US 20170241308A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2017/0241308 A1**

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(43) **Pub. Date: Aug. 24, 2017**

(54) **OIL MAINTENANCE STRATEGY FOR ELECTRIFIED VEHICLES**

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(21) Appl. No.: **15/051,994**

(22) Filed: **Feb. 24, 2016**

Publication Classification

(51) **Int. Cl.**

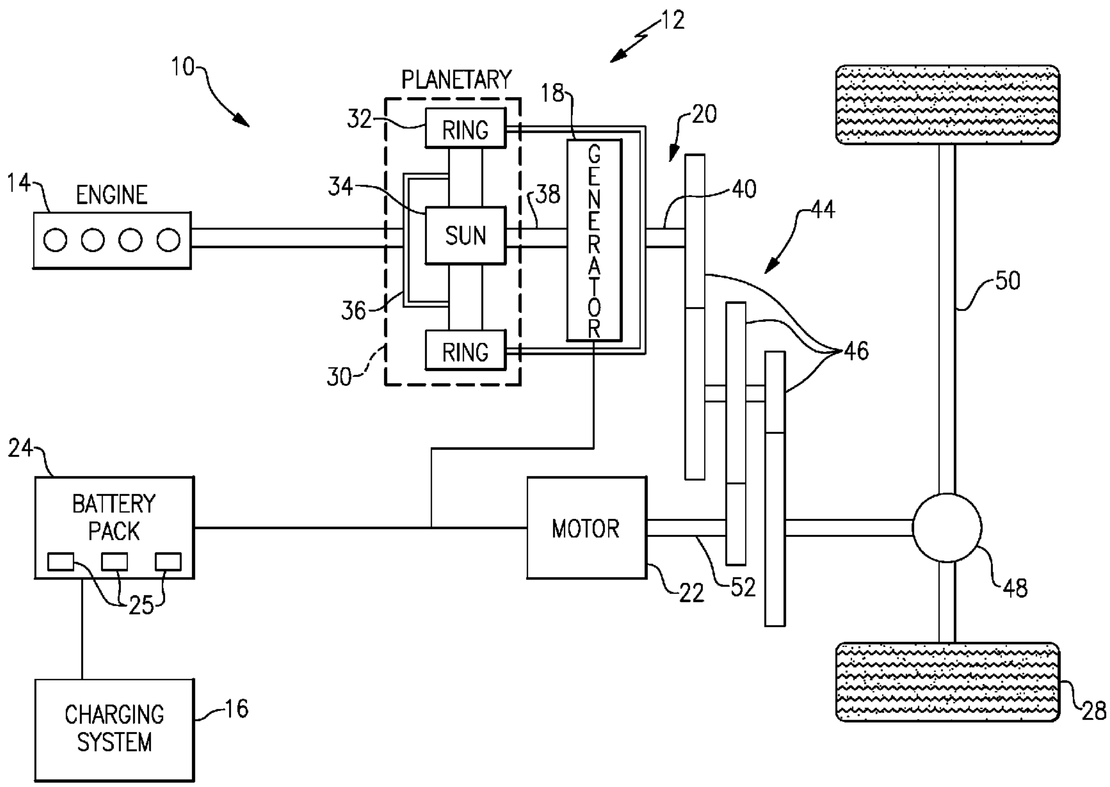
F01M 5/00	(2006.01)
B60K 6/40	(2006.01)
B60K 6/28	(2006.01)
B60K 6/365	(2006.01)
B60K 6/24	(2006.01)
B60K 6/445	(2006.01)

(52) **U.S. Cl.**

CPC ***F01M 5/001*** (2013.01); ***B60K 6/24*** (2013.01); ***B60K 6/445*** (2013.01); ***B60K 6/28*** (2013.01); ***B60K 6/365*** (2013.01); ***B60K 6/40*** (2013.01); *B60Y 2400/112* (2013.01); *B60Y 2200/92* (2013.01); *Y10S 903/905* (2013.01); *Y10S 903/907* (2013.01); *Y10S 903/91* (2013.01); *Y10S 903/951* (2013.01)

(57) **ABSTRACT**

A method according to an exemplary aspect of the present disclosure includes, among other things, selectively powering a heating device to augment heating of an engine oil associated with an engine of a vehicle in a manner that influences an oil quality value of the engine oil.



