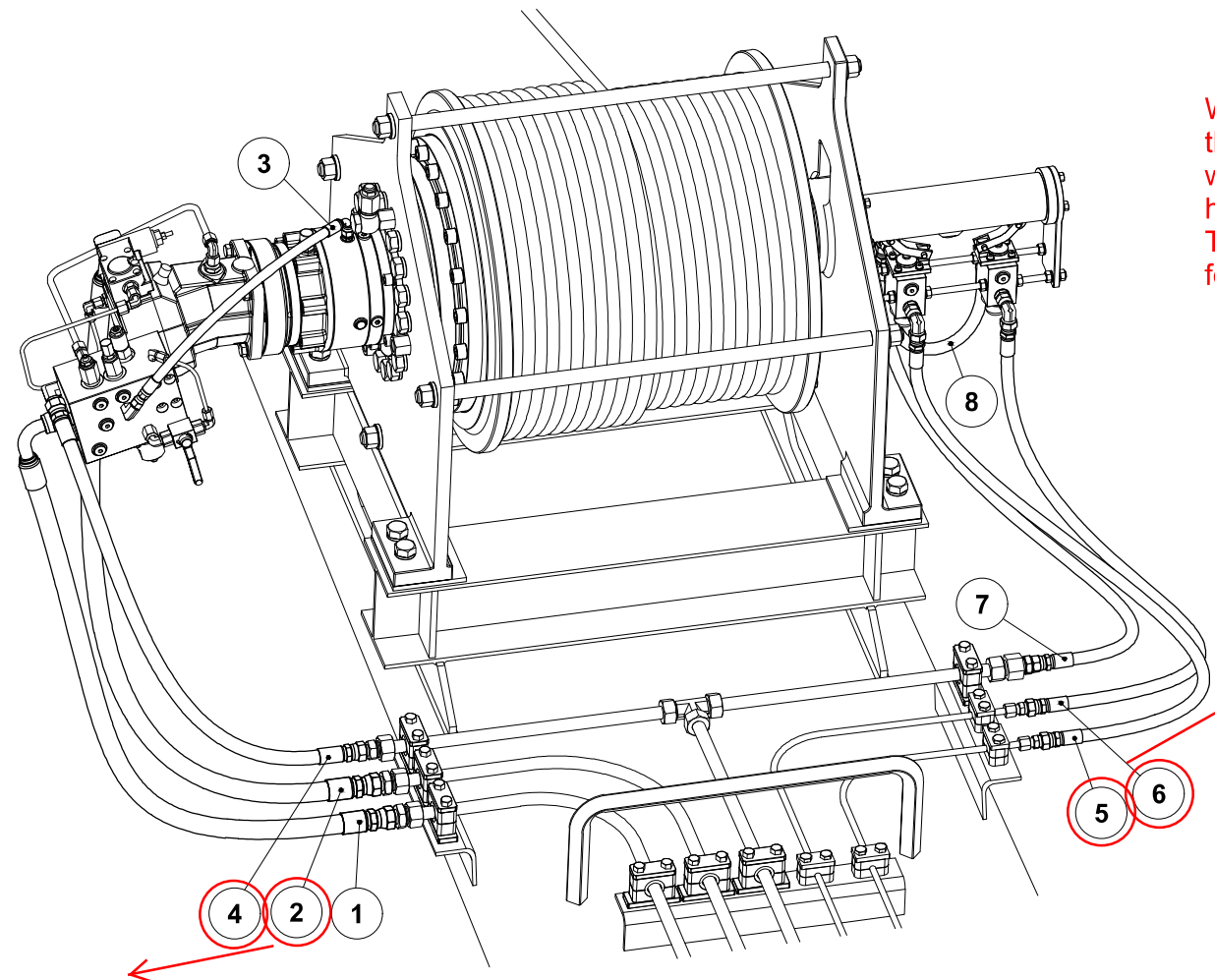


1. Hose

Hazard : Bursting of Hose due to ageing. Harsh marine atmosphere / weather conditions.
Potential risk: *Leading to oil spill and even pollution in some cases. *Injury to personnel.
Note: Lifespan of hoses is 3-4 years without denso tape / Tectyl compound protection.
With Protection, it could prolong up to around 5~7 years, thus it is strongly recommended to replace all hoses every 5 years.
The only downside of denso tape is that it is costly to apply to all hoses every time hose set is replaced and it takes a longer time during hose renewal.




WE have identified that there are a few hoses that are prone to bursting due to their high working pressure along with being exposed to harsh weather conditions. These hoses are highlighted in the pages 1~6 for easy understanding.

HOISTING/LOWERING
LIMIT P LINE HOSE


HOISTING/LOWERING
P LINE HOSE

8	S00002565	HYD. HOSE	1 EA	
7	S00002519	HYD. HOSE	1 EA	
6	S00002518	HYD. HOSE	1 EA	
5	S00002517	HYD. HOSE	1 EA	
4	S00002516	HYD. HOSE	1 EA	
3	S00002515	HYD. HOSE	1 EA	
2	S00002514	HYD. HOSE	1 EA	
1	S00002513	HYD. HOSE	1 EA	
NO.	PART NO.	DESCRIPTION	Q'TY	REMARKS

