controls.

PLATFORM CONTROLS

The platform controls is identical to the ground controls apart from the extra valve blank needed to control the slewing platform ram. The orifice in the platform slew fitting is there to prevent the platform from turning too quickly.

HAND PUMP

The hand pump enables lowering and operates the slew in case of an emergency. The pump is fed from the general return line. It is theoretically possible to extend the cylinder with the hand pump but the force required is excessive and the fixing bracket for the hand pump is not designed to take such a load. If no resistance is felt when operating the hand pump, try to operate the platform slew or the drop nose to prime the pump.

PLATFORM SLEW

The cylinder has no lock valve. It relies on the closed centre of the spool to prevent it from moving.

ALL OTHER BOOM CYLINDERS

Lock valves are fitted to prevent uncontrolled movement in case of hose failure.

STABILIZER CONTROL VALVE

In the centre position, this block has the B port connected to the tank. This is to ensure that the outrigger cylinder check valve closes quickly when setting up the machine. The 4 restrictors are there to prevent cylinder juddering caused by the check valves fitted to the outrigger cylinders.

The TL37J can be fitted with a variety of power options. The battery powered machine has only one solenoid valve fitted (SOL 1). Both the engine and the mains powered version have a separate dump valve fitted (SOL 2). This is because oil is in circulation all the time and not just when a cylinder movement is required as on the battery version. Having oil circulating through the different valve blocks may lead to uncontrolled movements should the controls be accidentally operated. By fitting the dump valve, the oil will always flow to tank unless the dump valve is activated.

Refer to the relevant circuit diagram under schematics or contact Snorkel or its local representative for further information if required.

TOP & BOTTOM RAM

Each ram is fitted with a manual release to enable lowering of the boom in case of an emergency. Press down on the red button as shown in Figure 3-5 and hold. When released, the red button will spring out and the movement should stop.

If the cylinder is operating erratically (jamming at odd intervals with the motor running), check that the little restrictor disc fitted at the nose of the cartridge is not loose. The disc is held in place with a small circlip. Replace cartridge.

The O/C valve enables the oil to flow freely into the cylinder but will not let any oil flow out until a pilot signal is received when pumping oil into the annular side of the ram. The O/C valve will then open up and let oil flow out in a controlled manner.

The O/C valve is also fitted with an adjustable relief valve which must be set to 1.25 times the maximum pressure inside the cylinder. If the cartridge is marked with CBBA, the adjusting screw is turned CCW to increase pressure.
If screwed fully CW, the cartridge is now fully open and does not hold any load. The O/C valve must be set correctly to ensure safe operation.

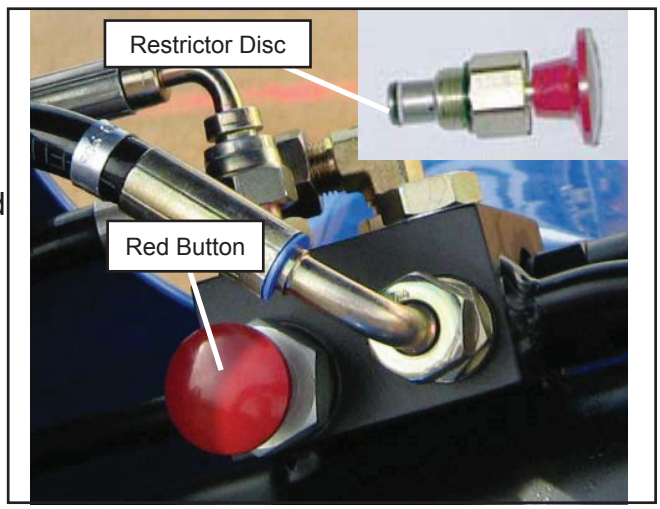


Figure 3-5: A view of the manual release valve and restrictor disc.

RAM NOT HOLDING UNDER LOAD

Releasing the controls must stop the cylinder movements.

- It is not advisable to leave an extended machine unattended to for a lengthy period of time.
- It is normal to expect slight creep over time however during normal operating conditions, the ram should hold the load and not move once the lock valve cartridge has closed. This may take between 1-2 seconds after the directional valve has been returned to the centre position. The pilot pressure holding the valve open must be allowed to drain back into the tank to allow the lock valve to seat fully.

When a cylinder is not holding the load in place, it is critical to know which part from the following list has failed.

- Cylinder piston seal.
- O/C valve (check valve)
- Emergency lowering cartridge (if fitted)

The efficient way of establishing where the failure is, is by removing all the hoses to determine where oil is leaking out from.

- If leakage is from the emergency lowering cartridge, clean or replace (#3).
- If leakage is from the O/C valve, clean and adjust the relief valve or replace (Check valves are non adjustable and can only be cleaned or replaced) (#1).
- If the leakage is from the piston seal kit, replace. The leakage is possibly through annular port which has no lock valve (#2).

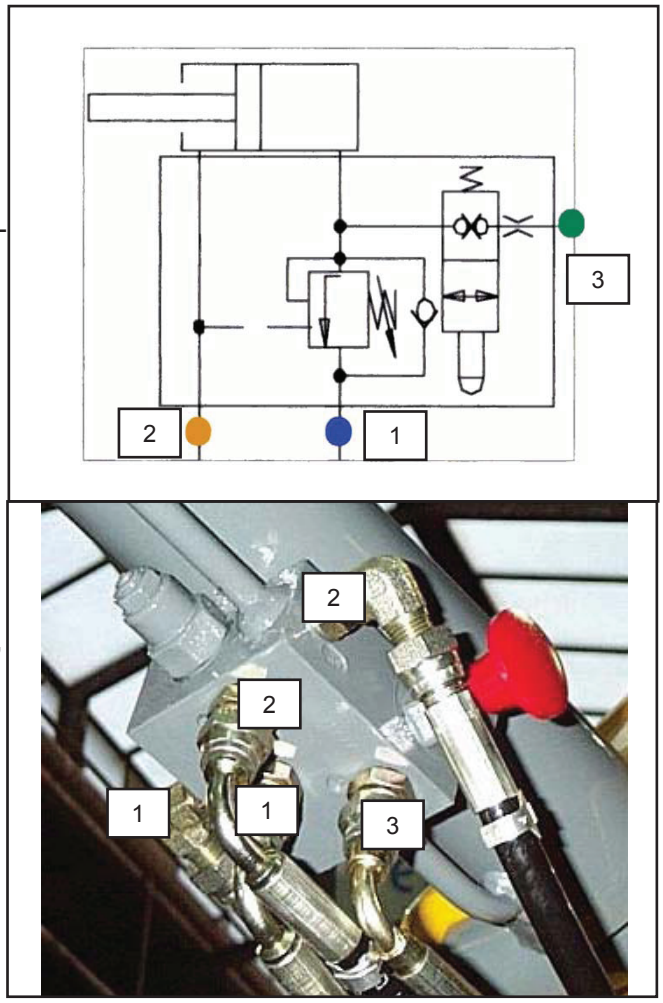


Figure 3-6: For clarity, the drawing shows only one hose to each service. In reality, there are two hoses. One for the platform controls and one for the ground controls. Only the emergency lower has one hose.

DROPNOSE RAM

The dropnose ram is fitted with two O/C valves. There are two ways to determine which component has failed.

1. Remove all hoses to determine where the oil is escaping from.
2. If the oil is escaping from the full bore side, the full bore O/C valve must be faulty.
3. Slowly open the adjusting screw for the O/C relief valve on the annular side.
4. The piston seals have failed if oil starts to flow out from the annular side and the cylinder is starting to close up at an increased speed. Replace the piston seals.

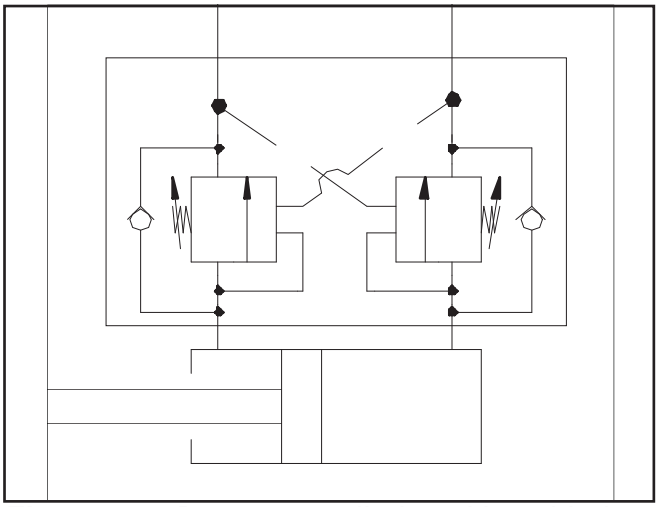


Figure 3-7: Dropnose cylinder with welded on block containing 2 adjustable O/C valves.

OUTRIGGER RAM

The outrigger ram is fitted with two check valves. They require no adjustment. If the outrigger is not holding under load, it is most likely that the check valve for the full bore side is leaking. The check valves are difficult to get to as the block is tucked away on the underside of the ram.

- With the outrigger retracted, remove the rod pin.
- Swing down the outrigger to remove the cylinder.
- Both check valves are identical. Swap them over to determine if the cylinder stops moving.

The full bore check is performed to ensure that the outriggers stay down when the booms have been lifted (#2).

The annular side checks are performed to enure that the outrigger remains vertical when towing the machine (#1).

The restrictor is critical to prevent the outrigger from juddering when raising the outrigger to the transport position. Do not replace with a non restricted hose adapter (#3).

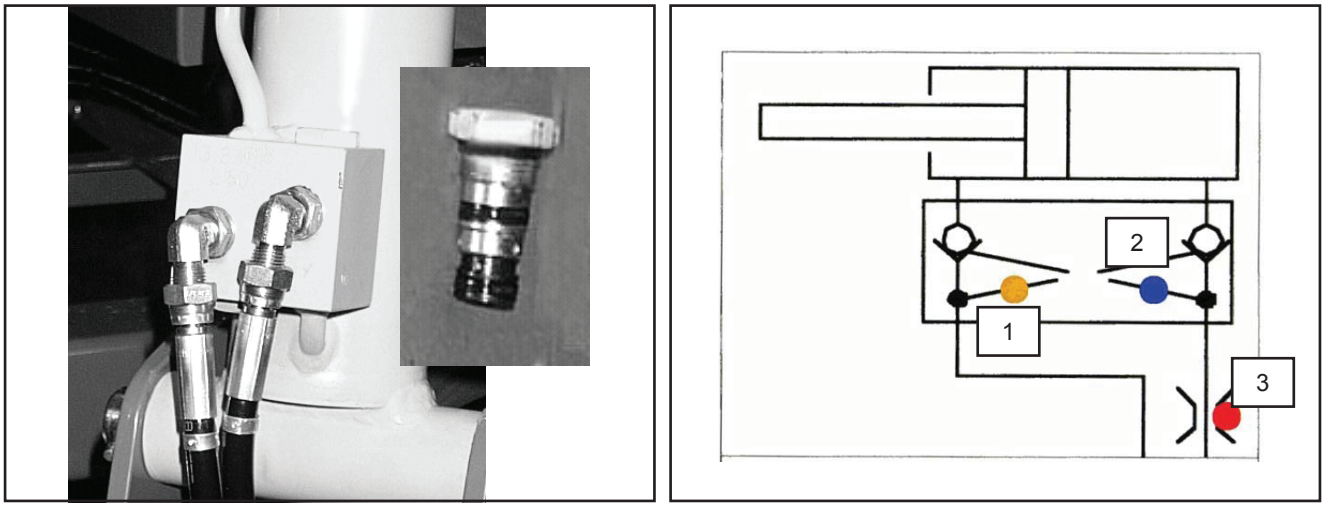


Figure 3-8: Outrigger cylinder with welded on block containing the two check valves. The restrictor shown is the hose adaptor fitted in the outrigger control valve.

PLATFORM CONTROL VALVE

The in-line check valve is found below the manual hand pump. The valve prevents the oil from flowing back down the pressure line when operating the hand pump. The relief valve is set at 190 bar and should be adjusted in accordance with the set up procedure.

To adjust the pressure, remove the cap of the relief valve and screw the adjusting screw inwards to increase pressure and outwards to decrease pressure. Place the cap back after adjusting.

The spools are all the same and are closed centred in the neutral position. It is critical that the valve block does not leak internally when in the neutral position. Note that there are two valve blocks with each connected together at the lift cylinders. If the ground valve is not leak free with the spool in the neutral position when operating the platform valve, the oil will not flow into the cylinder but leak out through the ground valve. The same scenario applies for operating the ground controls when the platform valve is leaking internally. This can also occur if the spool is not properly centralised by the spring at the end of the spool.

In a situation where the ground controls function well but the operation of the boom from the platform controls does not work, then the valve responsible for making the booms lift/lower is the faulty valve.

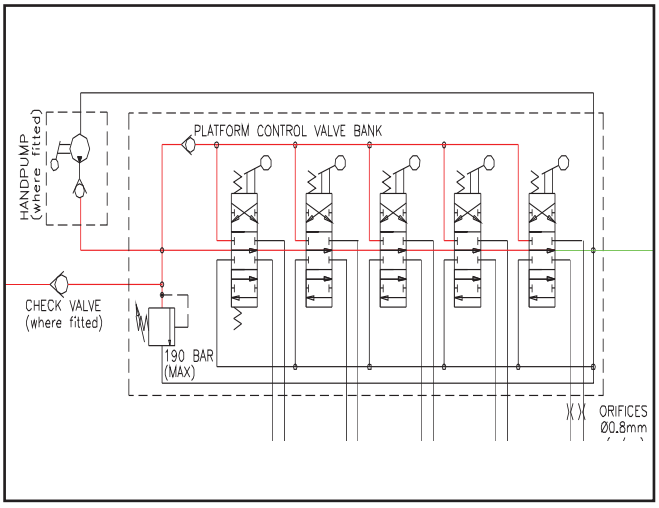


Figure 3-9: A view of the platform controls and check valve location.

GROUND CONTROL VALVE

This valve is identical to the platform control valve except

- It is not possible to operate the platform slew from the ground controls. On the ground control valve schematic shown in Figure 3-10, the last spool is that of the platform slew.
- A high pressure carry over plug has been fitted to the ground control valve to allow oil under full system pressure to pass through it. Without the internal plug, it is impossible to operate the platform valve as all the oil will flow directly back to the tank.

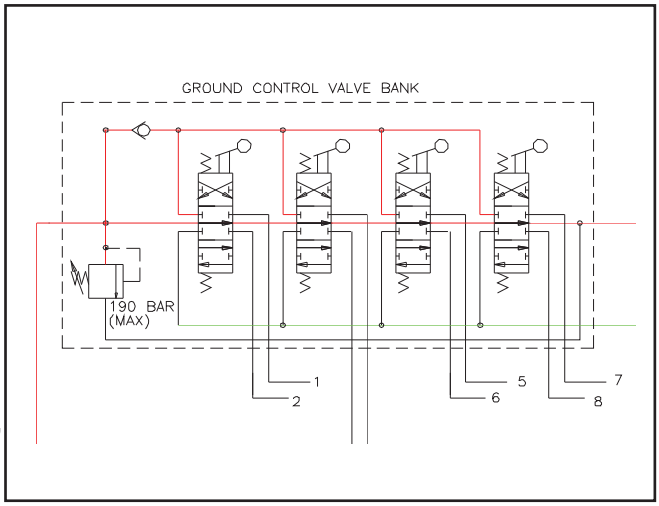


Figure 3-10: Ground control valve.

If it is necessary to operate the ground control valve, make sure the carry over plug is fitted. The plug is found inside the valve under the fitting for the return line. Shine a light down the port to make the Allen head grub screw visible. If not in place, use the head grub screw fitted to the replacement valve.

Incase of an oil leak from the valve block, it is most likely to be from the end cap. This refers to either the end where the lever is or at the opposite end where the return spring is. Never fully withdraw the spool. Push it out opposite to where the leak is coming from with sufficient space to clear the “O” ring which can now be observed with a small screw driver. Apply plenty of grease and keep well lubricated when pushing the spool back in. If the spool is not centring, check that the return spring and the end cap is well secured.

DIVERTER VALVE

When the diverter valve is not activated (no power on the coil), the oil will flow to the outrigger control valve. When activated, the oil flows to the ground control valve. Incase of a reduced flow and a high pressure drop over the valve, the valve could be sticking. Remove the cartridge from the aluminium body and clean. Also look for contamination in the valve or valve cavity.

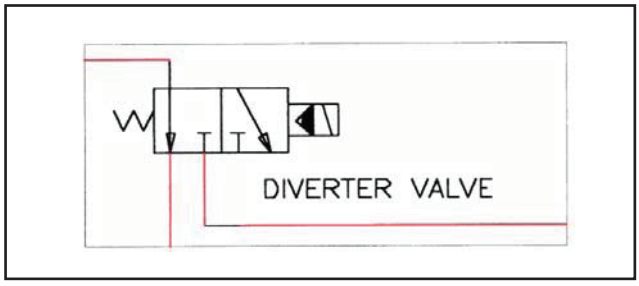


Figure 3-11: Diverter valve schematic.

To check that power is reaching the coil, hold a screw driver against the end of the coil. When the

coil is activated, a strong magnetic force is felt pulling the screwdriver towards the nut securing the coil to the cartridge.

Do not use great force when securing the coil to the cartridge as the casing can easily crack due to thermal expansion when heated up during use. The coil will fail if water gets through the crack.

OUTRIGGER CONTROL VALVE

This valve is not interchangeable with the ground control valve even tough it is a 4 bank valve block with a relief valve and looks identical to the ground controls.

When the spool is in the neutral position, the annular side of the ram is attached to the tank line. This is done to ensure that the pilot pressure holding the check valve on the full bore open is drained of quickly to tank so that the check valve closes quickly.

If the valve block is replaced, make sure that the piping is done exactly as shown. Rely on the closed port as back up for the check on the full bore side.

Note that earlier versions might not have this type of spool. This type can easily be identified as it has a “DIN - Oil” stamped on the end cap. This type used a standard closed centre valve block. The leakage rate across the closed centre spool is high enough to ensure that the deck would close.

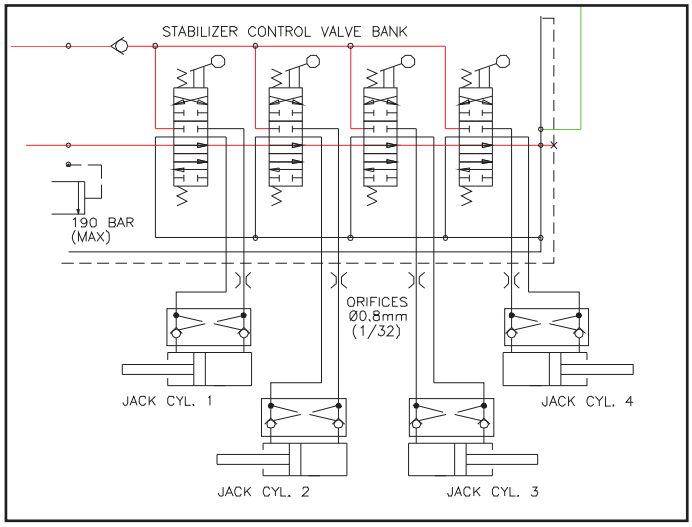


Figure 3-12: Schematic view of outrigger control valve.

Each A port has a restrictive hose adaptor fitted in the valve block. If the restrictor gets blocked, the cylinder will not operate correctly.

When looking for a fault relating to cylinders and valve blocks, swapping hose connections can easily provide a good pointer to where the fault is. If the fault position doesn’t change, then the fault is in the valve block. If the fault position moves, then the fault is in the cylinder.

Do not overtighten the hose fittings. Overtightening can lead to leakages due to deformation of the adaptor cone.

RESTRICTORS

All valve blocks have restrictors fitted at different locations. The current versions (2002) of the TL37J uses a hose adapter with a drilled hole. Other types which have been in use (and currently are on other machines) are a simple copper washer with a sized hole. The copper washer is squashed between the hose fitting and the adapter screwed into the valve block.

It is easy to observe that a copper washer type restrictor has been used as it looks like the hose fitting is not screwed fully down onto the adapter in comparism to the hose fitting next to it. A large force is needed when tightening the hose fitting to prevent leaks.

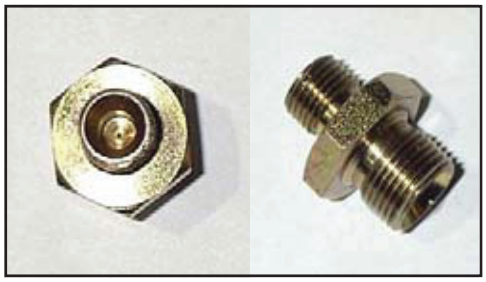


Figure 3-13: Hose adaptor shown here with drilled hole. If cylinder movement is erratic, check for contamination.

Figure 3-14: Copper restrictor fitted loose in the hose adaptor. Hose end requires more torque to prevent oil leak when securing hose.

SLEW MOTOR

The slew motor is a high torque low speed hydraulic motor. The slew motor is bolted directly on the slew gear. Apart from greasing and checking for oil leaks, no maintenance is required.

The motor can be unbolted from the slew drive to check for leakage. A full seal kit is available with overhaul instructions. Location 3 and 4 on figure 3-15 indicates the hoses going to the platform controls.

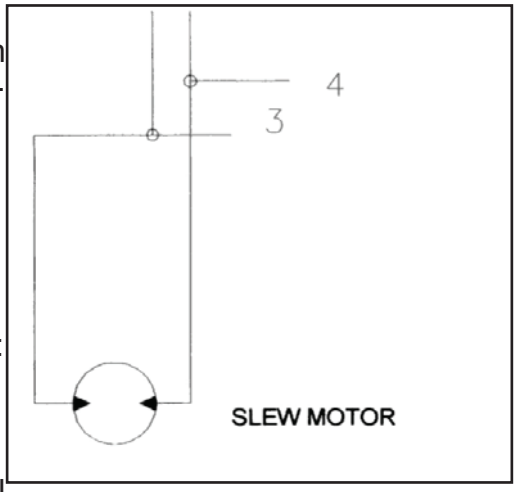


Figure 3-15: Hose connections to the platform controls.

GENERAL TESTS OF LOAD HOLDING VALVES

All critical movements rely on 2 components for safety namely:

- The lock valve on the cylinder
- The closed centre on the valve block

The valve blocks used have very low leakage rate. This is ideal for the slewing platform ram which has no lock valve.

