

# VOLVO CONSTRUCTION EQUIPMENT MATRIS REPORT

Machine model L110H	SerialNo 631210	Operating Hours 4902.1	Reading Date 11/7/2018
Company name VCE	Dealer	Report Issuer	
Contact name	Technician cptacek	Primary Application Rehandling	
Site	Workorder	Ground Condition	

MATRIS Reading, Summary / Recommendation

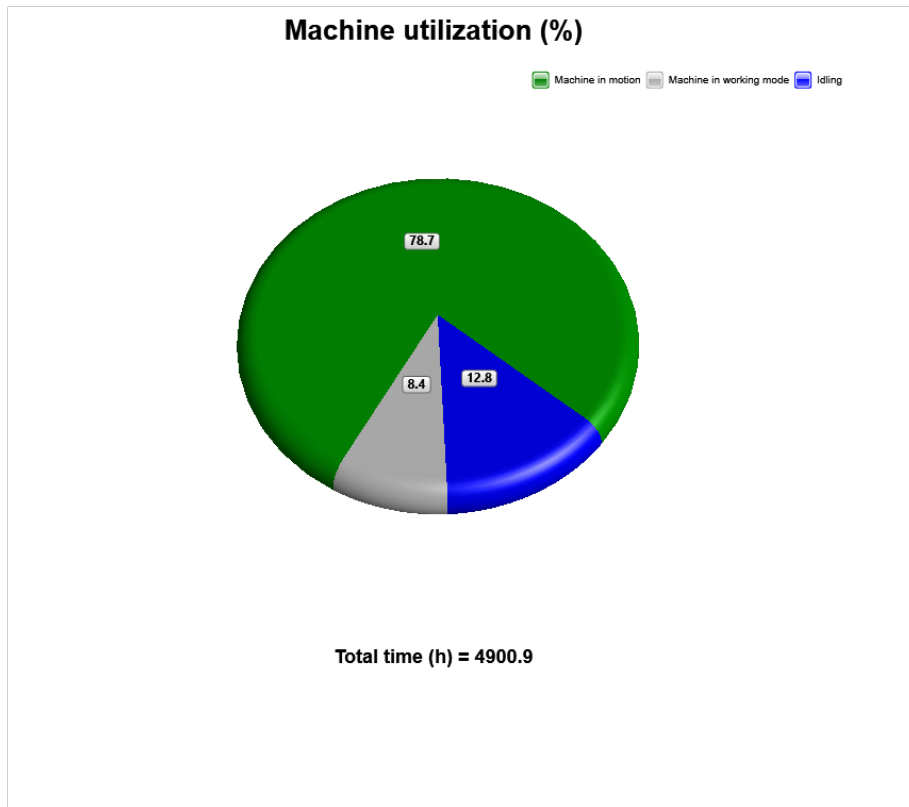


Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

Main equipment	Type	Equipment
	Tyre size/class	
	Main Attachment	
	Extra Counterweight	
	Ballast	
	Chains	
	Boom Suspension System	
	Attachment Interface	
	Volume m3 (yd3) / Area m2 (ft2)	
	Attachment make	



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



**Definition:**

The graph shows the distribution of the operating time for the machine. The operating time is defined as the time with engine on.

**Blue sector** = Engine speed less than idling or equal to idling and machine speed less than 0.5 km/h (0.3 mph)

Gear level position: Neutral, forward or reverse.

**Green sector** = Machine in motion.

Engine speed larger than idling and machine speed larger than 0.5 km/h (0.3 mph) .



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Gear level position: Forward or reverse.

One typical situation is material transportation, in bucket or long distance transportation.

**Grey sector** = Engine in working mode.

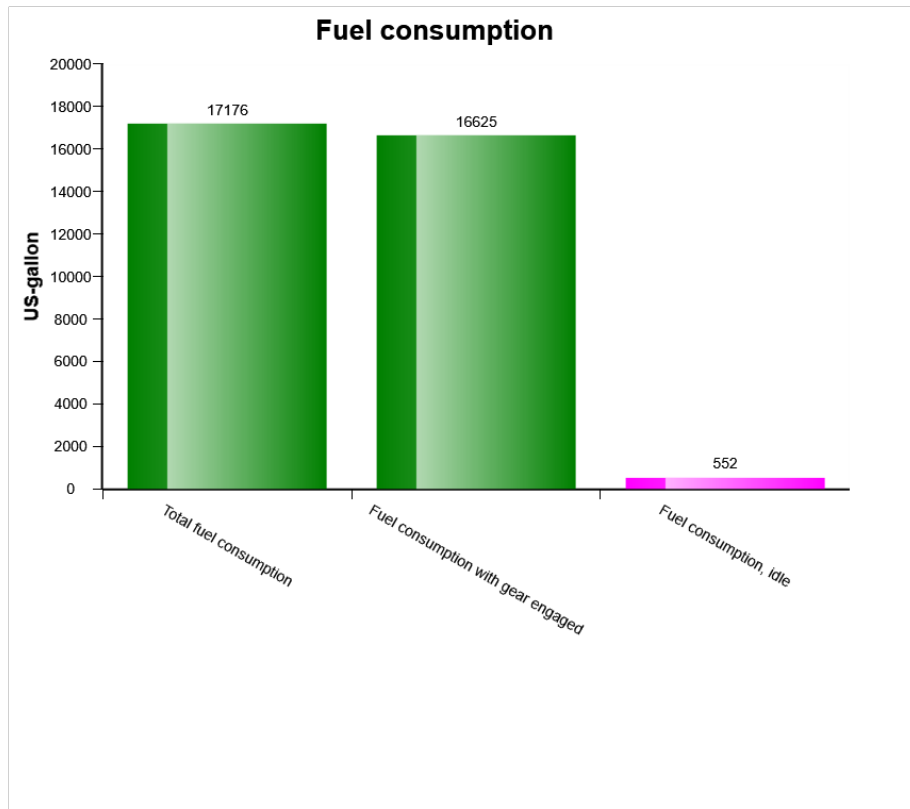
Engine speed larger than idling and machine speed less than 0.5 km/h (0.3 mph) .

Gear level position: Forward or reverse.

Typical application is loading and unloading of the bucket.



Machine model	SerialNo	Operating Hours	Reading Date
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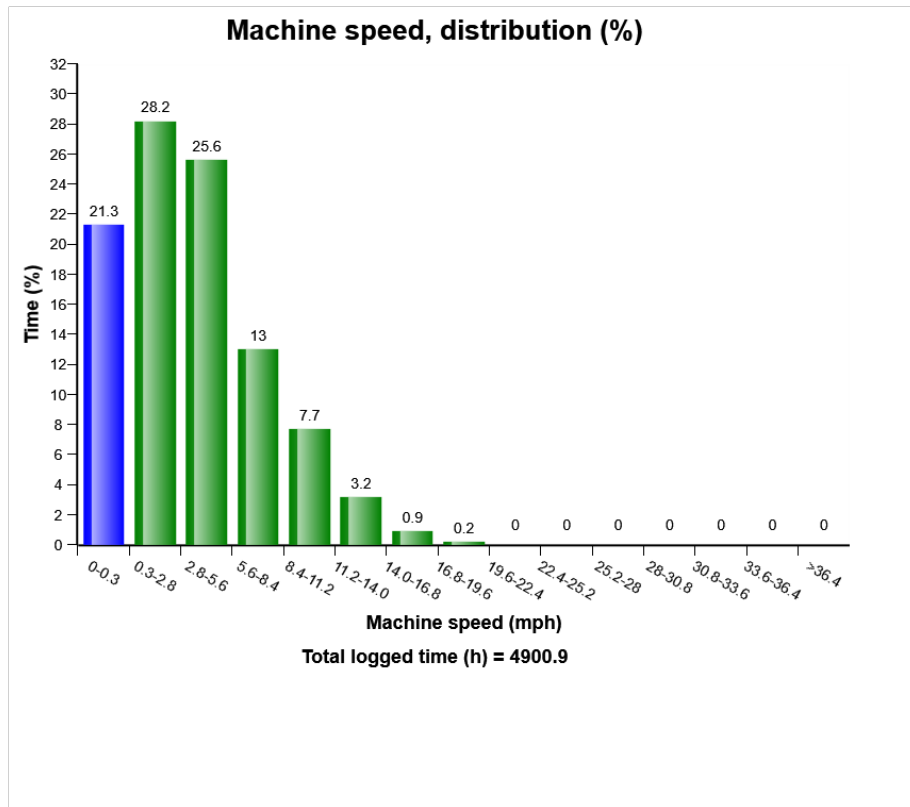


The diagram shows the total fuel consumption, fuel consumption with gear engaged and fuel consumption during idle.

High fuel consumption during idle can indicate that the machine is not fully utilized.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



**Definition:**

This graph describes the machine speed distribution.

The sum of all bars = 100% of machine speed time.

Under the graph total time with engine on, in hours, is displayed.

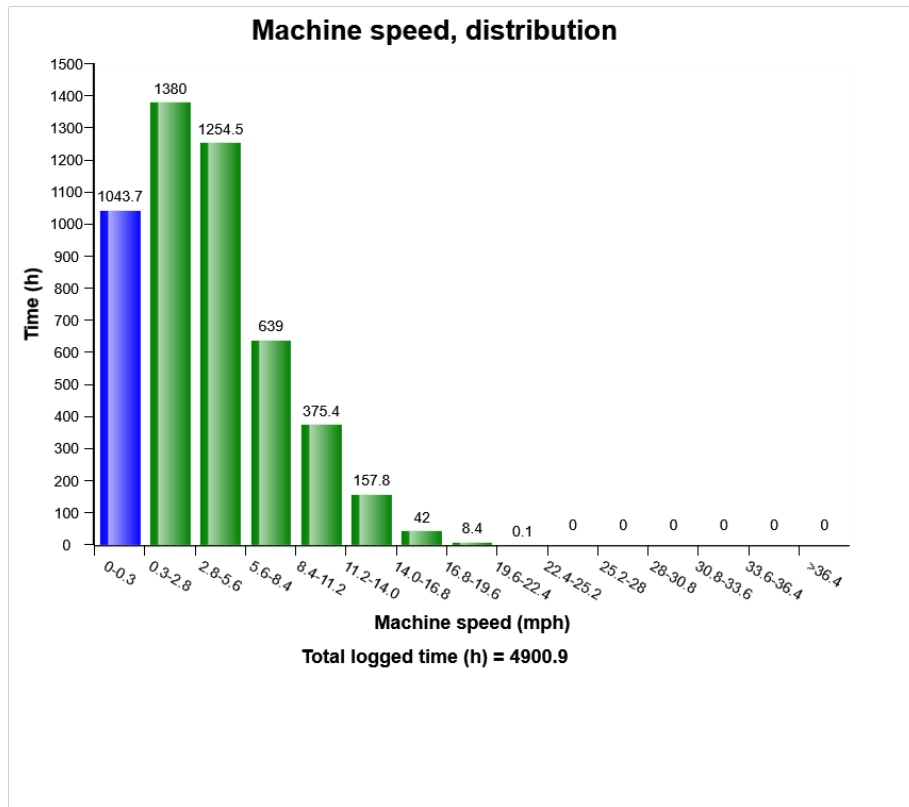
**Explanation:**

Y-axis: Time, specified for each speed interval.

X-axis: Machine speed, divided into speed intervals.



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L110H	631210	4902.1	11/7/2018



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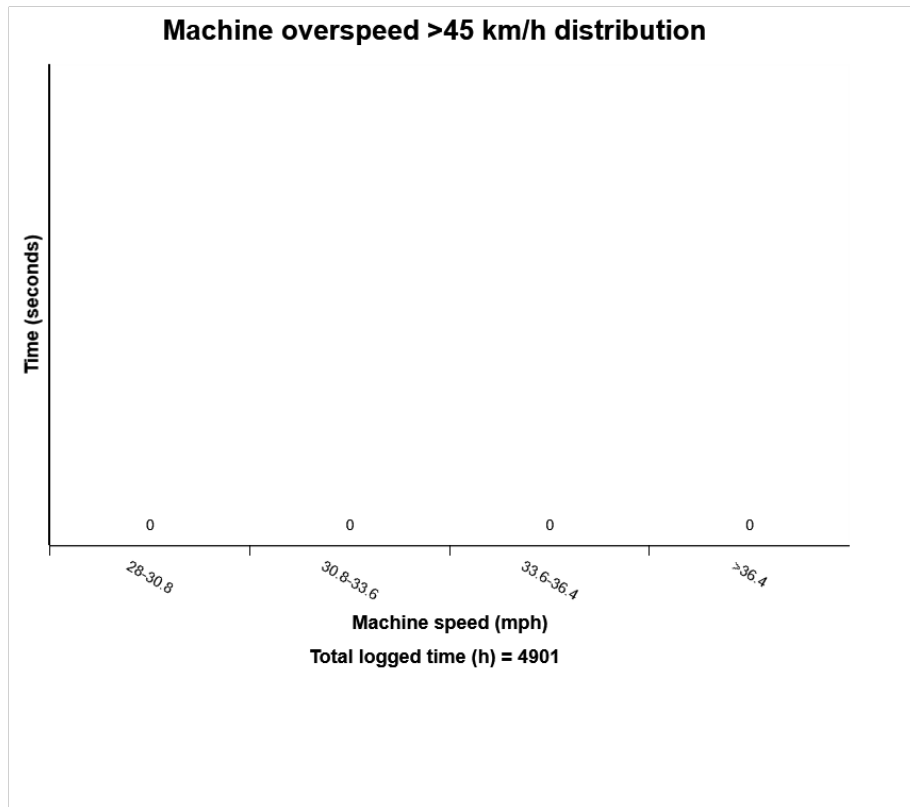
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L110H	631210	4902.1	11/7/2018