APPROVED

BY :  **SSil SANGSANGIN**

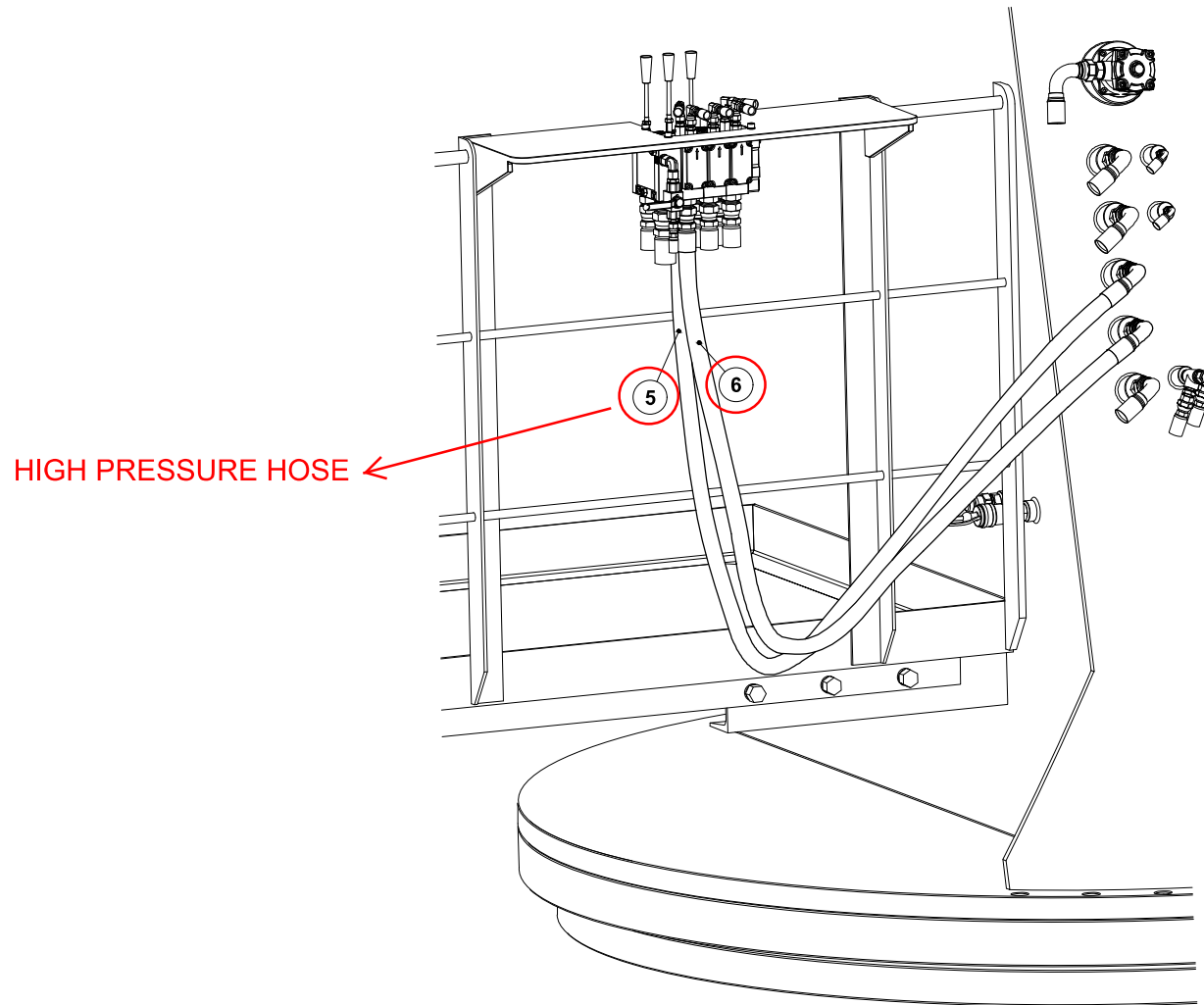
DESIGNED



BY :  **ZENITH MARINETECH**

DOC. NAME : **HYD. HOSE**

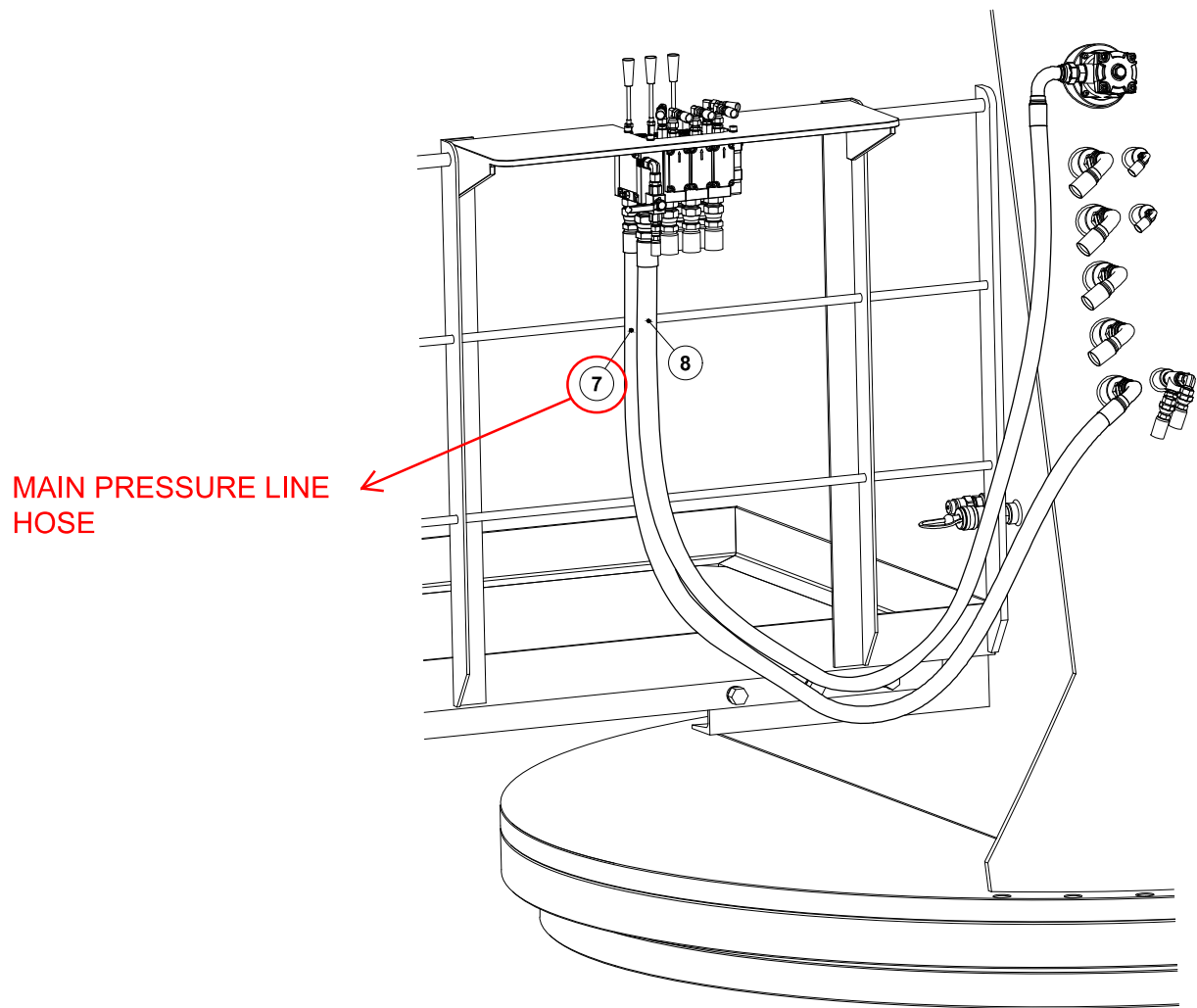
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MAIN CONTROL VALVE (MCV-01)



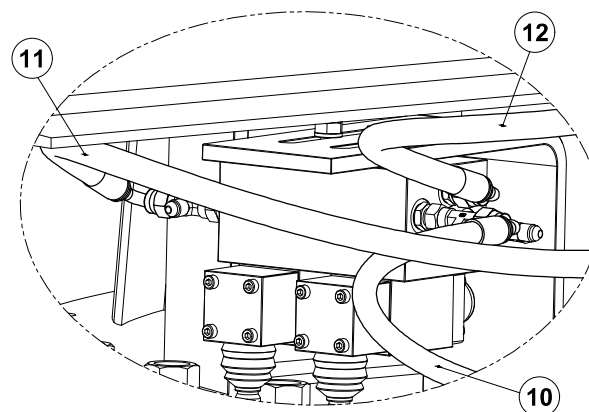
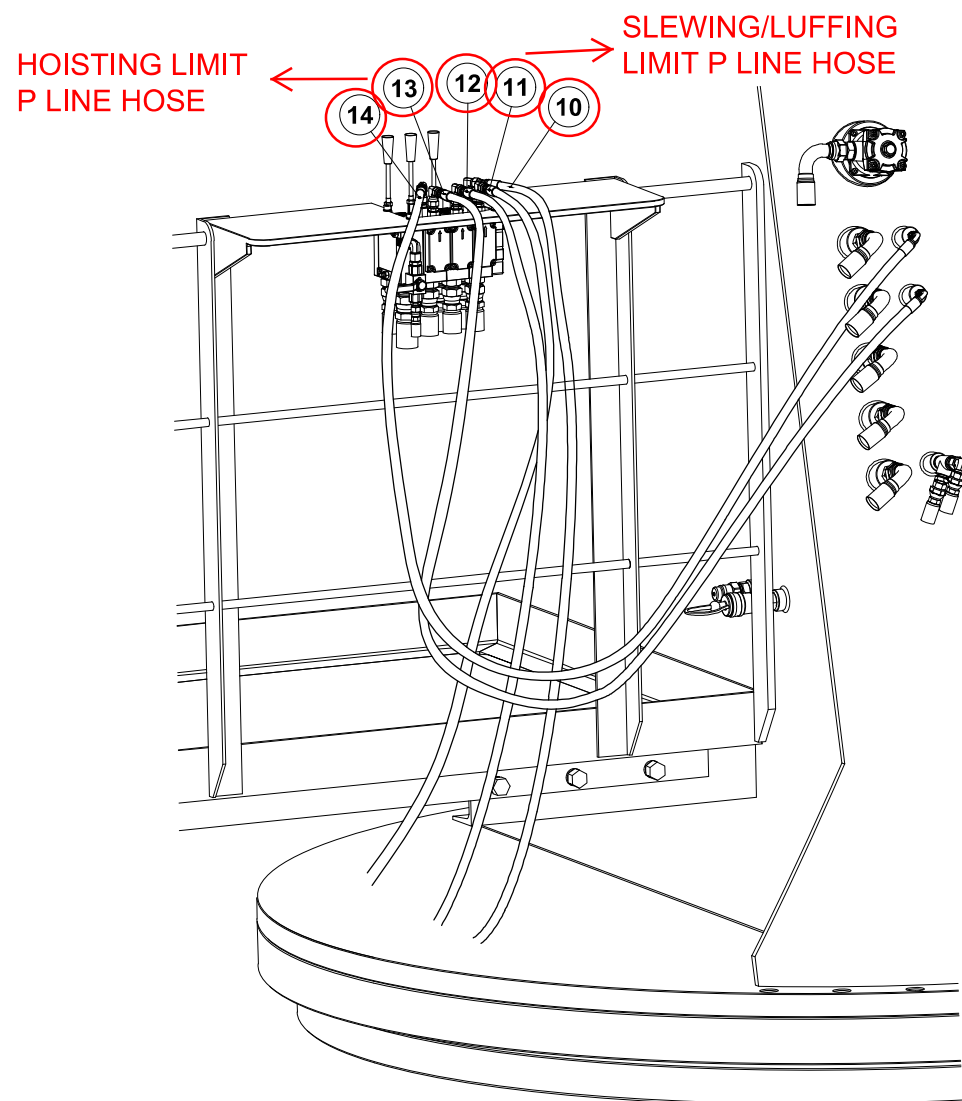
6	S00002229	HYD. HOSE	1 EA	
5	S00002228	HYD. HOSE	1 EA	
NO.	PART NO.	DESCRIPTION	Q'TY	REMARKS
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APPROVED BY :  SANGSANGIN		DESIGNED BY :  ZENITH MARINETECH		
DOC. NAME : HYD. HOSE				

