



R&M Materials Handling, Inc.
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8 Maintenance

The lifetime of the hoist is divided into Safe Working Periods (SWPs). At the beginning of the Safe Working Period, a new hoist has an SWP% of 100. A Safe Working Period ends when the SWP% of the hoist is zero. When a Safe Working Period ends, a General Overhaul (GO) must be conducted, after which the hoist is assigned a new Safe Working Period, refer to the section 'General Overhaul, GO'. During the SWP, the safe and efficient operation of the hoist is contingent on regular servicing.



For the safety carry out the inspection and servicing procedures for the hoist in accordance with the table below.



To avoid any risk of spark with explosive proof hoists due to the friction of two mechanical parts, it is important to follow strictly the maintenance intervals. The safety of the equipment could be compromised if not.

8.1 Daily inspections



Carry out following daily inspection on start of each work shift. Do not use the hoist unless it is in proper condition. Contact a service agent authorized by the manufacturer immediately in case of doubts! The usage of a defective hoist can result in serious damages, injuries or death.

1	Inspection of the wire rope <ul style="list-style-type: none"> • Check the wire rope visually for kinking, crushing, corrosion, broken wires and broken strands • Check visually that the rope lays in the grooves of the drum and in the rope sheaves
2	Inspection of the hook block <ul style="list-style-type: none"> • Check that the hook moves freely in every allowed direction • Check the presence of the safety latch and it's functioning • Check the free and smooth rotation of the rope sheaves
3	Inspection of the hoist limit switch <ul style="list-style-type: none"> • Verify that the upper limit switches operate properly • Verify that the lower limit switch operates properly
4	Inspection of the pushbutton controller <ul style="list-style-type: none"> • Check the pushbutton controller for cracks or other signs of wear in the housing, and for loose or broken buttons • Verify that all pushbuttons and switches correspond to their intended functions and directions • Check the operation of the emergency button. Do not depress the emergency button while the hoist is running during this test. Instead, depress the emergency button and verify that no movement can be activated with the pushbuttons.



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8.2 Periodical inspections and servicing

The servicing intervals for the hoist are defined as SWP% periods. The actual operation of the hoist is taken into account in SWP%. If the hoist is provided with a condition monitoring unit, the SWP value can be read from the SWP-data counter display of the unit. Refer to the more detailed instructions given in the separate operating instructions for the condition monitoring unit. The SWP% corresponding to the SWP value can be found from the table below. Check the rating plate fixed to the hoist for classification of the hoist's operating group.

SWP value in relation to the SWP%						
Operating group of the hoist ISO (FEM)						
M3 (1Bm)	M4 (1Am)	M5 (2m)	M6 (3m)	M7 (4m)	M8 (5m)	SWP%
400	800	1600	3200	6300	12500	100%
360	720	1440	2880	5670	11250	90%
320	640	1280	2560	5040	10000	80%
280	560	1120	2240	4410	8750	70%
240	480	960	1920	3780	7500	60%
200	400	800	1600	3150	6250	50%
160	320	640	1280	2520	5000	40%
120	240	480	960	1890	3750	30%
80	160	320	640	1260	2500	20%
40	80	160	320	630	1250	10%
20	40	80	160	320	625	5%
4	8	16	32	63	125	1%
0	0	0	0	0	0	0%

The table below shows the service intervals for the hoist in SWP% periods and in calendar months. Items for inspection and servicing refer to the servicing procedures described earlier in these operating instructions. The servicing procedure must be carried out latest at the end of a SWP% period, or by the end of the stated number of calendar months. Hoists without a condition-monitoring device must follow a servicing procedure guide by calendar months. For ensuring the usability of the hoist the servicing intervals can be shortened.



Hoists used under harsh conditions may require a shorter servicing interval than stated in the table below. Consult with a representative of the manufacturer for a tailored service agreement.



If ambient temperature is frequently over 40 °C (104 F) the servicing interval is half of the interval stated in the table below.



Periodical inspecting and servicing procedure may only be carried out by a serviceman authorized by the hoist manufacturer or service personnel adequately trained by the hoist manufacturer.

Items for inspection and servicing	Interval			
	SWP% reduction	10%	40%	80%
Hoist classification	all	M5/M6	M3/M4	
Calendar period. Years		1	4	8



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Items for inspection and servicing		Interval			
		SWP% reduction	10%	40%	80%
		Hoist classification	all	M5/M6	M3/M4
		Calendar period. Years	1	4	8
1	Inspection of trolley wheels ¹⁾	X			
2	Inspection of buffers ¹⁾	X			
3	Inspection of hoisting machinery and coupling			X	
4	Inspection of hoisting gear	X			
5	Inspection of hoisting motor and brake	X			
6	Inspection of hoisting limit switch	X			
7	Inspection of push button controller	X			
8	Inspection of travelling machinery ¹⁾	X			
9	Inspection of frequency controller ¹⁾	X			
10	Inspection of rope drum	X			
11	Inspection of rope guide	X			
12	Inspection of rope clamps	X			
13	Inspection of drumbrake ¹⁾	X			
14	Inspection of rope anchorage	X			
15	Inspection of hook block	X			
16	Inspection of rope sheave beam ¹⁾	X			
17	Inspection of wire rope	X			
18	Inspection of overload protector	X			
19	Inspection of condition monitoring unit ¹⁾	X			
20	Annual inspection according to local requirements ²⁾	X			

¹⁾ Not all hoist types include this equipment.