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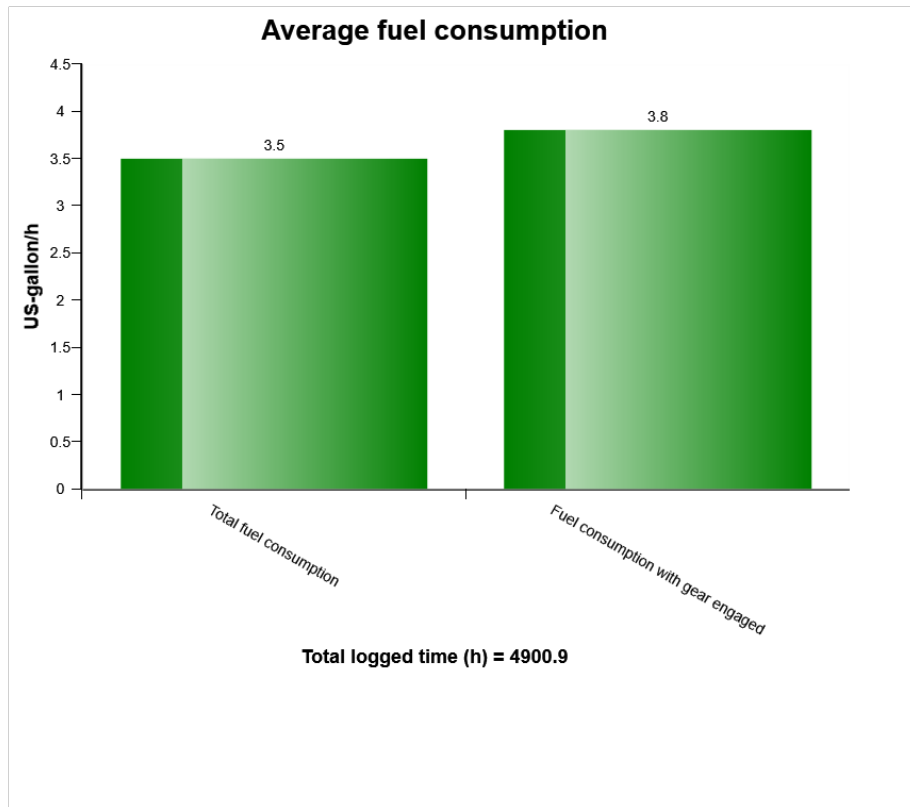
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Machine model	SerialNo	Operating Hours	Reading Date
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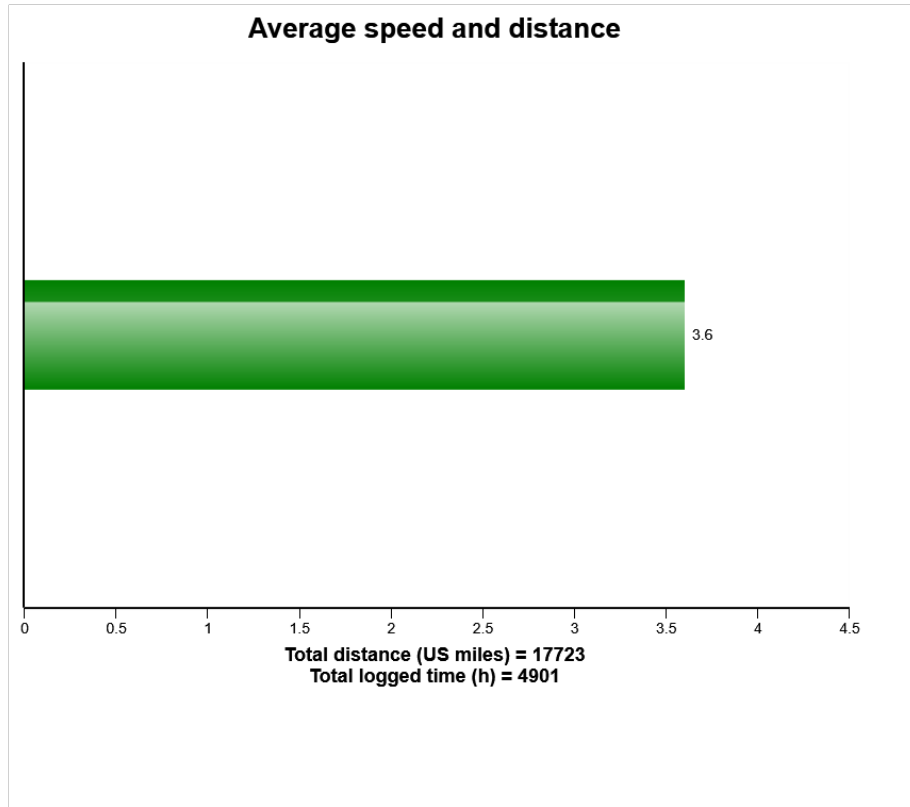


The diagram shows the total fuel consumption, fuel consumption with gear engaged and fuel consumption during idle.

High fuel consumption during idle can indicate that the machine is not fully utilized.



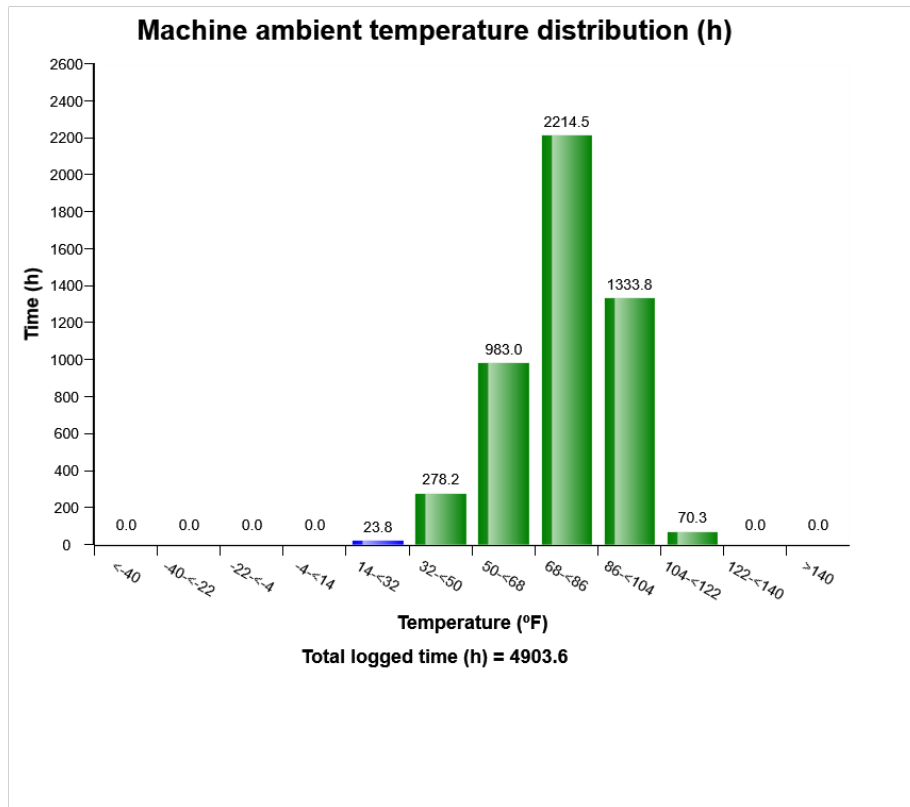
Machine model	SerialNo	Operating Hours	Reading Date
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The diagram shows the machines average speed based on the total operating hours.



Machine model	SerialNo	Operating Hours	Reading Date
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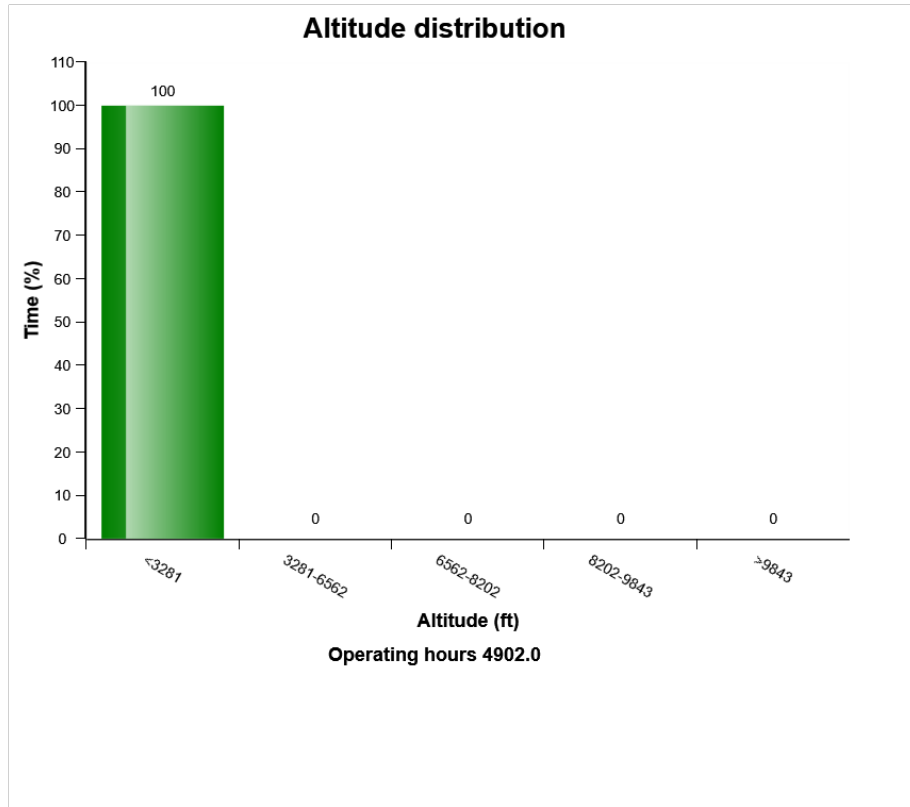


**Definition:**

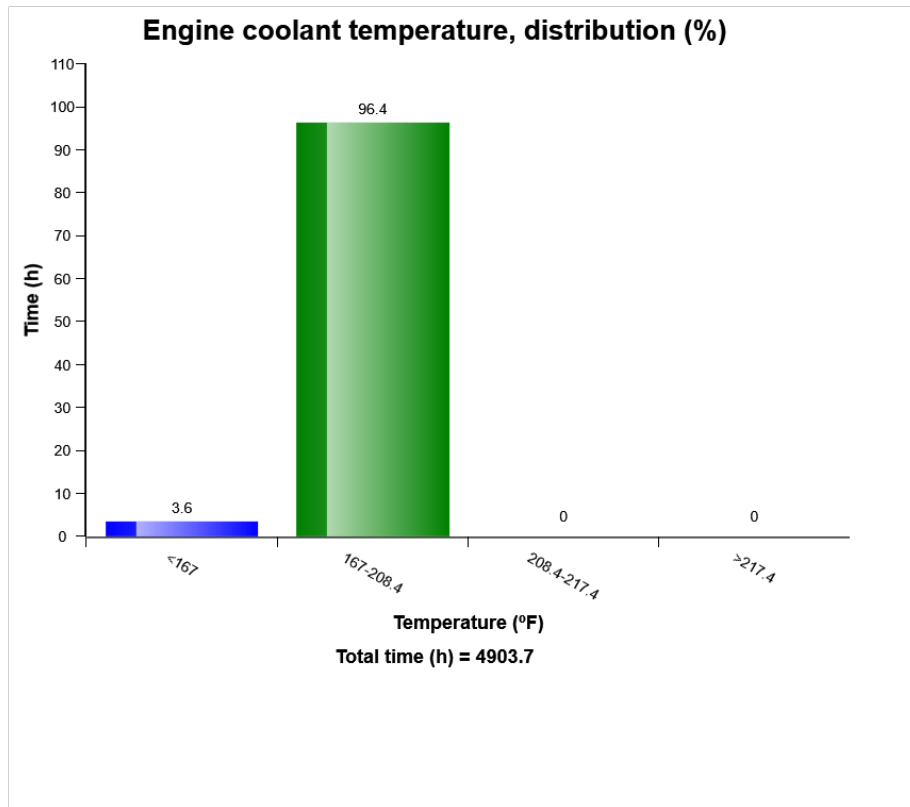
The diagram describes ambient temperature distribution of the machine while machine operates.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



**Definition:**

The graph shows the time distribution of the temperature, while engine running.

**Explanation:**

Y-axis: Time

X-axis: Temperature distribution in classes.

Blue bar = Warm-up phase.

During the engine warm-up phase, this temperature region is passed.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

It is normal to have registrations in this region.

**Green bar** = Normal working temperature. The Major part of the registrations shall be in this region.

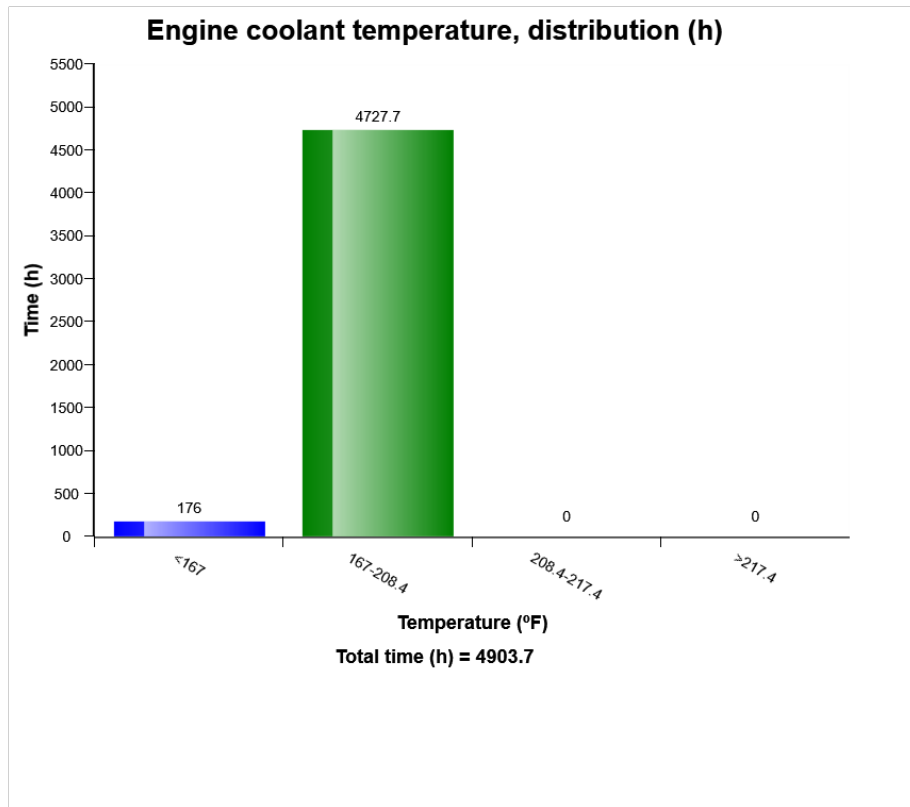
**Yellow bar** = High working temperature. It is normal to have some registrations in this region.

**Red bar** = Alarm.

Registrations in this region is not normal, running in this region may cause severe damage.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



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**Yellow bar** = High working temperature. It is normal to have some registrations in this region.

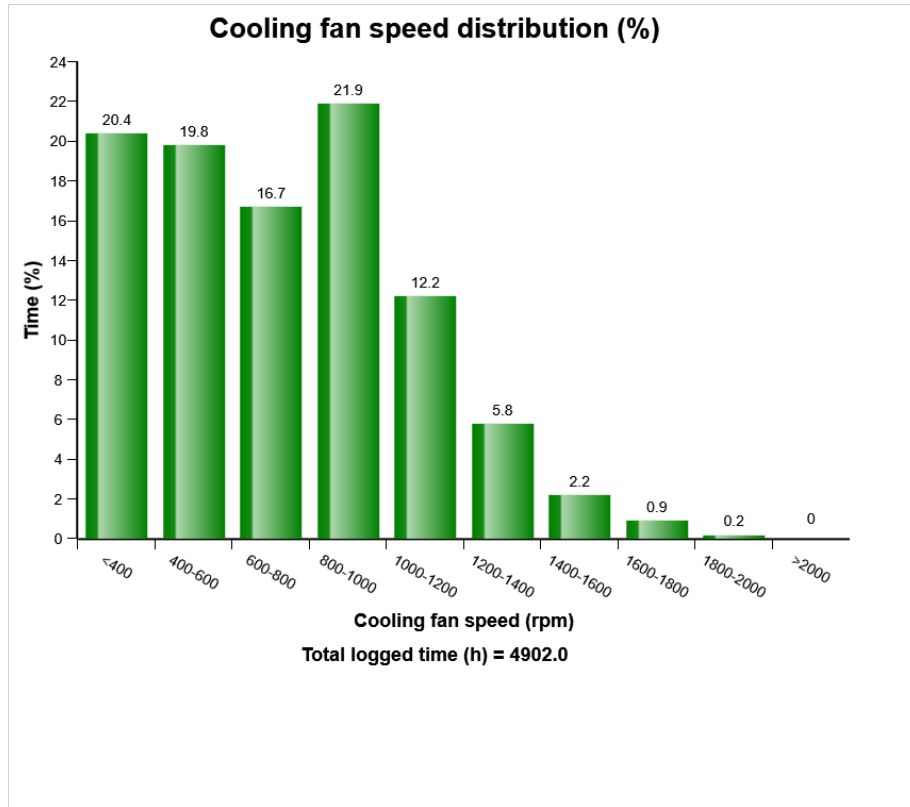
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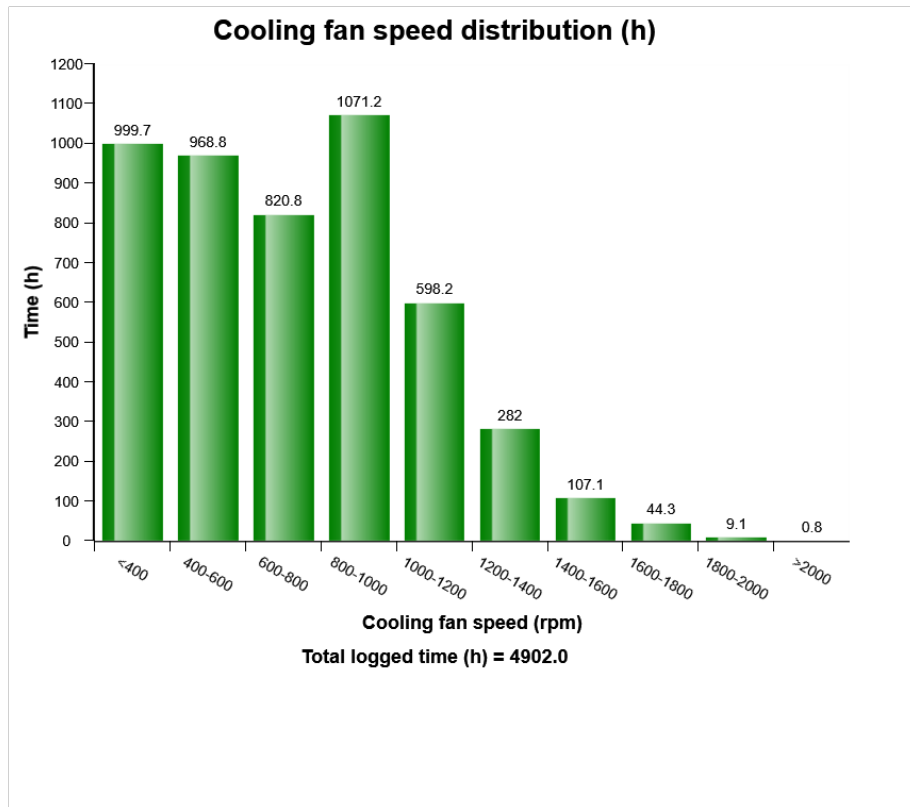
Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



The diagram shows the time distribution for the cooling fan in different rpm ranges.