To determine which load holding valve is in use be it the valve block or cylinder lock valve, perform the procedure below.

- With the pump not running, operate the valve blocks which leads to closing the ram up.
- If there is cylinder movement, then there is a leaking load holding valve on the cylinder.
- Do not use a machine with a failed load holding valve.

SLEWING PLATFORM RAM

Do not operate the slewing platform ram valve lever without the pump turning. If operated, the valve lever can push the platform from side to side. This allows air to enter the system and the platform will not stay put during transportation.

If this occurs, move the valve lever with the pump running. Moving the platform from side to side will fill the cylinder with oil and the platform will lock in place when the lever is released.

BLEEDING

The hydraulic system needs no special bleeding. If a cylinder is stripped down or hoses for repair removed, operate the cylinder fully in and fully out for the system to be operational.

Note

- *Replace filter and oil regularly.*
- *Make sure the oil in the tank is clean.*
- *Never use dirty cans when filling up the tank with oil.*
- *In situations where oil replacement is needed, the system must be leaking.*
- *Use the right oil for the right temperature:*
  - *Below 0° C - use low viscosity oil.*
  - Above *0° C - use regular grade oil.*
- *Keep a log of relief valve settings to monitor pump performance.*

HYDRAULIC PUMP

The engine drives a hydraulic pump via a spider type coupling.

If there is a loss of oil pressure experienced and the motor is running correctly, use the check procedures stated below.

- First check that the hydraulic system is working correctly by checking that the dump valve is activated. If the dump valve is working and there is still no oil flow, the issue is most likely to be a failed pump or that the coupling is spinning on the motor or pump shaft.
- Remove the bell housing to check that each coupling half is secured on the shaft. Then remove the pump and check the internal gears.

- The stop/run/start key switch is located on the right hand side of the engine. Also available is a separate start/stop push button on the platform controls.

Some engines are equipped with an automatic electrical choke (Figure 3-16) to facilitate remote cold start. For the engine to start remotely, the key switch on the engine must be in the run position. If not, the engine will turn over on the starter but will fail to ignite.

The platform's control circuit is powered by the engine's start battery. The built in heavy duty 10 A alternator will re-charge the battery during use. If the engine is not turning over when trying to start, the most likely cause is a dis-charged battery. Jump start using another 12 V battery or use the manual recoil fitted on all engines.

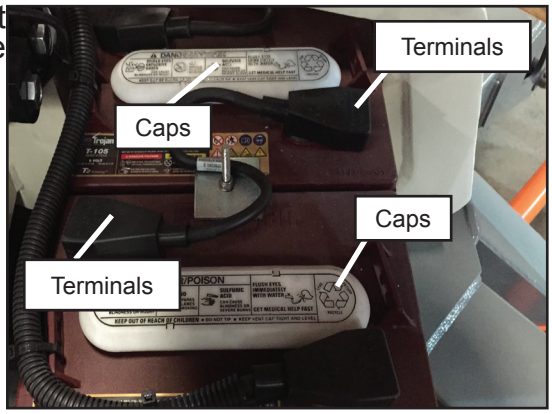


Figure 3-16: Check battery weekly and top up with distilled water if required.

Always switch the keyswitch on the engine position when not in use to isolate the circuit. Should the engine turnover without starting, check the fuel level first and then look at the electrical circuits for faults.

Note
Always let the engine reach operating temperature before loading the hydraulic circuit.

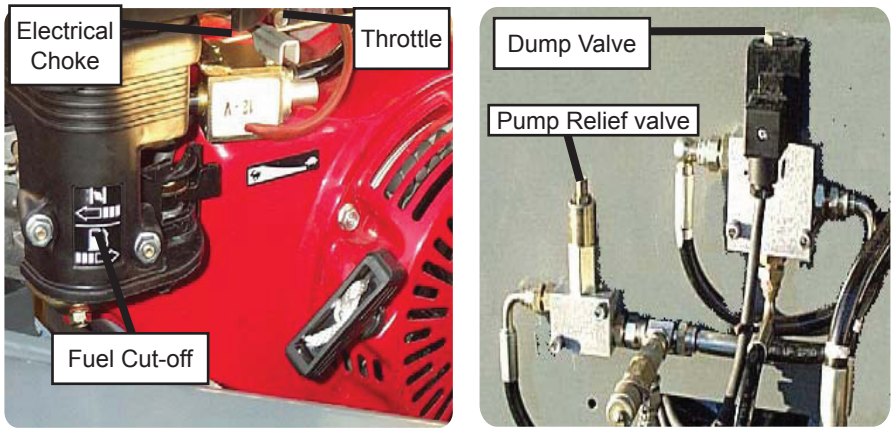
Some engines are fitted with a low oil level safety cut out which will stop the engine and prevents starting if the oil level is low.

Note
The engine Stop/Run/Start key switch must be in the run position even when starting the engine manually.

Check the battery level weekly and top up with distilled water if required.

ENGINE SETTINGS

The throttle is locked and must not be tampered with. If the boom speeds are not in accordance with the time test sheet, the engine speed may have to be adjusted. Set the engine speed by adjusting the throttle to give required pump flow which in turn governs boom speed. Then set the throttle end stop and secure the throttle from turning using a lock nut on the throttle spindle. Use fuel cut-off when moving the machine over long distances.



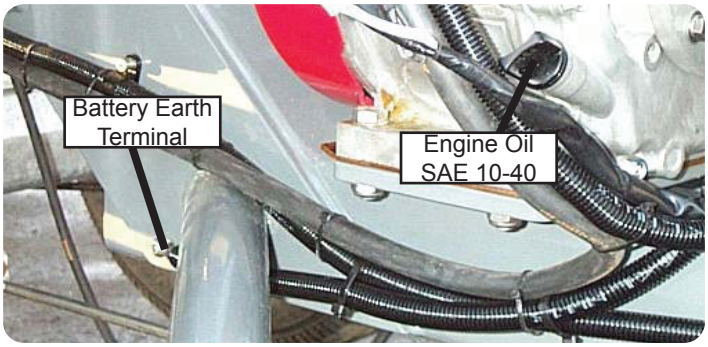


Figure 3-17: Engine settings.

ELECTRICAL START/STOP

The full engine electrical diagram shown below is not integrated in the main electrical diagram for the machine. The engine is stopped by letting the signal to the ignition coil go to earth.

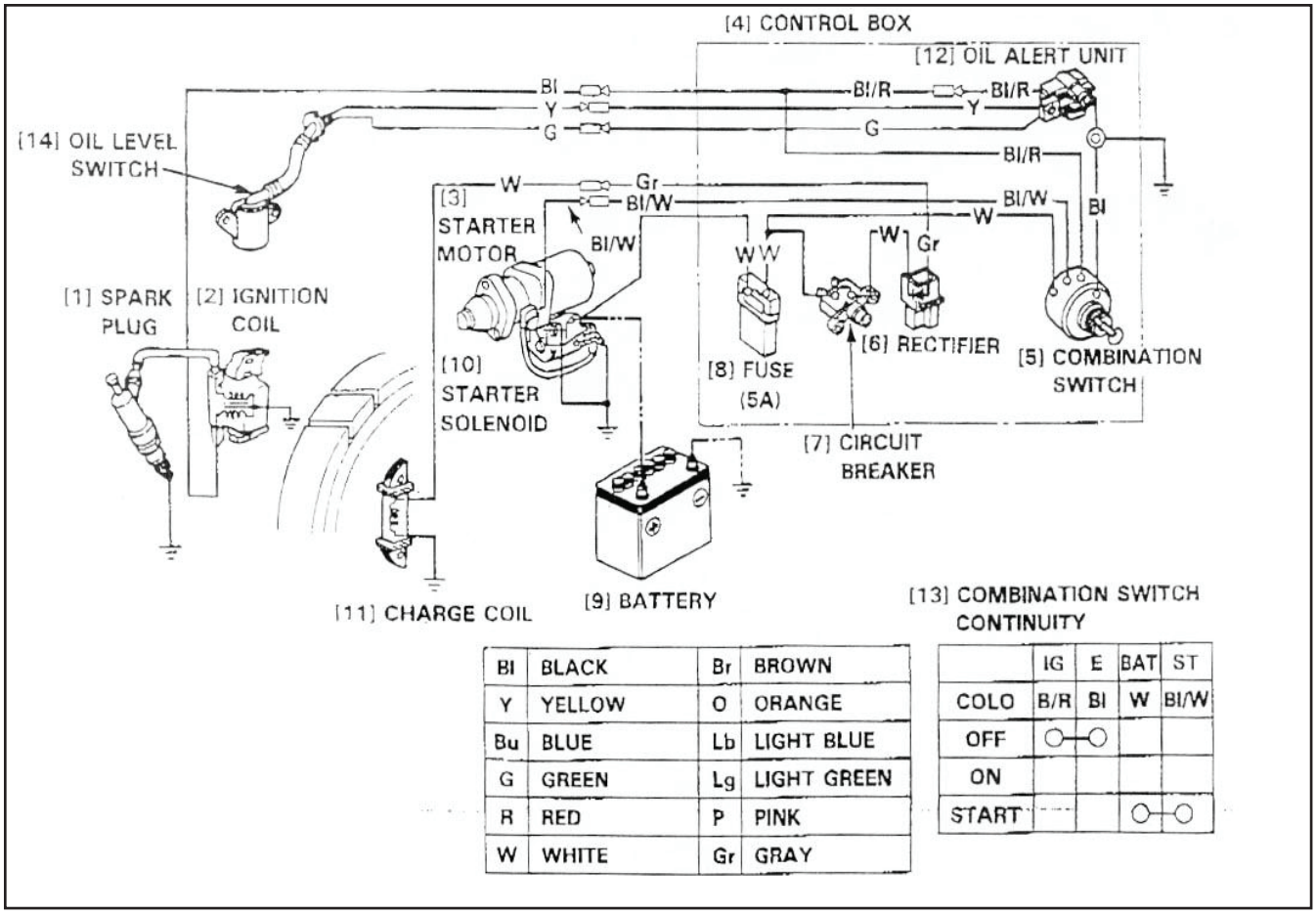


Figure 3-18: Engine engine schematics.

LEVEL GAUGE

The level gauge used for setting up the machine is located next to the outrigger control valve block. If the level is damaged or has been removed, do not use the machine until a new level has been fitted.

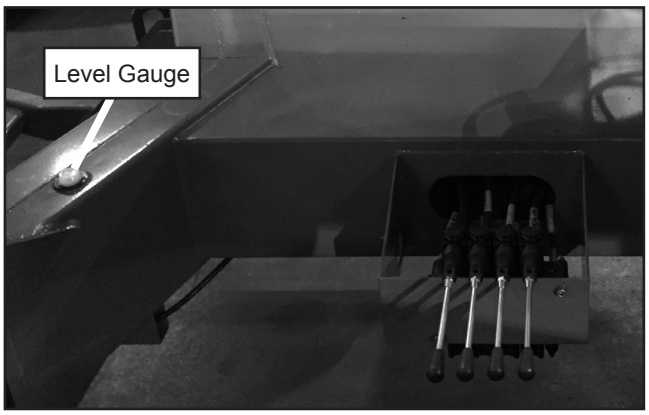


Figure 3-19: Level gauge location.

PHYSICAL DAMAGE

When looking for physical damage, it is important that the machine is clean. Large dents in the boom from operators hitting obstacles are generally easy to see. Crack in welds or corrosion damage can be harder to spot. The biggest wear and tear is due to the constant vibration from towing the machine. Curbs and speed bumps passed at high speed can also cause severe damage to the tow bar or the axle.

On machines fitted with the optional sliding axle, inspect the underside of the axle carrier and the sliding box suspension.

On machines fitted with the fixed axle, check the fixing bolts and the main chassis member.

Check the area just behind the coupling where the vertical boom is secured to the tow bar. Incase the vertical boom is not secured to the tow bar and the machine is towed over a long distance on poor roads, damage may have occurred due to the constant banging of the vertical boom against the towbar. Also check the top boom rest. The top boom must be locked in place during transport.

Note
Forgetting to lower the boom leads to damage occurring to the underside of the top boom due to movement in its rest position during transportation. Fitting the top boom lock would greatly reduce the need for top boom repairs or possible replacement.

Another area prone to damage is the drop nose. When reversing, the basket may hit a low wall or a post. The impact may not be easy to spot on an already battered basket however may bend the bottom of the drop nose. Check the straightness of the top tie bar. A slight dip is acceptable but a kink or sideways bend is unacceptable. Check both booms for creases in the steel next to the main bosses which is next to the slew post and the vertical boom. Hoses and cables are prone to damage, wear and tear. If the outer sheathing on the hydraulic hose is a slightly frayed fitting, a temporary outer sleeve may be adequate depending on the size of the damage.

Note
If in doubt, replace or ask Snorkel or its local representative for advice.

NUTS & BOLTS

Replace any missing bolts immediately. The main pivot shafts and pivot pins are secured with one or two locking pegs. The locking peg not only secures the shafts from falling out but also stops them from turning.

Most nuts used are nyloc nuts which are superior to the normal full nut and spring washer. Never use plain nuts and spring washers unless originally fitted. Always torque fixings.

THREAD SIZE	MAXIMUM TIGHTENING TORQUES			
	UNPLATED		PLATED	
	Nm	Lbf.in.	Nm	Lbf.in.
M4	4.6	40.7	3.5	31
M5	9.5	84.1	7.1	62.8
M6	16.0	142.0	12.0	106.0
M8	39.0	345.0	29.0	257.0
M10	77.0	682.0	58.0	513.0
M12	135.0	1200.0	101.0	894.0
M14	215.0	1900.0	161.0	1420.0
M16	330.0	2920.0	248.0	2190.0
M20	650.0	5750.0	488.0	4320.0

Table 3-7: Torque table for nuts & bolts.

LOCKING PEG

Each shaft is secured with a locking peg. If a peg is broken or the bolt and peg is missing then this could be down to a seized shaft as a result of no lubrication. If a seized shaft is suspected, check that the x-drilling for the locking peg lines up with the bolt for the locking peg. Fit a new peg. Carefully operate the boom to determine if the shaft is trying to turn.

If a grease nipple is fitted, apply grease. If the shaft has seized, it is recommended to drive the shaft 1/2 way out. Clean and apply new grease. If the shaft is badly worn or scoured, replace both shaft and the bush. Depending on which shaft is causing the problem, the structure might need support to prevent jamming when extracting the shaft.

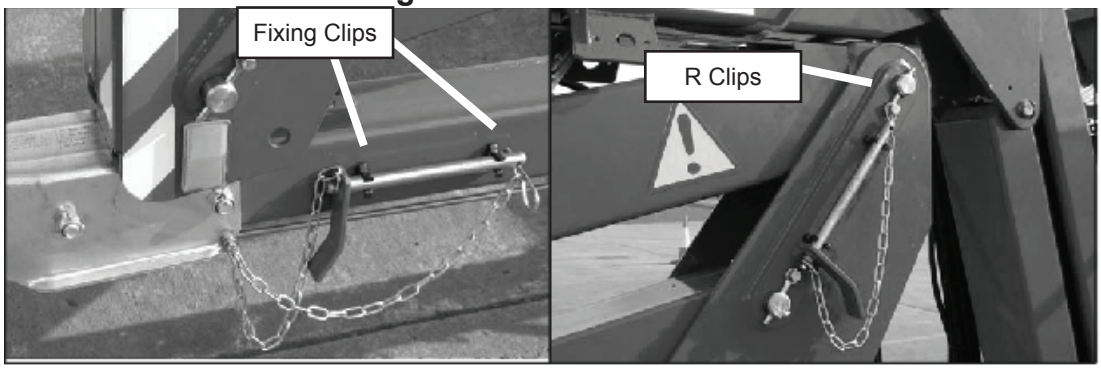
Figure 3-20: Locking peg.

LOCKING PINS

It is important that the boom locking pins are used when the machine is transported. Never transport a machine if the pin is missing. The fixing clips fitted on machines have been provided to prevent paint damage by the pin hitting the structure during use.

When towing, insert the pin and lock in place with the “R” clip provided. During inspection, look for indication of the machine being moved without the pin. Signs of damage include dents in the top boom and crack lines below the vertical boom. Contact Snorkel or its local representative for repairs.

Locking Pins when machine in use



Locking Pins during Transit

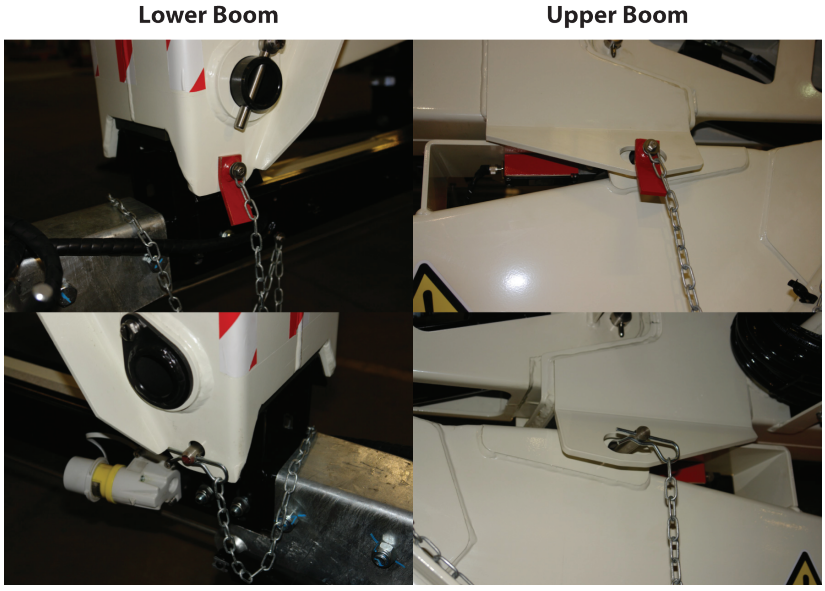


Figure 3-21: Locking Pins locations

TIE DOWN LUGS

Check for wear and tear. Also check for damage. There are two lugs on each side attached to the tow-bar and two other lugs on each side of the rear outriggers. Current machines have a single box towbar. Earlier models had an “A” frame towbar with one individual lug welded to each side of the towbar.

Note
The lugs are used to secure the platform when being stowed or transported. They are not designed for lifting the access platform.

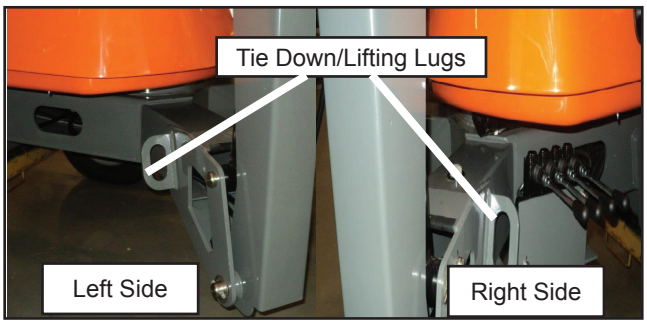


Figure 3-22: Tie down lugs location.

BATTERY & CHARGING

If the machine is fitted with a fully automatic charger, refer to the information provided here. If the machine is fitted with a different type of charger, refer to documentation included with the unit.

The fully automatic charger is

- Waterproof.
- Capable of charging batteries when the motor is running.
- Dual voltage with auto select and indicator light to show voltage selected.
- Short circuit protection.
- Designed to withstand heavy vibration.
- Modular design. The black box will control 12 V, 24 V and 48 V at 30 A outputs with the appropriate transformer.
- Auto-boost to enable batteries to be kept in optimum condition when machine is in storage with the charger connected.

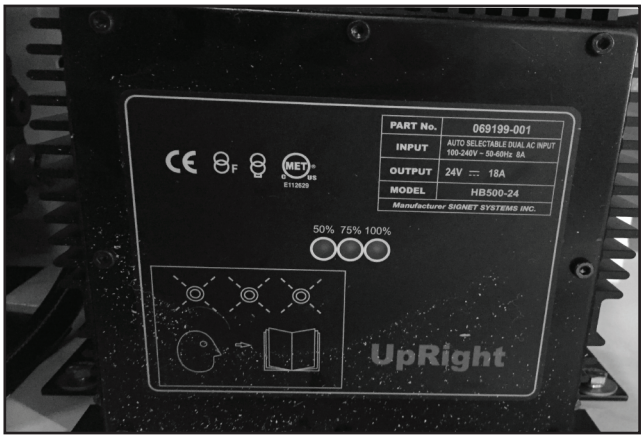


Figure 3-23: The charger (black box) shown has a 110 V plug. To operate on 240 V, replace plug.

OPERATION

The LED’s are visible on the battery charger.

- 50% green LED blinking – indicates that the batteries are 0% to 50% charged.
- 50% solid green LED light and 75% green LED blinking – indicates that the batteries are 50% to 75% charged.
- 50% solid green LED light, 75% solid green LED light and green LED blinking – indicates that the batteries are 75% to 100% charged.
- 50% solid green LED light, 75% solid green LED light and a 100% solid green LED light – indicates that the charge cycle is complete.

The fuse used is a 24 V (15 A) fuse.

ERROR CODES

If the display panel on the box is flickering between -1 and 2, then there is a fault in the transformer or the black box. Check the two output fuses under the terminal cover. The black box or the transformer contains no user replaceable parts. Opening the black box apart from the terminal cover shown will invalidate the warranty.

If the “time out light” comes on, there is a possibility of a faulty battery. Check each cell with a hydrometer. The “time out light” will come on and the charger will switch off if gassing level has not been reached in 24 hours. The “reverse polarity light” will light if the output cables to the battery are reversed. The red cable must go to the positive terminal and the black cable goes to the negative terminal.

CHARGING TIMES

The charger will recharge 2/3’s of discharged batteries in 8 to 10 hours. In reality, batteries are often discharged more than 2/3’s when used on an access platform. The operator tends to use the machine until the motor stops (This causes arcing of the motor contactor and severe heat rise in the motor; both of which shortens the components life considerably.). After which it is easy to forget to put the machine back on charge after using it. This results in the battery being as much as 95% discharged before the charger is connected (this causes severe reduction in battery life).

If the battery cell voltage is below 1 V, the charger may not start. In this case, hold down the low voltage start button for several seconds. This will bypass the charger safety system and cause it to start irrespective of battery voltage. After the voltage has increased sufficiently for the controller to take over, the button can be let go off.