²⁾ Germany: Inspection according to BGV D6 (bisherige UVV 8/VBG 9)

8.3 Calculation of Safe Working Period (SWP)

If the hoist is not provided with a condition-monitoring unit, the end of the Safe Working Period must be calculated in accordance with standard FEM 9.775. Calculation has to be carried out during each recurring inspection and servicing. The end of the Safe Working Period can be calculated as follow:



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8.3.1 STEP 1: Operating hours per inspection interval, T_i

$$T_i = \frac{2 * H * N * T * J}{V * 60}$$

- H = average hoisting height [m]
- N = number of work cycles per hour [cycles/h]
- T = daily working time [h]
- V = hoisting speed [m/min]
- J = working days during inspection interval [days]

8.3.2 STEP 2: Actual load spectrum factor per inspection interval, K_{mi}

Load spectrum factor can be calculated using following table:

Load %	Lifting time %	Factor k^3	Load spectrum factor
100 %	<input type="text"/>	1	<input type="text"/>
	+		+
80 %	<input type="text"/>	0.51	<input type="text"/>
	+		+
60 %	<input type="text"/>	0.22	<input type="text"/>
	+		+
40 %	<input type="text"/>	0.06	<input type="text"/>
	+		+
20 %	<input type="text"/>	0.01	<input type="text"/>
	+		+
0 %	<input type="text"/>	0	<input type="text"/>
	=		=
Sum:	100%		Sum: <input type="text"/>
			Divide by 100: /100 =
			Load spectrum factor, K_{mi} : <input type="text"/>

8.3.3 STEP 3: Partial duration of service, S_i [hours]

When the load spectrum factor of inspection interval K_{mi} and the operating hours per inspection interval T_i are identified, the Partial duration of service, S_i can be calculated as follow:

$$S_i = 1.2 * K_{mi} * T_i$$

8.3.4 STEP 4: Actual duration of service, S [hours]

Actual duration of service can be calculated when the earlier partial duration of inspection intervals is known.

$$S = S_1 + S_2 + \dots + S_i$$



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8.3.5 STEP 5: SWP% and remaining service life

SWP% and estimated remaining service life can be obtained from table below.

Hoist operating group marked on hoist's rating plate				SWP%	Estimated remaining service life [years]
M4 (1Am)	M5 (2m)	M6 (3m)	M7 (4m)		
Actual duration of service, S [h]				SWP%	
0	0	0	0	100%	10
80	160	320	630	90%	9
160	320	640	1260	80%	8
240	480	960	1890	70%	7
320	640	1280	2520	60%	6
400	800	1600	3150	50%	5
480	960	1920	3790	40%	4
560	1120	2240	4410	30%	3
640	1280	2560	5040	20%	2
720	1440	2880	5670	10%	1
800	1600	3200	6300	0%	0

When SWP% is zero, a General Overhaul (GO) must be conducted. Refer to section 'General Overhaul (GO)'.

8.4 General Overhaul, GO

Once the SWP% of the hoist reaches zero, the hoist has exhausted its theoretical lifetime. The probability of a defect in the hoist is therefore higher and operating safety is jeopardized. When the theoretical lifetime is exhausted, a General Overhaul (GO) of the hoist must be conducted. Only the hoist manufacturer or a service organization authorized by the hoist manufacturer may conduct a GO. The components in the hoist that have an impact on hoist lifetime are inspected in a GO and critical components are replaced. A new theoretical SWP is given to the hoist after completion of a GO.



When the Safe Working Period (SWP) of the hoist is exhausted, the hoist may only be used after a GO has been conducted.

If the hoist is not provided with a condition monitoring unit, the end of the Safe Working Period must be calculated in accordance with standard FEM 9.775, refer to section 'Calculation of the Safe Working Period'.

8.5 Recommended tightening torques

Recommended tightening torques for screws and nuts in the hoist.

Size	Tightening torque			
	Strength 8.8		Strength 10.9	
	[Nm]	[Ft lb]	[Nm]	[Ft lb]
M4	2.7	2.0	4.0	2.9
M5	5.4	4.0	7.9	5.8
M6	9.3	6.8	14	10.3
M8	23	17.0	33	24
M10	45	33.0	66	48.5



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Size	Tightening torque			
	Strength 8.8		Strength 10.9	
	[Nm]	[Ft lb]	[Nm]	[Ft lb]
M12	77	56.6	115	84.6
M14	125	92	180	132
M16	190	140	280	206
M18	275	202	390	287
M20	385	283	550	404
M22	530	390	750	552
M24	660	485	950	699
M27	980	721	1400	1030
M30	1350	993	1900	1398



It is recommended that the self locking nut (Nyloc nut) is replaced always when removed. Self locking nut can be reused max 5 times.