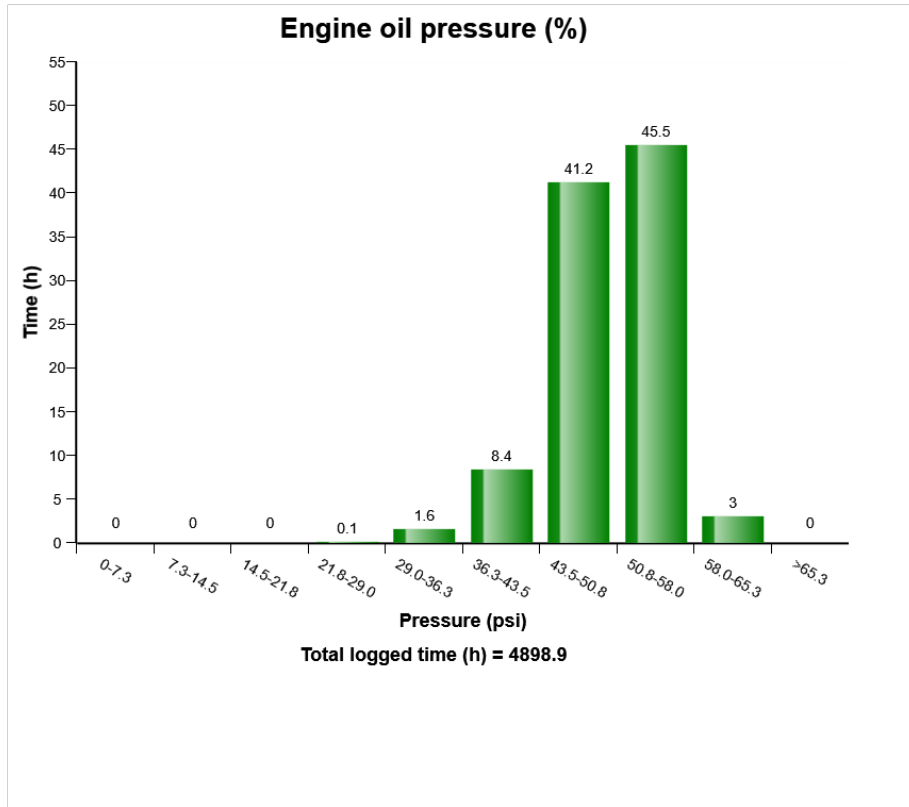
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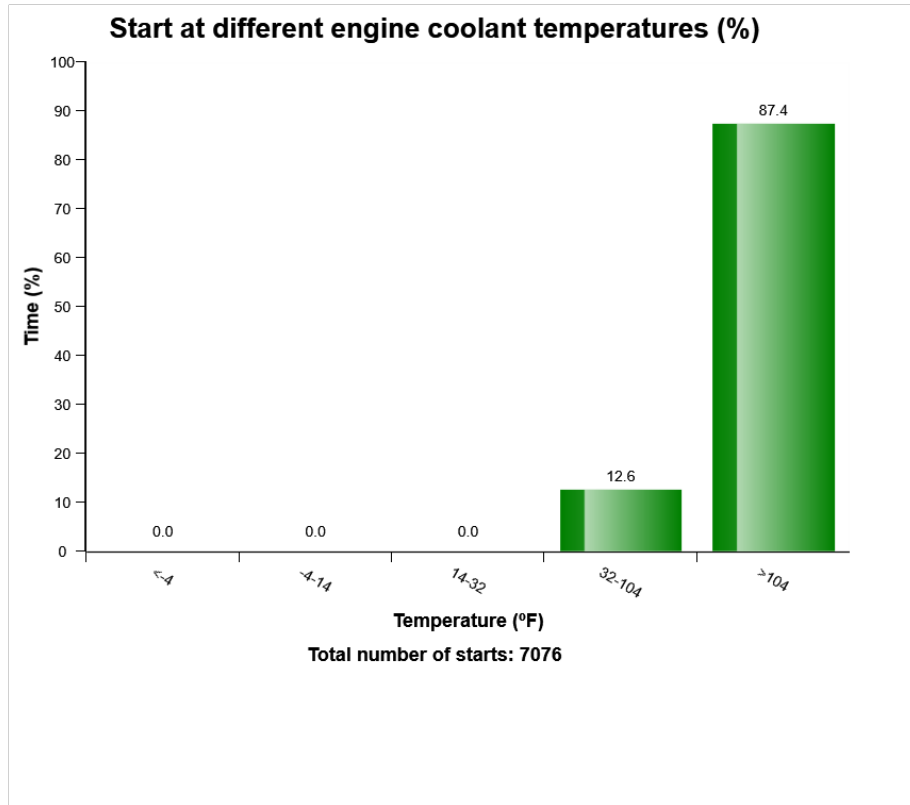
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L110H	631210	4902.1	11/7/2018



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



**Definition:**

The graph shows the distribution of engine coolant temperature, at the starting moment.

**Explanation:**

Y-axis: Number of engine starts

X-axis: Engine coolant temperature.

A great proportion of engine wear is due to cold starts. Try to avoid extremely cold starts. Try using an electric coolant heater.



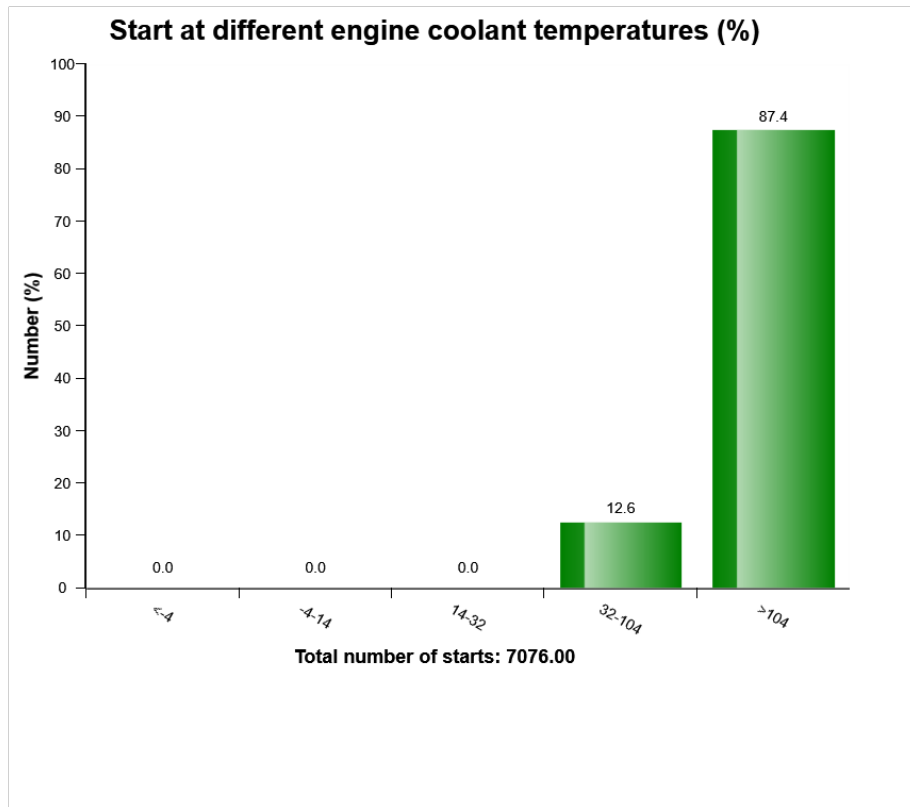
Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

Under the graph the total number of engine starts is displayed.

Also see " *Number of starts / hour*" to get a complete picture of engine starting.



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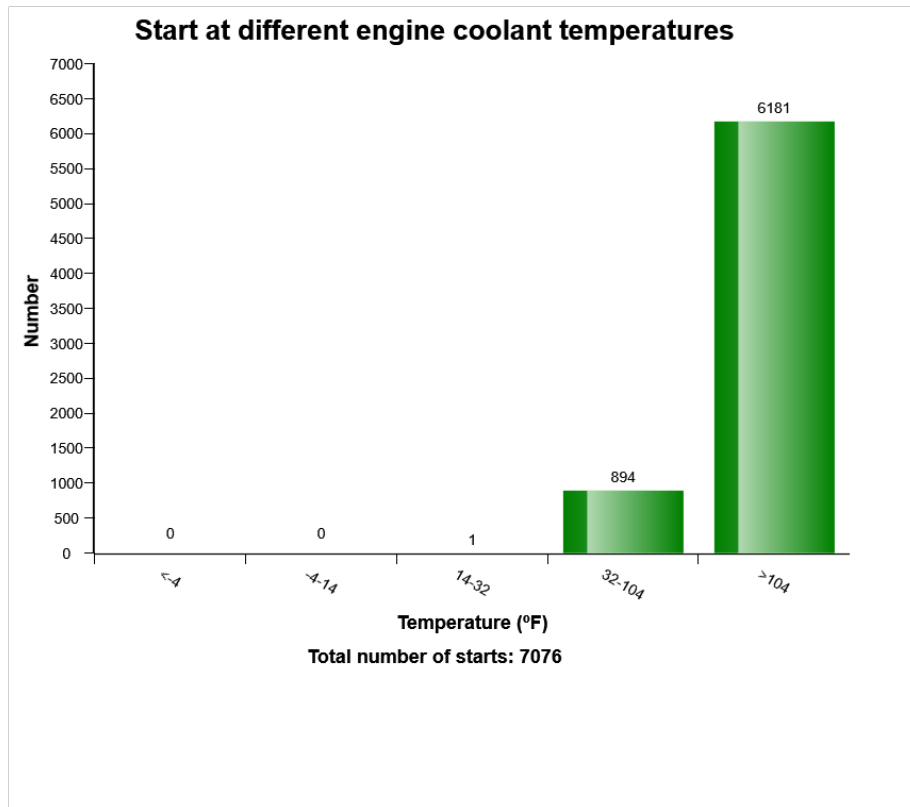
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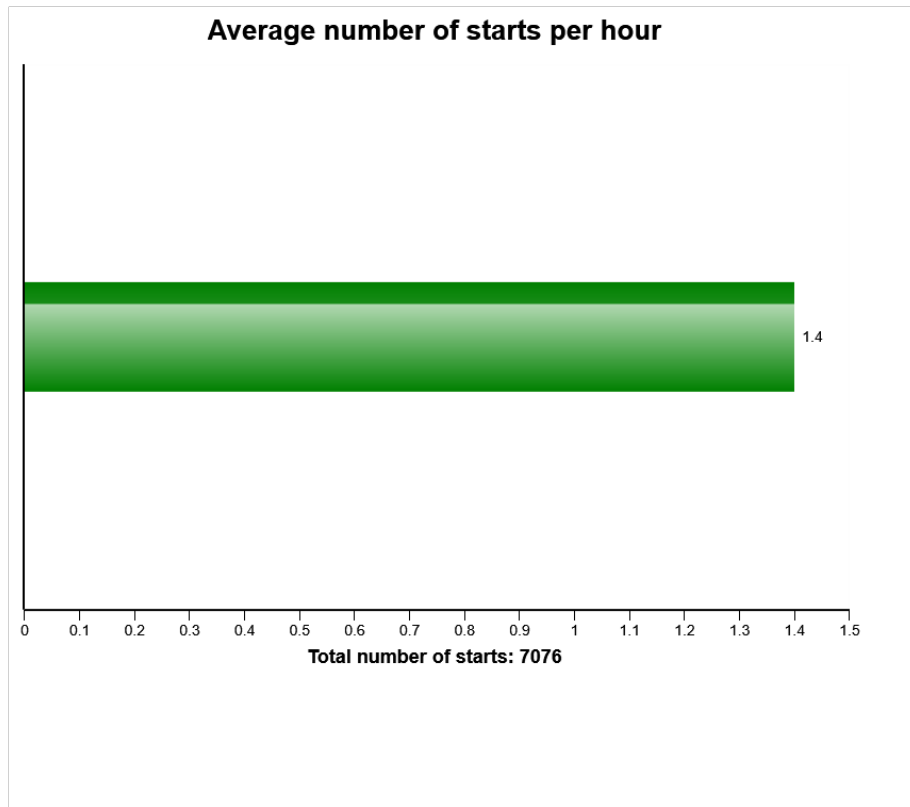
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Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



**Definition:**

The graph describes the average number of engine starts per engine running hour.

**Explanation:**

X-axis: Number of average starts per hour.

The actual time used for calculation, is time with engine on

If the fuel consumption is high one reason may be that the engine is not turned off often enough, perhaps machine is left idling for long periods. Check " Machine utilization".

The value can vary a lot depending on in which application the machine is used.



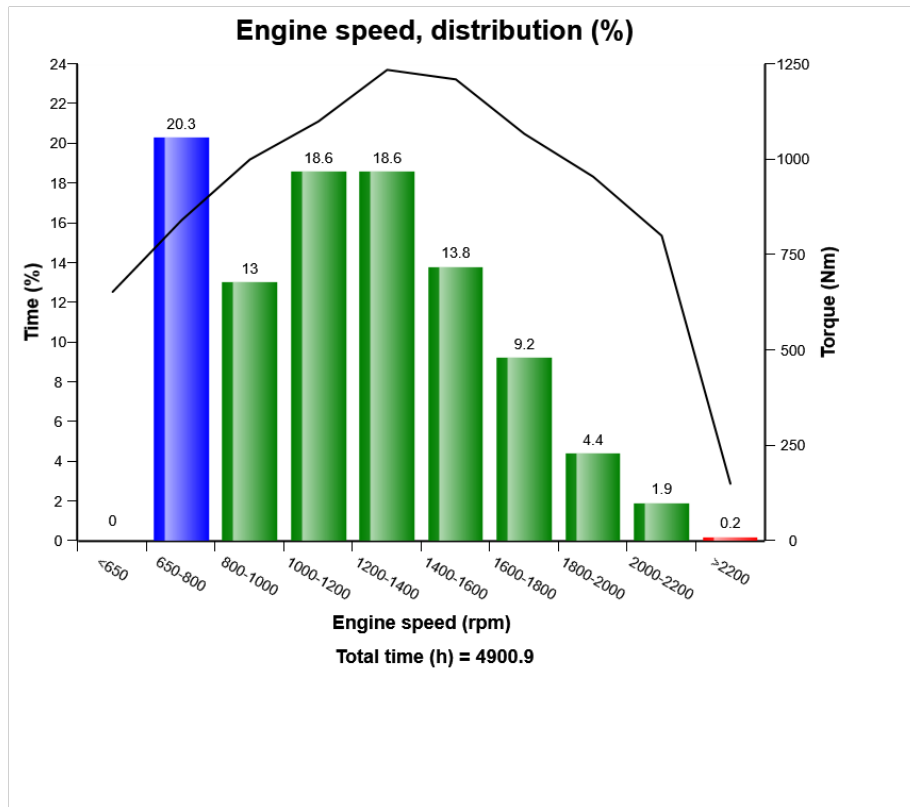
Machine model	SerialNo	Operating Hours	Reading Date
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To see at which different temperatures engine is started see" Start at different engine temperatures."