If gassing level is not reached in 24 hours, the charger will switch off and the “time out light” will come on. Disconnecting the input lead will automatically re-set the timer. Take care not to disconnect the charger during a charging cycle. Always let the charger reach “Charge complete” or “Time out” to prevent overcharging.

PRACTICAL APPLICATIONS

The machine will not work if the batteries are run down fully. This is still the case even if the charger is connected. The electric motor requires as much as 3 times the charger output. The charger will float on 30 A maximum and the motor will not turn (This results in damage to the motor and contactor). If the user has a very hectic work schedule, it is easy to run out of battery power before work is completed. In this case, the charger can be connected to the mains supply before the batteries are 50% discharged. This will provide enough time for the charger to keep topping up the batteries and extend the duty cycle of the machine considerably. The battery life may be slightly reduced as the optimum charging cycle for any battery is “fully charged - 2/3’s discharged and then fully charged.

To check if a charger works, connect the voltmeter to the same battery terminals as the charger. Take a note of the reading. The next step is to connect the charger to a mains voltage. There should be a marked increase in voltage. Check the display on the charger. An in-line anmeter (or use a clamp on type) can also be connected to check that the charger output display matches the current going into the batteries.

BATTERY & CHARGING CHECKLIST

- Check that the fuses are secured in the fuse holder.
- Check that all wires are secure on the terminal block and on the battery terminal.
- Check that the multi pin plug is secure on the pcb.
- Check for damage to cables and wiring.

BATTERY SAFETY PRECAUTION

When charging the battery, explosive hydrogen gas will be given off. Keep away from open flames. Always wear appropriate personal safety equipment such as eye goggles and rubber gloves to prevent injury incase of spillage. Keep the top of the batteries clean and free from dirt. It is very easy for the battery to be contaminated when topping up with distilled water. Regular topping up with distilled water will be required from time to time.

BATTERY CHARGING USING A GENERATOR

The charger can only be connected to a generator fitted with a full AVR (Automatic voltage regulator) and spike filtering system. Large voltage fluctuations and spikes will damage the electronic components in the charger. It has been noted that the Honda generator set offers the best and most reliable voltage supply. This applies only to the fully integrated Honda generator sets and not the cheaper options using a Honda engine fitted with a non-Honda generator unit.

EMERGENCY STOP

Two emergency stops are fitted; one at the lower controls and the other at the upper controls. When pressed down on, they must stop all movements immediately. To release, pull up the emergency stop. The switch head is not physically attached to the switch mechanism behind the head. If the head is released and the machine will not start, check that the switch has not seized in the off position.

ELECTRICAL SYSTEM

The electrical system is quite simple and requires minimal maintenance. The biggest problem is loose connections which is caused by vibration during towing and secondly moisture or condensation caused by high humidity and temperature fluctuations.

Erratic running of the motor when pressing down on the platform raise/lower button and moving the booms can be caused by an intermittent internal cable failure. The failure can be hard to locate. The best way is to lower the relevant boom. If the motor has stopped permanently, use the emergency lower system. Try raising the boom again to determine if the fault occurs roughly in the same place. If it does, it is highly likely there is an internal cable failure and the complete cable should be replaced.

On mains powered machines, the control circuit is almost identical apart from voltage variants and the use of an isolation transformer on the control circuit. The bolt on motor contactor used on the DC pack is replaced by a combined thermal overload and motor contactor mounted inside its own junction box. On engine powered machines, the boom circuit is the same as for the DC powered machines apart from the electrical start/stop circuit needed for the engine.

OUTRIGGER SAFETY & MAINTENANCE

- It should not be possible to raise the outriggers with the booms up in the air. If this occurs, immediately check the boom limit switch and the diverter valve. If it is not possible to lift up the outriggers after lowering the booms, check the same components.
- It should not be possible to lift the booms up in the air unless the outriggers are all down and in full contact with the ground. If this occurs, adjust the outrigger limit switch immediately. If lifting is performed without having the outrigger correctly set, the operator will fall over. In any case of instability, the machine will stop and the audible alarm mounted on the underside of the platform control box will sound. The hand pump must be used for dropping down and re-setting the outriggers. Check that the LED on the ground control panel is working correctly. Each LED should only come on when the outrigger is in contact with the ground.
- Check that the audible alarm is working. It should sound when the outriggers are unstable.

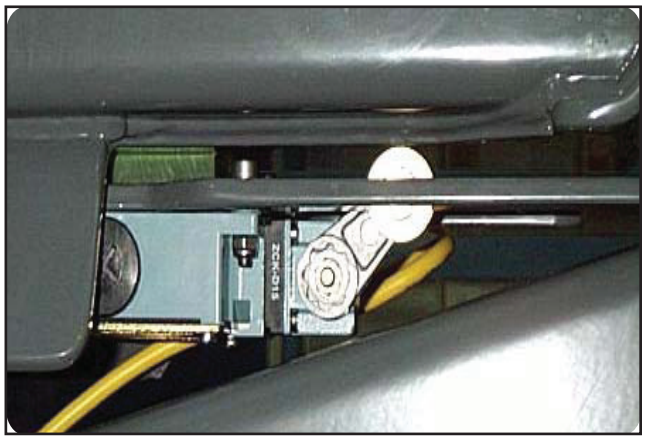


Figure 3-24: Boom limit switch.

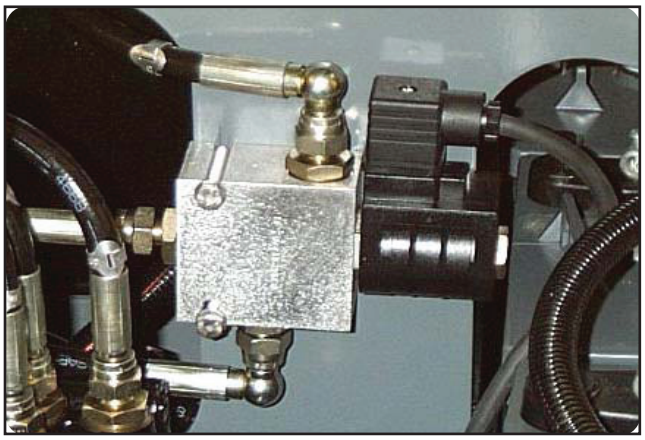


Figure 3-25: Diverter valve.

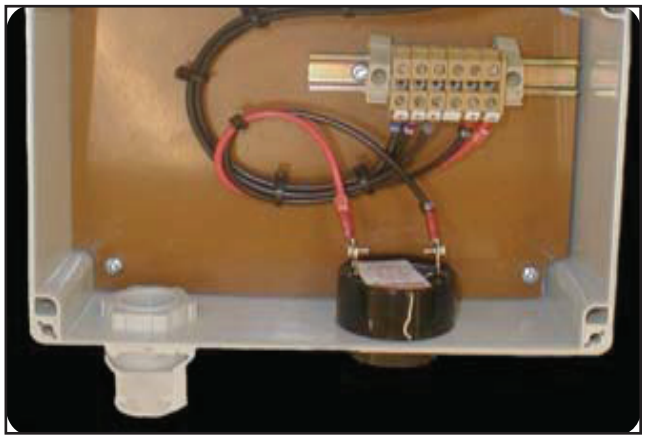


Figure 3-26: Audible alarm.

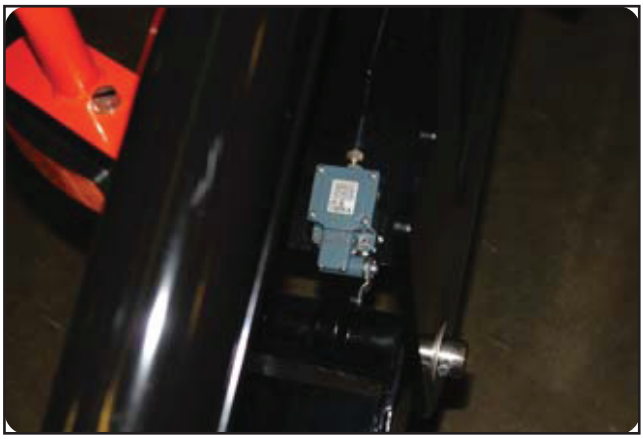


Figure 3-27: Outrigger limit switch.

EMERGENCY LOWERING SAFETY & MAINTENANCE

- When using the emergency lowering valve on the top or bottom ram, it is important to fully extend the cylinder to fill the ram up with oil. There is a delay if it is the first time powering the cylinder down because it has to fill up with oil. If the oil tank is overflowing, clean up the oil spillage immediately. The spillage is due to the tank being overfilled.
- The emergency slew handle and the slew valve handle must be operated at the same time to allow oil to circulate. When the hydraulic motor is turned, it becomes a pump leading to the oil being moved elsewhere.

Figure 3-28: Emergency slew.

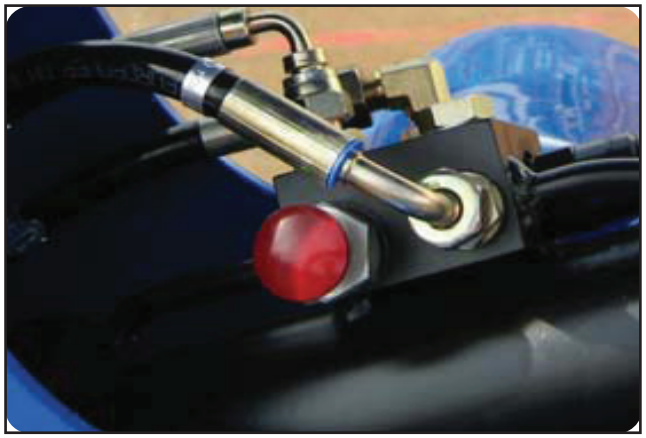


Figure 3-29: Emergency lowering valve.

WHEELS

Check for damage to the tyre/tyres. Replace if tread pattern is worn below 3 mm. On machines with sliding axle, increased wear will be noticed on the inside part of the tyre/tyres compared to the outside part. It is important that correct tyre pressure is maintained at all times. The correct pressure is 4 to 4.5 Bar (60 to 65 PSI) and not what may be indicated on the tyre. Refer to the tyre pressure sticker fitted on the top of the mudguard. Tyre size is 185R14C.

Note
For full service and maintenance information on the running gear, contact Snorkel to request a copy of the running gear OEM service handbook.

BRAKES

Check Bowden cable for damage - Replace if inner steel core is visible. Sticking brakes can be down to seized cables. The inner steel wire must run freely inside the cable.

Adjust the brakes with the wheels removed. Remove the plastic bung in the back of the brake plate.

Use a screw driver to adjust the star wheel until resistance is felt when turning the brake drum in the direction of travel. Then, slack back until the brake drum turns freely.

Check for correct movement of the Bowden cable. The cable should move 5 to 8 mm. Check for uniform response when braking. All adjustments must be done at the wheel brake and not on the brake linkage.

When removing the drum for cleaning the brake shoes, always ensure that a new flanged nut is used. Tighten the flange nut to between 280 - 300 Nm. When re-fitting the wheel, tighten wheel nuts in the N.S.W.E. sequence and to a torque of 88 Nm.

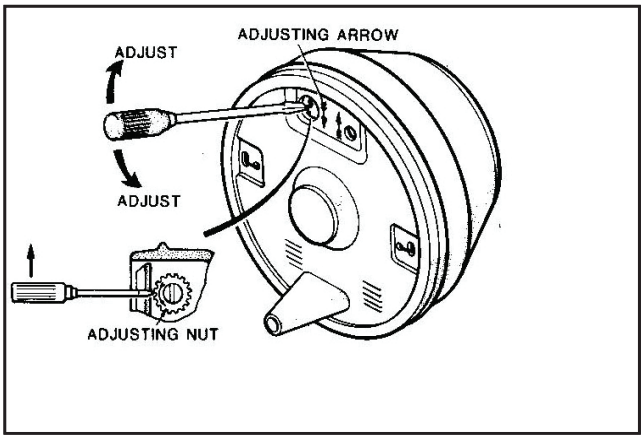


Figure 3-30: Nut adjusting direction.

Note

If the handbrake is not fully applied, there is a risk that the trailer could move backwards. The brake rod must not be under tension or bowed when the handbrake is disengaged.

AXLE

The axle is fully maintenance free. Check the fixing bolts. If ordering replacement axle, quote all reference numbers on the oval serial number plate riveted to the axle beam.

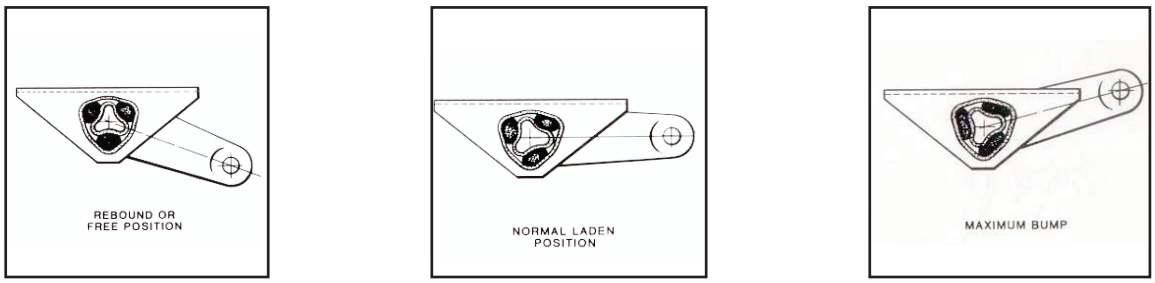


Figure 3-31: View of the different axle positions.

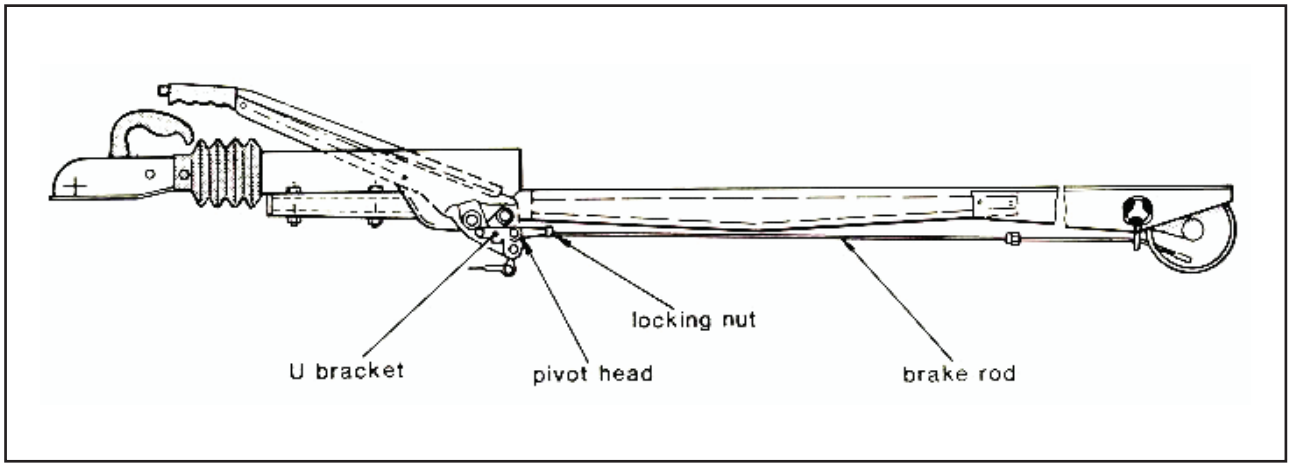


Figure 3-32: Coupling/Overrun device.

En- sure that the draw bar is fully extended. Screw the brake rod into the pivot head and secure with an M10 nut. Using the M10 ball nut, connect the brake rod to the Bowden cable via the compensating bracket. Fit and hand tighten the hex securing nut. Tighten the M10 ball nut on the brake rod until there is no further play on the pivot head against the draw bar (the draw bar must be fully extended).
The compensating bracket must be square on the brake rod. The current type of Bowden cables are

non adjustable. Hook the cable on to the compressor bracket. Adjust to ensure even braking on the brake, not on the compensator.

Check that both wheels run freely in the forward direction. Apply the handbrake; the brakes should start to hold on at the second click. The gas strut will ensure that the handbrake is fully applied. If the trailer is moving backwards, the handbrake will move further up. It is imperative that the gas strut is working correctly. Without the gas strut, the brakes will not hold the trailer on a slope.

Adjust brakes if required and check that all nuts are secured. Grease the coupling head (Multipurpose grease to DIN 51825 KTA 3K), clean and oil all other moving parts.

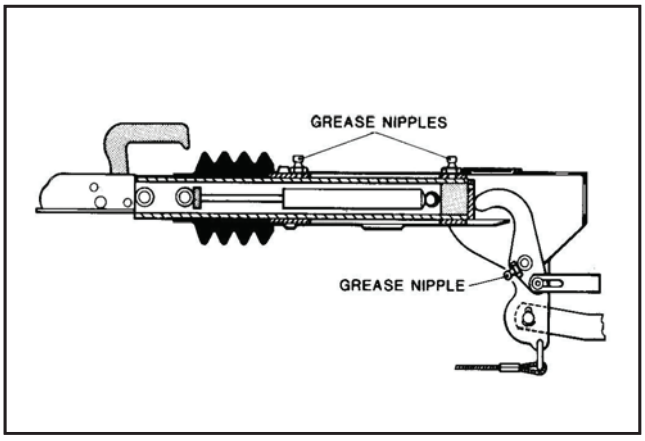


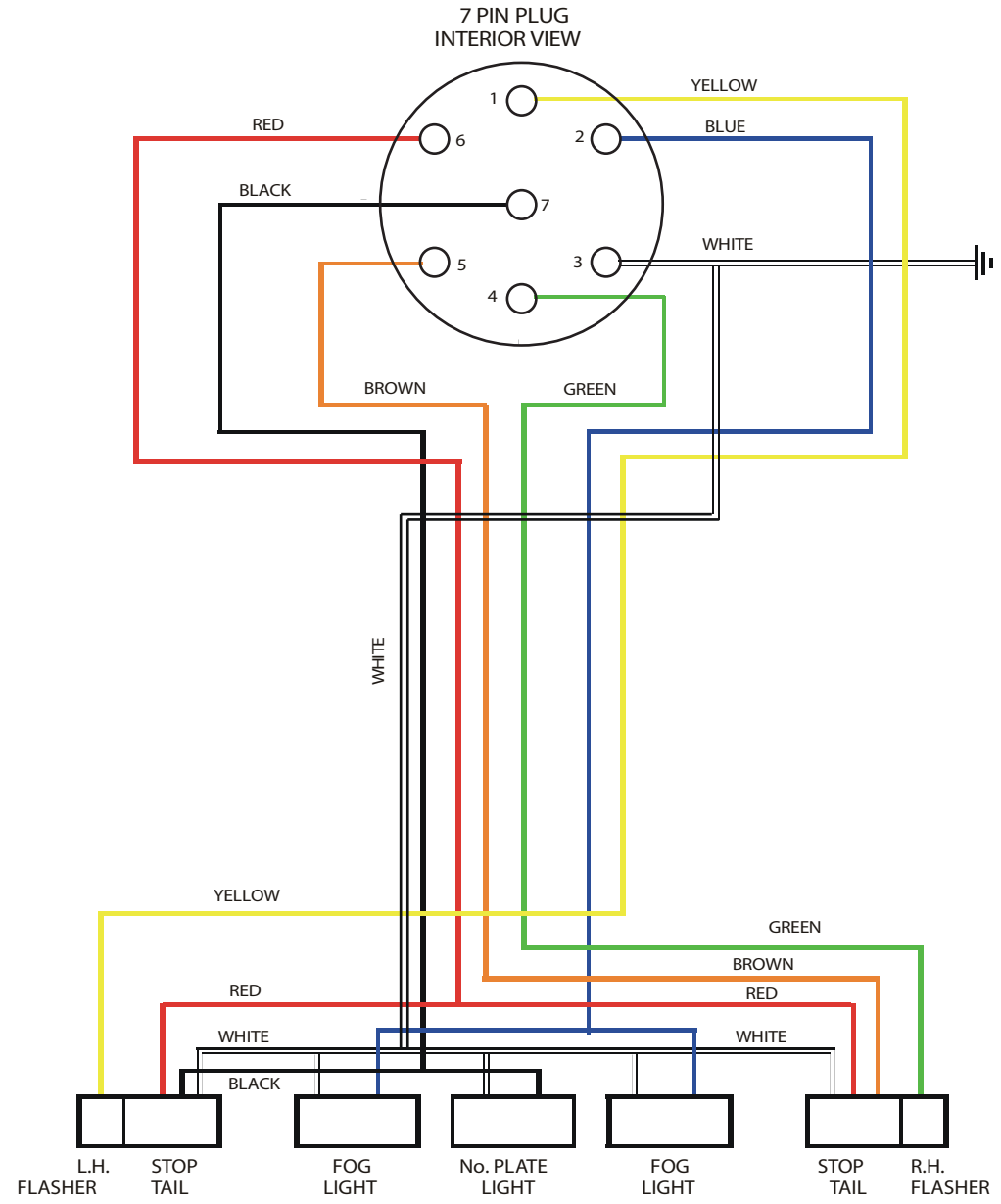
Figure 3-33: View of the grease nipple locations.

WHEEL BEARINGS

The wheel bearings are sealed permanently and require no maintenance or grease. The service life for a set of bearings is in the region of 20000 to 30000 miles depending on running conditions. It is vital that the brakes have not been overheated as this will cause the grease in the sealed ball bearings to evaporate and the bearings will fail. Never re-use the flanged nut when re-fitting the brake drum as the wheel may come off when towing.

When purchasing a brake drum, the bearings are normally included fitted to the brake drum. If replacing the bearings only, contact Snorkel or its local representative for further information. Always use a new flanged nut and torque to between 280 - 300 Nm when re-fitting the drum.

TL37 REAR LIGHTS



NUMBER	REFERENCE	COLOUR	FUNCTION
1	L	YELLOW	L.H. INDICATOR
2	54G	BLUE	REAR FOG LAMP(S)
3	31	WHITE	EARTH
4	R	GREEN	R.H. INDICATOR

NUMBER	REFERENCE	COLOUR	FUNCTION
5	58R	BROWN	R.H.TAIL
6	54	RED	STOP LIGHTS
7	58L	BLACK	L.H. TAIL & NUMBER PLATE

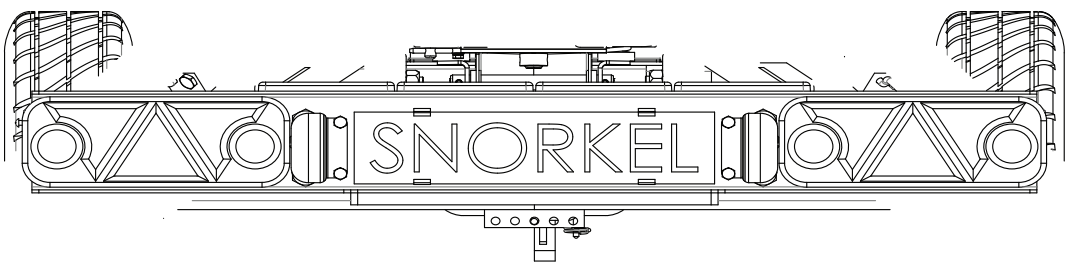


Figure 3-34: Colour and function table for rear lights.

