

4

Run-in regulations

Individual parts have run-in regulations which must be adhered to after:

- **Commissioning** or
- **replacement of a part** or
- **general inspection.**

This is why you must carry out **additional maintenance work** on the **carrier** and **superstructure** after stipulated periods of time have expired:

Operating hours (oper. hrs.)	driven km	Additional maintenance work on the CARRIER
	After 50	Tighten wheel nuts; ■■■► <i>Special torques, p. 10 - 2.</i>
	After 150	Tighten wheel nuts; ■■■► <i>Special torques, p. 10 - 2.</i>
After 50		Tighten up the clips on the coolant hoses; ■■■► <i>Special torques, p. 10 - 2.</i>
After 100		Lubricate the support bearings; ■■■► <i>Lubricating the outriggers, p. 7 - 114.</i>
During the first 100		Check the hydraulic oil filters weekly; ■■■► <i>Cleaning the magnetic rods, p. 7 - 76,</i> ■■■► <i>Changing the hydraulic oil filter, p. 7 - 89.</i>
After 100	After 1 000	Change the drive oil; ■■■► p. 7 - 42 for the transfer case, ■■■► p. 7 - 47 for the axle centre drives, ■■■► p. 7 - 51 for the final drives.
After 250	After 2 500	Change the engine oil; ■■■► <i>Engine manufacturer's documentation.</i>



Operating hours (oper. hrs.)	Additional maintenance work on the SUPERSTRUCTURE
After 50	Tighten up the clips on the coolant hoses; ■■■▶ <i>Special torques</i> , p. 10 - 2.
During the first 100	Check the hydraulic oil filters weekly; ■■■▶ <i>Changing the hydraulic oil filter</i> , p. 8 - 49.
After 100	Tighten up the bolts on the ball bearing slewing; ■■■▶ <i>Ball slewing bearing</i> , p. 8 - 39, ■■■▶ <i>Special torques</i> , p. 10 - 2.
After 100	Hook blocks; ■■■▶ <i>Lubricating</i> , p. 8 - 84.
After 200	First oil change on the hoists; ■■■▶ <i>Changing the oil/Checking the oil</i> , p. 8 - 30.
After 1000 or after 12 months at the latest	Second oil change on the hoists; ■■■▶ <i>Changing the oil/Checking the oil</i> , p. 8 - 30.
After 200	Change the slewing gear oil; ■■■▶ <i>Changing the oil/Checking the oil</i> , p. 8 - 36.
After 250	Change the engine oil; ■■■▶ <i>Engine manufacturer's documentation</i> .

5 Maintenance overview

5.1	Maintenance intervals	5 - 1
5.2	Maintenance plans	5 - 3
5.2.1	Maintenance plan D	5 - 4
5.2.2	Maintenance plan W	5 - 6
5.2.3	Maintenance plan M 1	5 - 8
5.2.4	Maintenance plan M 3	5 - 10
5.2.5	Maintenance plan M 6	5 - 12
5.2.6	Maintenance plan M 12	5 - 14
5.2.7	Maintenance plan Y 2	5 - 16
5.2.8	Maintenance plan Y 3	5 - 16
5.2.9	Maintenance plan Y 5	5 - 17
5.2.10	Maintenance plan Y 6	5 - 17
5.2.11	Maintenance plan Y 10	5 - 18
5.3	Periodic inspections	5 - 19
5.3.1	Load hook inspection.	5 - 20
5.4	Measures required for winch monitoring	5 - 21
5.4.1	Theoretical service life.	5 - 21
5.4.2	Proportion of theoretical service life used.	5 - 22
5.4.3	Example	5 - 26

5

Maintenance overview

- Maintenance plans **D** (= daily),
- Maintenance plans **W** (= weekly) and
- Maintenance plans **M 1** (= monthly) to **M 12** (= every 12 months) and
- Maintenance plans **Y 2** (= every 24 months) to **Y 10** (= every 120 months).

The maintenance plans are given in table form, divided into

- Maintenance work on the **carrier** and
- Maintenance work on the **superstructure**.

In the tables, you are directed by cross references to the sections in which the appropriate maintenance work has been described. The cross references consist of the chapter number and the corresponding page number, e.g.