Green bar = Number of average starts per hour



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



**Definition:**

The graph describes the engine speed distribution, compared with the engine torque curve.

The sum of all bars = total time of engine running.

**Explanation:**

Y-axis\_1: Engine running time.

Y-axis\_2: Torque (Nm)

X-axis: Engine speed in rpm.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

□

Black curve = Engine torque curve. The highest part of the torque curve points out at which engine speed that the engine is strongest. To use the machine most efficient, keep the engine speed in the highest part of the torque curve. See below examples:

Blue bar = Idling interval.

Green bars = Normal engine speed range.

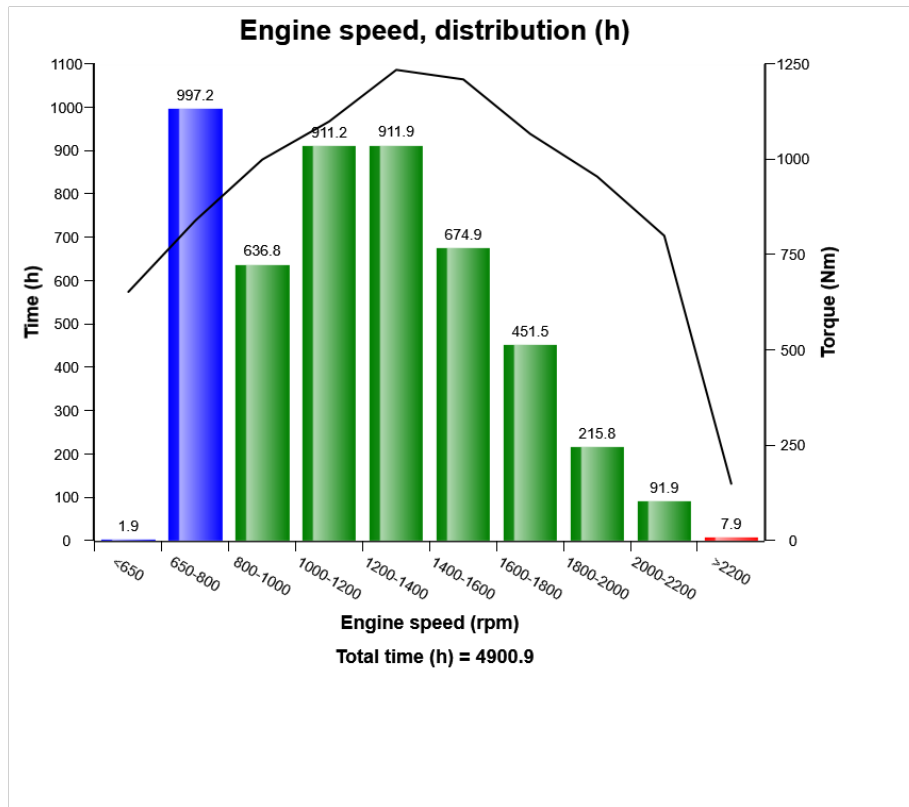
Red bar =The engine speed has exceeded the maximum design speed.

Never exceed the maximum engine design speed .

Exceeding the maximum design speed may cause severe damage to the engine.



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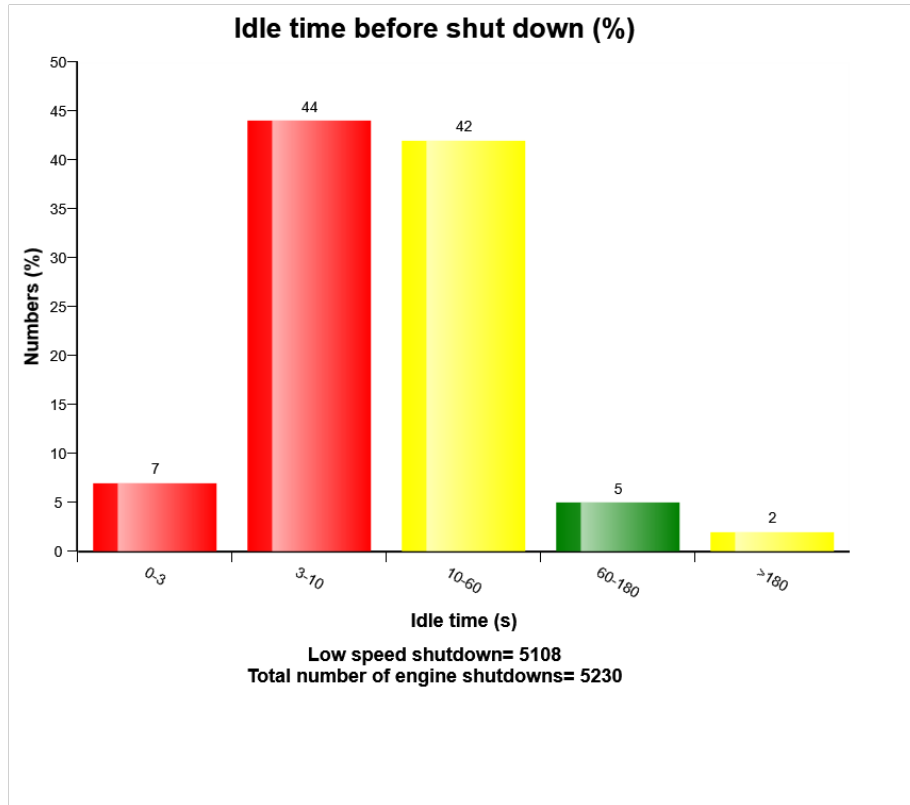
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Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



**Definition:**

This graph shows the distribution of delayed time at low idle speed until the engine is turned off.

The delayed time distribution for each bar is shown on top of its column in percentage.

The sum of bars is 100%.





Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

**Starter overheating**  
**Total number of occurrences = 12**

Op hours	Year	Month	Day	Hour	Minute
0	2000	0	0	0	0
0	2000	0	0	0	0
0	2000	0	0	0	0
0	2000	0	0	0	0
0	2000	0	0	0	0
0	2000	0	0	0	0
0	2000	0	0	0	0
0	2000	0	0	0	0
0	2000	0	0	0	0
3453	2018	4	23	13	41
3453	2018	4	23	13	43
3453	2018	4	23	13	41
3824	2018	5	31	17	36
3824	2018	5	31	17	34
3824	2018	5	31	17	34
3824	2018	5	31	17	33
3824	2018	5	31	17	32
4009	2018	6	25	15	9
4009	2018	6	25	15	9
4009	2018	6	25	15	7
4009	2018	6	25	15	8

**Definition:**

The starter can be damaged if it is overheated.



Machine model	SerialNo	Operating Hours	Reading Date
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Alarm is registered if the starter is used continuously more than 40 seconds and if it is less than five minutes since the latest alarm .

#### Explanation:

X-axis: Number of times that the starter alarm has been activated.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

**Low engine oil level at start**  
**Total number of occurrences = 0**

Op hours	Year	Month	Day	Hour	Minute
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0
* 0	2000	0	0	0	0

**Definition :**

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

hours is displayed in the first column, followed by year, month , day , hour and minute to show when an event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed

#### Criteria :

In order for an occurrence of low engine oil level to be recorded in a data point and the count to increment by 1, an Alarm shall have been received at start up of machine



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

**Low Engine Oil Pressure**  
**Total number of occurrences = 0**

	<b>Op hours</b>	<b>Year</b>	<b>Month</b>	<b>Day</b>	<b>Hour</b>	<b>Minute</b>	<b>Duration (seconds)</b>	<b>Extreme (psi)</b>
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0
*	0	2000	0	0	0	0	0	0

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**This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating hours is displayed in the first column, followed by year, month, day, hour**



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

**and minute to show when an event has occurred.**

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**Only one event per minute is registered.**

**Over the table the total number of events is displayed**

Duration :

**The duration of each event is shown after the timestamp of the event.**

**The duration is counted as long as the criteria is fulfilled.**

Extreme value :

**The extreme value column displays the most extreme value during the event.**

Criteria :

In order for an occurrence of low engine oil pressure to be recorded in a data point and the count to increment by 1, the engine oil pressure state must change from "normal" or "error" to "low." The event of low transmission oil pressure will end when the status changes from "low" back to "normal" or "error."



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

**Low Air filter pressure**  
**Total number of occurrences = 0**

Op hours	Year	Month	Day	Hour	Minute	Duration (seconds)
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
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Only one event per minute is registered.

Over the table the total number of events is displayed.

Duration :

**The duration of each event is shown after the timestamp of the event.**

**The duration is counted as long as the criteria is fulfilled.**

Criteria :

The criteria to get an registration, is that the alarm signal for air filter clogged is active, and that the diesel engine is running.





Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

**Engine overspeed, duration**  
**Total number of occurrences = 0**

Op hours	Year	Month	Day	Hour	Minute	Duration (seconds)	Extreme value
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0

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Only one event per minute is registered.

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**Duration :**

The duration of each event is shown after the timestamp of the event.

The duration is counted as long as the criteria is fulfilled.

**Extreme value :**

The extreme value column displays the most extreme value during the event.

**Criteria :**

Logging is performed when, Alarm high hydraulic oil temperature , is active.





Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

**Regeneration ignored**  
**Total number of occurrences = 26**

	Op hours	Year	Month	Day	Hour	Minute	Duration (min)
*	2203	2017	10	31	8	52	45
*	2398	2017	11	28	12	8	45
*	2705	2018	1	9	13	51	45
*	2842	2018	1	29	20	43	45
*	3026	2018	2	26	23	41	45
*	3454	2018	4	23	14	2	45
*	4009	2018	6	25	13	16	45
*	4482	2018	8	27	9	3	45
*	4506	2018	8	30	13	0	107
*	4506	2018	8	30	12	55	3
*	4506	2018	8	30	12	15	25
*	4508	2018	8	30	14	50	5
*	4508	2018	8	30	14	59	140
*	4510	2018	8	30	17	33	1
*	4510	2018	8	30	17	41	12
*	4510	2018	8	30	17	21	4
*	4511	2018	8	30	18	40	1
*	4511	2018	8	30	18	21	2
*	4511	2018	8	30	18	13	1
*	4511	2018	8	31	7	44	55



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

**Regeneration duration**  
**Total number of occurrences = 16**

Op hours	Year	Month	Day	Hour	Minute	Duration (min)
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 494	2017	1	24	9	36	45
* 1007	2017	4	25	12	24	45
* 1208	2017	5	30	12	0	44
* 1476	2017	7	3	11	59	45
* 1625	2017	7	25	10	18	44
* 1993	2017	9	19	15	58	45
* 2203	2017	10	31	8	52	45
* 2398	2017	11	28	12	8	45
* 2705	2018	1	9	13	51	45
* 2842	2018	1	29	20	43	45
* 3026	2018	2	26	23	41	45
* 3454	2018	4	23	14	2	45
* 4009	2018	6	25	13	16	45
* 4482	2018	8	27	9	3	45
* 4506	2018	8	30	12	16	0
* 4511	2018	8	31	7	54	45



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

**High engine coolant temperature**  
**Total number of occurrences = 0**

Op hours	Year	Month	Day	Hour	Minute	Duration (seconds)	Extreme (° F)
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32

**Definition :**

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

hours is displayed in the first column, followed by year, month, day, hour and minute to show when an event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed.

Duration :

**The duration of each event is shown after the timestamp of the event.**

**The duration is counted as long as the criteria is fulfilled.**

Extreme value :

**The extreme value column displays the most extreme value during the event.**

Criteria :

The criteria to get an registration, is that the alarm signal for high engine coolant temperature is active and that the diesel engine is running.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

**Water level warning in water separator**  
**Total number of occurrences = 0**

Op hours	Year	Month	Day	Hour	Minute	Duration (min)
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0
* 0	2000	0	0	0	0	0





Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

**High voltage**  
**Total number of occurrences = 0**

Op hours	Year	Month	Day	Hour	Minute	Duration (seconds)	Extreme value
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0

**Definition :**

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

hours is displayed in the first column, followed by year, month , day , hour and minute to show when an event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed

**Duration :**

The duration of each event is shown after the timestamp of the event.

The duration is counted as long as the criteria is fulfilled.

**Extreme value :**

The extreme value column displays the most extreme value during the event.

**Criteria :**

Logging is performed when, Alarm high system voltage , is active.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

**Low voltage**  
**Total number of occurrences = 0**

Op hours	Year	Month	Day	Hour	Minute	Duration (seconds)	Extreme value
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0

Definition :

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

hours is displayed in the first column, followed by year, month , day , hour and minute to show when an event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed

**Duration :**

The duration of each event is shown after the timestamp of the event.

The duration is counted as long as the criteria is fulfilled.

**Extreme value :**

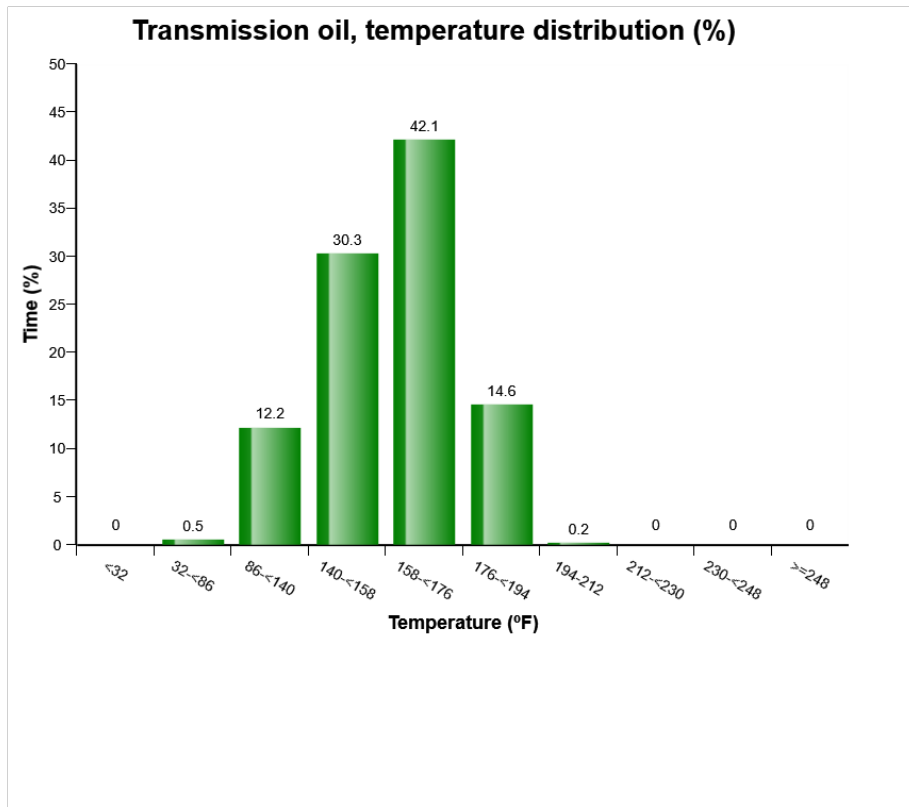
The extreme value column displays the most extreme value during the event.