GENERAL GREASE POINTS

Regular greasing greatly improves the service life of the bushes and also removes any moisture which may cause internal corrosion on the wall of the bosses making it difficult to remove the pivot shafts for inspection.

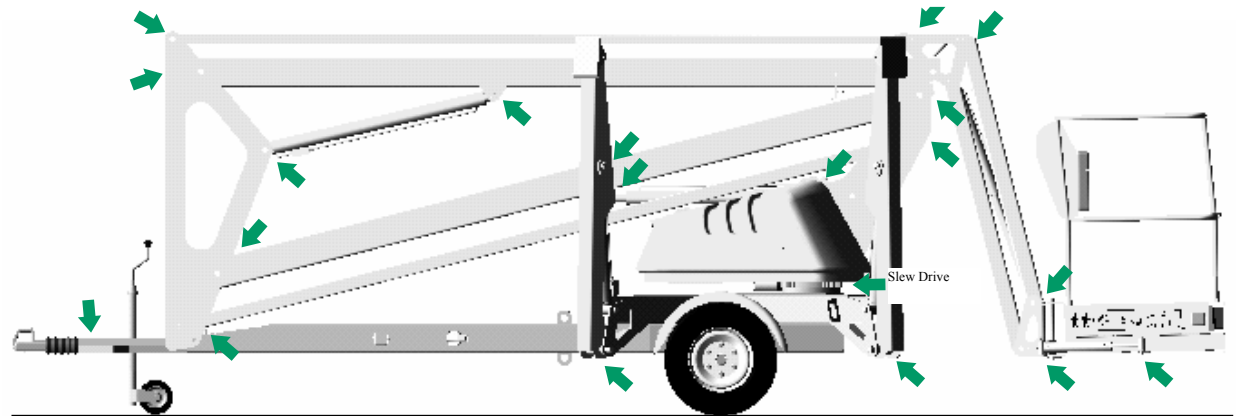


Figure 3-35: General grease point locations.

LUBRICATION SPECIFICATIONS

It is recommended that only premium quality grease is used. Lithium based grease offer very good performance. For the slew ring, the “RENOLIT ARMNA G4789” from Fuchs offers extremely good lubrication and anti corrosion properties especially at very low temperatures (-30°C).

SLEW DRIVE

To grease the slew ring, the machine needs to be set up and slew around to gain access to the reassessed grease nipple fitted to the top face of the slew ring.

When greasing the worm housing, take care not to push out the oil seal on the end face. If you do, remove excess grease from the end and drive the seal back in. Refer to the slew drive section for more details.

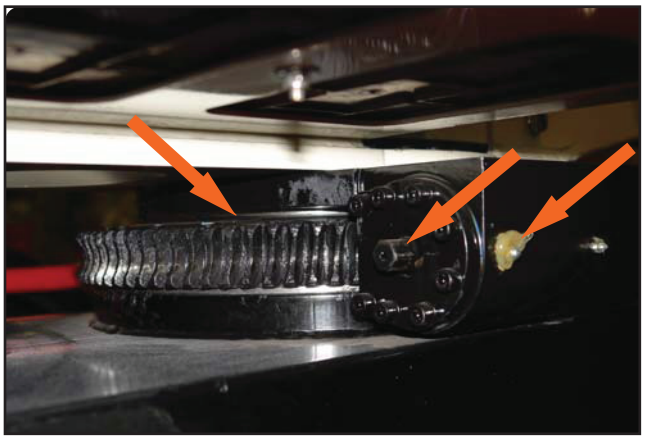


Figure 3-36: Location of the slew drive and grease locations.

SLEW DRIVE GEARS

The slew drive gear is designed to be largely maintenance free. However, it is recommended that the gear teeth be greased on a weekly/monthly basis with a high pressure grease depending on operation conditions. Always clean the gear firstly to remove any road dirt and grime. In very dusty or sandy conditions, take care to prevent a build up of grit/sand mixed with grease which may cause pre-mature wear on the gear.

Additionally, the ring gear and gear box should be greased on a six monthly basis. The grease nipple

for the ring gear is on the top face of the slew gear set between the fixing bolts. It can be accessed by lifting one of the side covers and slewing the structure appropriately.

The ring gear should be inspected on a six monthly basis for excessive wear. It is unlikely there will be any wear if the machine is maintained correctly.

To check the gear, place a payload of approximately 80 Kg on the platform. Elevate the lower boom to approximately half way. Then, gently elevate the top boom whilst observing the ring gear. Excessive wear will be observed by noticing more than 0.5 mm movement between the inner and outer bearing rings. If excessive wear is present, the gear ring should be replaced.

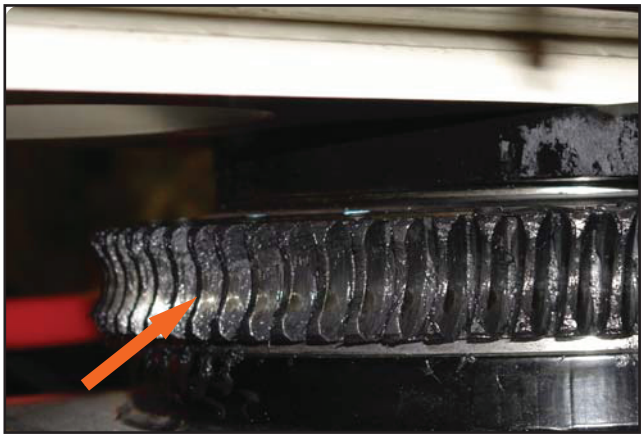


Figure 3-37: Location of the slew drive gears.

SLEW STOP

The slew stop mechanism is fully lubricated and should normally not require any further lubrication. Should more lubrication be needed, this can be done in two ways;

1. When greasing the slew bearing, some grease will drop into the centre part of the slew. Keep on greasing the slew bearing until grease escaping becomes visible from the outside sealing lip on the slew gear. Keep on greasing as the grease will now be pushed out through the outer and inner sealing ring of the slew bearing. Grease escaping from the inner seal will drop unto the slew stop ring.
2. LPS-3 lubrication can also be sprayed between the slew tube and the chassis plate.

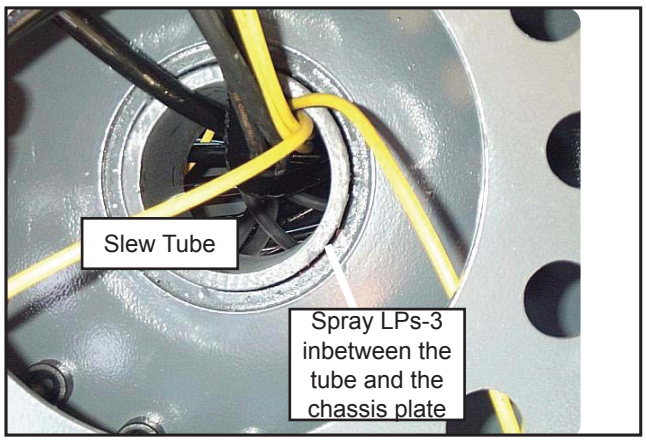


Figure 3-38: Different procedures of lubrication.

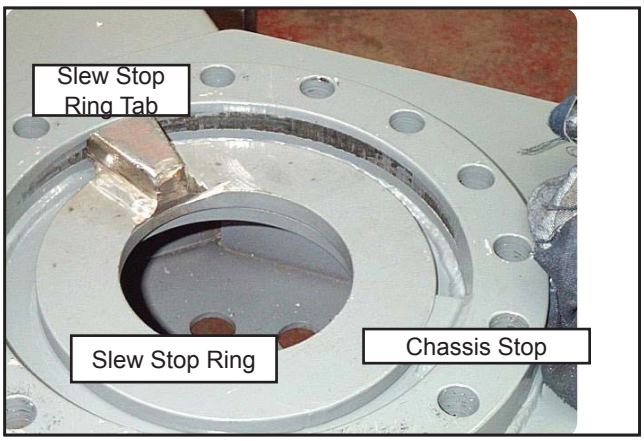


Figure 3-39: Critical parts of the slew stop.

The slew stop mechanism is very simple and prevents the cables and hoses getting tangled up by continuous rotation. The slew stop ring will allow the operator to turn almost 360° in each direction from the stowed position.

The critical parts of the slew stops are as follows:

- Chassis stop
- Slew stop ring
- Slew stop ring tab
- Slew tube stop

When slewing (rotating), the slew tube stop will pick up on the slew stop ring tab and drag it around until the slew stop ring tab hits the chassis stop. It is possible to slew almost two turns in the opposite direction until the slew stop ring tab hits the chassis stop again. This provides almost two turns (lock to lock). From the parking position, this equates to one left turn or one right turn.

The mechanism is very simple and has proven reliable in the field. However, if the slew does not stop, check that one of the 3 steel stop blocks has broken loose. If this is not rectified, the platform can slew continually and will rip out the hoses and cables. To solve such a problem, split the machine and re-weld the slew stop.

Check hydraulic pressure. Apply plenty of lubrication to ensure that the slew stop ring has not got jammed. Again, if the problem does not disappear contact Snorkel or its local representative for further assistance.

Note

All machines being operated in the UK must have a thorough inspection carried out every 6 months in accordance with LOLER regulations 1998 and a certificate of Thorough Inspection produced by a competent person.

When the machine has passed its test, a sticker will be issued showing the certificate number and the date of the next Examination. A copy of the certificate is available upon request.

TROUBLESHOOTING

CONTENTS

TROUBLESHOOTING

FAULT FINDING

It is recommended that fault finding is only carried out by technically competent personnel. Whilst every effort has been made to ensure these procedures are as comprehensive as possible, they do not cover all eventualities.

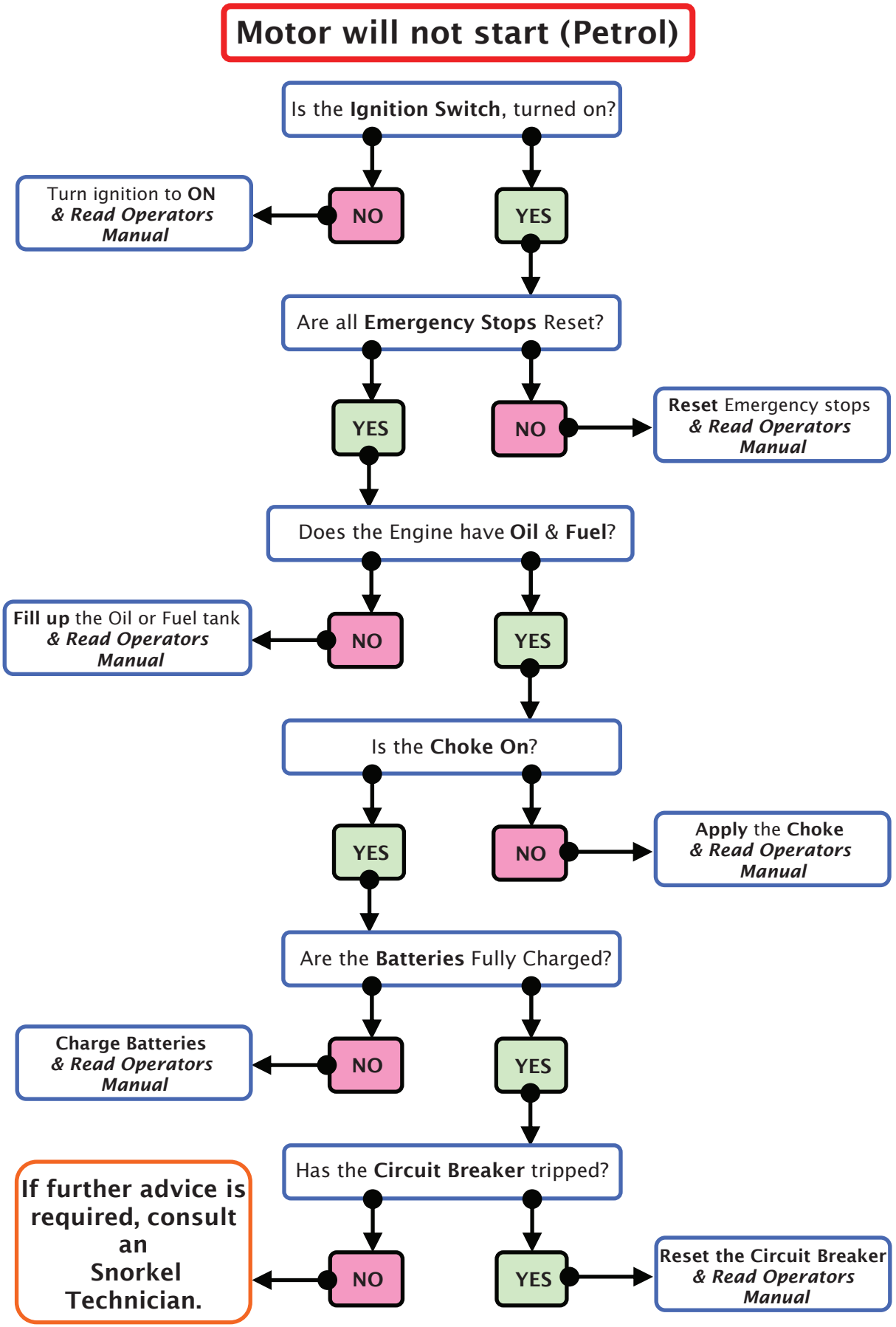
If difficulty is experienced in identifying a fault, contact Snorkel for assistance. A list of troubleshooting notes are also listed below to help with solutions to faults identified.

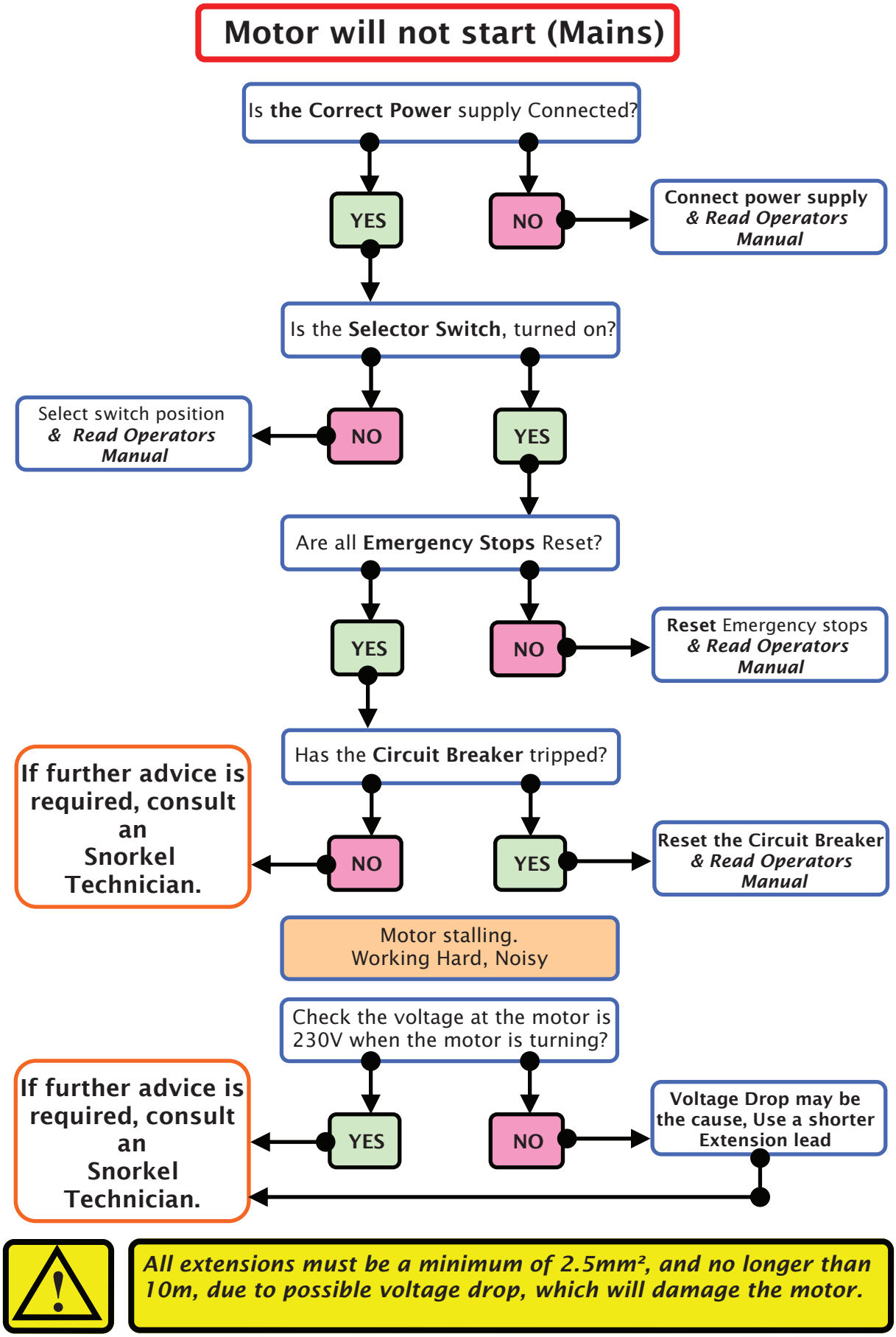
ISSUE	REMEDY
Engine will not start - if fitted.	Ensure there is enough fuel in the tank.
	Switch off emergency stops.
	Turn on the engine ignition.
	Ensure the batteries are fully charged.
	If the engine is cold, apply the choke manually.
	Check engine blade fuse.
DC motor not turning when trying to lower the outriggers.	Ensure the ground control select is turned to ground controls.
	Check the battery level. The battery should be 2/3 charged.
	Check the motor contactor.
	Check the motor brushes.
	Check the motor fuse.
	Ensure the emergency stop button is not engaged.
DC motor turning but not able to operate outriggers.	Ensure the top boom is lowered and the boom switch is activated.
	Check that the limit switch arm is secure on the boom switch.
	Ensure the diverter valve is de-activated. Refer to the hydraulic circuit.
	Check the hydraulic pressure. If there's no pressure, check the pump.
DC motor not turning after outriggers have been lowered.	Check that the key selector switch is not in the off position.
	Ensure the emergency stop buttons are not engaged.
	If the overload alarm still sounds, check the outrigger switches.
Boom will not raise/lower when the control lever is operated and DC motor running.	Ensure the right control select is in use.
	Check the oil level.
	Ensure that the diverter valve is activated.
	Check that the other control valve has all spools in centre position.
	Check the hydraulic pressure. If there's no pressure, check the pump.
	Check that the emergency lowering valve is not opened on the cylinder.
	Check for obstructions.

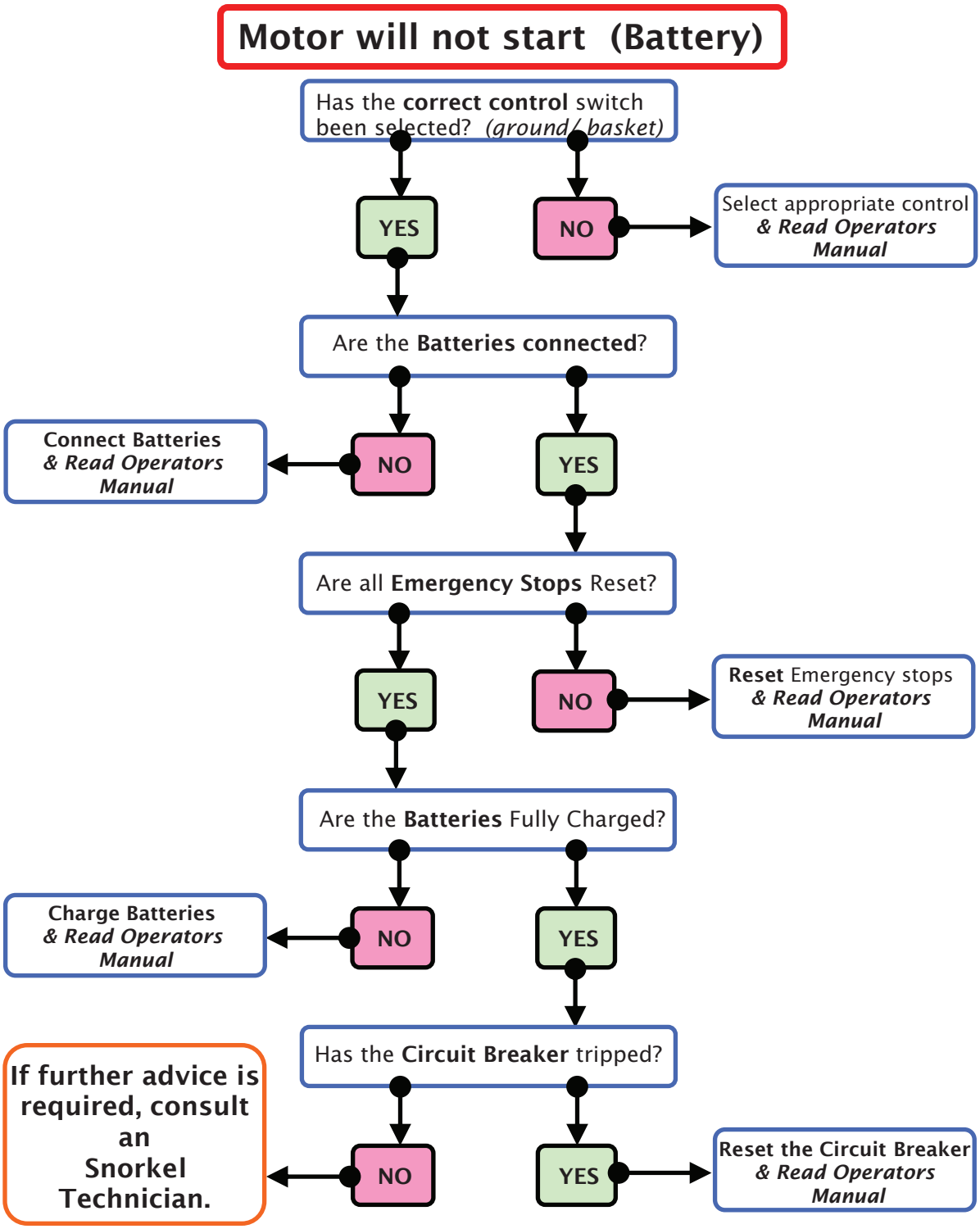
Audible alarm activated when outriggers are not moving	Check the level and limit switches on the outriggers
Slew will not operate in either direction with DC motor running	Check that the machine is on level ground. Slew will not operate if the machine is out of level.
	Check for obstructions.
	Ensure the slew has not reached the slew stop. 2002 machine specification will only slew +/- 355 degrees from the stowed position. Earlier machines would slew +/- 450 degrees from the stowed position.
Loss of movements on the mains/engine powered machines.	Check the dump valve. To enable movement, the dump valve must pull in to stop oil going to the tank.
	Check the oil pressure.
	Check the pump and coupling.
Mains motor/engine stalls when trying to operate the machine	Check relief valve setting.
Mains motor stalls when operating the machine	Check for voltage drop.
	Use shorter extension lead.
	If the voltage reading on the motor terminals is below 10% of the motor rating when it is running under load, the motor will fail. Do not run the machine.
RCD on mains powered machines keeps tripping	Check for water ingress on terminal boxes.
	Check motor start and run capacitors.
0.5A fuse on control circuit keeps popping (Mains powered machines)	Check coil on selector valve and dump valve for cracks/signs of water damage.
Burnt out mains isolating transformer (Mains powered machines)	Check fuse.
	Check coil on selector valve and dump valve for cracks/signs of water damage.