Checking hydraulic oil level; ■■■► p. 7 - 73.

Checking the hydraulic oil level is described in Chapter 7, the section starts on page 7 - 73.

5.1

Maintenance intervals

The length of the interval depends on the quality of the oil used and the operating conditions of the truck crane.

The next maintenance must be carried out after

- a specified **time (maintenance interval)** or
- a specified number of **kilometres driven** or
- a specified number of **operating hours (oper. hrs.)** or
- a **display** on the *on-board computer* display, *ECOS* display in the driver's cab; ■■■► p. 7 - 11 or
- an **indication** on the *ECOS* display in the crane cab; ■■■► p. 8 - 7.



The **maintenance interval which occurs first** shall determine when maintenance work is next due.

- The **km** can be taken from the speedometer.
- You can call up the **engine and power unit working hours (oper. hrs.)** of the superstructure one by one on the *ECOS* display in the crane cab. The operating hours of the engine equal the total operating hours of the superstructure.

The following table sets out the maintenance intervals for the maintenance plans:

Maintenance plans	Maintenance interval	Km driven (carrier)	Operating hours (oper. hrs.) of engine (superstructure)
D	Daily / before putting into operation	—	—
W	Weekly	—	—
M 1	Monthly	approx. 2 000	100
M 3	Every three months	5 000 – 6 000	250
M 6	Every six months	10 000 – 12 500	500
M 12	Every 12 months	20 000 – 25 000	1 000
Y 2	Every 24 months	40 000 – 50 000	2 000
Y 3	Every 36 months	—	3 000
Y 5	Every 60 months	100 000	5 000
Y 6	Every 72 months	—	6 000
Y 10	Every 120 months	200 000	12 000

Please note that the long-term maintenance plans always include the short-term ones!

5.2

Maintenance plans

The descriptions of certain maintenance work in the maintenance plans **D**, **W**, **M 1** to **M 12** and **Y 2** to **Y 10** have been provided for

- the carrier in Chapter 7 and for
- the superstructure in Chapter 8.

References (chapter and page number) to the description of this maintenance work can be found after the respective maintenance work for carrier and superstructure.

The section titles

- of Chapter 7 *Maintenance work on the carrier* and
- of Chapter 8 *Maintenance work on the superstructure*

contain the abbreviations (**D** to **Y 10**) of the relevant maintenance plan for better comprehension.

In addition to the **Maintenance work on the carrier** and the **Maintenance work on the superstructure** Chapter 6 also lists the **Lubricants and consumables**:

- The **descriptions** of the oils/lubricants in accordance with *Lubricants list*, p. 6 - 2.
- The **amounts** as approximate values for oil amounts in litres (l) (the exact oil amounts can always be determined by the oil level inspection holes, the dipsticks or the oil level indicators) *Lubricant – Application*, p. 6 - 2.



Items that are only available with additional equipment are designated accordingly in Chapter 7 and Chapter 8.

Maintenance work on the engine over and above the daily and weekly checks is **only partially** described in this maintenance manual! When carrying out such maintenance work, follow the instructions in the *Engine manufacturer documentation* supplied.

5.2.1

Maintenance plan D

D

Maintenance work on the CARRIER: Daily / before putting into operation	
Engine – Checking the oil level – Checking the air filter – Checking the coolant level	<p>▣▣▣▣▶ p. 7 - 13</p> <p>▣▣▣▣▶ p. 7 - 17</p> <p>▣▣▣▣▶ p. 7 - 18</p>
Fuel system – Draining off water from fuel filter 1	▣▣▣▣▶ p. 7 - 23
Exhaust system with exhaust emission control ¹⁾ – Checking the level of the urea tank	▣▣▣▣▶ p. 7 - 30
Wheels – Checking the tyres for damage	▣▣▣▣▶ p. 7 - 55
Steering – Checking for leaks	▣▣▣▣▶ p. 7 - 67
Hydraulic system – Checking the oil level	▣▣▣▣▶ p. 7 - 73
Electrical system – Checking the lighting and indicators	▣▣▣▣▶ p. 7 - 95