MAIN CONTROL VALVE (MCV-01)

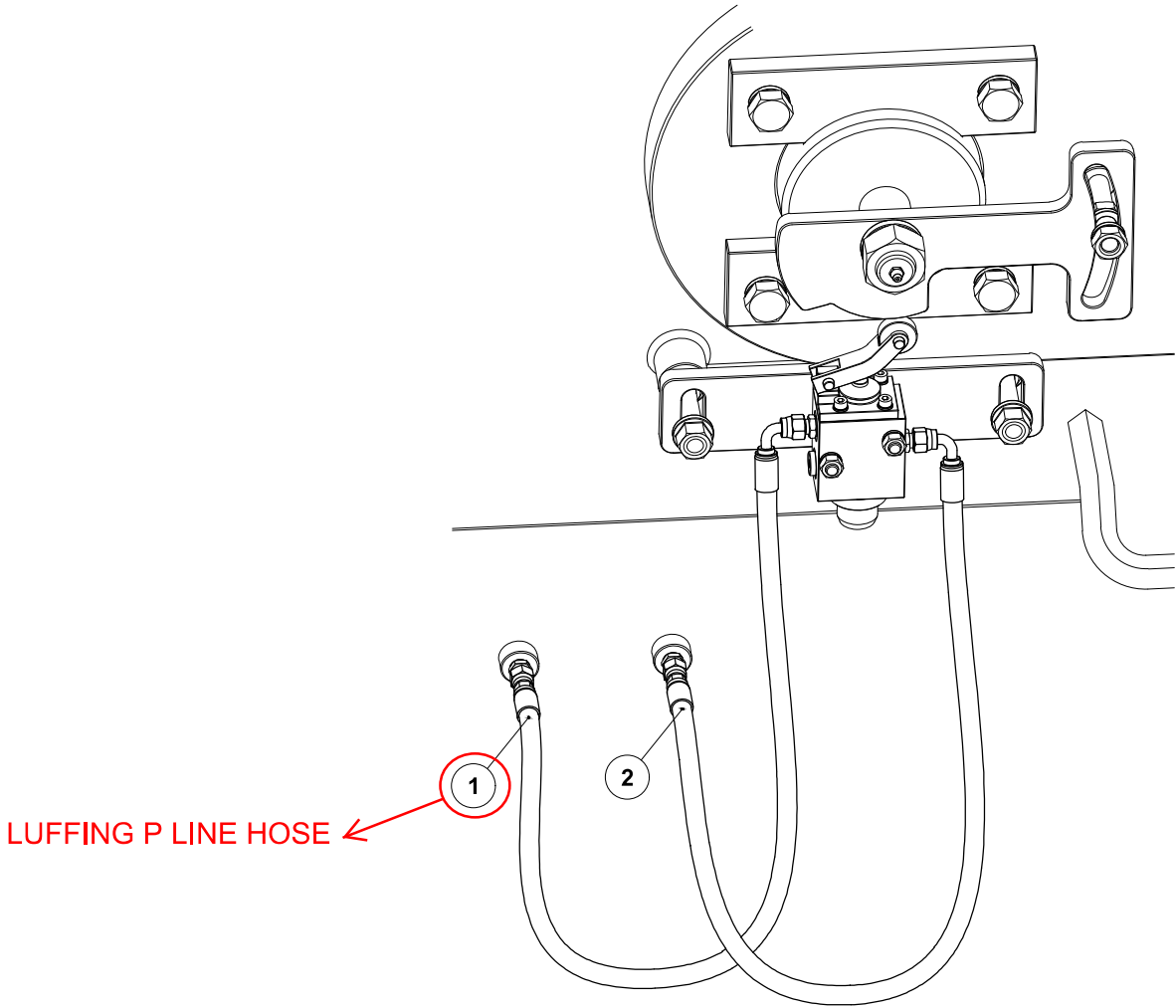




8	S00002231	HYD. HOSE	1 EA	
7	S00002230	HYD. HOSE	1 EA	
NO.	PART NO.	DESCRIPTION	Q'TY	REMARKS
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BY :  SSil SANGSANGIN		BY :  ZENITH MARINETECH		
DOC. NAME : HYD. HOSE				

MAIN CONTROL VALVE (MCV-01)

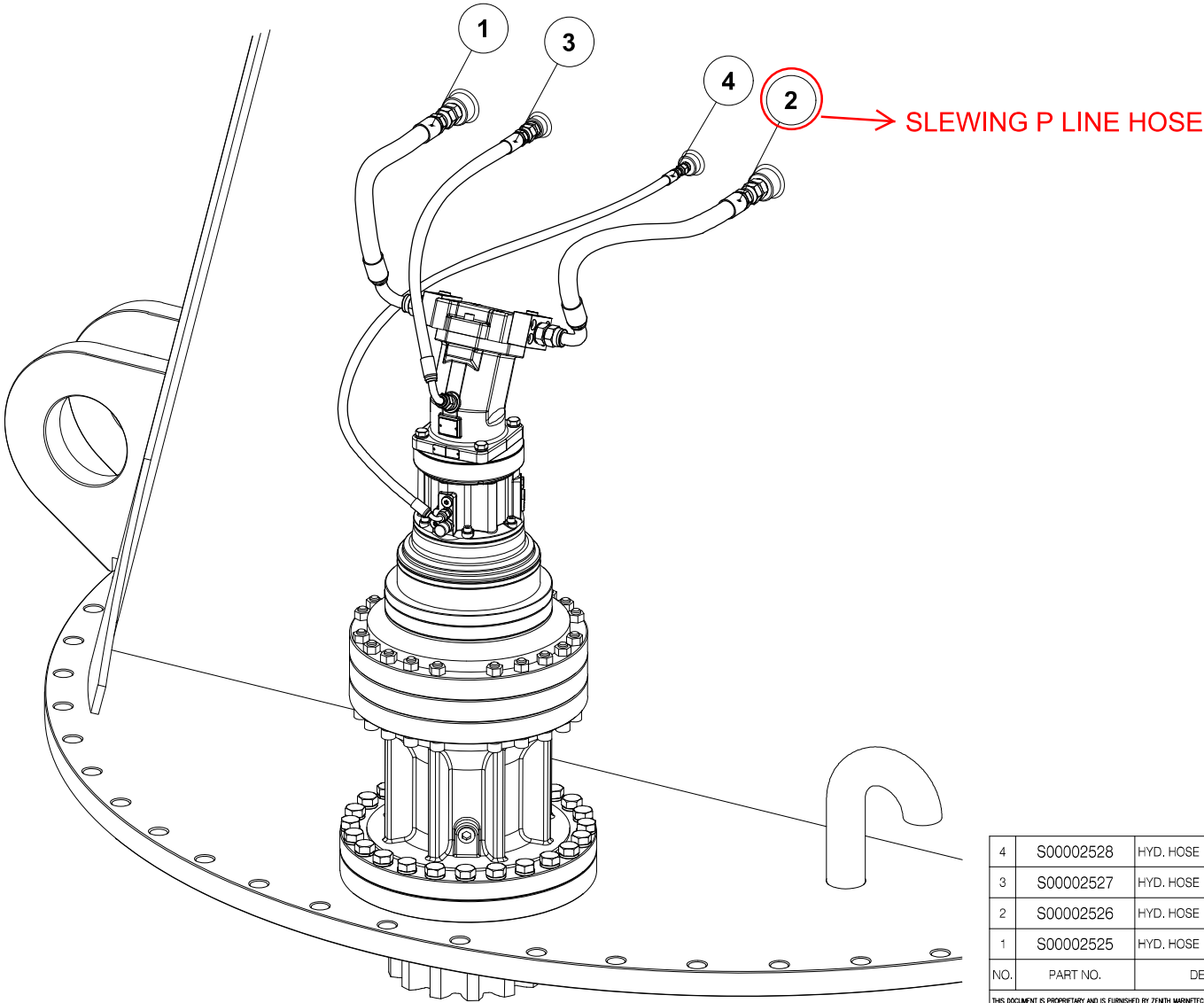
[illegible]



LUFFING LIMIT VALVE (LLV-01)



2	S00001779	HYD. HOSE	1 EA	
1	S00001778	HYD. HOSE	1 EA	
NO.	PART NO.	DESCRIPTION	Q'TY	REMARKS
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DOC. NAME : HYD. HOSE				