**Criteria :**

Logging is performed when, Alarm low system voltage , is active.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



The diagram shows the transmission oil temperature in various temperature ranges. The time is displayed in the following ten temperature ranges:

<32°F Temperatures below 32°F

32-<86°F Temperatures from 32°F until 86°F

86-<140°F Temperatures from 86°F until 140°F

140-<158°F Temperatures from 140°F until 158°F

158-<176°F Temperatures from 158°F until 176°F

176-<194°F Temperatures from 176°F until 194°F



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

194-<212°F Temperatures from 194°F until 212°F

212-<230°F Temperatures from 212°F until 230°F

230-<248°F Temperatures from 230°F until 248°F

>248°F Temperatures over 248°F

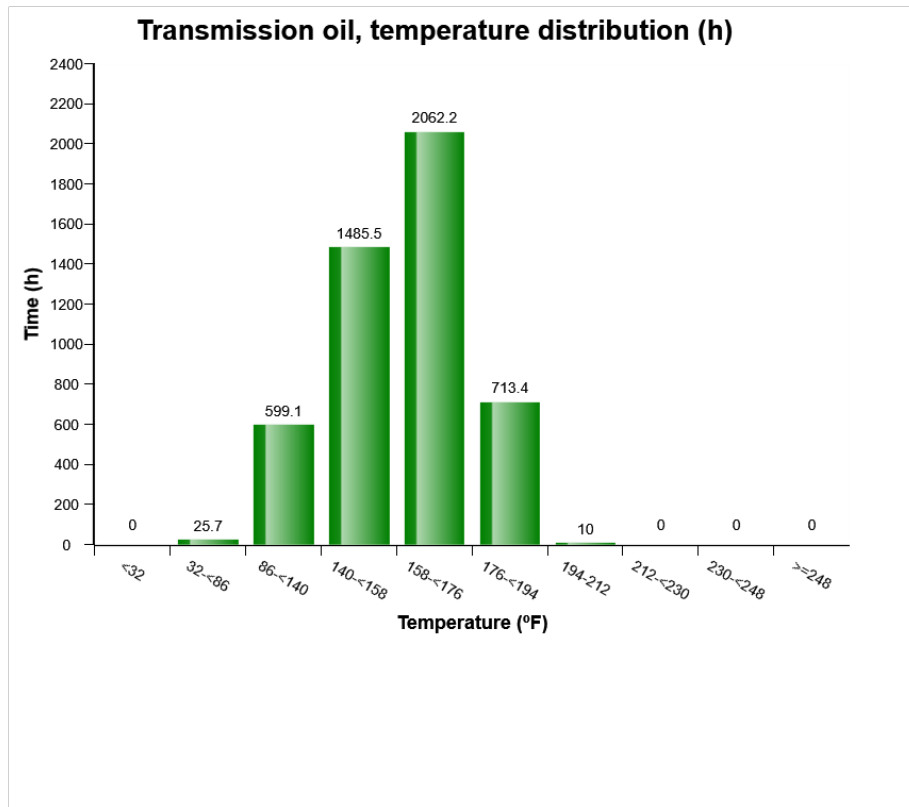
The bar that describes temperatures from 230°F until 248°F is yellow and means that the oil has begun to be overheated. Driver has been given orange central warning

The bar that describes >248°F is red and means that the oil has been overheated. Driver has been given red central warning.

Oil temperatures exceeding 230°F must be avoided since the properties of the oil are degraded



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



The diagram shows the transmission oil temperature in various temperature ranges. The time is displayed in the following ten temperature ranges:

<32°F Temperatures below 32°F

32-86°F Temperatures from 32°F until 86°F

86-140°F Temperatures from 86°F until 140°F

140-158°F Temperatures from 140°F until 158°F

158-176°F Temperatures from 158°F until 176°F

176-194°F Temperatures from 176°F until 194°F



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

194-<212°F Temperatures from 194°F until 212°F

212-<230°F Temperatures from 212°F until 230°F

230-<248°F Temperatures from 230°F until 248°F

>248°F Temperatures over 248°F

The bar that describes temperatures from 230°F until 248°F is yellow and means that the oil has begun to be overheated. Driver has been given orange central warning

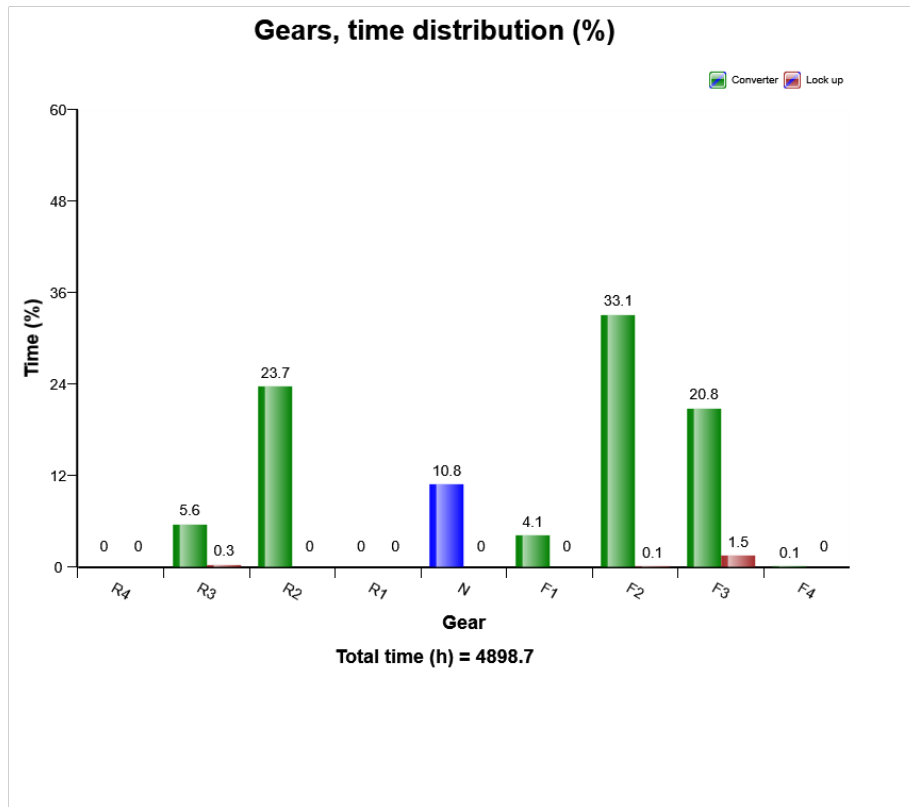
The bar that describes >248°F is red and means that the oil has been overheated. Driver has been given red central warning.

Oil temperatures exceeding 230°F must be avoided since the properties of the oil are degraded





Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



**Definition:**

The graph describes the distribution of the usage of the different gears, expressed as percentage of total engine running time.

The sum of all bars = 100% = total engine running time.

Under the graph the total engine running time (in hours) is displayed.

**Explanation:**

Y-axis: Engine running time, in percent.

X-axis: Active gear.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

### Green bars:

R1 = First reverse gear

R2 = Second reverse gear

R3 = Third reverse gear

R4 =Fourth reverse gear

N = Neutral position

F1=First forward gear

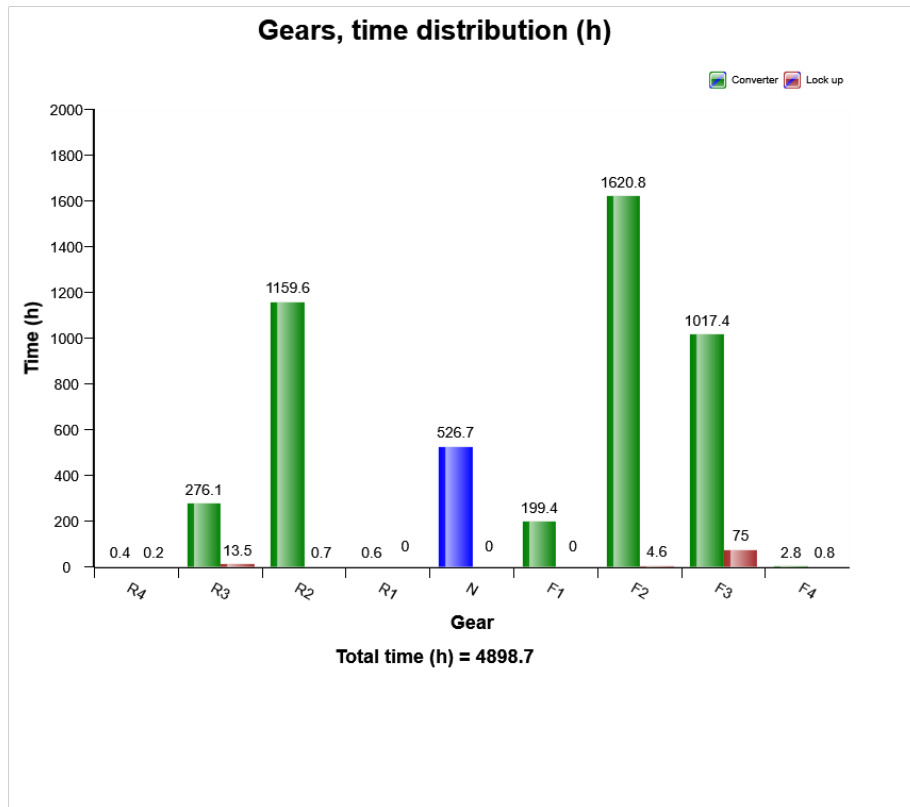
F2=Second forward gear

F3=Third forward gear

F4=Fourth forward gear



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



### Definition:

The graph describes the distribution of the usage of the different gears, expressed as total running time for each gear..

The sum of all bars = Total engine running time.

Under the graph the total engine running time (in hours) is displayed.

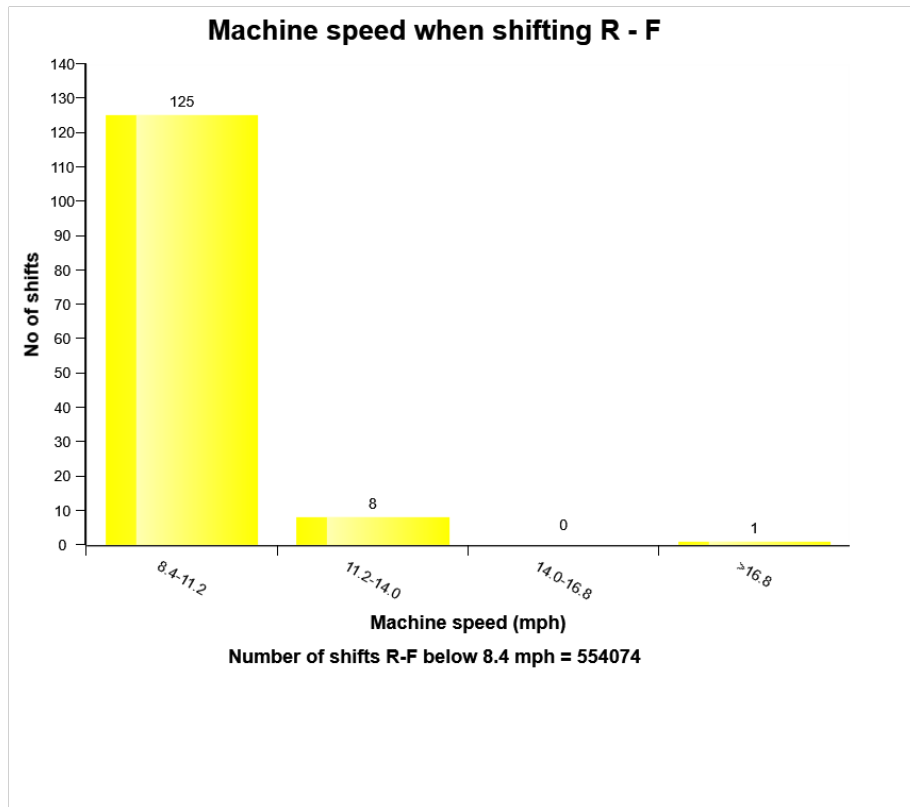
### Explanation:

Y-axis: Engine running time, in hours.

X-axis: Active gear.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



**Definition:**

The graph shows the machine speed at direction shift, reverse to forward (R-F)

**Explanation:**

Y-axis: Number of shifts (reverse-forward)

X-axis: Machine speed in mph.

Under the graph the total number of directional gear shifts R-F below 8,4 mph is displayed. Below the diagram the total number of gearshifts is displayed.

Transmission wear depends on current speed when shifting direction. Less machine speed when



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

shifting direction generally causes less wear on the transmission.

Yellow bar = From 8.4 mph to 11.2 mph

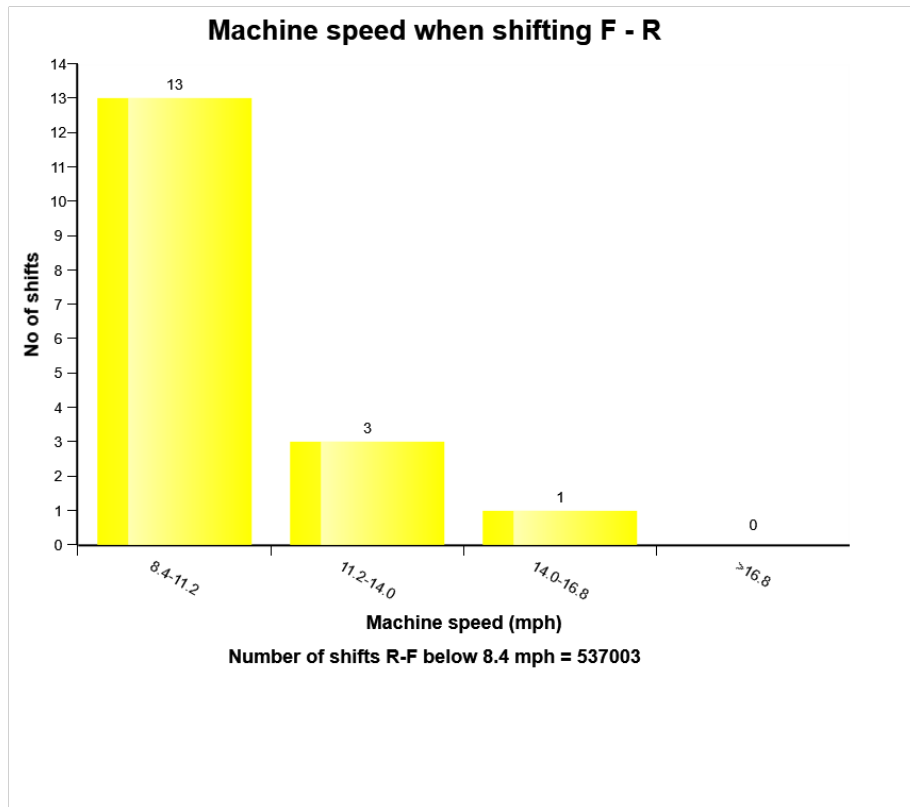
Red bar = From 11.2 mph to 14.0 mph

Red bar = From 14.0 mph to 16.8 mph

Red bar = Over 16.8 mph



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



**Definition:**

The graph shows the machine speed at direction shift, reverse to forward (R-F)

**Explanation:**

Y-axis: Number of shifts (reverse-forward)

X-axis: Machine speed in mph.

Under the graph the total number of directional gear shifts R-F below 8,4 mph is displayed. Below the diagram the total number of gearshifts is displayed.

Transmission wear depends on current speed when shifting direction. Less machine speed when



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

shifting direction generally causes less wear on the transmission.

Yellow bar = From 8.4 mph to 11.2 mph

Red bar = From 11.2 mph to 14.0 mph

Red bar = From 14.0 mph to 16.8 mph

Red bar = Over 16.8 mph



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

**Transmission oil temperature high**  
**Total number of occurrences = 0**

Op hours	Year	Month	Day	Hour	Minute	Duration (seconds)	Extreme (° F)
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32

**Definition :**

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating





Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

hours is displayed in the first column, followed by year, month, day, hour and minute to show when an event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed.