¹⁾ Additional equipment *Urea System*

Maintenance work on the SUPERSTRUCTURE: Daily / before putting into operation	
Engine – Checking the oil level – Checking the air filter – Checking the coolant level	<p>▣▣▣▣▶ p. 8 - 9</p> <p>▣▣▣▣▶ p. 8 - 13</p> <p>▣▣▣▣▶ p. 8 - 14</p>
Fuel system – Draining off water from fuel filter 1	▣▣▣▣▶ p. 8 - 20
Hydraulic system – Checking the oil level	▣▣▣▣▶ p. 8 - 43
Hoist ropes – Checking the position on the rope drums	▣▣▣▣▶ p. 8 - 65
Electrical system – Checking the lighting and indicators	▣▣▣▣▶ p. 8 - 85

5.2.2

Maintenance plan W

W

Maintenance work on the CARRIER: Weekly	
Engine – General inspection	▣▣▣▣▶ p. 7 - 19
Transmission – General inspection	▣▣▣▣▶ p. 7 - 35
Transfer case – General inspection	▣▣▣▣▶ p. 7 - 41
Axle lines – General inspection	▣▣▣▣▶ p. 7 - 45
Wheels – Checking the tyre air pressure	▣▣▣▣▶ p. 7 - 56
Compressed air system – Draining the compressed air system – Checking for leaks	▣▣▣▣▶ p. 7 - 69 ▣▣▣▣▶ p. 7 - 70
Hydraulic system – Checking the hydraulic hoses – Checking for leaks – Checking ventilation filters	▣▣▣▣▶ p. 7 - 74 ▣▣▣▣▶ p. 7 - 75 ▣▣▣▣▶ p. 7 - 76
Central lubrication system – Checking the level	▣▣▣▣▶ p. 7 - 91
Other maintenance work – Checking windscreen washing system	▣▣▣▣▶ p. 7 - 113

















W

Maintenance work on the SUPERSTRUCTURE: Weekly	
Engine – General inspection	▣▣▣▣▶ p. 8 - 15
Hoists – Checking the oil level – General inspection – Checking the hoist brake	▣▣▣▣▶ p. 8 - 27 ▣▣▣▣▶ p. 8 - 28 ▣▣▣▣▶ p. 8 - 28
Slewing gear – Checking the oil level – Checking for leaks	▣▣▣▣▶ p. 8 - 33 ▣▣▣▣▶ p. 8 - 34
Hydraulic system – Checking the hydraulic hoses – Checking ventilation filters – Checking for leaks	▣▣▣▣▶ p. 8 - 44 ▣▣▣▣▶ p. 8 - 44 ▣▣▣▣▶ p. 8 - 45
Hoist ropes – Checking the hoist ropes	▣▣▣▣▶ p. 8 - 66
Central lubrication system – Checking the level	▣▣▣▣▶ p. 8 - 83
Other maintenance work – Checking windscreen washing system	▣▣▣▣▶ p. 8 - 91








5.2.3

Maintenance plan M 1

M 1

Maintenance work on the CARRIER: Monthly / after approx. 2000 km	
Engine – Notes;  <i>Engine manufacturer's documentation</i>	 p. 7 - 13
Exhaust system with exhaust emission control ¹⁾ – Checking the exhaust system for external damage	 p. 7 - 31
Transfer case – Checking the oil level	 p. 7 - 41
Axle lines – Checking the oil level on axle centre drives – Final drives – checking the oil level – Lubricating the cardan shafts on the axle lines	 p. 7 - 45  p. 7 - 50  p. 7 - 53
Wheels – Checking the tightness of wheel nuts	 p. 7 - 57
Suspension – Suspension struts – checking the oil level – Suspension struts – checking the fastening	 p. 7 - 63  p. 7 - 64
Electrical system – Checking the batteries	 p. 7 - 96
Air-conditioning system – Checking the air-conditioning system – Cleaning the condenser fins	 p. 7 - 101  p. 7 - 101
Towbar coupling – Lubricating the towbar coupling	 p. 7 - 105
Other maintenance work – Lubricating the outriggers – Checking the auxiliary heater for correct operation	 p. 7 - 114  p. 7 - 115