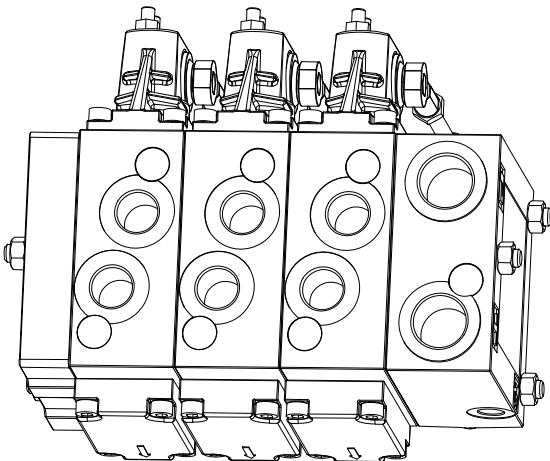
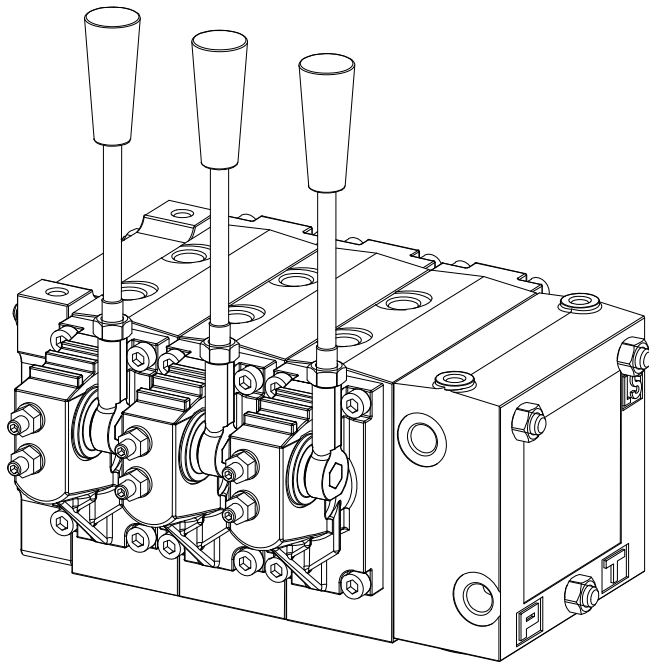
SLEWING WINCH (SW-01)




4	S00002528	HYD. HOSE	1 EA	
3	S00002527	HYD. HOSE	1 EA	
2	S00002526	HYD. HOSE	1 EA	
1	S00002525	HYD. HOSE	1 EA	
NO.	PART NO.	DESCRIPTION	QTY	REMARKS
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APPROVED			DESIGNED	
BY :  SANGSANGIN			BY :  ZENITH MARINETECH	
DOC. NAME : HYD. HOSE				

MAIN CONTROL VALVE - S00000013

The main control valve is one of the most critical components in an electrohydraulic crane system as it governs the flow of hydraulic oil in order to ascertain specific movements of the crane such as hoisting, luffing and slewing - thus controlling the crane movement, direction and safety also. While keeping the MCV as a spare would be desirable but not very cost effective. Therefore, we have identified some of its critical parts whose inventory as a bare minimum is essentially to be maintained on board to ensure safe operation all the time. same is represented in the following three pages

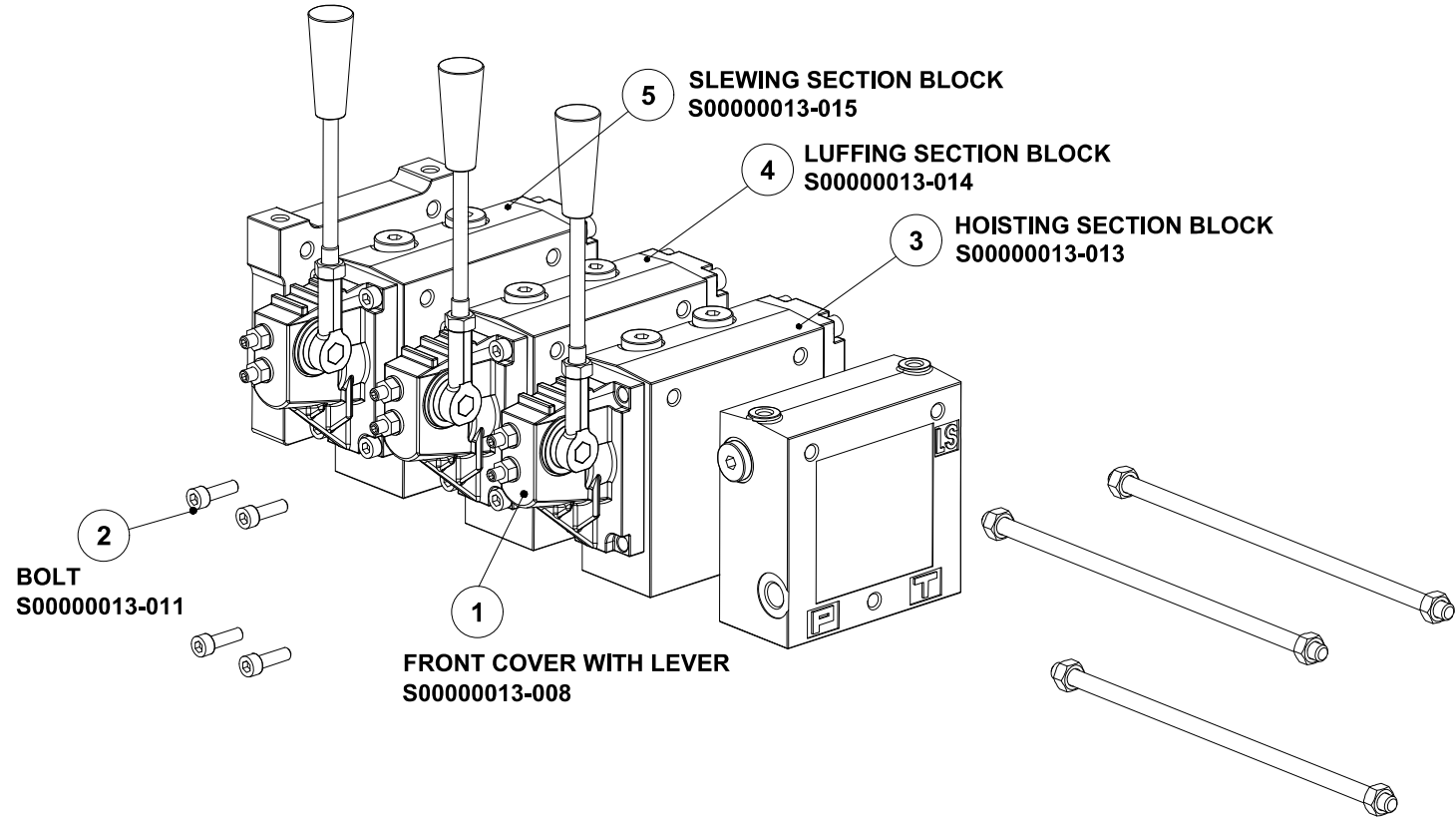


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1	S00000013	MAIN CONTROL VALVE	1 SET	
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BY :			BY :  ZENITH MARINETECH	
DOC. NAME : MAIN CONTROL VALVE ASS'Y				


MAIN CONTROL VALVE

The MCV generally comprises of Three section blocks (or 4 in case of the PTS) namely the slewing, luffing and hoisting section blocks. the hoisting one usually is the one which wears the most and is advisable to have it as a spare. Alternately, as a bare minimum the spool only also can be kept as spare to keep it cost effective but then this may take some time to replace the spool after dismantling and shall not be as easy as the replacement of the section block would be.