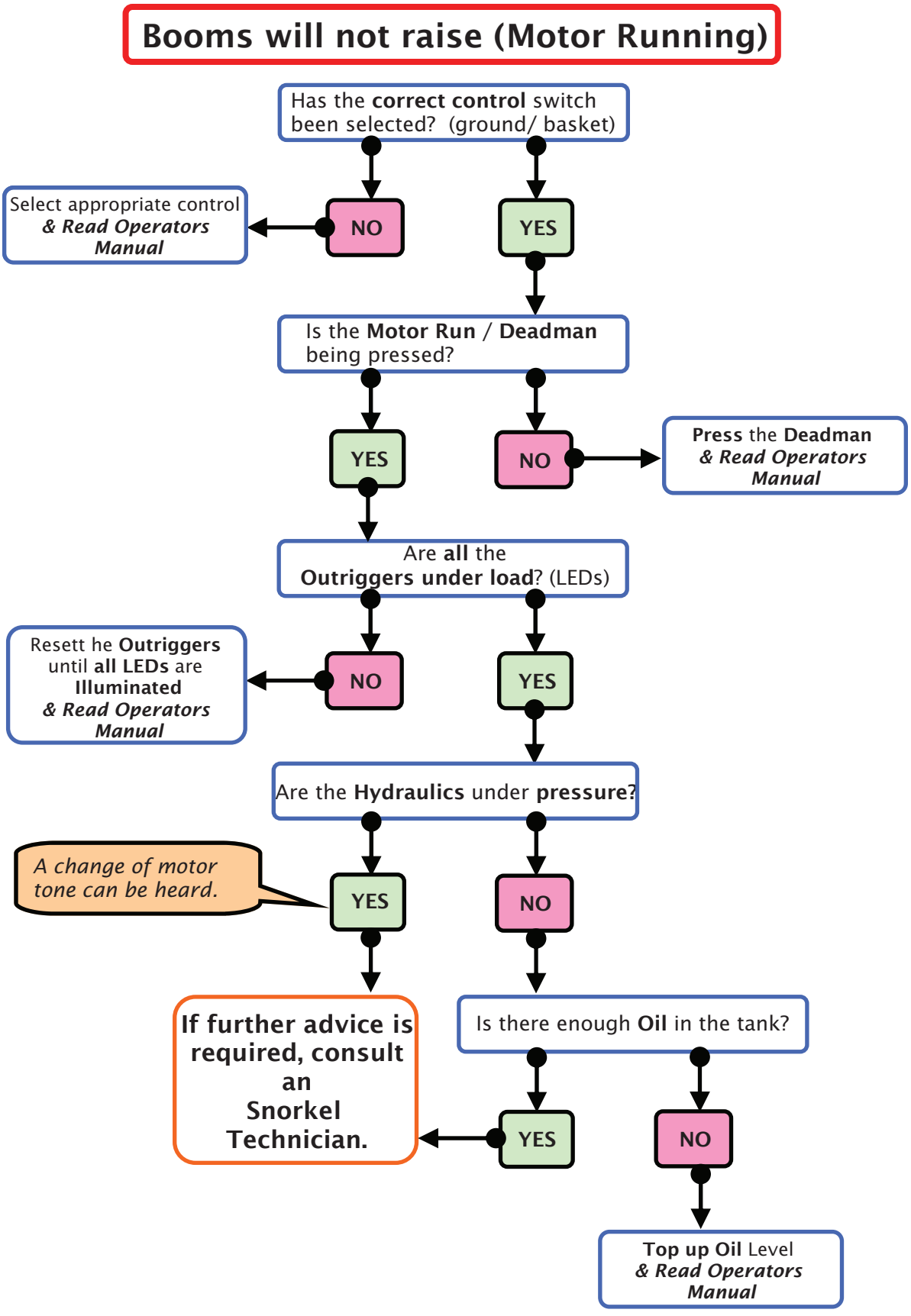
Table 3-3: Fault finding list and possible solutions.

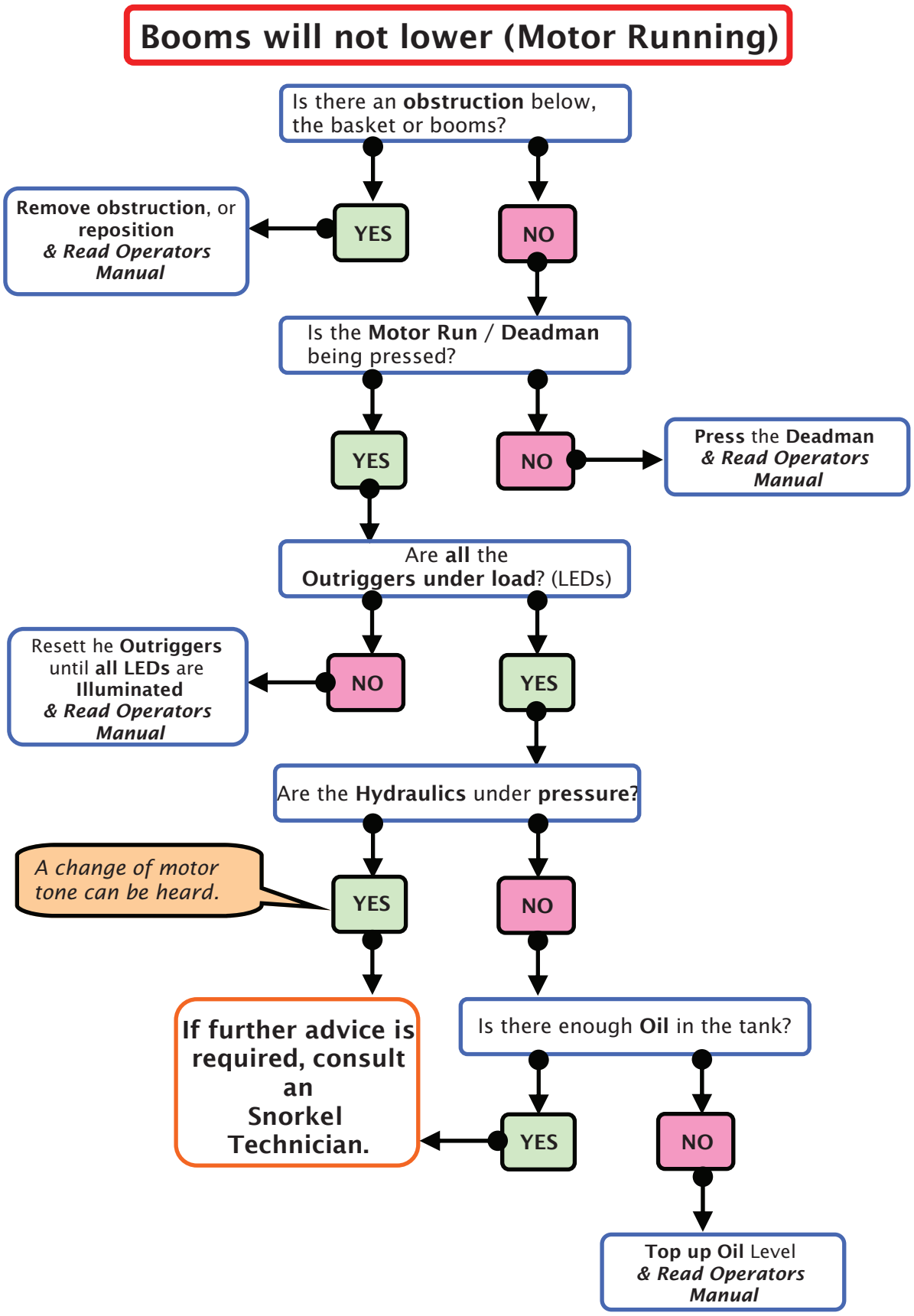
FAULT FINDING MATRIX

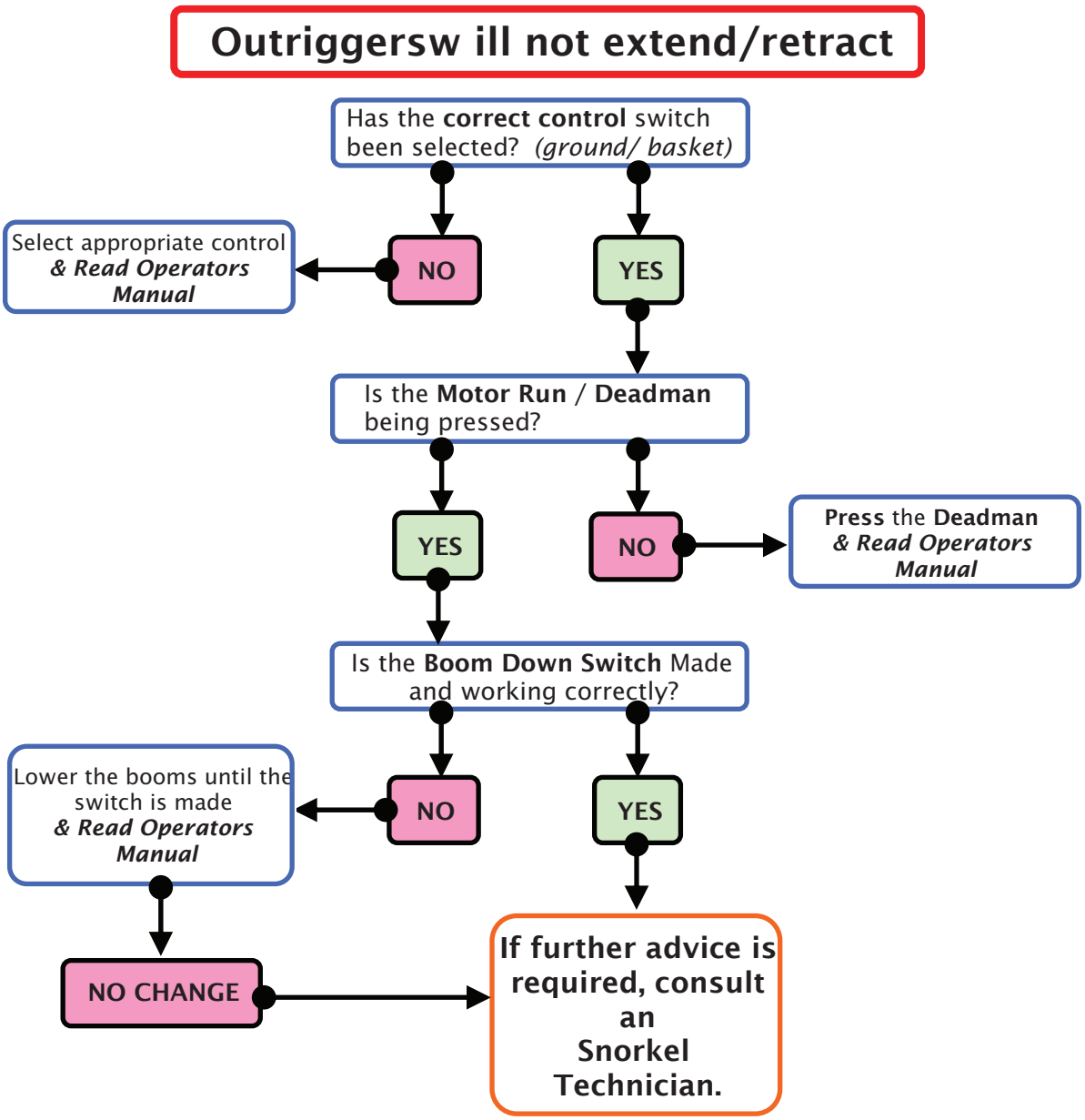


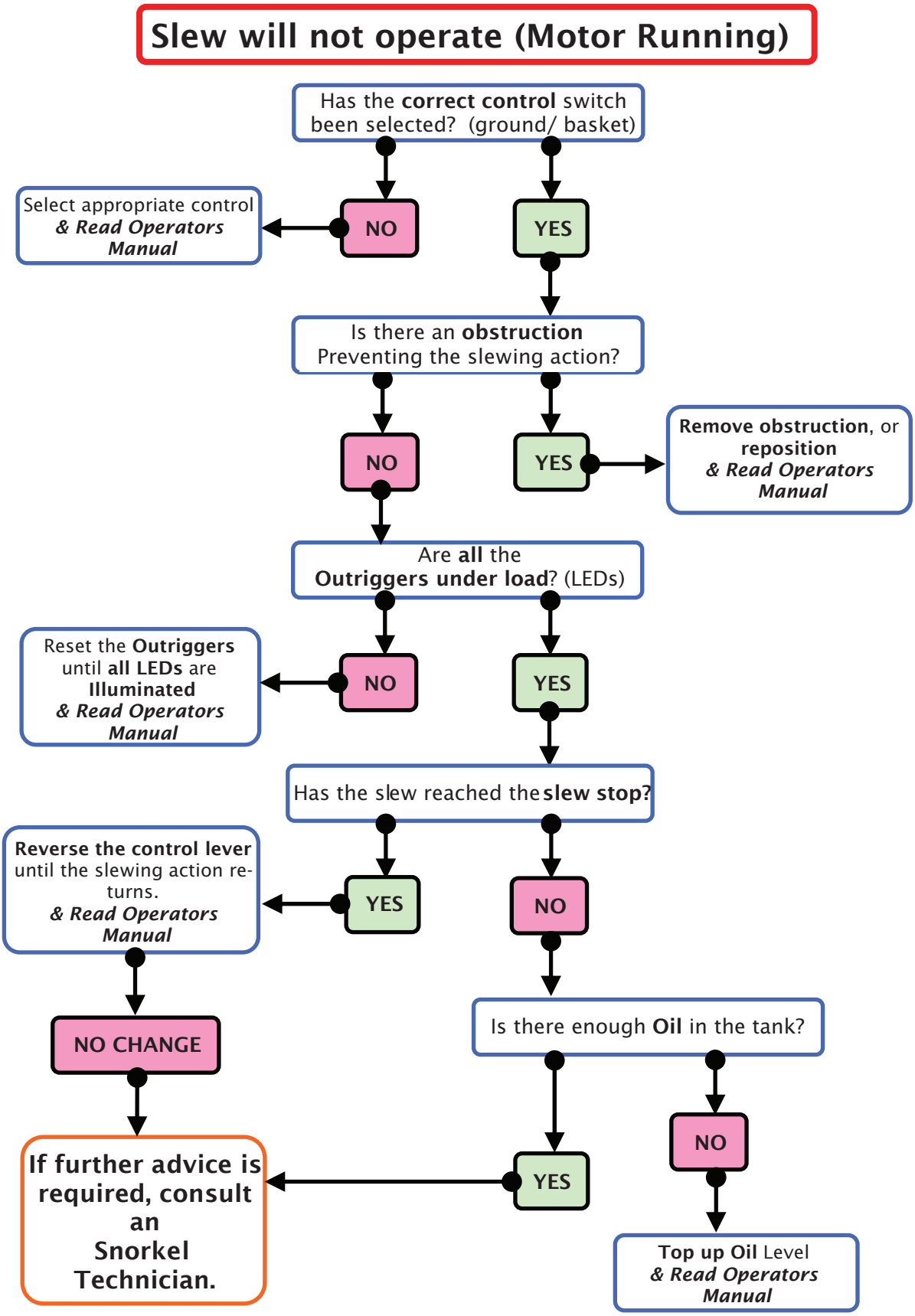

Motor will not start (Mains)
Is the Correct Power supply Connected?
YES
NO
Connect power supply & Read Operators Manual
Is the Selector Switch, turned on?
Select switch position & Read Operators Manual
NO
YES
Are all Emergency Stops Reset?
YES
NO
Reset Emergency stops & Read Operators Manual
Has the Circuit Breaker tripped?
If further advice is required, consult an Snorkel Technician.
NO
YES
Reset the Circuit Breaker & Read Operators Manual
Motor stalling. Working Hard, Noisy
Check the voltage at the motor is 230V when the motor is turning?
If further advice is required, consult an Snorkel Technician.
YES
NO
Voltage Drop may be the cause, Use a shorter Extension lead
All extensions must be a minimum of 2.5mm², and no longer than 10m, due to possible voltage drop, which will damage the motor.


Motor will not start (Battery)
Has the correct control switch been selected? (ground/ basket)
YES
NO
Select appropriate control & Read Operators Manual
Are the Batteries connected?
Connect Batteries & Read Operators Manual
NO
YES
Are all Emergency Stops Reset?
YES
NO
Reset Emergency stops & Read Operators Manual
Are the Batteries Fully Charged?
Charge Batteries & Read Operators Manual
NO
YES
Has the Circuit Breaker tripped?
If further advice is required, consult an Snorkel Technician.
NO
YES
Reset the Circuit Breaker & Read Operators Manual

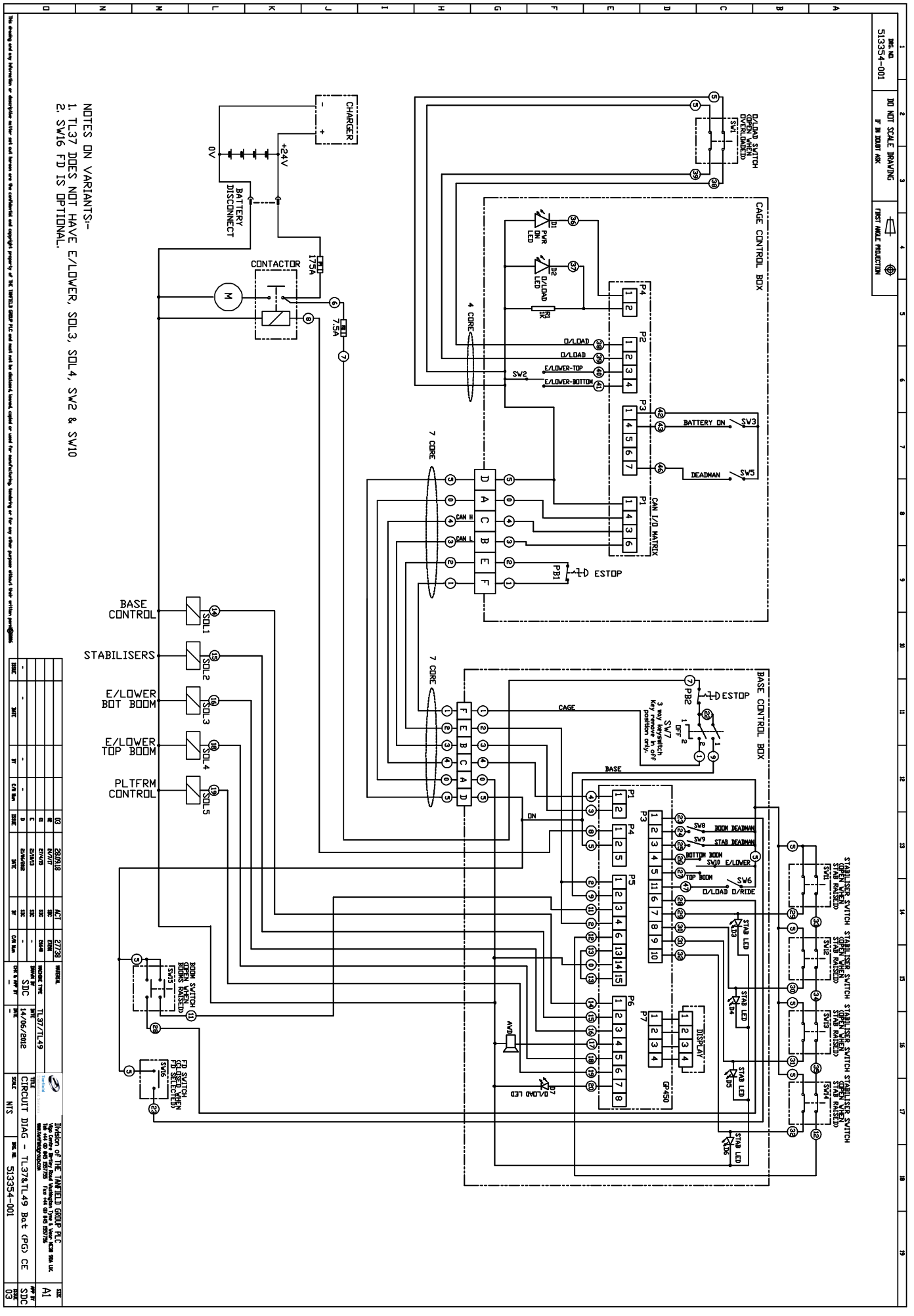

Booms will not raise (Motor Running)
Has the correct control switch been selected? (ground/ basket)
NO
YES
Select appropriate control & Read Operators Manual
Is the Motor Run / Deadman being pressed?
YES
NO
Press the Deadman & Read Operators Manual
Are all the Outriggers under load? (LEDs)
NO
YES
Resett he Outriggers until all LEDs are Illuminated & Read Operators Manual
Are the Hydraulics under pressure?
A change of motor tone can be heard.
YES
NO
If further advice is required, consult an Snorkel Technician.
Is there enough Oil in the tank?
YES
NO
Top up Oil Level & Read Operators Manual