Duration :

**The duration of each event is shown after the timestamp of the event.**

**The duration is counted as long as the criteria is fulfilled.**

Extreme value :

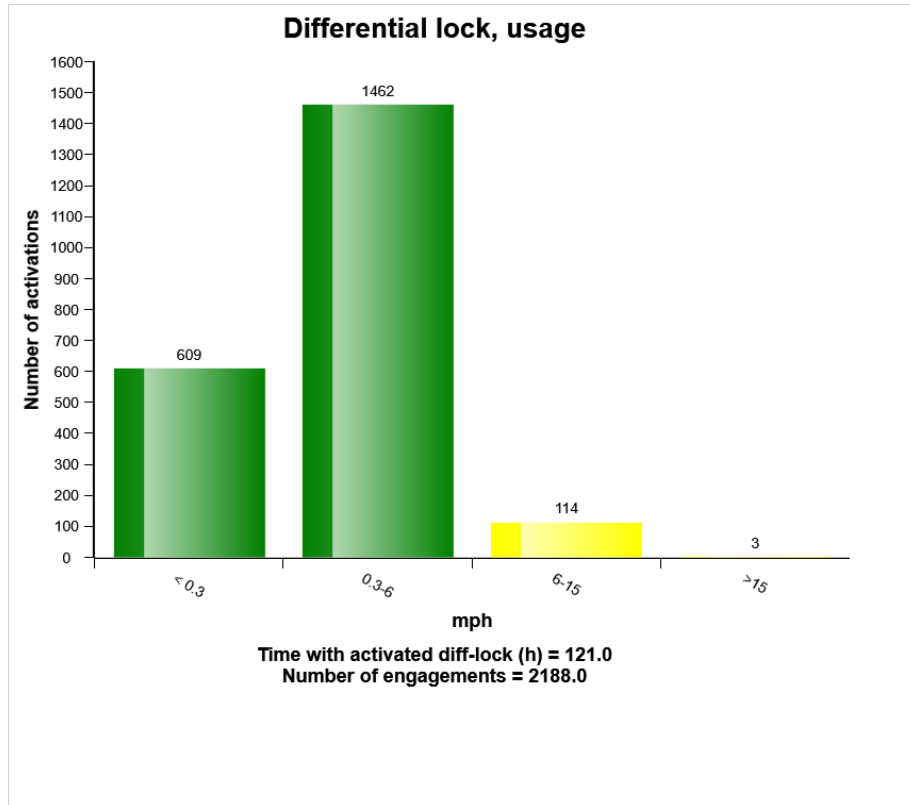
**The extreme value column displays the most extreme value during the event.**

Criteria :

In order for an occurrence of high transmission oil temperature to be recorded in a data point and the count to increment by 1, the high transmission oil temperature state must change from "normal" or "error" to "high." The event of high transmission oil temperature will end when the status changes from "high" back to "normal" or "error."



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

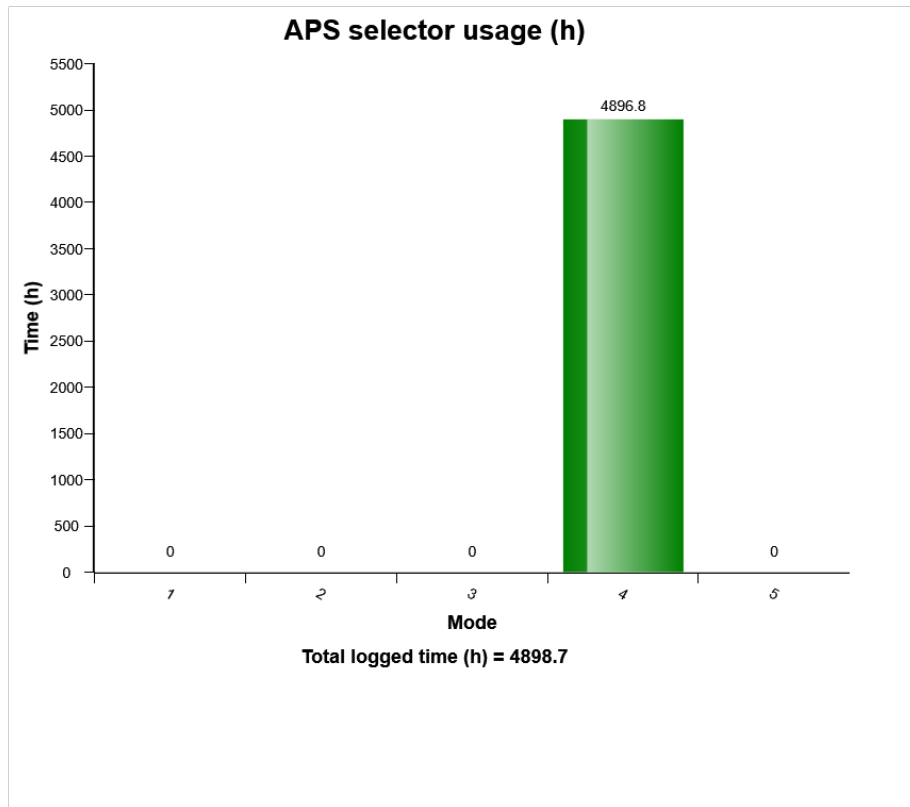


**Definition:**

The diagram show, number of times the differential lock has been engaged at each speed interval



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



The diagram shows the time distribution for the different APS modes.

For WLO :

Mode1 = Light

Mode2 = Normal

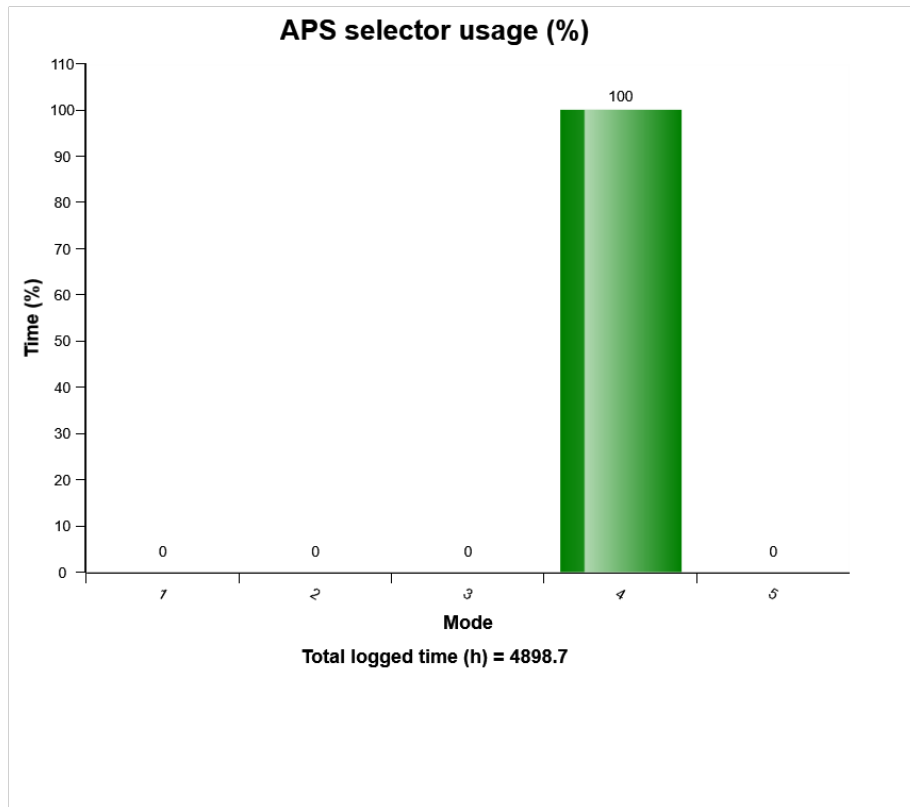
Mode3 = Heavy

Mode4 = Auto

Mode5 = Service.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



The diagram shows the time distribution for the different APS modes.

For WLO :

Mode1 = Light

Mode2 = Normal

Mode3 = Heavy

Mode4 = Auto

Mode5 = Service.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

**Transmission oil pressure low**  
**Total number of occurrences = 0**

<b>0</b>	<b>Year</b>	<b>Month</b>	<b>Day</b>	<b>Hour</b>	<b>Minute</b>	<b>Duration (seconds)</b>	<b>Extreme (psi)</b>
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0
0	2000	0	0	0	0	0	0

**Definition :**

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

hours is displayed in the first column, followed by year, month, day, hour and minute to show when an event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed.

Duration :

**The duration of each event is shown after the timestamp of the event.**

**The duration is counted as long as the criteria is fulfilled.**

Extreme value :

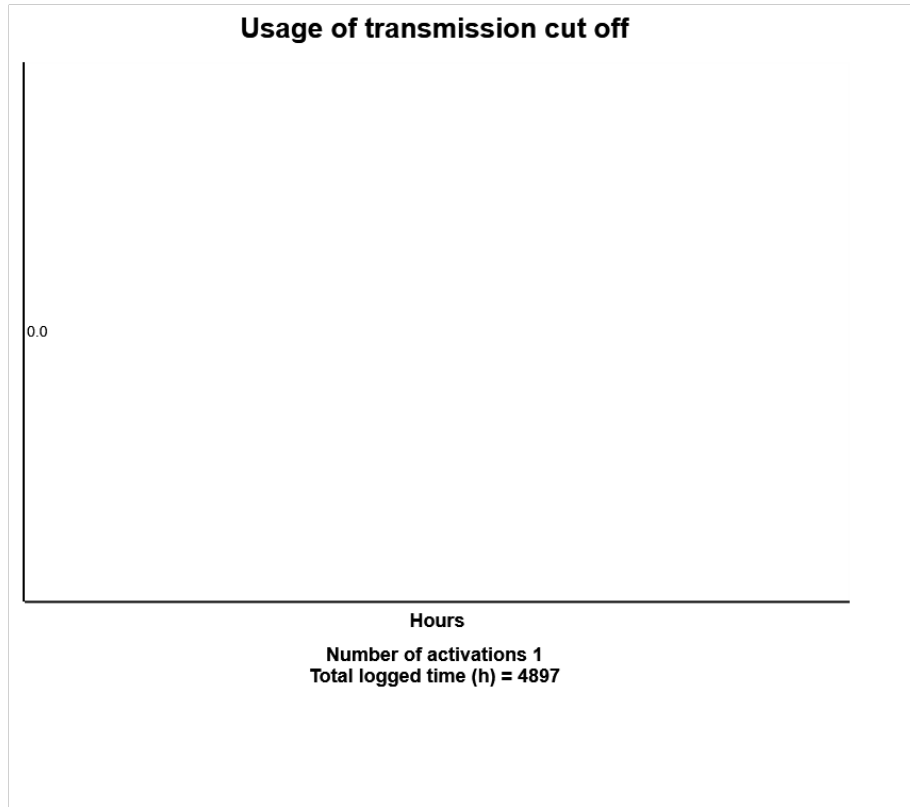
**The extreme value column displays the most extreme value during the event.**

Criteria :

In order for an occurrence of low transmission oil pressure to be recorded in a data point and the count to increment by 1, the transmission oil pressure state must change from "normal" or "error" to "low." The event of low transmission oil pressure will end when the status changes from "low" back to "normal" or "error."



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

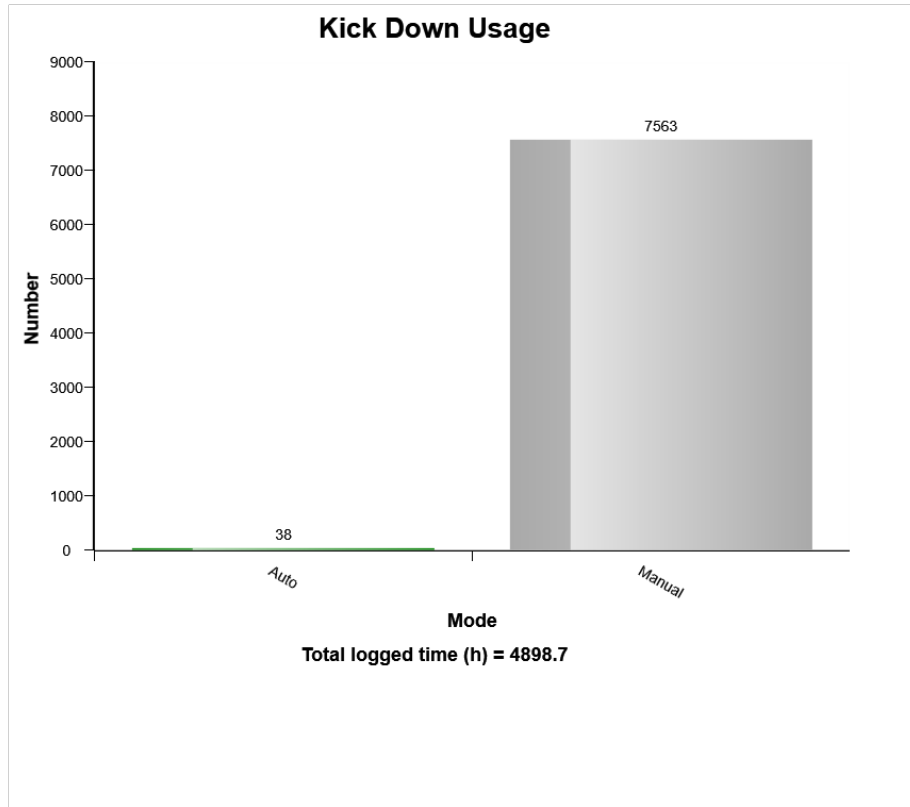


The diagram shows the time that the transmission cut off has been ON.

Below the diagram total number of activations is presented.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

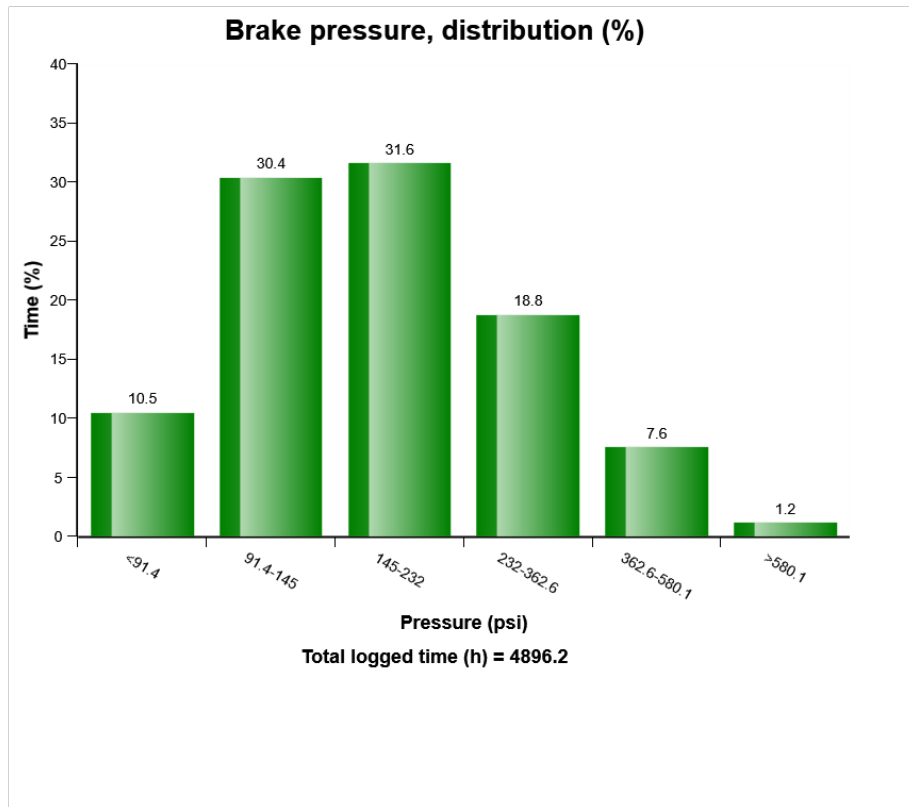


The diagram shows the distribution between Auto and Manual activations of the Kick down function.





Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



**Definition:**

The graph describes the brake pressure distribution.

The sum of bars=100% of brake engagements.

**Explanation:**

Y-axis: Percentage of times that the brake has been engaged.

X-axis: Brake pressure distribution in bar.

The distribution of the bars throughout the ranges reflects the operator's way of handling the machine. A concentration in the lower ranges indicates that the machine is being operated correctly.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

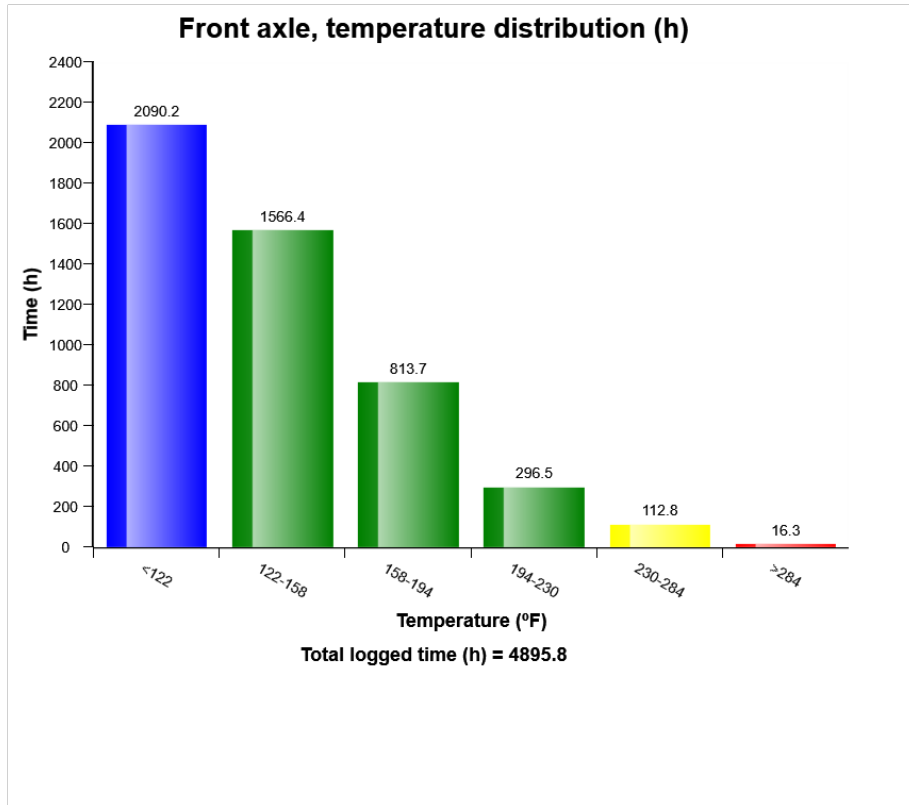
A concentration in the highest range indicates that the machine is operated hard and in an inefficient manner.

To get a greater understanding of how the brake is used also study the presentation "Brake engagement time".

Green bars = Brake pressure ranges



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



**Definition:**

The graph shows the time distribution of the temperature, while engine running.

**Explanation:**

Y-axis: Time

X-axis: Temperature distribution in classes.

Blue bar = Warm-up phase.

During the engine warm-up phase, this temperature region is passed.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

It is normal to have registrations in this region.

**Green bar** = Normal working temperature. The Major part of the registrations shall be in this region.

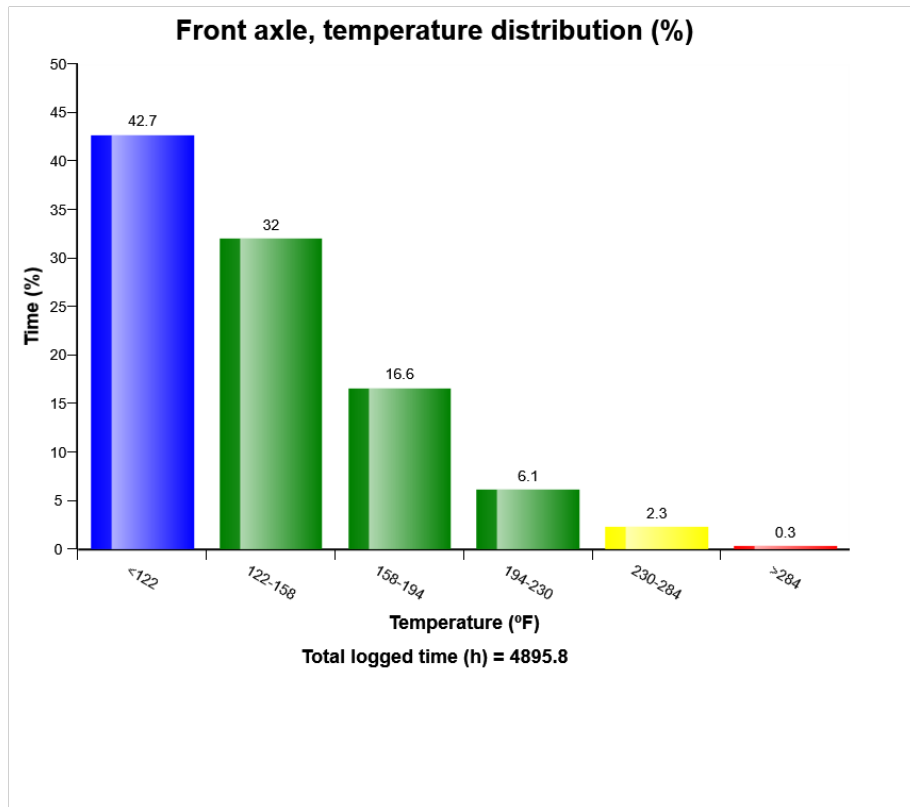
**Yellow bar** = High working temperature. It is normal to have some registrations in this region.

**Red bar** = Alarm.

Registrations in this region is not normal, running in this region may cause severe damage.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



**Definition:**

The graph shows the time distribution of the temperature, while engine running.

**Explanation:**

Y-axis: Time

X-axis: Temperature distribution in classes.

Blue bar = Warm-up phase.

During the engine warm-up phase, this temperature region is passed.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

It is normal to have registrations in this region.

**Green bar** = Normal working temperature. The Major part of the registrations shall be in this region.

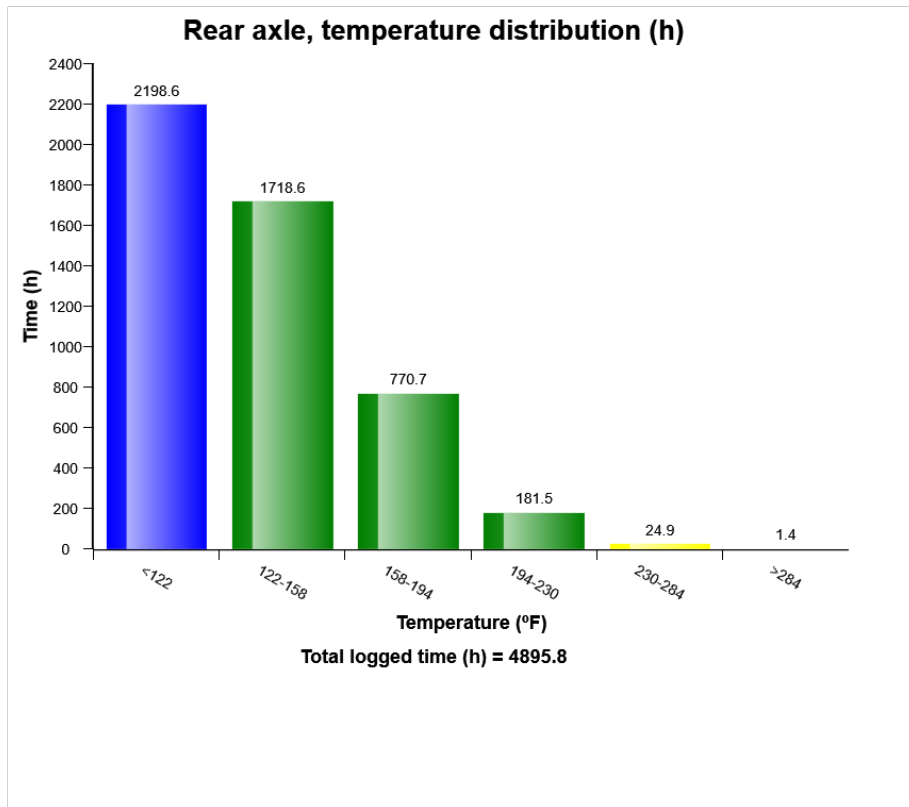
**Yellow bar** = High working temperature. It is normal to have some registrations in this region.

**Red bar** = Alarm.

Registrations in this region is not normal, running in this region may cause severe damage.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



**Definition:**

The graph shows the time distribution of the temperature, while engine running.

**Explanation:**

Y-axis: Time

X-axis: Temperature distribution in classes.

Blue bar = Warm-up phase.

During the engine warm-up phase, this temperature region is passed.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

It is normal to have registrations in this region.

**Green bar** = Normal working temperature. The Major part of the registrations shall be in this region.

**Yellow bar** = High working temperature. It is normal to have some registrations in this region.

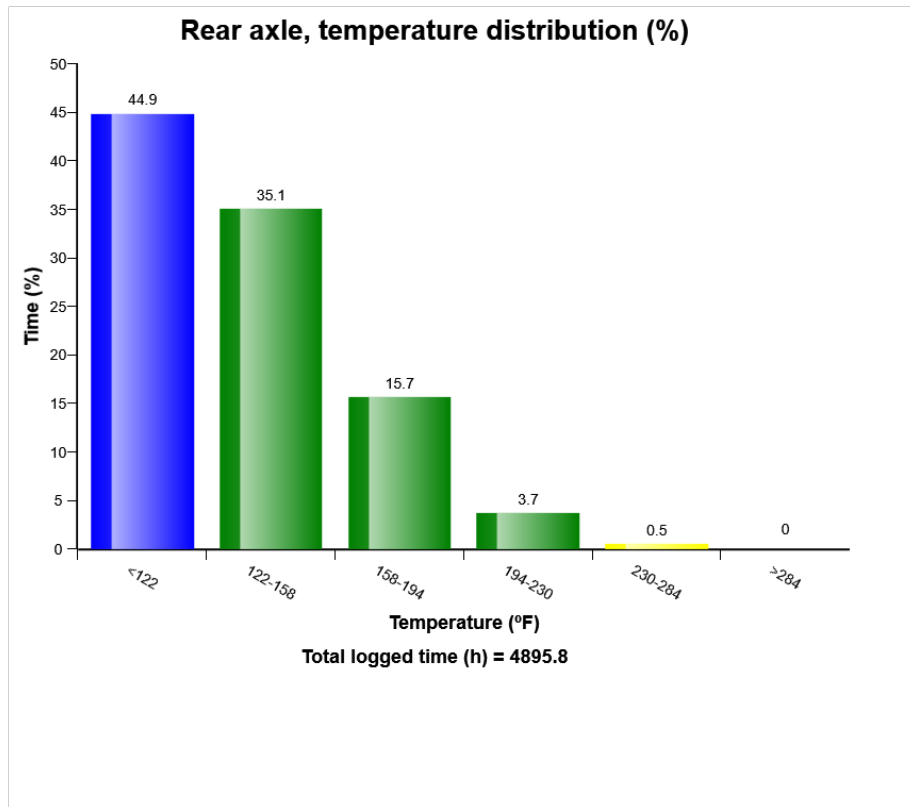
**Red bar** = Alarm.

Registrations in this region is not normal, running in this region may cause severe damage.





Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



**Definition:**

The graph shows the time distribution of the temperature, while engine running.

**Explanation:**

Y-axis: Time

X-axis: Temperature distribution in classes.

Blue bar = Warm-up phase.

During the engine warm-up phase, this temperature region is passed.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

It is normal to have registrations in this region.

**Green bar** = Normal working temperature. The Major part of the registrations shall be in this region.

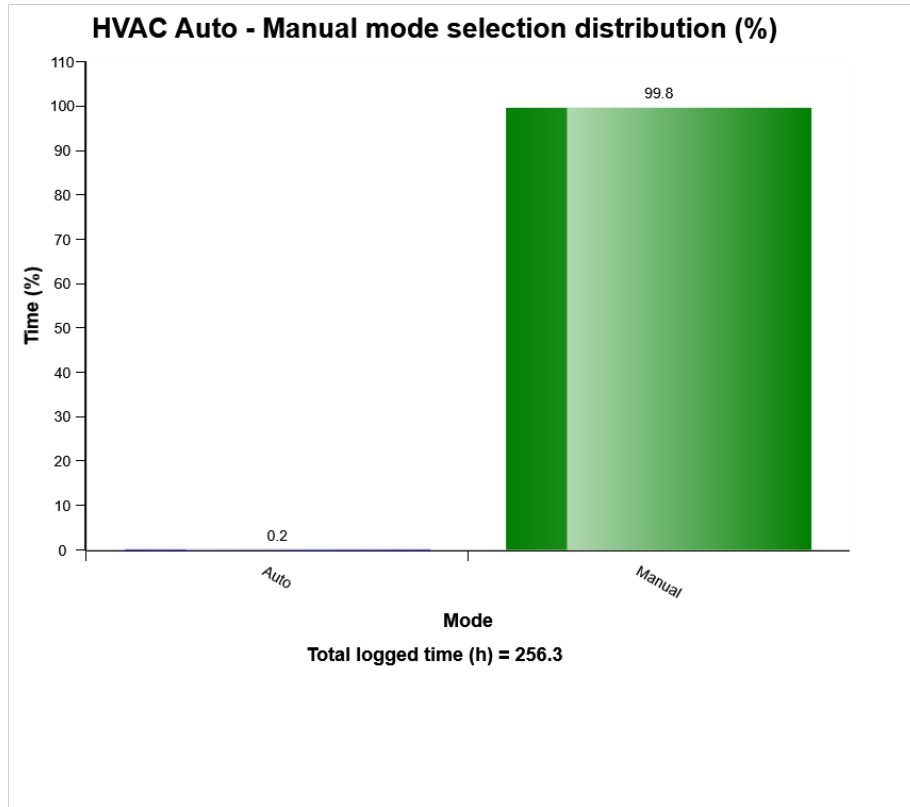
**Yellow bar** = High working temperature. It is normal to have some registrations in this region.