5	S00000013-015	SLEWING SECTION BLOCK	1 SET	
4	S00000013-014	LUFFING SECTION BLOCK	1 SET	
3	S00000013-013	HOISTING SECTION BLOCK	1 SET	
2	S00000013-011	BOLT	12 SET	
1	S00000013-008	FRONT COVER WITH LEVER	3 SET	
NO.	PART NO.	DESCRIPTION	QTY	REMARKS

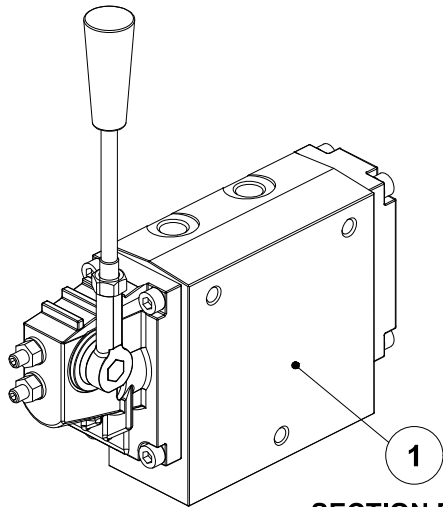
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DOC. NAME :					

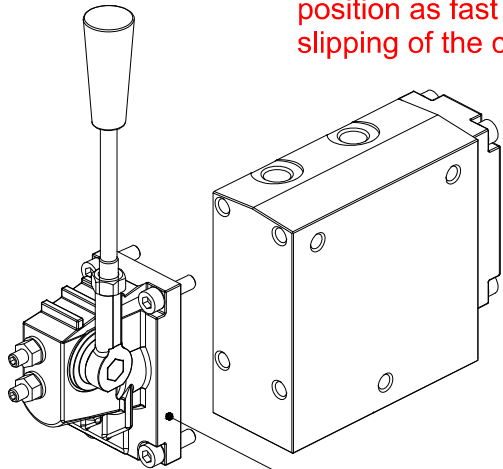
MAIN CONTROL VALVE ASS'Y

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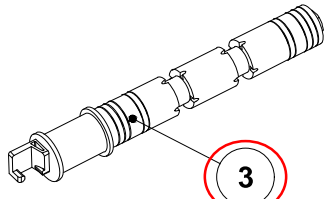
MAIN CONTROL VALVE



**SECTION BLOCK
S00000013-006**



**FRONT COVER WITH LEVER
S00000013-008**




**SPOOL
S00000013-009**

2. Front cover with lever
Risk: Oil leakage / pollution hazard- can even cause the brake to slip. The front cover leak is independent of the seals condition and the from cover is not part of the MCV seal kit also. Therefore, prudent to have one as ROB always
Over a period of time after prolonged usage, the front cover lever gets stuck. The lever then gets sluggish and does not return to neutral position as fast as it should causing the brake to slip and subsequent slipping of the cargo hose or any load on the hook.

3. Spool
Risk: Oil leakage / pollution, abnormal noise, full SWL not getting lifted. Scratches develop between spool and spool housing over time mostly owing to contamination of hydraulic oil. The scratches and increase in the clearances, abnormal noise occurs and/or pressure generated gets insufficient to lift SWL or Overload (125% of SWL).

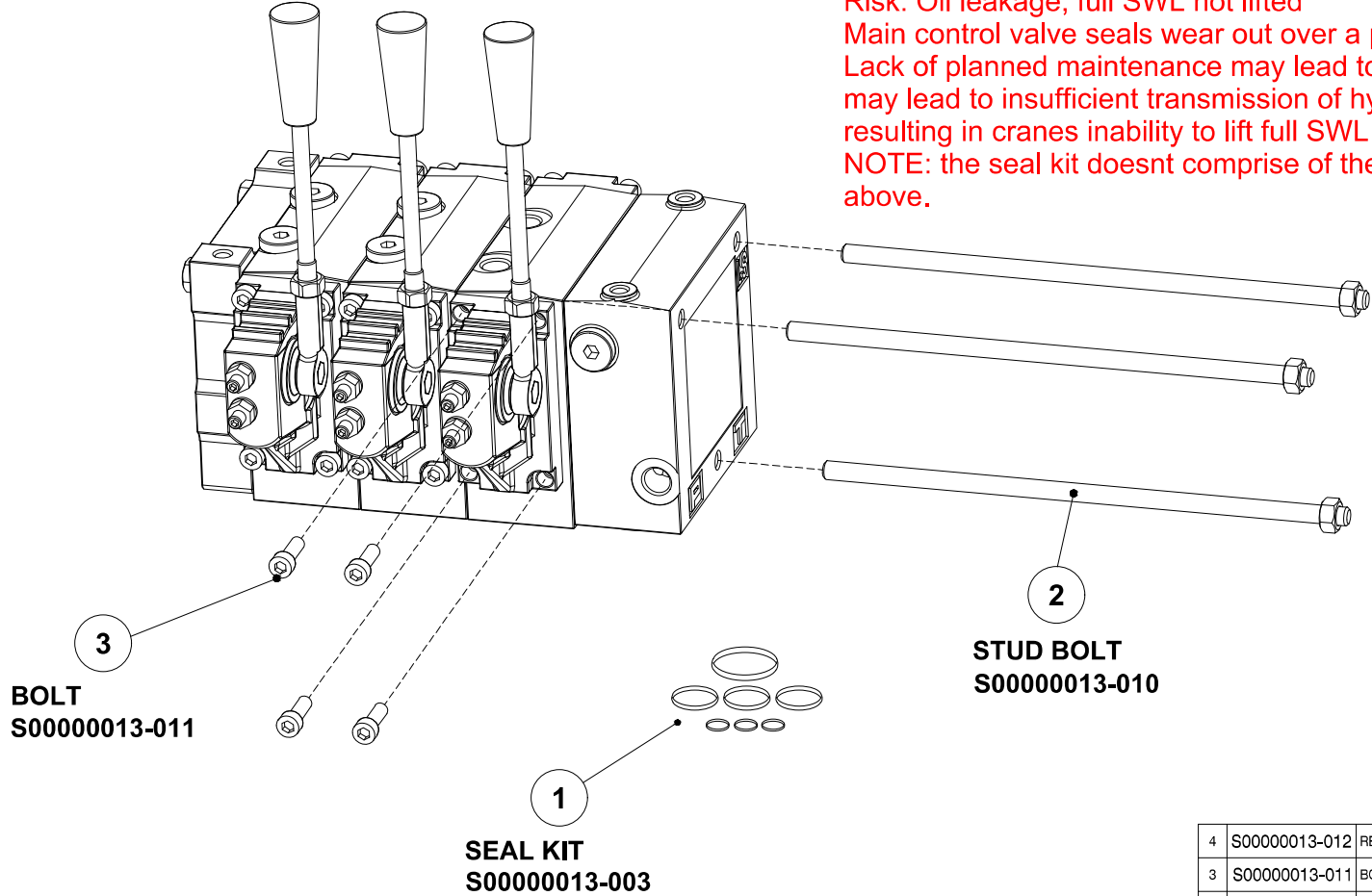
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3	S00000013-009	SPOOL	1 EA	
2	S00000013-008	FRONT COVER WITH LEVER	3 SET	
1	S00000013-006	SECTION BLOCK	3 SET	HOISTING, LUFFING, SLEWING
NO.	PART NO.	DESCRIPTION	QTY	REMARKS
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BY :			BY :  ZENITH MARINETECH	
DOC. NAME : MAIN CONTROL VALVE ASS'Y				

MAIN CONTROL VALVE

→ **REPAIR KIT S00000013-012**
INCLUSIVE OF ALL ITEMS IN LIST

4. Main control valve repair kit
Risk: Oil leakage, full SWL not lifted
Main control valve seals wear out over a period of time.
Lack of planned maintenance may lead to oil leak which subsequently may lead to insufficient transmission of hydraulic pressure resulting in cranes inability to lift full SWL or Overload (125% of SWL).
NOTE: the seal kit doesnt comprise of the front cover which is explained above.




BOLT
S00000013-011

SEAL KIT
S00000013-003

STUD BOLT
S00000013-010

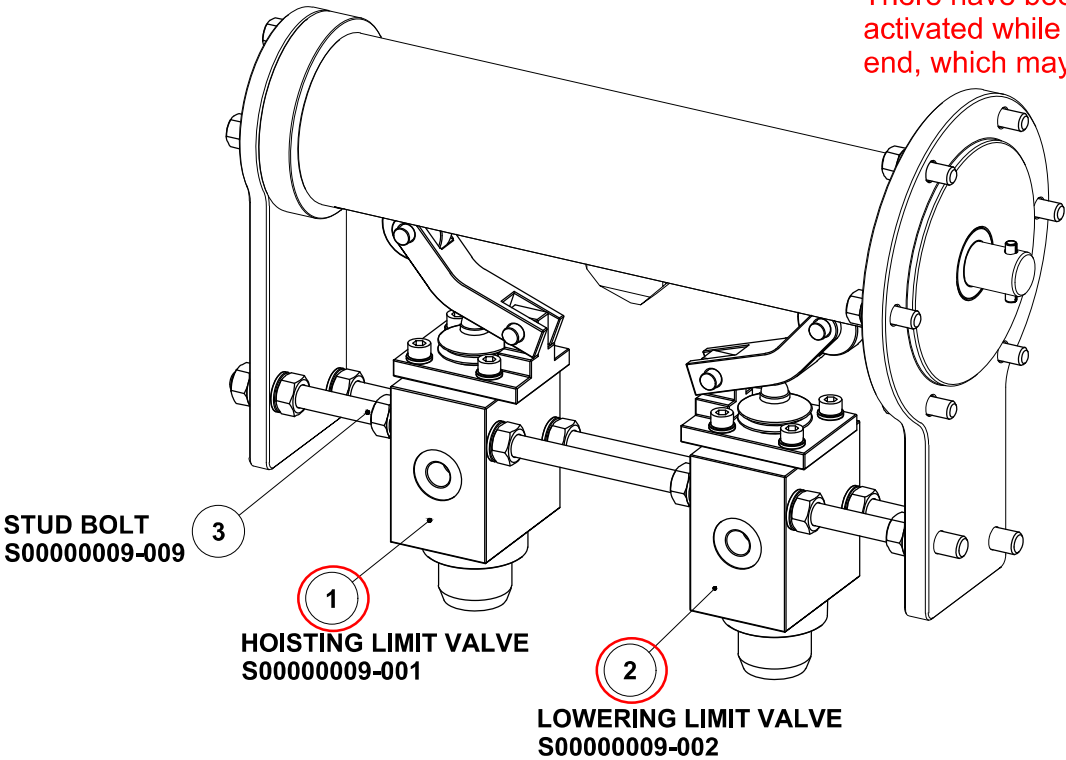
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4	S00000013-012	REPAIR KIT	1 SET	ALL IN LIST
3	S00000013-011	BOLT	12 SET	
2	S00000013-010	STUB BOLT & NUT	3 SET	
1	S00000013-003	SEAL KIT	1 SET	
NO.	PART NO.	DESCRIPTION	QTY	REMARKS
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APPROVED			DESIGNED	
BY :			BY :  ZENITH MARINETECH	
DOC. NAME : MAIN CONTROL VALVE ASS'Y				