Booms will not lower (Motor Running)
Is there an **obstruction** below, the basket or booms?
YES
Remove **obstruction**, or **reposition** *& Read Operators Manual*
NO
Is the **Motor Run** / **Deadman** being pressed?
YES
NO
Press the **Deadman** *& Read Operators Manual*
Are **all** the **Outriggers under load**? (LEDs)
NO
Resett he **Outriggers** until **all LEDs** are **Illuminated** *& Read Operators Manual*
YES
Are the **Hydraulics** under **pressure**?
A change of motor tone can be heard.
YES
NO
If further advice is required, consult an Snorkel Technician.
Is there enough **Oil** in the tank?
YES
NO
Top up Oil Level *& Read Operators Manual*

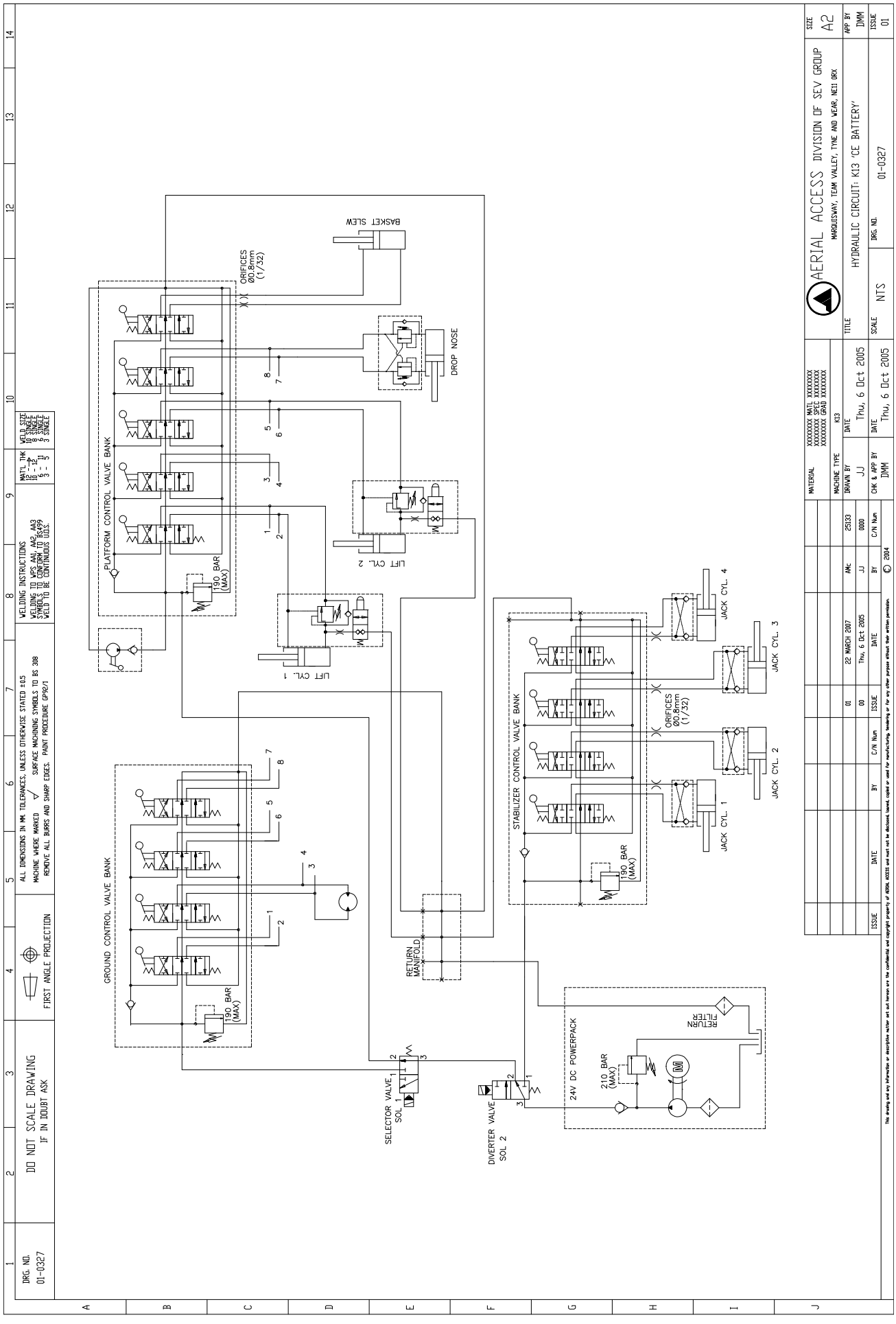

Outriggersw ill not extend/retract
Has the **correct control** switch been selected? *(ground/ basket)*
NO
YES
Select appropriate control *& Read Operators Manual*
Is the **Motor Run** / **Deadman** being pressed?
YES
NO
Press the **Deadman** *& Read Operators Manual*
Is the **Boom Down Switch** Made and working correctly?
NO
YES
Lower the booms until the switch is made *& Read Operators Manual*
NO CHANGE
If further advice is required, consult an Snorkel Technician.


Slew will not operate (Motor Running)
Has the correct control switch been selected? (ground/ basket)
NO
YES
Select appropriate control & Read Operators Manual
Is there an obstruction Preventing the slewing action?
NO
YES
Remove obstruction, or reposition & Read Operators Manual
Are all the Outriggers under load? (LEDs)
NO
YES
Reset the Outriggers until all LEDs are Illuminated & Read Operators Manual
Has the slew reached the slew stop?
YES
NO
Reverse the control lever until the slewing action returns. & Read Operators Manual
NO CHANGE
Is there enough Oil in the tank?
YES
NO
If further advice is required, consult an Snorkel Technician.
Top up Oil Level & Read Operators Manual

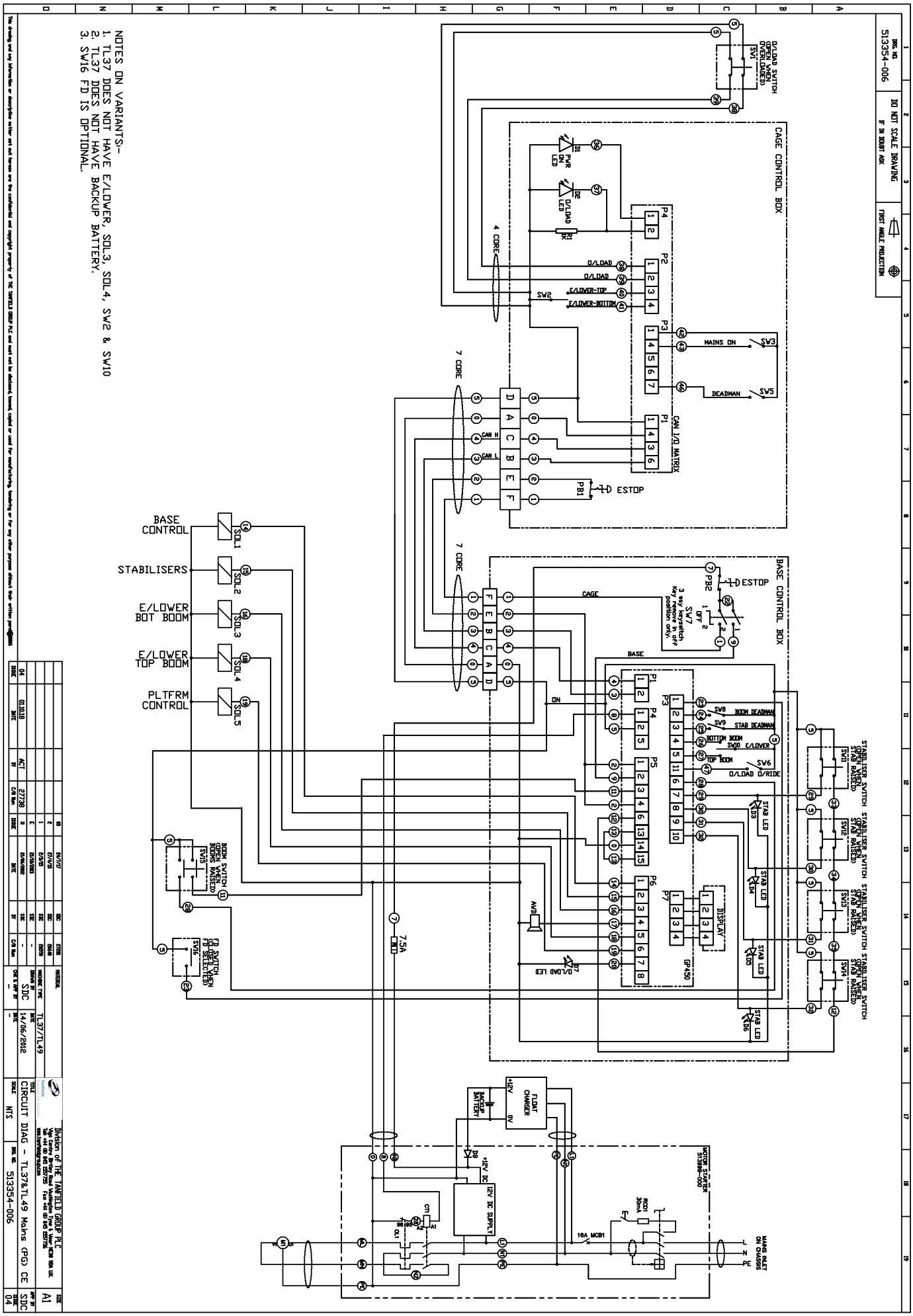
BATTERY - CIRCUIT SCHEMATIC

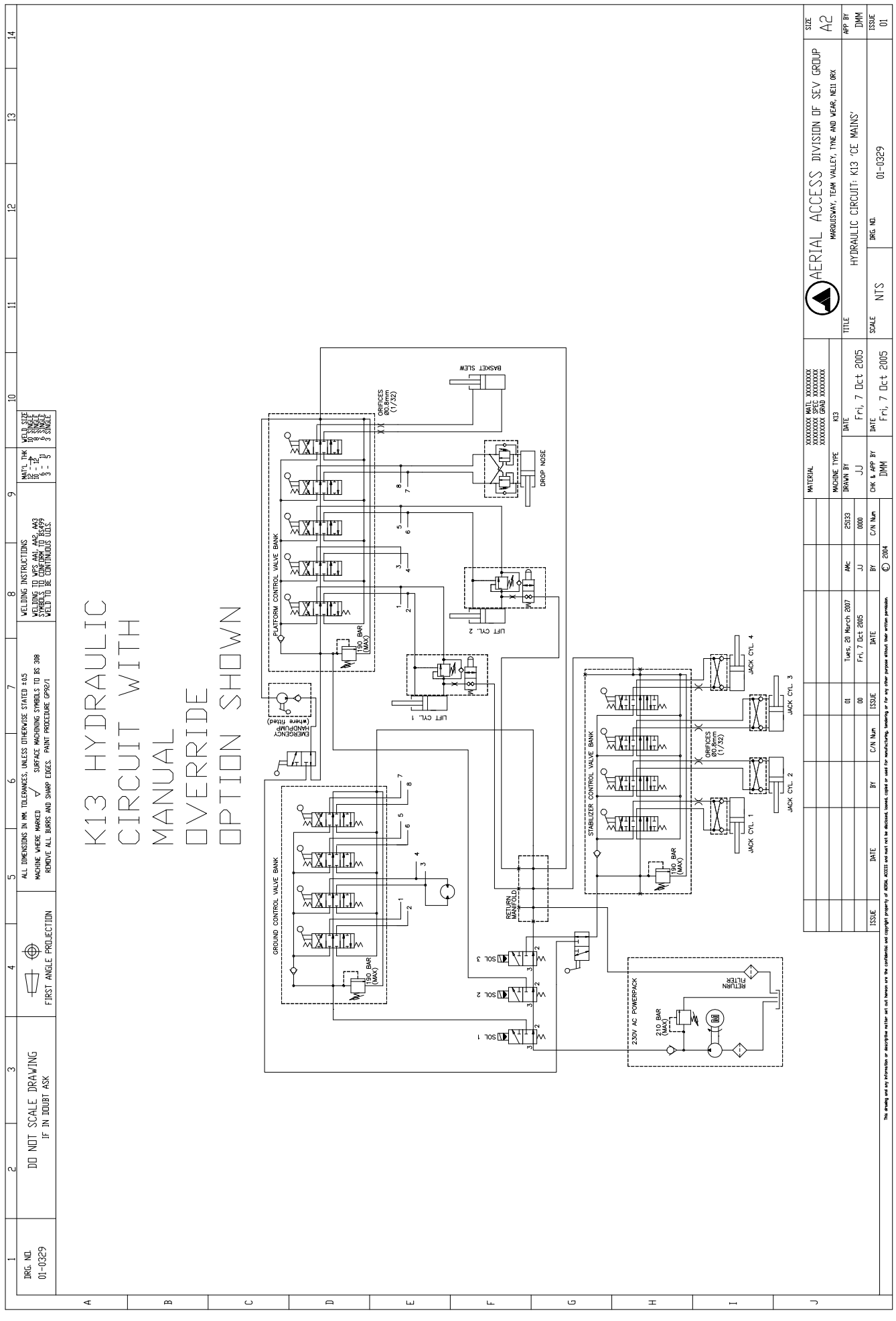


BATTERY - HYDRAULIC FLOW DIAGRAM

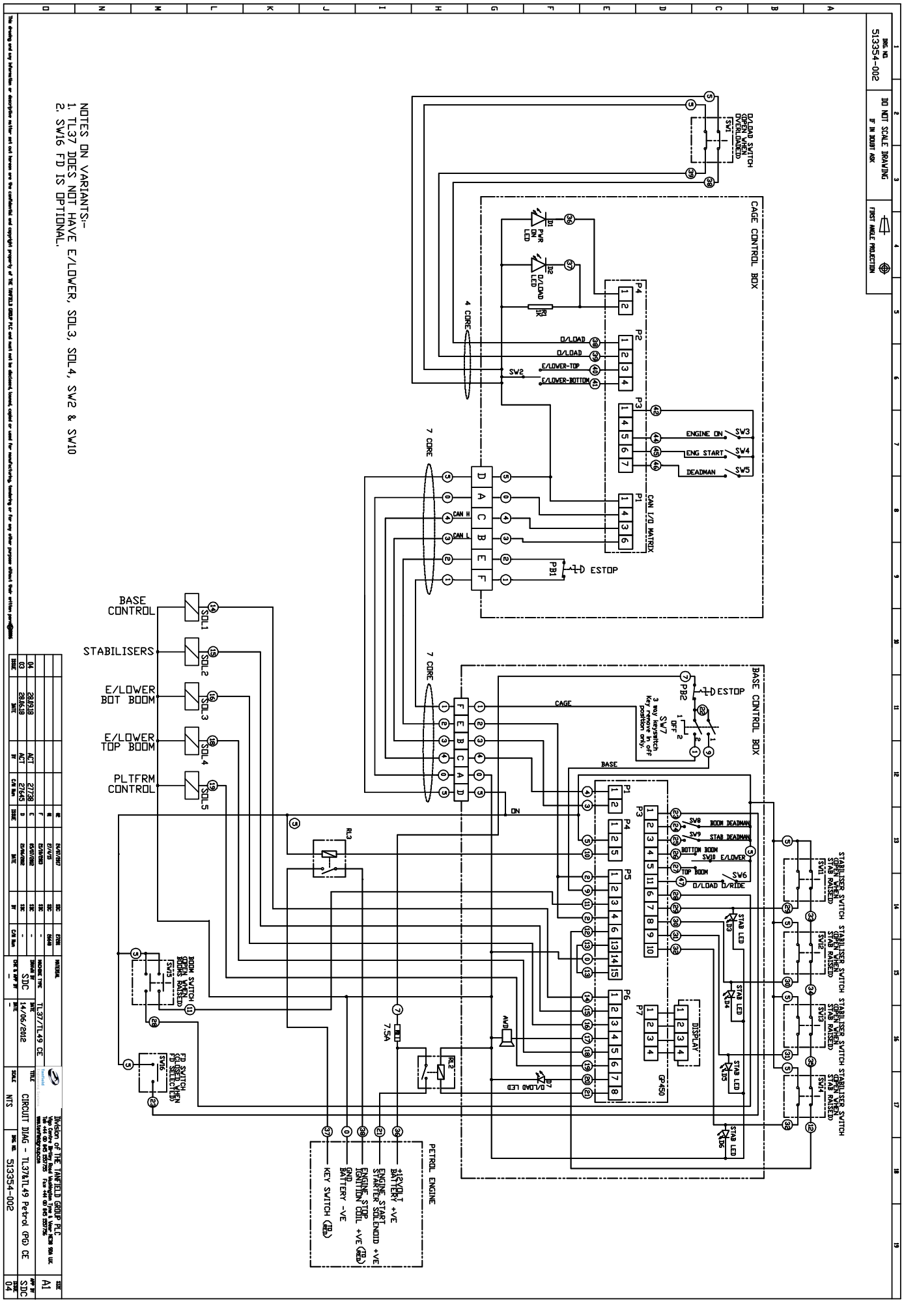


MAINS - CIRCUIT SCHEMATIC

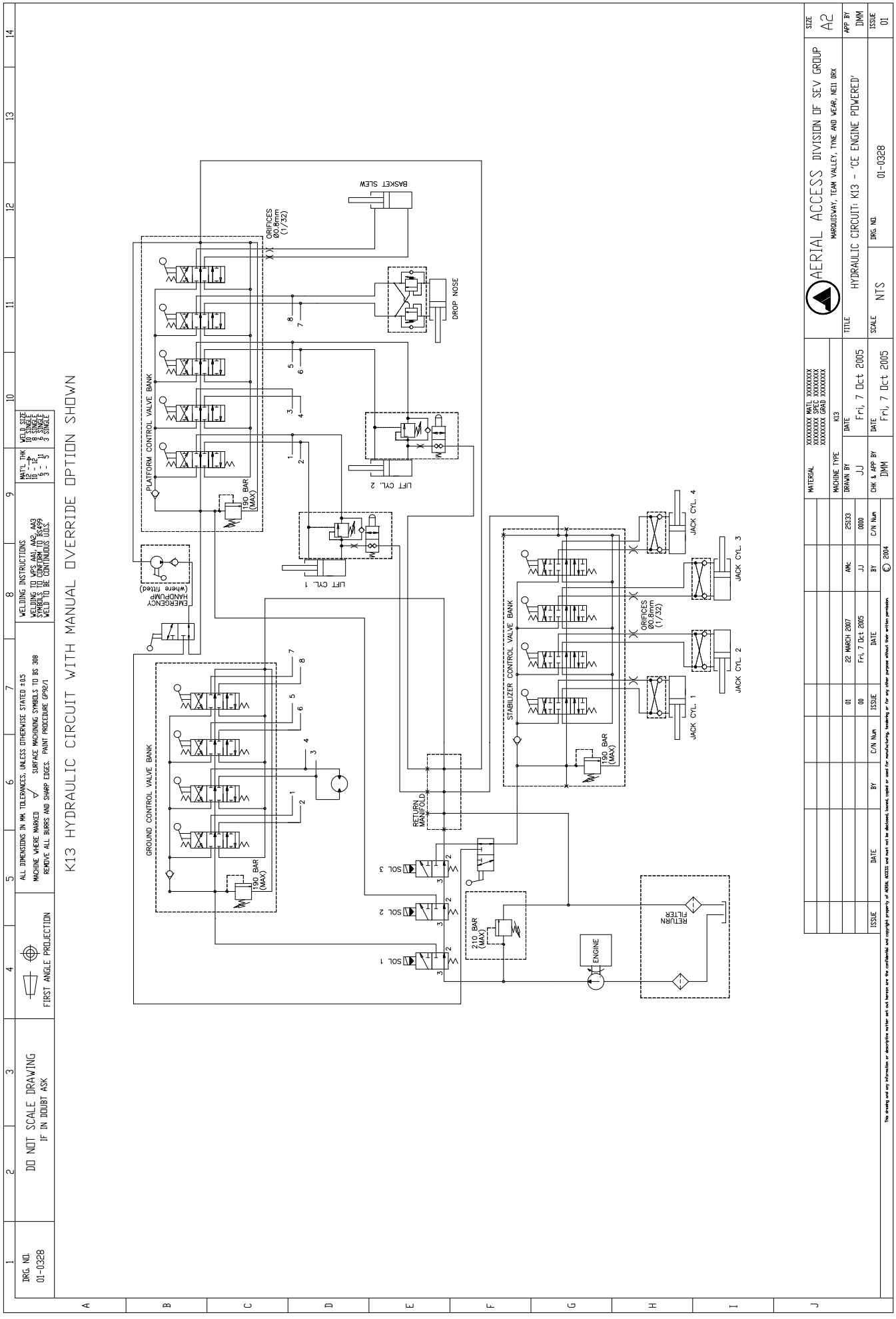



K13 HYDRAULIC CIRCUIT WITH MANUAL OVERRIDE OPTION SHOWN
DRG. NO. 01-0329
DO NOT SCALE DRAWING IF IN DOUBT ASK
FIRST ANGLE PROJECTION
ALL DIMENSIONS IN MM. TOLERANCES, UNLESS OTHERWISE STATED ±0.5
MACHINE WHERE MARKED ✓ SURFACE MACHINING SYMBOLS TO BS 308
REMOVE ALL BURRS AND SHARP EDGES. PAINT PROCEDURE GP92/1
WELDING INSTRUCTIONS
WELDING TO BE CARRIED OUT TO BS 5135 AA1 AA2 AA3
SYMBOLS TO CONFORM TO BS 499
WELD TO BE CONTINUOUS U.O.S.
MATL. THK
12 - 12
10 - 6
5 - 3
WELD SIZE
10 SINGLE
6 SINGLE
3 SINGLE
PLATFORM CONTROL VALVE BANK
GROUND CONTROL VALVE BANK
STABILIZER CONTROL VALVE BANK
ORIFICES Ø0.8mm (1/32)
DROP NOSE
BASKET SLEW
LIFT CYL. 1
LIFT CYL. 2
JACK CYL. 1
JACK CYL. 2
JACK CYL. 3
JACK CYL. 4
EMERGENCY HANDPUMP (Where fitted)
RETURN MANIFOLD
SOL. 1
SOL. 2
SOL. 3
190 BAR (MAX)
210 BAR (MAX)
230V AC POWERPACK
RETURN FILTER
MATERIAL
XXXXXXX MATL XXXXXXX
XXXXXXX SPEC XXXXXXX
XXXXXXX GRAD XXXXXXX
MACHINE TYPE
K13
DRAWN BY
AMc
JJ
CHK & APP BY
DMM
DATE
Tues, 20 March 2007
Fri, 7 Oct 2005
Fri, 7 Oct 2005
25133
0800
C/N Num
ISSUE
01
00
BY
DATE
© 2004
AERIAL ACCESS DIVISION OF SEV GROUP
MARQUISWAY, TEAM VALLEY, TYNE AND WEAR, NE11 0RX
TITLE
HYDRAULIC CIRCUIT: K13 'CE MAINS'
SCALE
NTS
DRG. NO.
01-0329
SIZE
A2
APP BY
DMM
ISSUE
01