**Red bar** = Alarm.

Registrations in this region is not normal, running in this region may cause severe damage.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

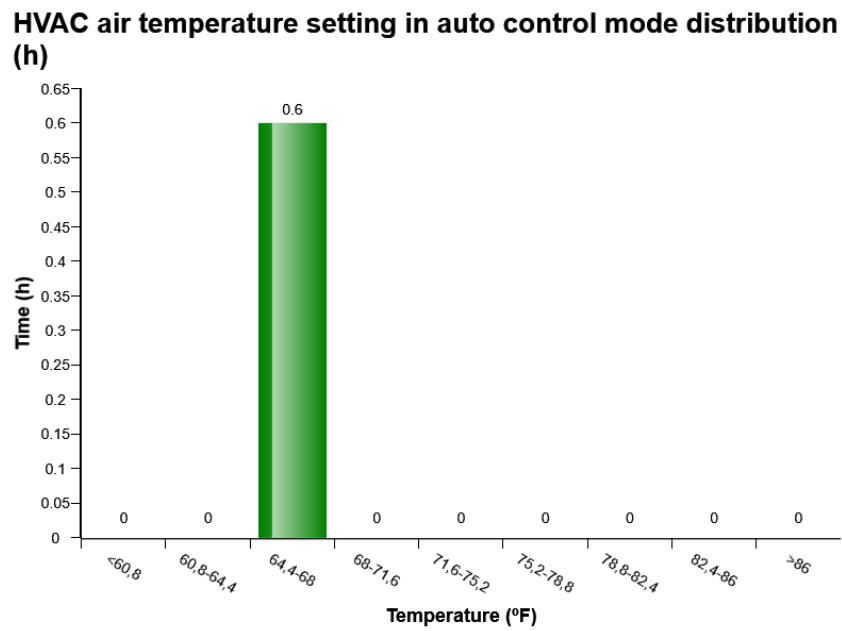


**Definition:**

The diagram describes auto-manual mode selection distribution of HVAC system in machine while it Works. The share of each mode compared to Total time of HVAC operation is displayed.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

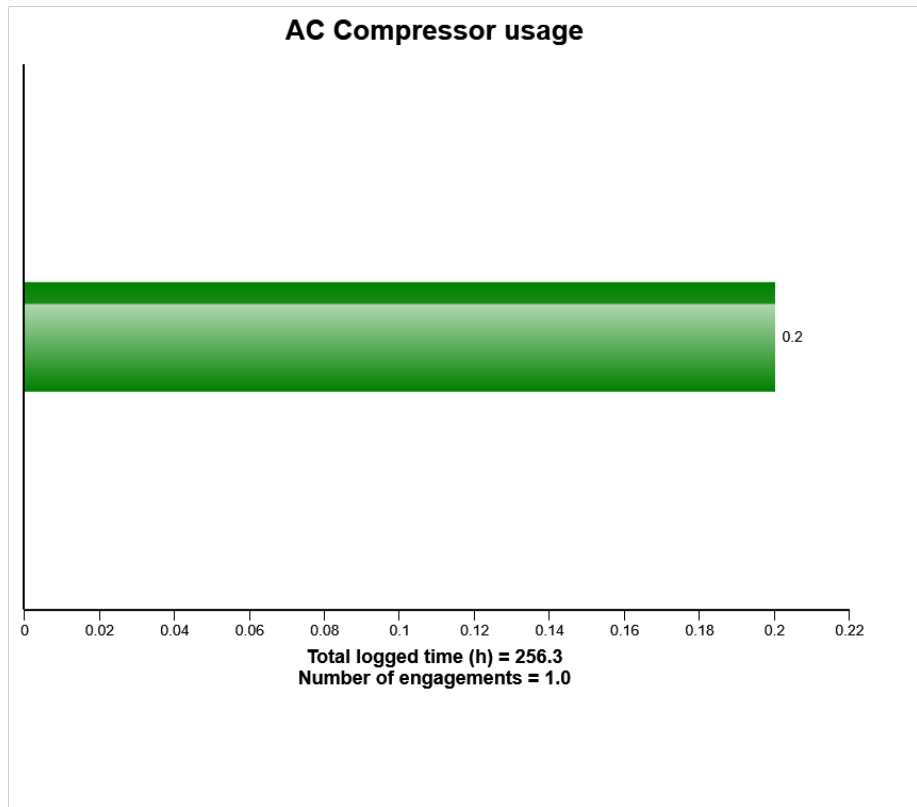


**Definition:**

The diagram describes air temperature setting distribution for HVAC auto control mode established by operator in Cabin



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



**Definition:**

The graph shows the total time of AC compressor engagement.

**Explanation:**

Green bar: Total time in hours, AC compressor has been engaged.

Under the graph the total engine running time (in hours) is displayed.

Total number of AC compressor activations is also displayed.

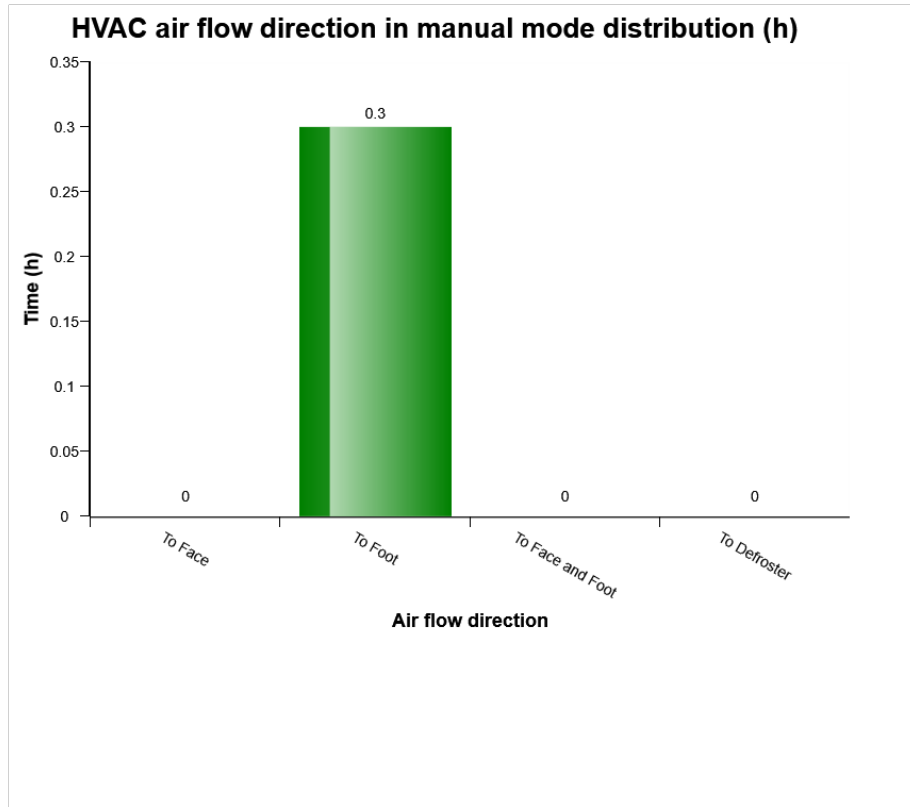


Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

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Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

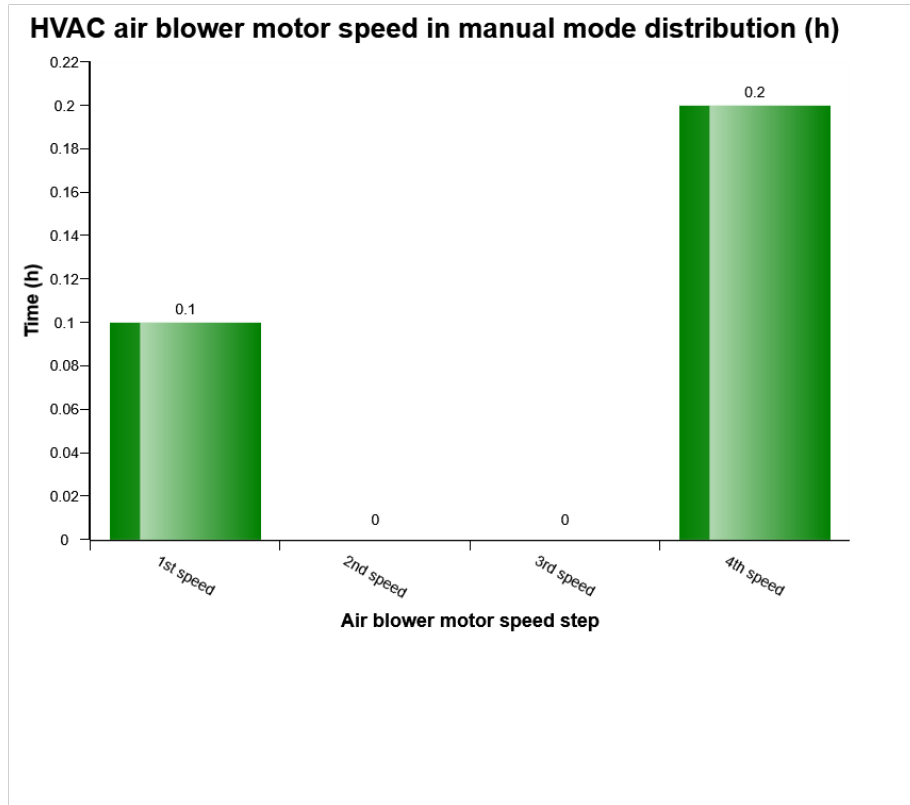


**Definition:**

The diagram describes air flow direction distribution for HVAC manual control mode established by operator in Cabin.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



**Definition:**

The diagram describes air blower motor speed distribution for HVAC manual control mode established by operator in Cabin.





Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

**AC High Pressure  
Total number of occurrences = 0**

Op hours	Year	Month	Day	Hour	Minute	Duration (seconds)	Ambient temperature (°F)
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32

Definition :

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

hours is displayed in the first column, followed by year, month , day , hour and minute to show when an event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed

**Duration :**

The duration of each event is shown after the timestamp of the event.

The duration is counted as long as the criteria is fulfilled.

**Extreme value :**

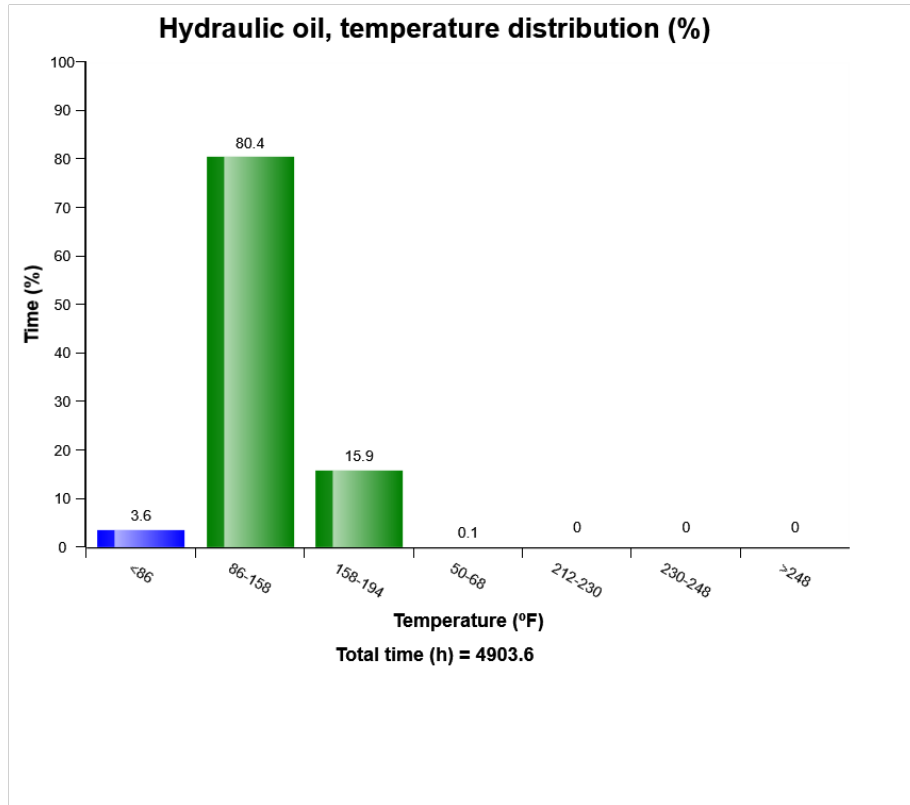
The extreme value column displays the most extreme value during the event.

**Criteria :**

Logging is performed when, High AC Pressure signal is active. Ambient temp is viewed.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



**Definition:**

The graph shows the time distribution of the temperature, while engine running.

**Explanation:**

Y-axis: Time

X-axis: Temperature distribution in classes.

Blue bar = Warm-up phase.

During the engine warm-up phase, this temperature region is passed.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

It is normal to have registrations in this region.

**Green bar** = Normal working temperature. The Major part of the registrations shall be in this region.

**Yellow bar** = High working temperature. It is normal to have some registrations in this region.

**Red bar** = Alarm.

Registrations in this region is not normal, running in this region may cause severe damage.



Machine model <b>L110H</b>	SerialNo <b>631210</b>	Operating Hours <b>4902.1</b>	Reading Date <b>11/7/2018</b>
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### High hydraulic oil temperature Total number of occurrences = 0

Op hours	Year	Month	Day	Hour	Minute	Duration (seconds)	Extreme (° F)
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32

**Definition :**

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

hours is displayed in the first column, followed by year, month , day , hour and minute to show when an event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed

**Duration :**

The duration of each event is shown after the timestamp of the event.

The duration is counted as long as the criteria is fulfilled.

**Extreme value :**

The extreme value column displays the most extreme value during the event.

**Criteria :**

Logging is performed when, Alarm high hydraulic oil temperature , is active.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

**Low Hydraulic Oil Level**  
**Total number of occurrences = 0**

Op hours	Year	Month	Day	Hour	Minute	Duration (seconds)
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0

**Definition :**

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

hours is displayed in the first column, followed by year, month , day , hour and minute to show when an event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed

#### Duration :

The duration of each event is shown after the timestamp of the event.

The duration is counted as long as the criteria is fulfilled.

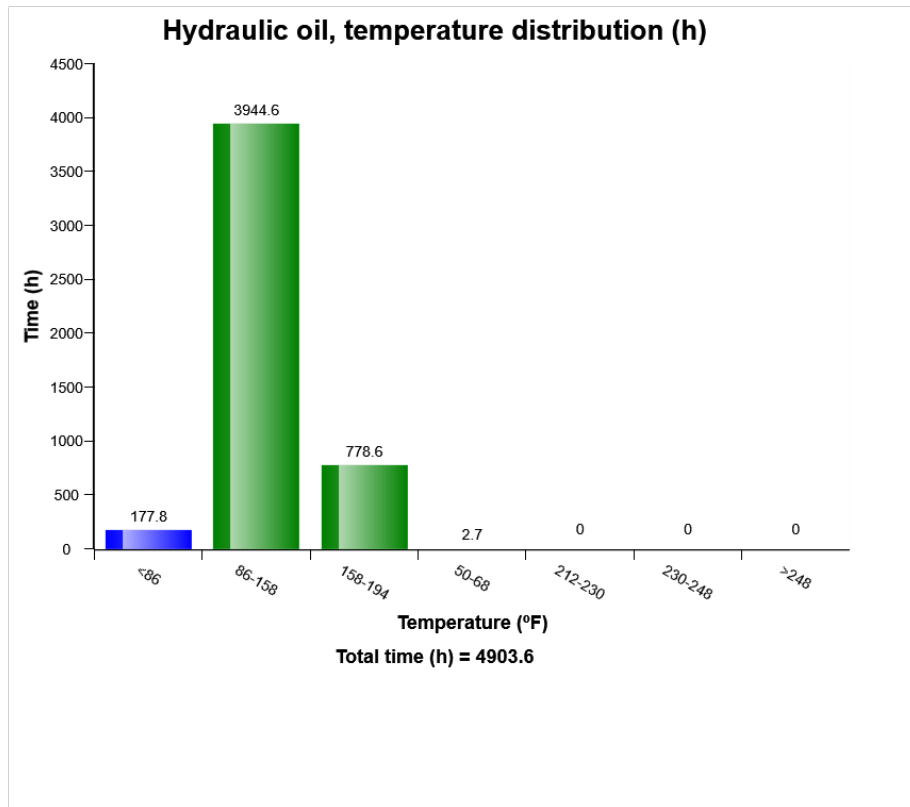
#### Criteria :

The criteria to get a registration, is that the Alarm signal for low hydraulic oil level i s active and that the diesel engine is running.





Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018



**Definition:**

The graph shows the time distribution of the temperature, while engine running.

**Explanation:**

Y-axis: Time

X-axis: Temperature distribution in classes.

Blue bar = Warm-up phase.

During the engine warm-up phase, this temperature region is passed.



Machine model	SerialNo	Operating Hours	Reading Date
L110H	631210	4902.1	11/7/2018

It is normal to have registrations in this region.

**Green bar** = Normal working temperature. The Major part of the registrations shall be in this region.

**Yellow bar** = High working temperature. It is normal to have some registrations in this region.

**Red bar** = Alarm.

Registrations in this region is not normal, running in this region may cause severe damage.