HOISTING LIMIT DEVICE ASS'Y - S00000009

5. Hoisting / Lowering Limit Valve
Risk: With the personal safety being the paramount concern here, this is one of the most common reasons of not passing the class survey also as it is generally neglected and not checked diligently. Further it can also lead to hook block, sheave and jib end damage.

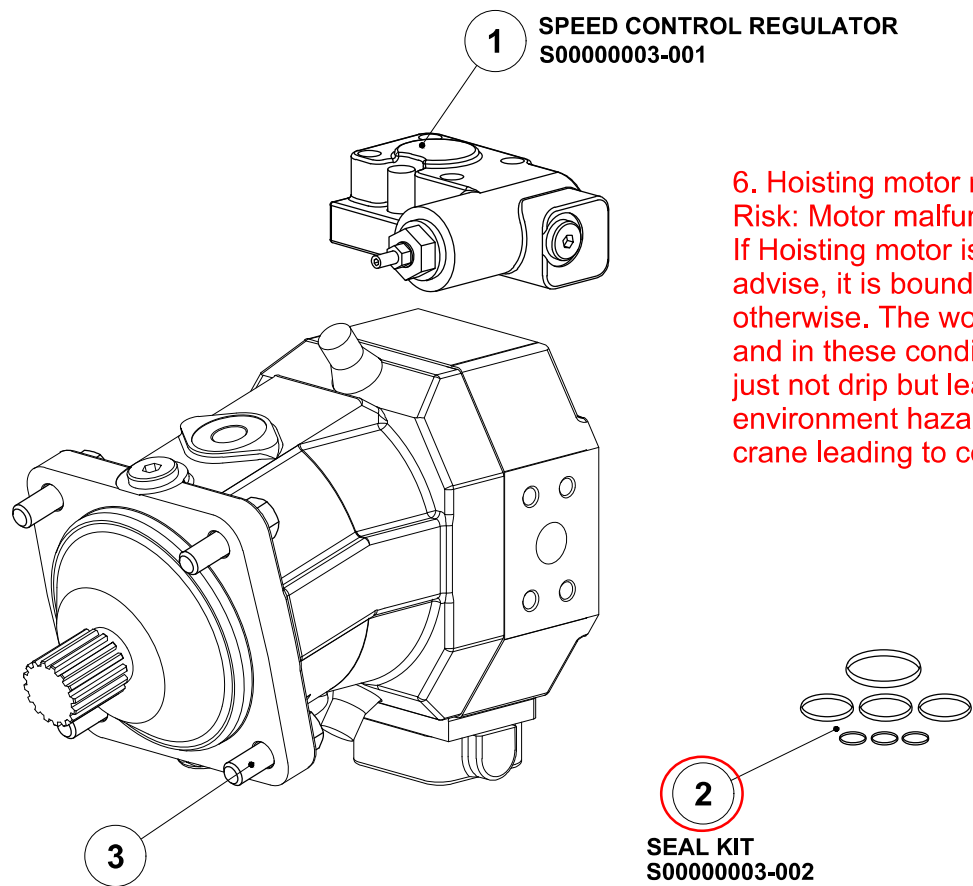
There have been some instances in the past that if limit does not get activated while hoisting reaches its limit, hook block crashes into the jib end, which may break hook block, sheave and jib end.



3	S00000009-009	STUD BOLT	2 EA	INCL.14 SET NUT & S/W
2	S00000009-002	LOWERING LIMIT VALVE	1 EA	
1	S00000009-001	HOISTING LIMIT VALVE	1 EA	
NO.	PART NO.	DESCRIPTION	QTY	REMARKS
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DOC. NAME : HOISTING LIMIT DEVICE ASS'Y				


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HOISTING MOTOR - S00000003



6. Hoisting motor repair kit
Risk: Motor malfunction, heavy oil leakage / spill / pollution.
If Hoisting motor is not overhauled regularly as per the makers advise, it is bound to lose its functionality much faster than otherwise. The working pressure in the motor is generally high and in these conditions, if the internal seals are worn, the oil may just not drip but leak profusely which could be a potential environment hazard as well apart from the inoperability of the crane leading to commercial losses.

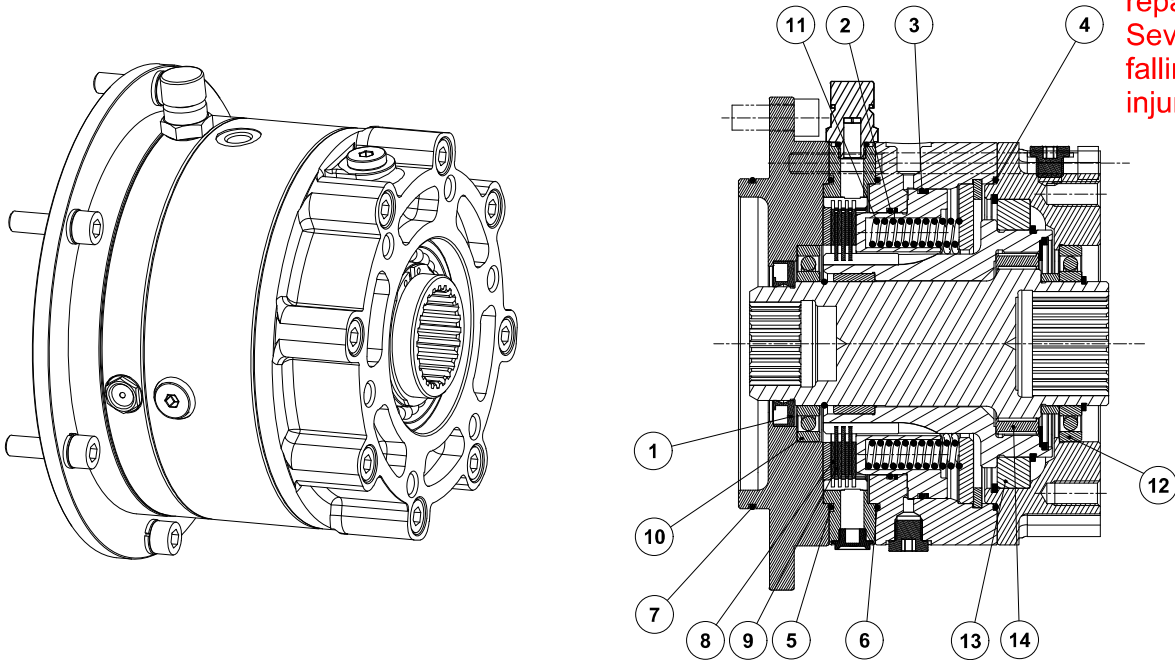
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3	S00000003-003	HEX BOLT & S/W	4 SET	
2	S00000003-002	SEAL KIT	1 SET	
1	S00000003-001	SPEED CONTROL REGULATOR	1 EA	
NO.	PART NO.	DESCRIPTION	Q'TY	REMARKS
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BY :			BY :  ZENITH MARINETECH	
DOC. NAME : HOISTING MOTOR				

HOISTING BRAKE ASS'Y - S00000006

→ **BRAKE REPAIR KIT S00000006-040**
INCLUSIVE OF ALL ITEMS IN LIST

7. Hoisting brake repair kit
Risk: Due to the brake malfunction, the crane may cease to hoist or lower the cargo resulting in delays and commercial loss. It is imminent to have these brakes overhauled as per makers advise and also to have the repair kit handy all the times as ROB - in case any urgent repair is to be executed.
Severe brake slip in the hoisting motor will result in cargo falling onto the deck - which can even result in personal injuries to the crew / bystander.