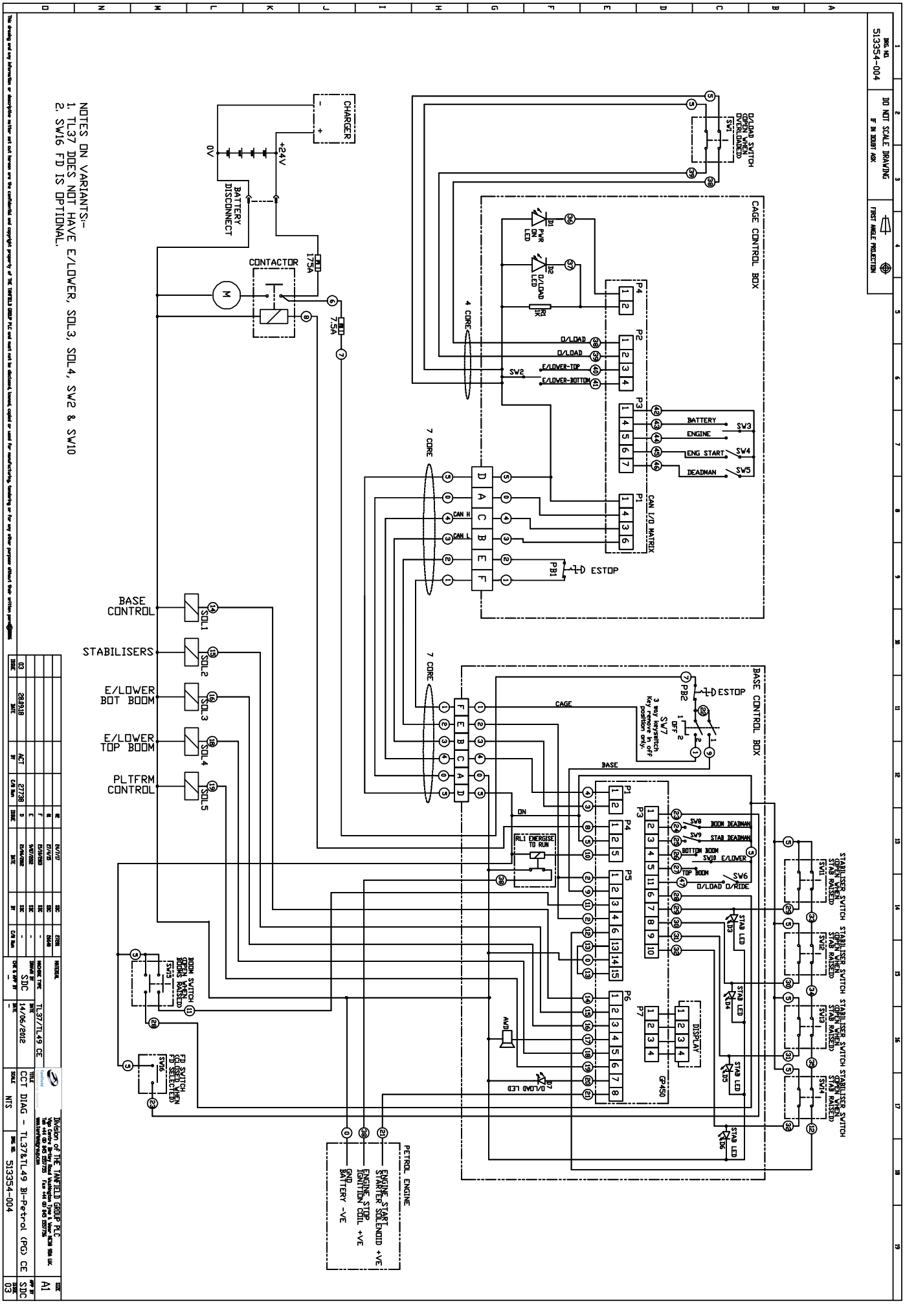
PETROL - CIRCUIT SCHEMATIC



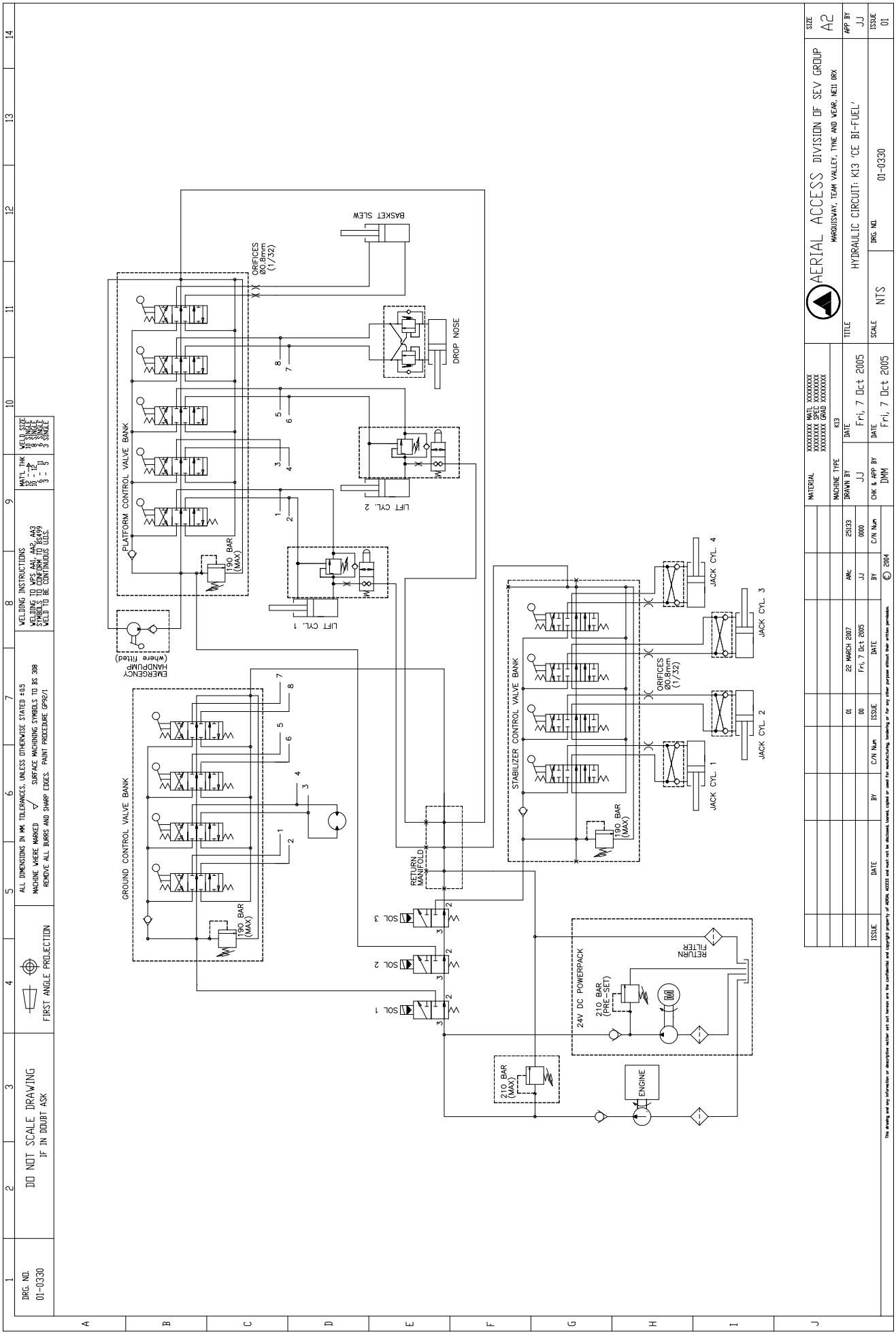
PETROL - HYDRAULIC FLOW DIAGRAM



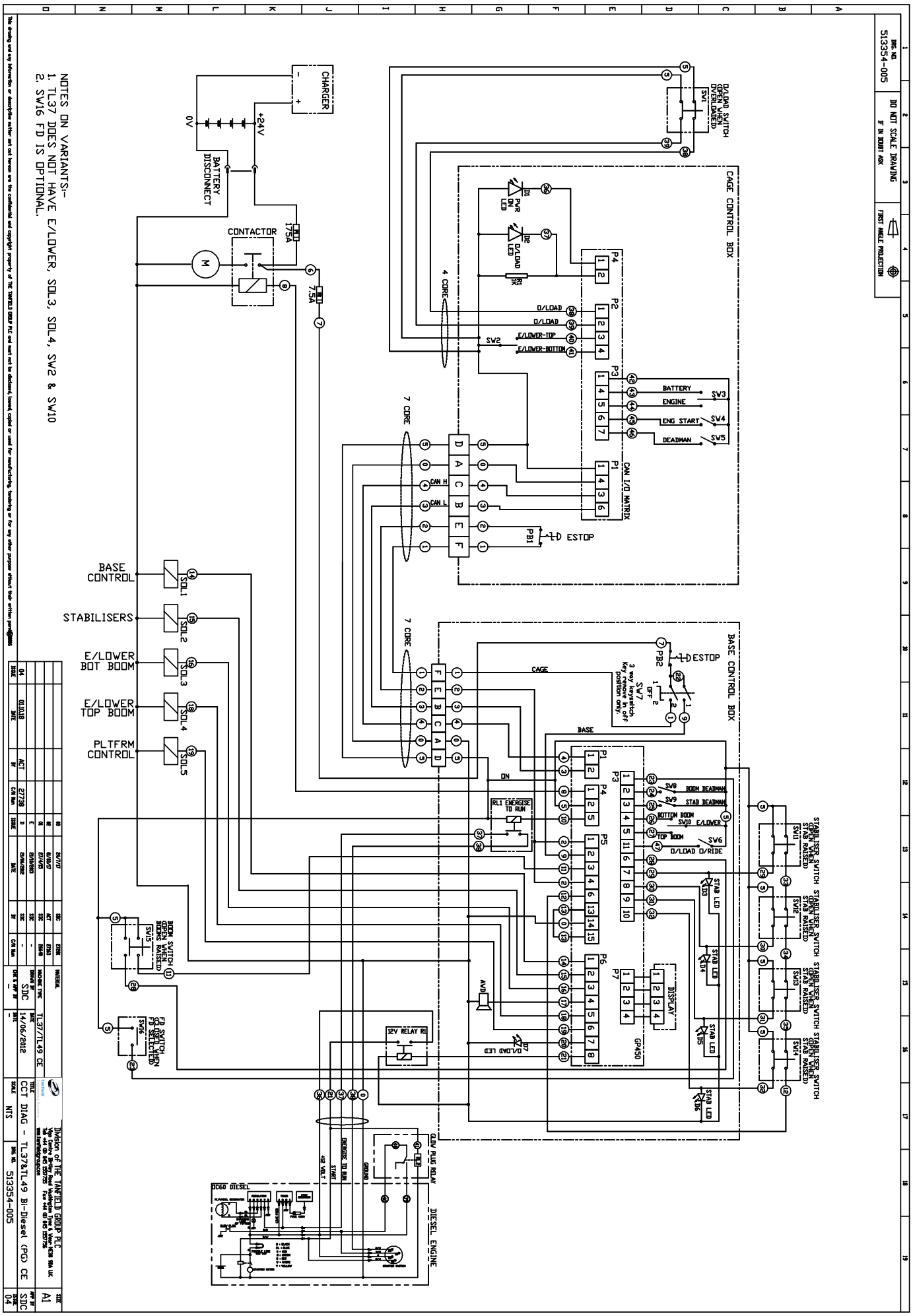
BI-FUEL PETROL- CIRCUIT SCHEMATIC

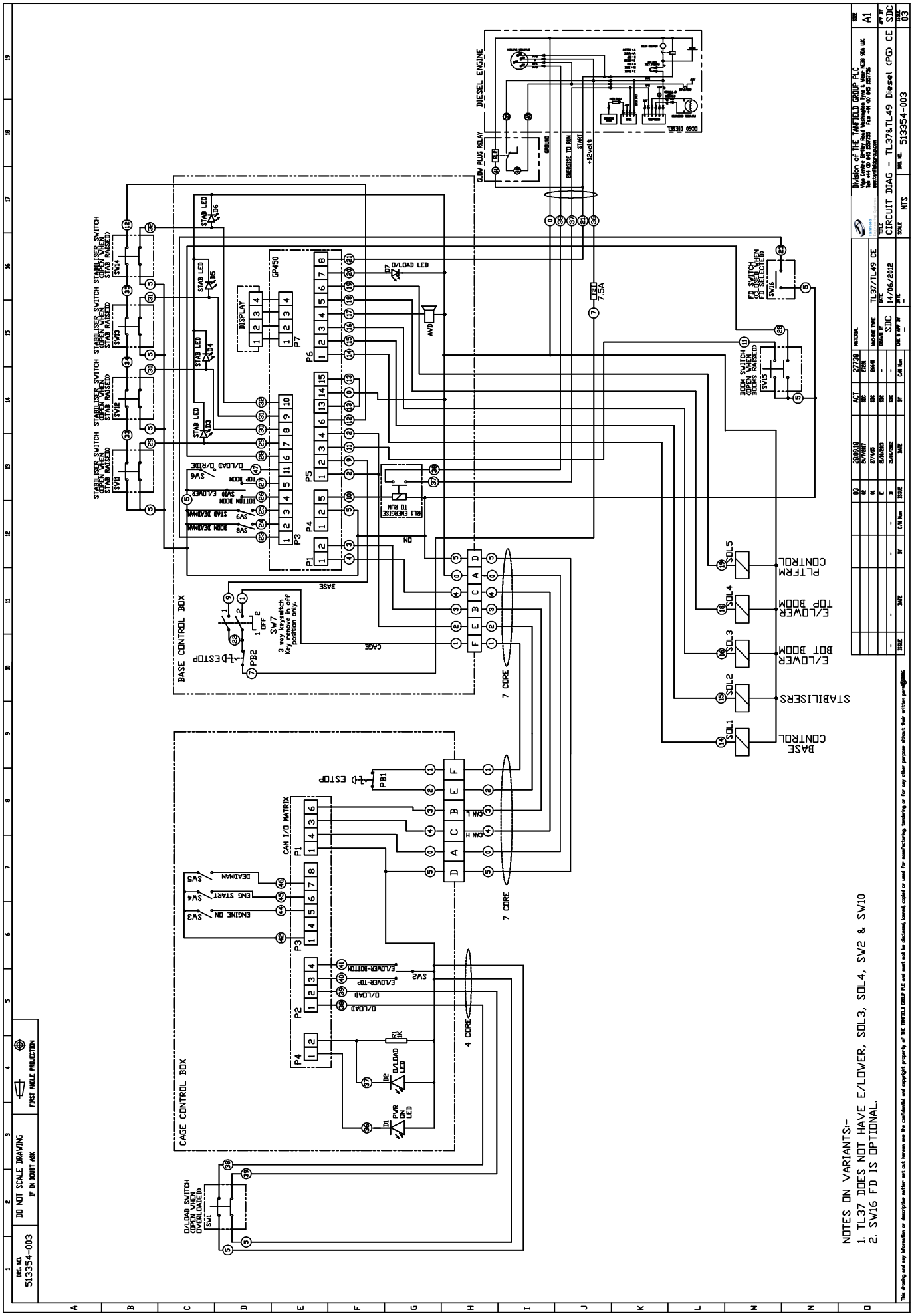


BI-FUEL- HYDRAULIC FLOW DIAGRAM

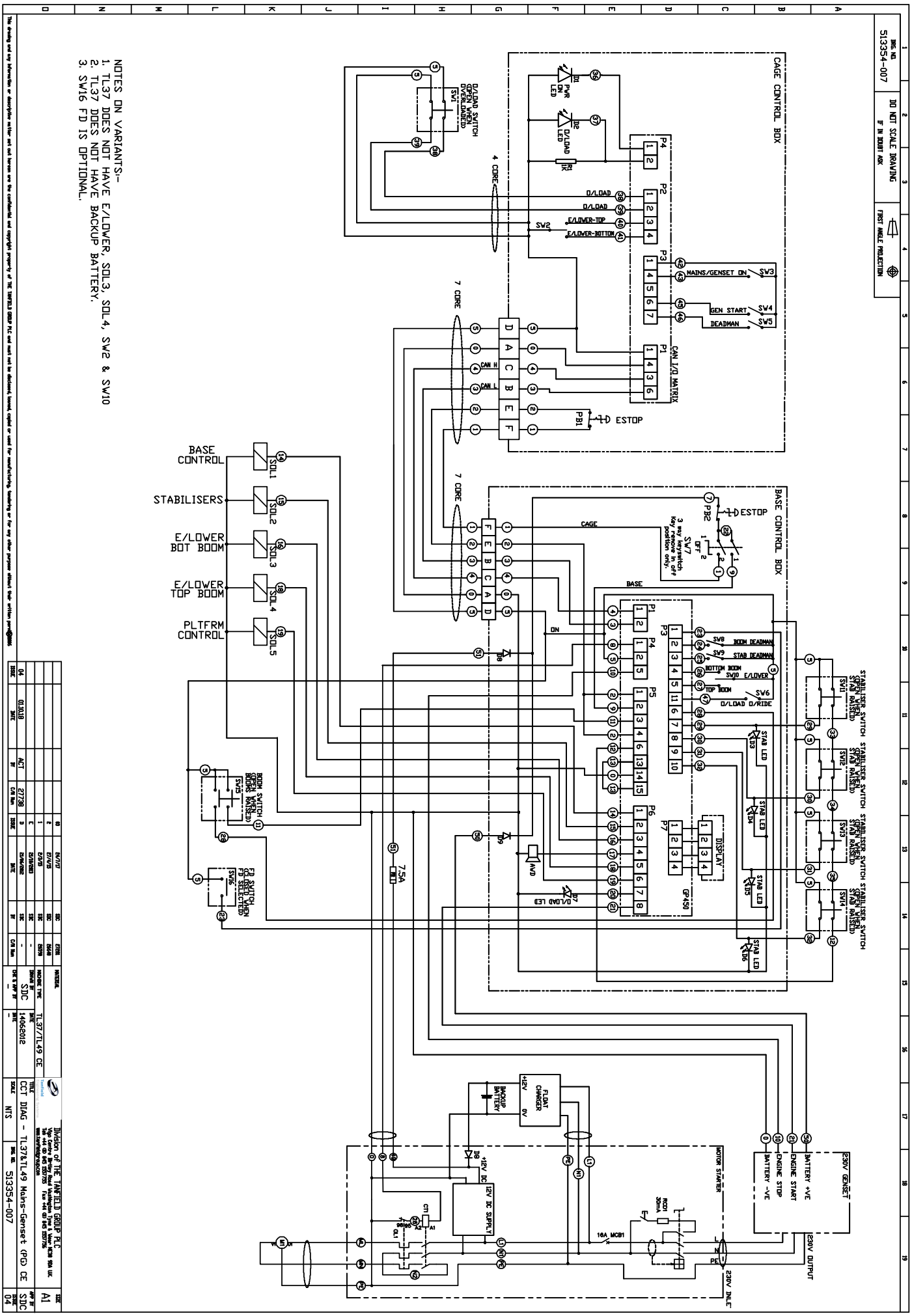


BI-FUEL DIESEL- CIRCUIT SCHEMATIC

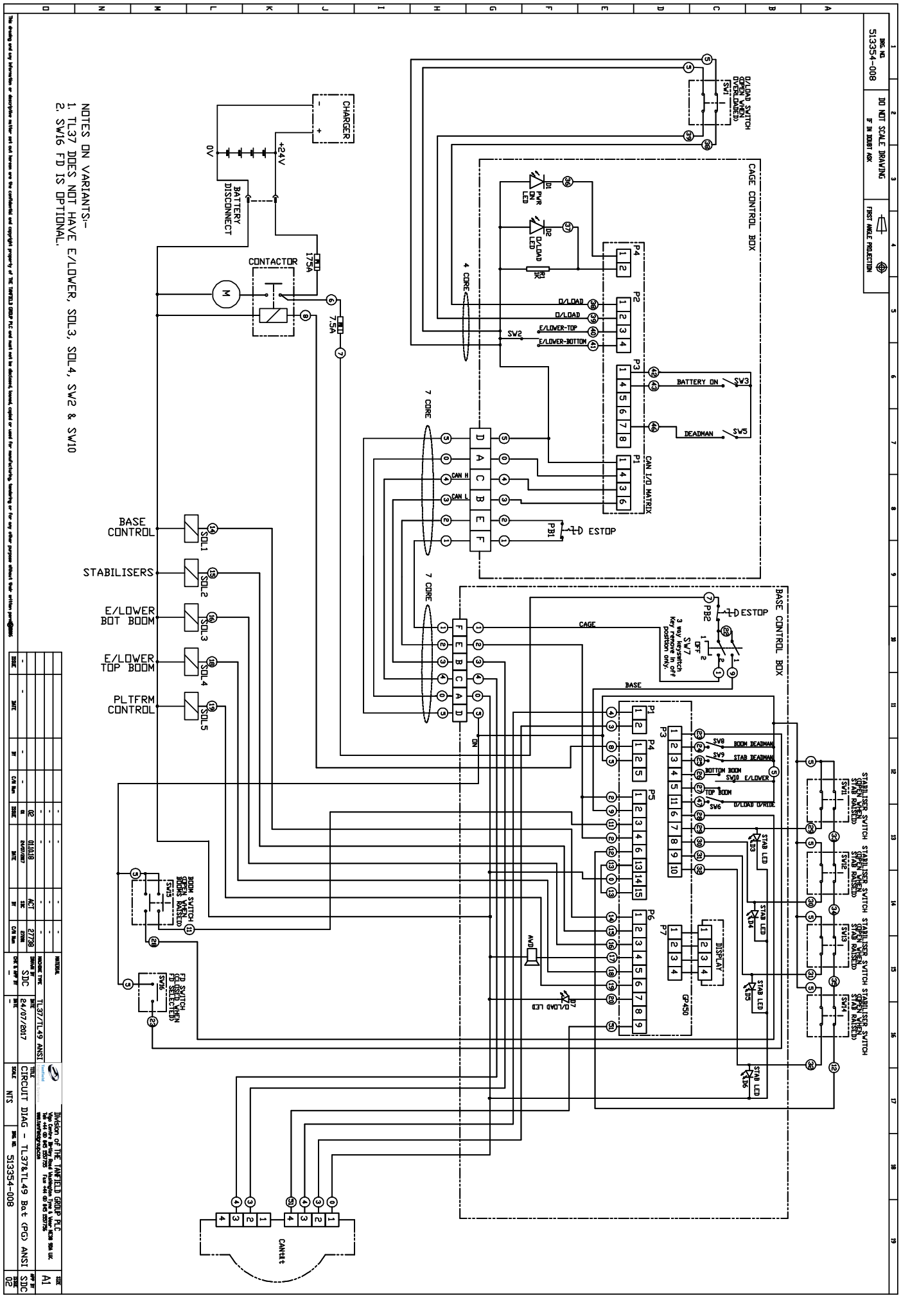



DIESEL ENGINE
GLOW PLUG RELAY
BASE CONTROL BOX
CAGE CONTROL BOX
CAN I/O MATRIX
BASE CONTROL
STABILISERS
E/LOWER BOT BOOM
E/LOWER TOP BOOM
PLTFRM CONTROL
7 CORE
4 CORE
NOTES ON VARIANTS:-
1. TL37 DOES NOT HAVE E/LOWER, SOL3, SOL4, SW2 & SW10
2. SW16 FD IS OPTIONAL.
CIRCUIT DIAG - TL37&TL49 Diesel (PG) CE
513354-003