¹⁾ Additional equipment *Urea System*

Maintenance work on the SUPERSTRUCTURE: Monthly / after 100 oper. hrs.	
Engine – Notes;  <i>Engine manufacturer's documentation</i>	 p. 8 - 9
Main boom – Lubricating the piston rod of the derricking cylinder	 p. 8 - 55
Electrical system – Checking the batteries	 p. 8 - 86
Air-conditioning system – Checking the air-conditioning system – Cleaning the condenser fins	 p. 8 - 87  p. 8 - 87
Other maintenance work – Checking the auxiliary heater for correct operation	 p. 8 - 92

5.2.4

Maintenance plan M 3

M 3







Maintenance work on the CARRIER: Every three months / after 5000 - 6000 km	
Engine – Notes;  <i>Engine manufacturer's documentation</i>	 p. 7 - 13
Fuel system – Changing fuel filter 1	 p. 7 - 24
Vehicle brake – Checking brake-lining thickness	 p. 7 - 61
Suspension – Forced lever – checking correct functioning	 p. 7 - 65
Hydraulic system – Cleaning the magnetic rods	 p. 7 - 76
Electrical system – Checking the charge level of the batteries	 p. 7 - 98
Towbar coupling – Checking the bearing – Checking the cotter pin – Checking the lower bushing – Checking the initial tension of the springs – Checking the support ring – Checking the function of the coupling jaw / Resetting central position	 p. 7 - 107  p. 7 - 108  p. 7 - 109  p. 7 - 109  p. 7 - 110  p. 7 - 110

Maintenance work on the SUPERSTRUCTURE: Every 3 months / after 250 oper. hrs.	
Engine – Notes; ■■■▶ <i>Engine manufacturer's documentation</i>	■■■▶ p. 8 - 9
Fuel system – Changing fuel filter 1	■■■▶ p. 8 - 21
Ball slewing bearing – Check the bolt torques; ■■■▶ <i>Special torques</i>	■■■▶ p. 10 - 2
Main boom – Lubricating the telescopic sections – Checking the sheaves	■■■▶ p. 8 - 56 ■■■▶ p. 8 - 63
Hoist ropes – Lubricating the hoist rope	■■■▶ p. 8 - 67
Hook blocks – Checking the sheaves	■■■▶ p. 8 - 83
Electrical system – Checking the charge level of the batteries	■■■▶ p. 8 - 86









5.2.5

Maintenance plan M 6

M 6

Maintenance work on the CARRIER: Every six months / after 10 000 - 12 500 km	
Engine – Notes;  <i>Engine manufacturer's documentation</i>	 p. 7 - 13
Transfer case – Changing the oil	 p. 7 - 42
Axle lines – Lubricating longitudinal cardan shafts	 p. 7 - 54
Wheels – Wheel change	 p. 7 - 58
Air-conditioning system – Checking hoses	 p. 7 - 102


















M 6

Maintenance work on the SUPERSTRUCTURE: Every 6 months / after 500 oper. hrs.	
Engine – Notes;  <i>Engine manufacturer's documentation</i>	 p. 8 - 9
Hoists – Lubricating the auxiliary hoist	 p. 8 - 29
Slewing gear – Checking the slewing gear brake	 p. 8 - 34
Ball slewing bearing – Lubricating gear teeth – General inspection	 p. 8 - 39  p. 8 - 41
Cable drums and slewing angle sensor – Maintenance of the slip ring assemblies	 p. 8 - 79
Air-conditioning system – Checking hoses	 p. 8 - 88

















5.2.6

Maintenance plan M 12

M 12

Maintenance work on the CARRIER: Every twelve months / after 20 000 - 25 000 km	
Engine – Notes;  <i>Engine manufacturer's documentation</i>	 p. 7 - 13
Fuel system – Changing fuel filter 2	 p. 7 - 26
Exhaust system with exhaust emission control ¹⁾ – Having the urea system checked	 p. 7 - 33
Transmission – Checking the oil level	 p. 7 - 35
Axle lines – Axle centre drives – changing the oil – Final drives – changing the oil	 p. 7 - 47  p. 7 - 51
Suspension – Pressure accumulator – checking the gas pressure	 p. 7 - 66
Compressed air system – Replacing the filter cartridge of the compressed air drier	 p. 7 - 71
Hydraulic system – Changing the ventilation filter – Taking oil samples: depending on the oil sample test results: – Change the oil – Changing the hydraulic oil filter	 p. 7 - 79  p. 7 - 80  p. 7 - 85  p. 7 - 89
Air-conditioning system – Checking the entire air conditioning system – Changing the pollen filter	 p. 7 - 102  p. 7 - 104
Other maintenance work – Lubricating the cab door – Lubricating the connecting and socket pins	 p. 7 - 115  p. 7 - 116