Section view

15	S00000006-040	BRAKE REPAIR KIT	1	ALL IN LIST
14	S00000006-033	FREE WHEEL	1	
13	S00000006-030	BEARING	1	
12	S00000006-025	BEARING	1	
11	S00000006-020	SPRING	18	
10	S00000006-016	BEARING	1	
9	S00000006-012	DISK	3	
8	S00000006-011	LINING	4	
7	S00000006-010	O-RING	1	
6	S00000006-009	O-RING	1	
5	S00000006-008	O-RING	1	
4	S00000006-007	O-RING	1	
3	S00000006-006	O-RING	1	
2	S00000006-004	O-RING	1	
1	S00000006-002	OIL SEAL	1	
NO.	PART NO.	DESCRIPTION	Q'TY	REMARKS

APPROVED


BY :

DESIGNED

BY :

DOC. NAME :

HOISTING BRAKE ASS'Y

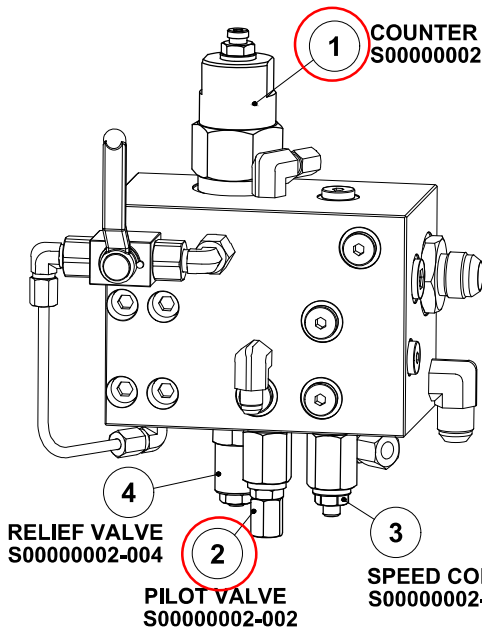


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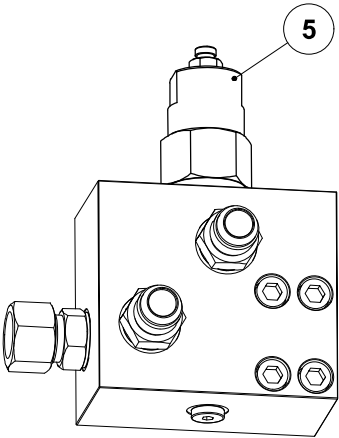
HYDRAULIC BLOCK

8. Counter balance valve
Risk: Crane jib hunting, brake malfunction with light load, damage to hoses due to pressure surge.
It controls oil going in and out and makes it balanced such that crane movement is smooth and linear.
It also acts as a brake with light load by equalizing oil inflow and outflow.
Malfunction of it will cause crane hunting movement and brake malfunction with light load. Hunting may cause pressure surge which can lead to the bursting of hoses also - in an extreme case.

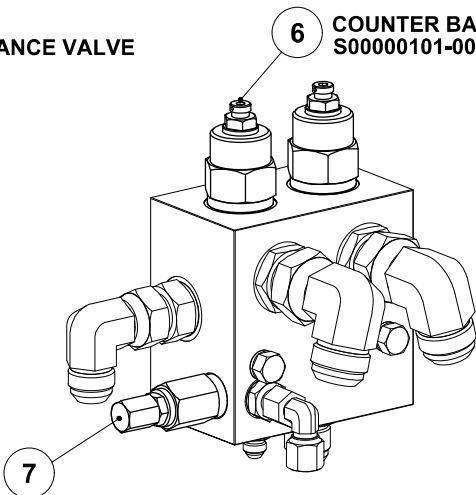


HOISTING BLOCK
S00000002


9. Pilot valve
Risk: Brake damage, malfunction of brakes.
It opens the brake when oil pressure reaches 20-30 bar.
However over a period of time, the spool inside valve loses tension and allows higher pressure to go into the brake. High pressure may break cast housing and/or cause the brake spring to get stuck -thus leading to braking failure.



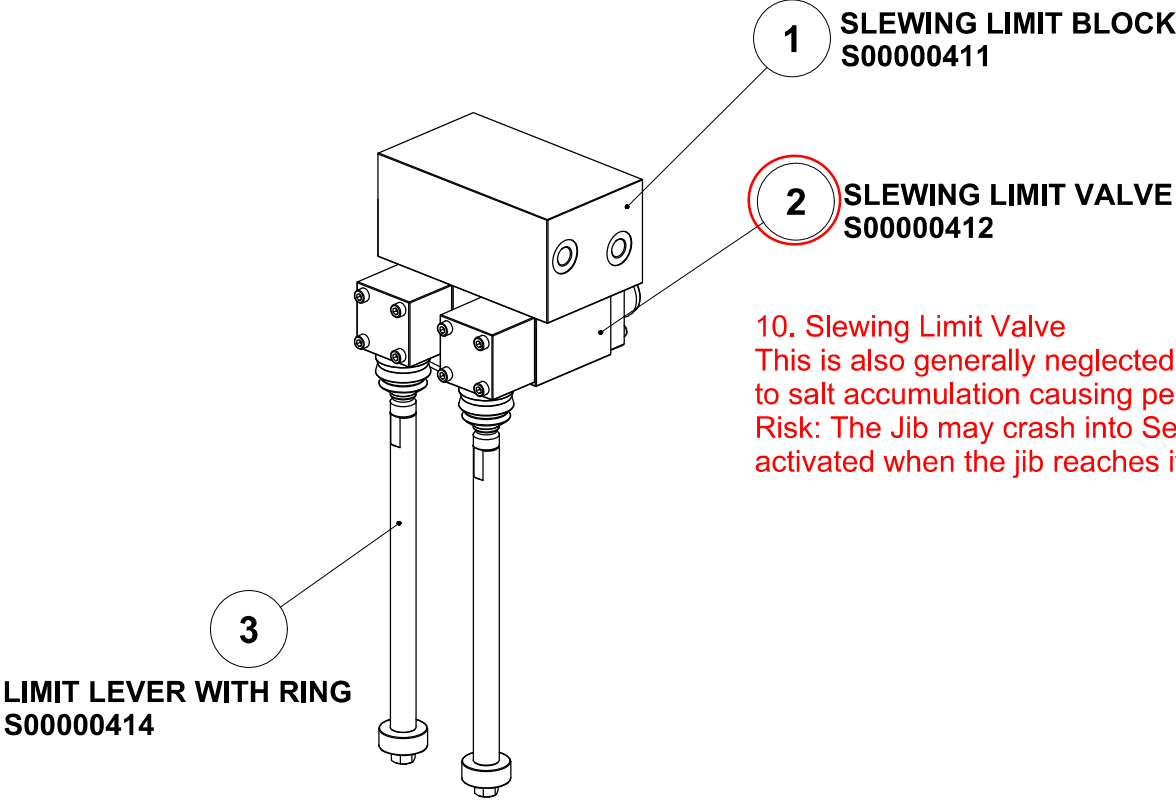
LUFFING BLOCK
S00000059-004




SLEWING BLOCK
S00000101

7	S00000101-002	PILOT VALVE	1 EA	
6	S00000101-001	COUNTER BALANCE VALVE	2 EA	
5	S00000059-005	COUNTER BALANCE VALVE	1 EA	
4	S00000002-004	RELIEF VALVE	1 EA	
3	S00000002-003	SPEED CONTROL VALVE	1 EA	
2	S00000002-002	PILOT VALVE	1 EA	
1	S00000002-001	COUNTER BALANCE VALVE	1 EA	
NO.	PART NO.	DESCRIPTION	Q'TY	REMARKS
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BY :			BY :  ZENITH MARINETECH	
DOC. NAME : HOISTING BLOCK ASS'Y				