MAINS / GEN SET - CIRCUIT SCHEMATIC



BATTERY ANSI CANTILT - CIRCUIT SCHEMATIC(From SN:TL37J-01-****00291)



ISSUE	DATE	BY	C/R No.	ISSUE	DATE	BY	C/R No.	MATERIAL
-	-	-	-	02	01/03/18	ACT	2778	MACHINE TYPE TL37/TL49 ANSI

DRAWN BY SDC | DATE 24/07/2017 | TITLE CIRCUIT DIAG - TL37&TL49 Bat (PG) ANSI | SCALE NTS | DRG. NO. 513354-008 | ISSUE 02 | APP BY SDC | SIZE A1

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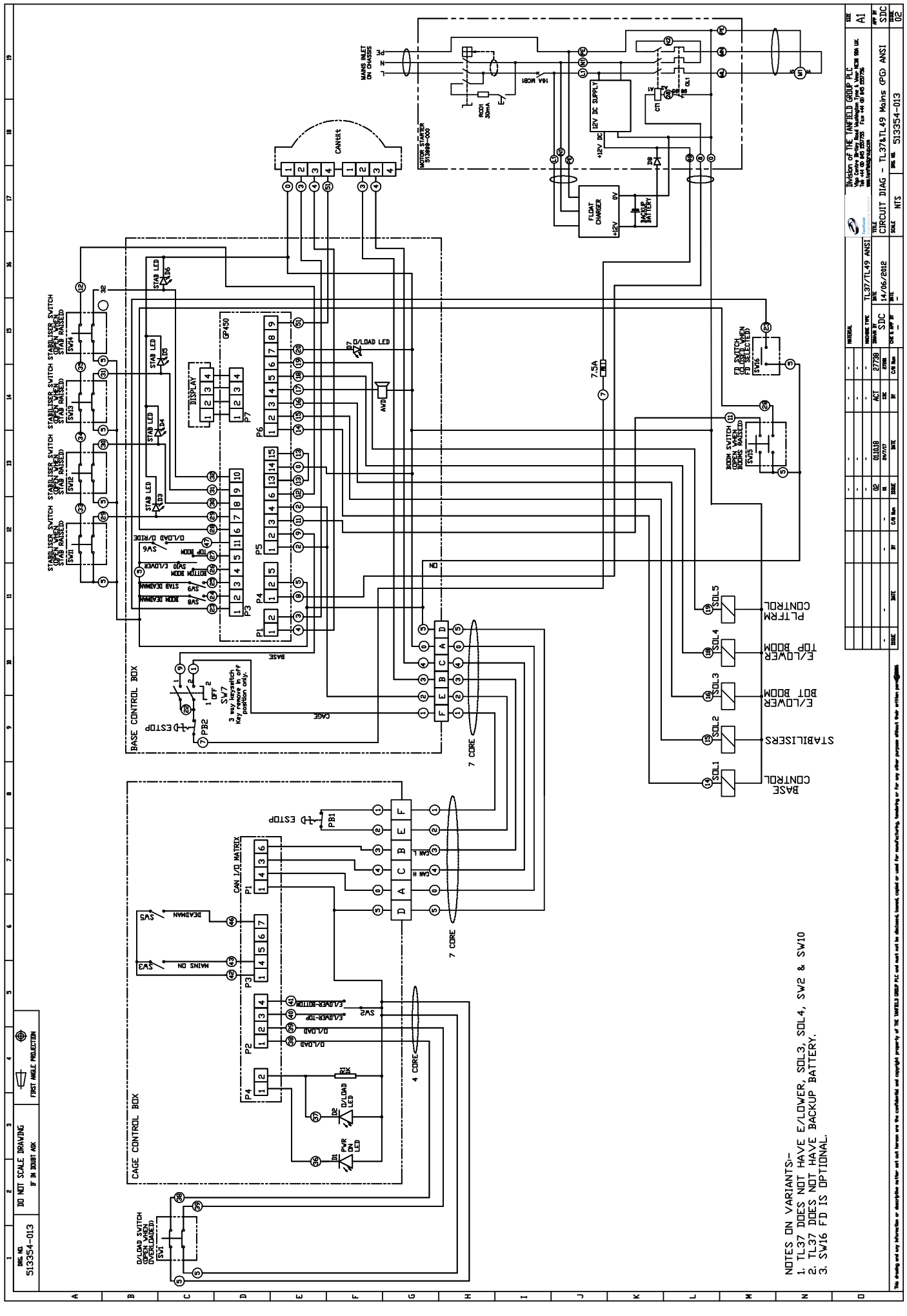
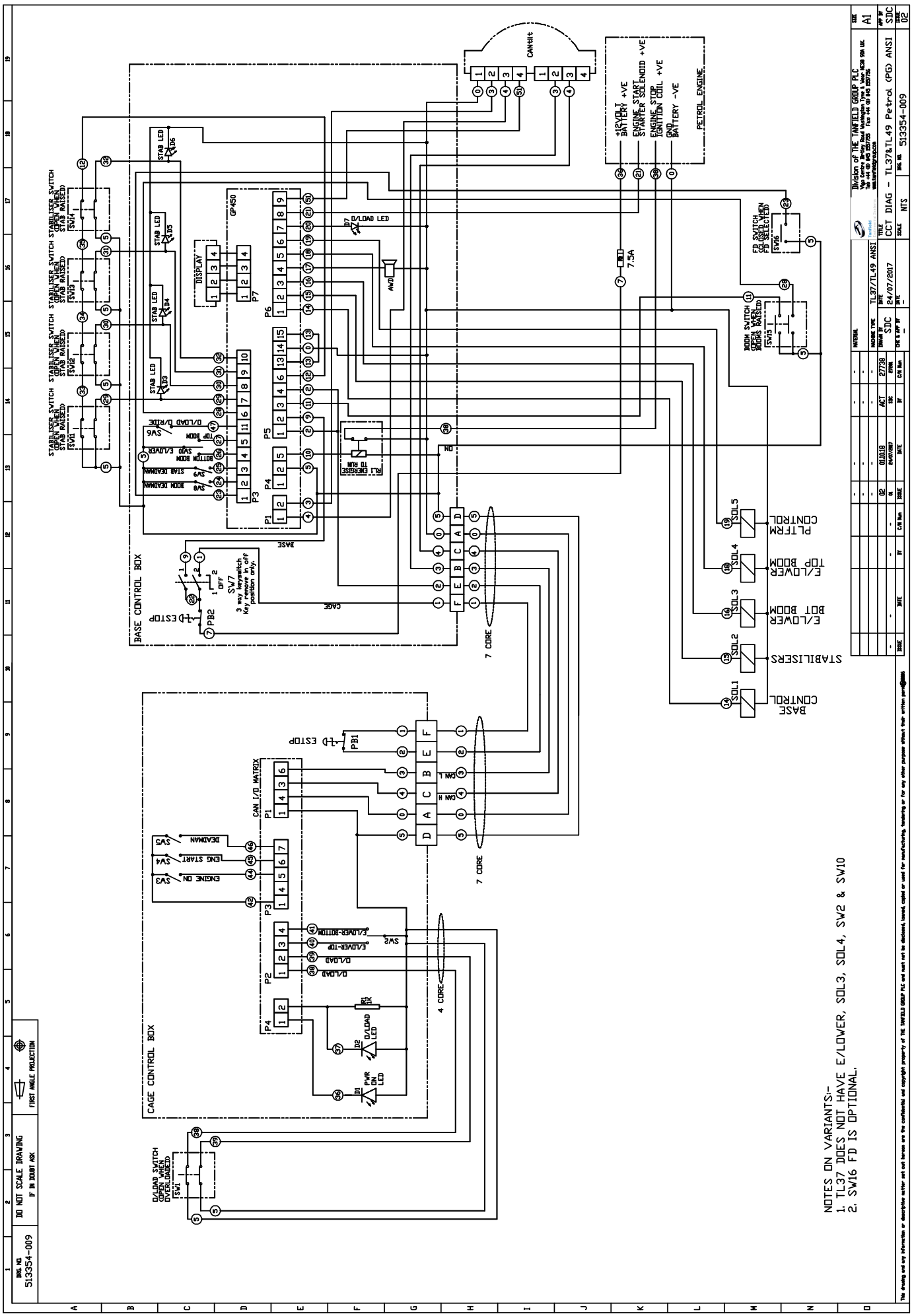
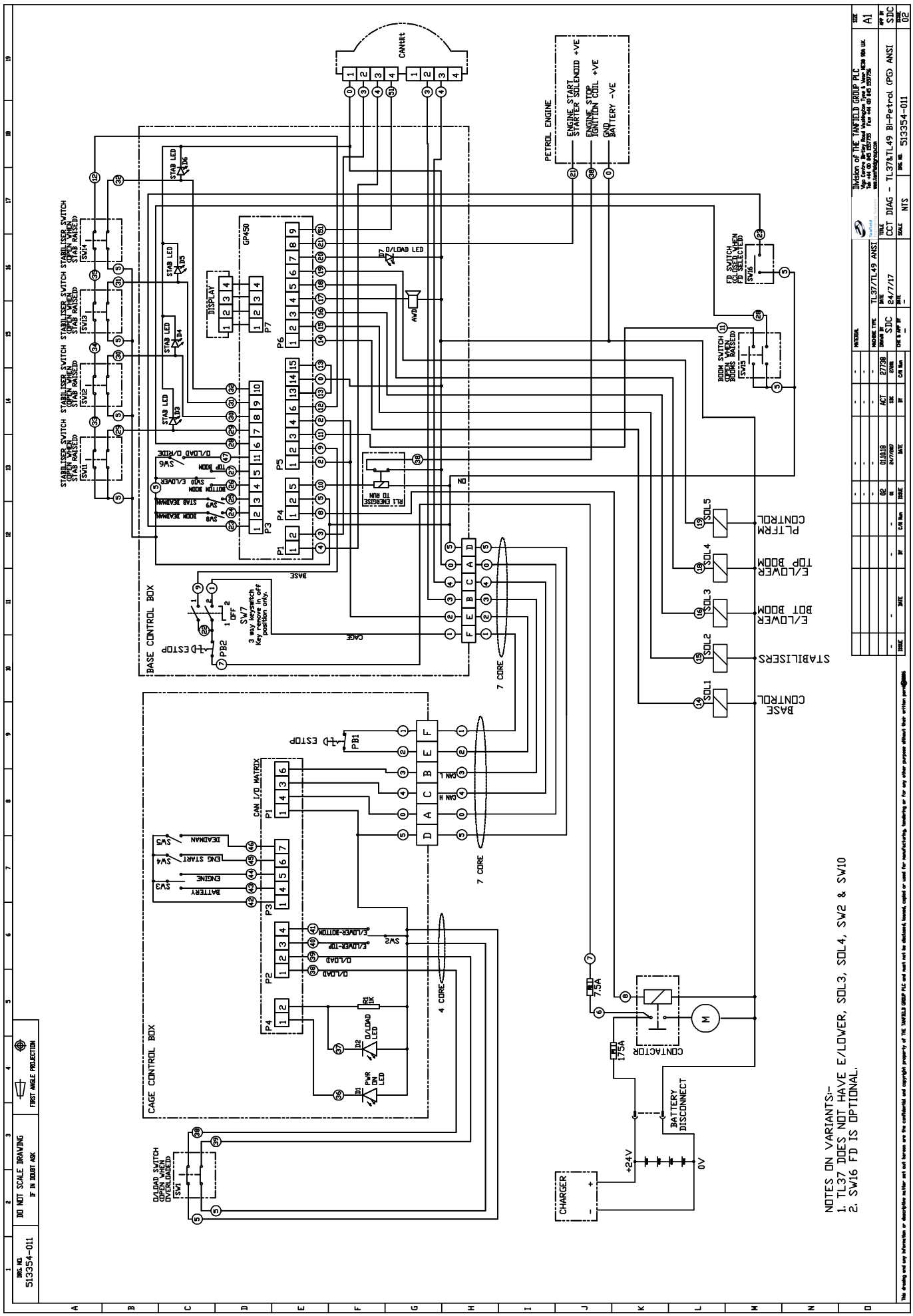
MAINS ANSI, CANTILT - CIRCUIT SCHEMATIC (From SN:TL37J-01-****00291)



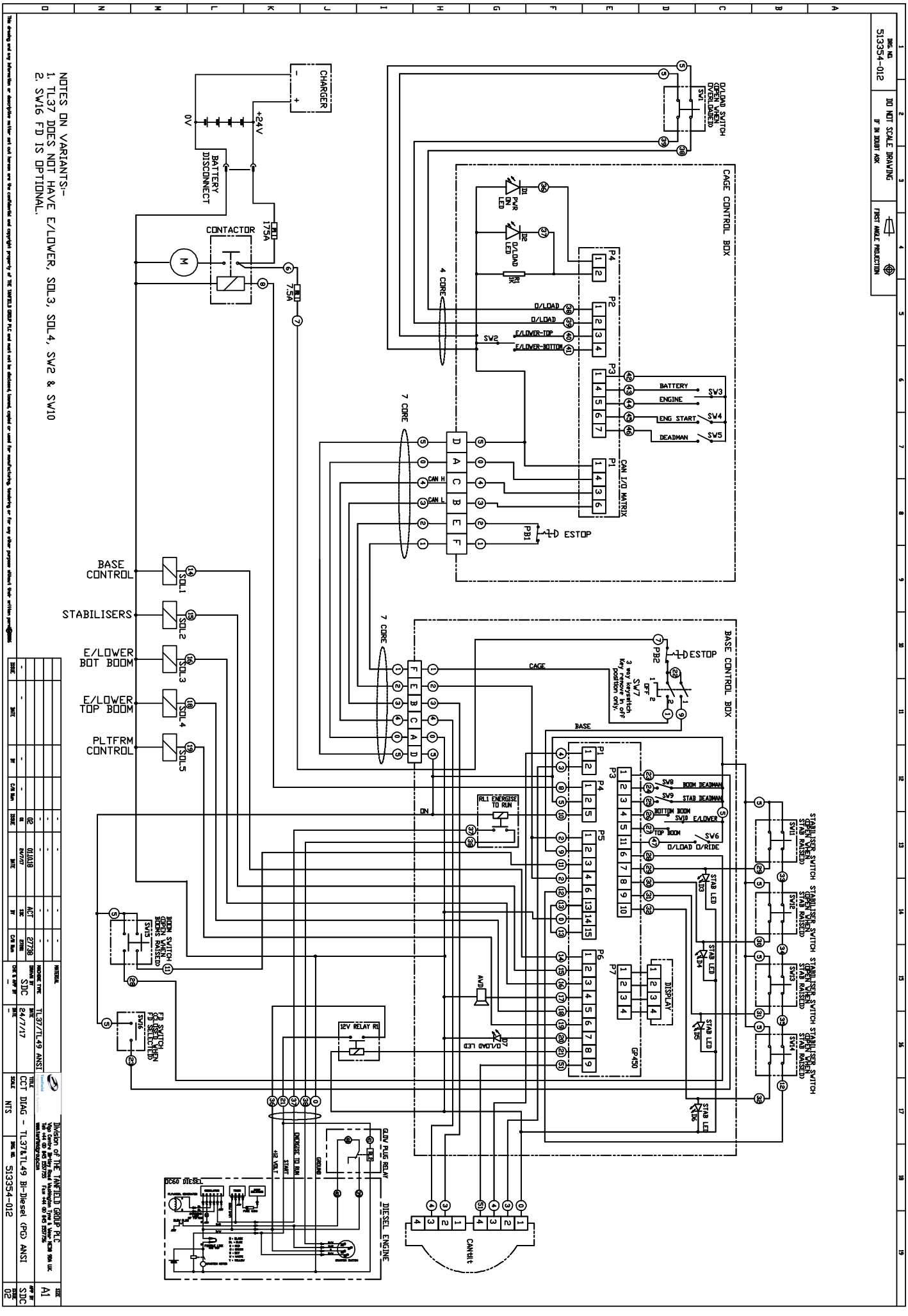
PETROL ANSI, CANTILT - CIRCUIT SCHEMATIC (From SN: TL37J-01-****00291)



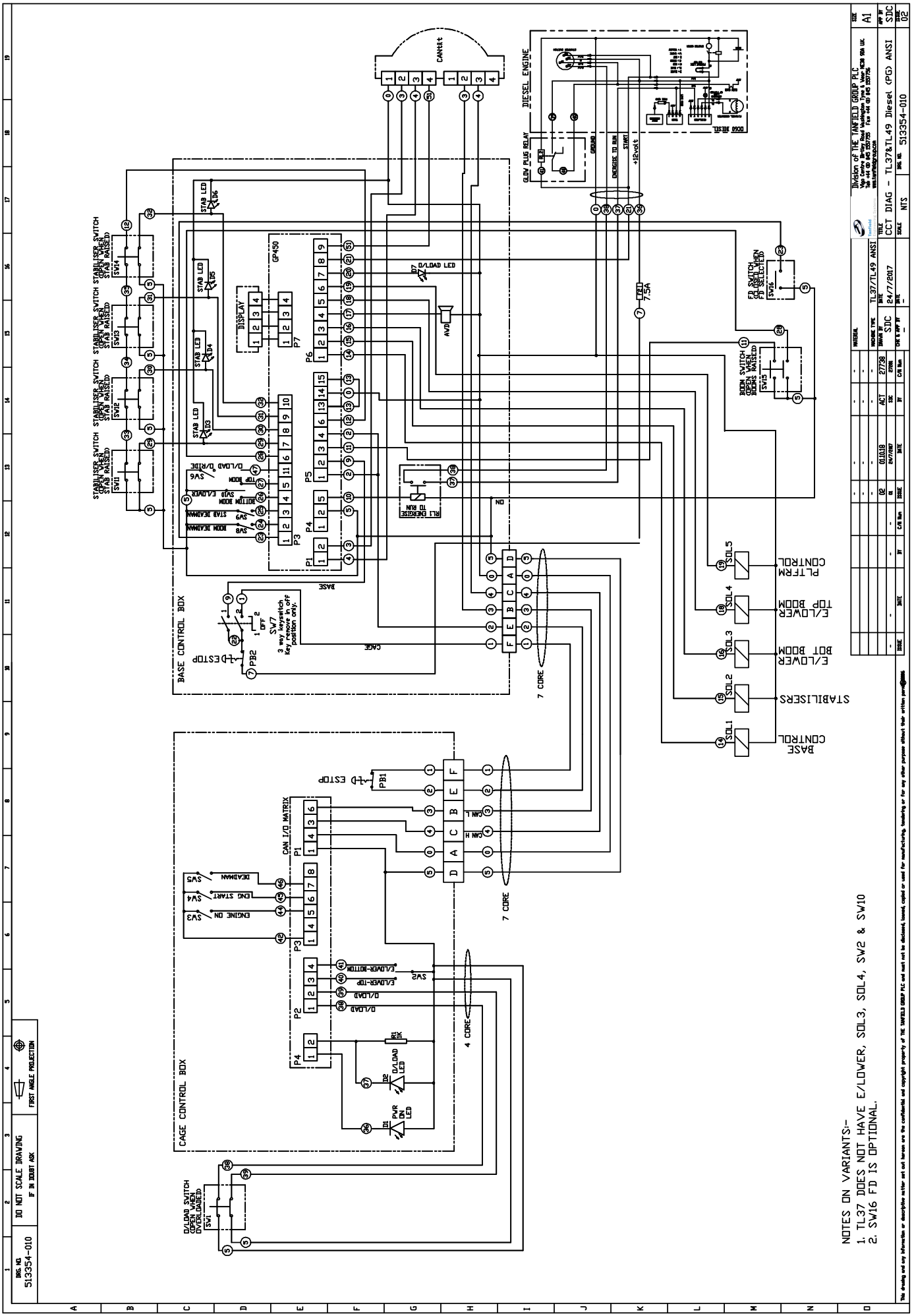
BI-FUEL PETROL ANSI,CANTILT - CIRCUIT SCHEMATIC (From SN:TL37J-01-****00291)



BI-FUEL DIESEL ANSI, CANTILT - CIRCUIT SCHEMATIC (From SN:TL37J-01-****00291)



DIESEL ANSI, CANTILT - CIRCUIT SCHEMATIC (From SN:TL37J-01-****00291)



MAINS / GEN SET ANSI, CANTILT- CIRCUIT SCHEMATIC (From SN:TL37J-01-****00291)