¹⁾ Additional equipment *Urea System*

Maintenance work on the SUPERSTRUCTURE: Every 12 months / after 1000 oper. hrs.	
Engine – Notes;  <i>Engine manufacturer's documentation</i>	 p. 8 - 9
Fuel system – Changing fuel filters 2 and 3	 p. 8 - 23
Hoists – Changing the oil/Checking the oil	 p. 8 - 30
Slewing gear – Changing the oil/Checking the oil	 p. 8 - 36
Ball slewing bearing – Measuring tilting play	 p. 8 - 41
Hydraulic system – Changing the ventilation filter – Pressure accumulator – checking the gas pressure – Taking oil samples depending on the oil sample test results: – Changing the hydraulic oil – Changing the hydraulic oil filter	 p. 8 - 46  p. 8 - 47  p. 8 - 47  p. 8 - 52  p. 8 - 49
Main boom – Checking the locking system	 p. 8 - 63
Hook blocks – Lubricating	 p. 8 - 84
Air-conditioning system – Checking the entire air conditioning system	 p. 8 - 88
Other maintenance work – Lubricating the crane cab door – Lubricating the connecting and socket pins	 p. 8 - 93  p. 8 - 94

5.2.7

Maintenance plan Y 2

Y 2

Maintenance work on the CARRIER: every 24 months / after 40 000 – 50 000 km	
Engine – Notes; ■■■► <i>Engine manufacturer's documentation</i> – Changing the oil and oil filter	■■■■► p. 7 - 13 ■■■■► p. 7 - 19
Other maintenance work – Having the fire extinguisher checked	■■■■► p. 7 - 117

Maintenance work on the SUPERSTRUCTURE: Every 24 months / after 2,000 oper. hrs.	
Engine – Notes; ■■■► <i>Engine manufacturer's documentation</i> – Changing the oil and oil filter	■■■■► p. 8 - 9 ■■■■► p. 8 - 15
Other maintenance work – Having the fire extinguisher checked	■■■■► p. 8 - 95

5.2.8

Maintenance plan Y 3

Y 3

Maintenance work on the CARRIER: Every 36 months	
No maintenance work in this period. The long-term intervals always include the short-term intervals!	

Maintenance work on the SUPERSTRUCTURE: Every 36 months / after 3,000 oper. hrs.	
Hoists – Having a partial inspection carried out	■■■■► p. 8 - 32

5.2.9

Maintenance plan Y 5

Y 5

Maintenance work on the CARRIER: Every 60 months / 100 000 km	
Transmission – Changing the oil	➡ p. 7 - 37
– Have the cardan shaft between the transmission on the engine and the transfer case replaced by Manitowoc Crane Care or an authorised GROVE dealer.	

Maintenance work on the SUPERSTRUCTURE: Every 60 months / after 5,000 oper. hrs.	
Cable drums and slewing angle sensor – Lubricating the slewing angle sensor	➡ p. 8 - 81

5.2.10

Maintenance plan Y 6

Y 6

Maintenance work on the CARRIER: Every 72 months	
No maintenance work in this period. The long-term intervals always include the short-term intervals!	

Maintenance work on the SUPERSTRUCTURE: Every 72 months / after 6,000 oper. hrs.	
Hoists – Having a general inspection carried out	➡ p. 8 - 32

5.2.11

Maintenance plan Y 10

Y 10

Maintenance work on the CARRIER: Every 120 months / after 200 000 km	
Steel construction – Check the load-bearing steel construction. For more information, please contact Manitowoc Crane Care .	

Maintenance work on the SUPERSTRUCTURE: Every 120 months / after 12 000 oper. hrs.	
Steel construction – Check the load-bearing steel construction. For more information, please contact Manitowoc Crane Care .	
Safe load indicator (SLI) – Have the SLI checked by Manitowoc Crane Care .	