SLEWING LIMIT VALVE BLOCK ASS'Y - S00001317



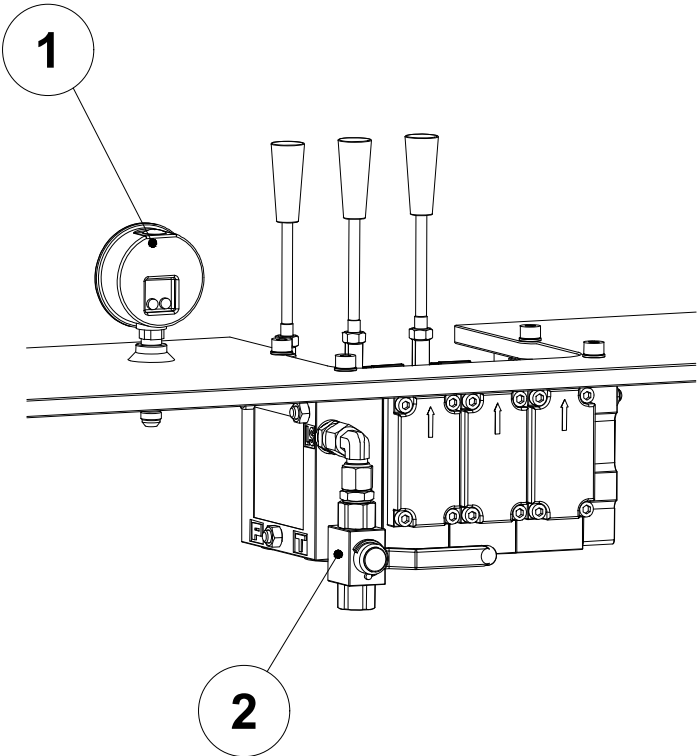
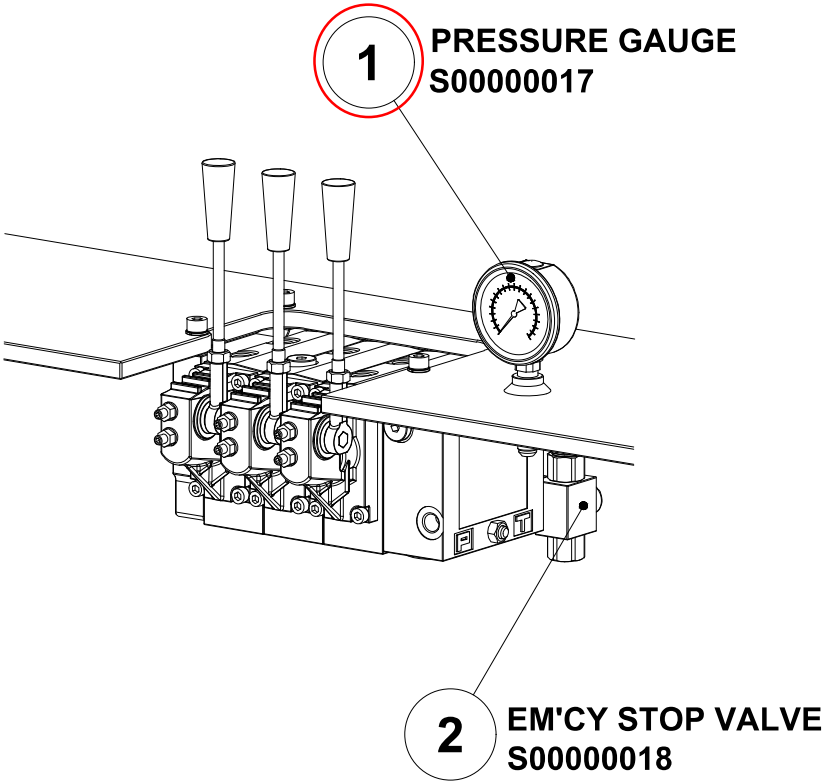
10. Slewing Limit Valve
This is also generally neglected malfunctions / gets stuck due to salt accumulation causing permanent damages at times
Risk: The Jib may crash into Search light column if limit is not activated when the jib reaches its limit - while slewing.

3	S00000414	LIMIT LEVER WITH RING	2 SET	
2	S00000412	SLEWING LIMIT VALVE	4 EA	
1	S00000411	SLEWING LIMIT BLOCK	2 EA	
NO.	PART NO.	DESCRIPTION	QTY	REMARKS
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DOC. NAME : SLEWING LIMIT DEVICE SPARE ORDER BOOK				

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PRESSURE GAUGE

11. Pressure Gauge
Its basic tool to check pressure at various stages of operation and is one of the most important tool in fault finding process. The pressure may directly at times reflect the condition of various parts of the crane.

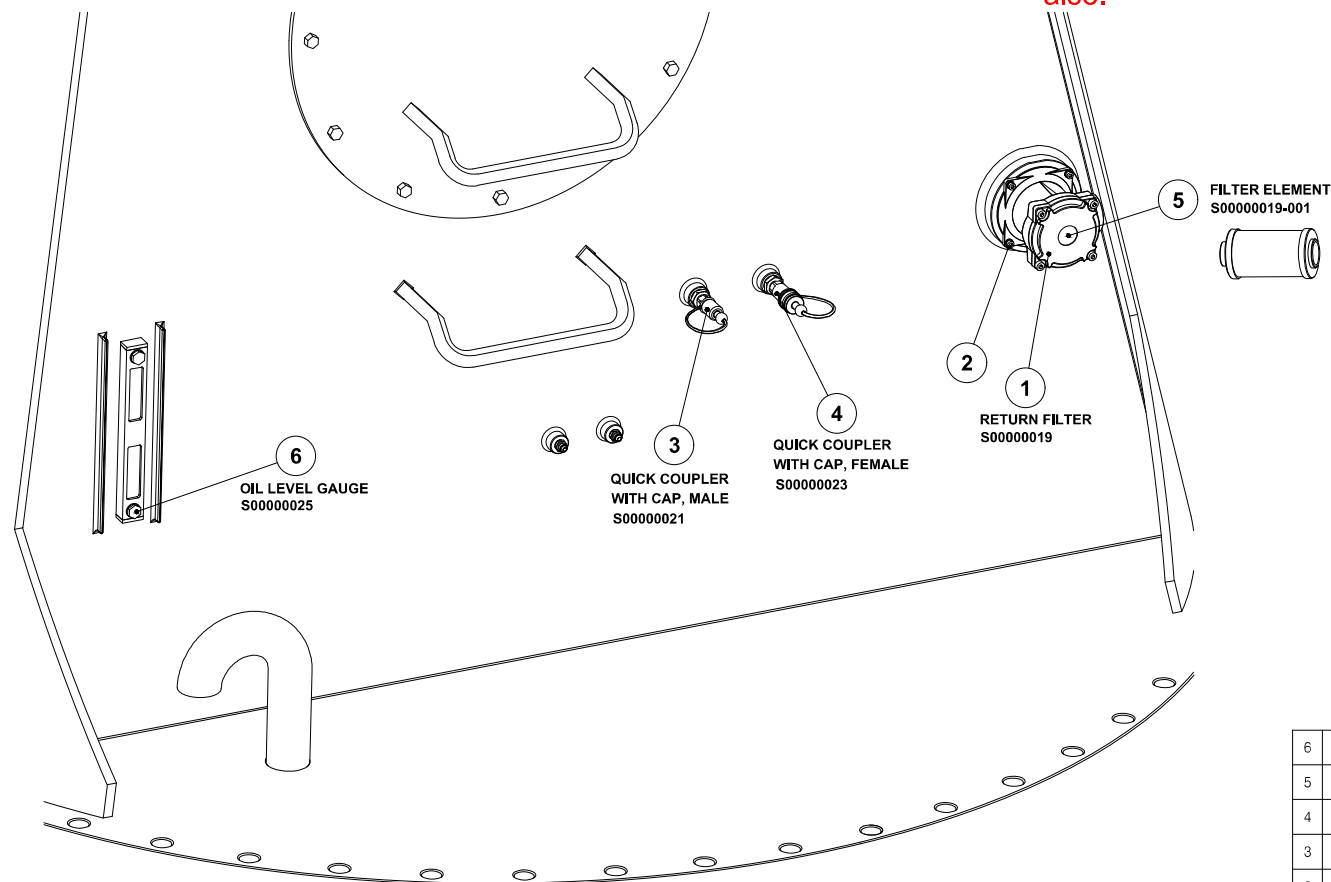


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2	S00000018	EM'CY STOP VALVE	1 SET	
1	S00000017	PRESSURE GAUGE	1 SET	
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APPROVED		DESIGNED		
BY :		BY :		
DOC. NAME :		MAIN CONTROL		

OIL LEVEL GAUGE, QUICK COUPLER, AND RETURN FILTER ELEMENT

12. Return filter element
The importance of the hydraulic oil cleanliness in any hydraulic system is paramount for the system functioning well. The poor oil quality can cause abrasion in various sliding parts with minute clearances which upon wearing, mostly due to the poor oil quality- leads to various malfunctions as explained above also.



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6	S00000019-001	FILTER ELEMENT	1 EA	
5	S00000025	OIL LEVEL GAUGE	1 EA	
4	S00000023	QUICK COUPLER WITH CAP, FEMALE	1 EA	
3	S00000021	QUICK COUPLER WITH CAP, MALE	1 EA	
2	S00000020	HEX. BOLT & S/W	4 SET	
1	S00000019	RETURN FILTER	1 EA	
NO.	PART NO.	DESCRIPTION	Q'TY	REMARKS
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