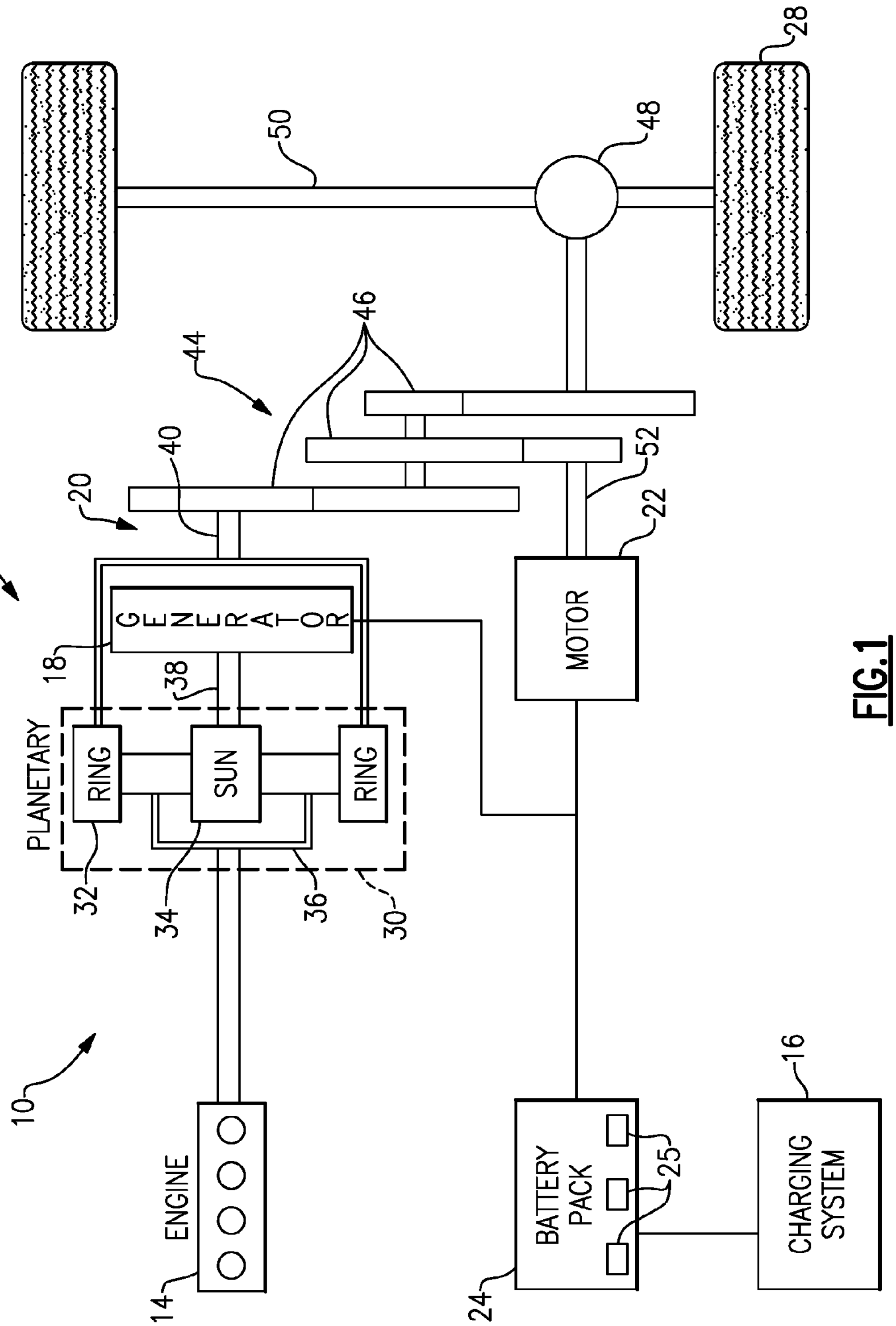

ENGINE
PLANETARY
RING
SUN
RING
GENERATOR
MOTOR
BATTERY PACK
CHARGING SYSTEM
10
12
14
16
18
20
22
24
25
28
30
32
34
36
38
40
44
46
48
50
52

FIG.1

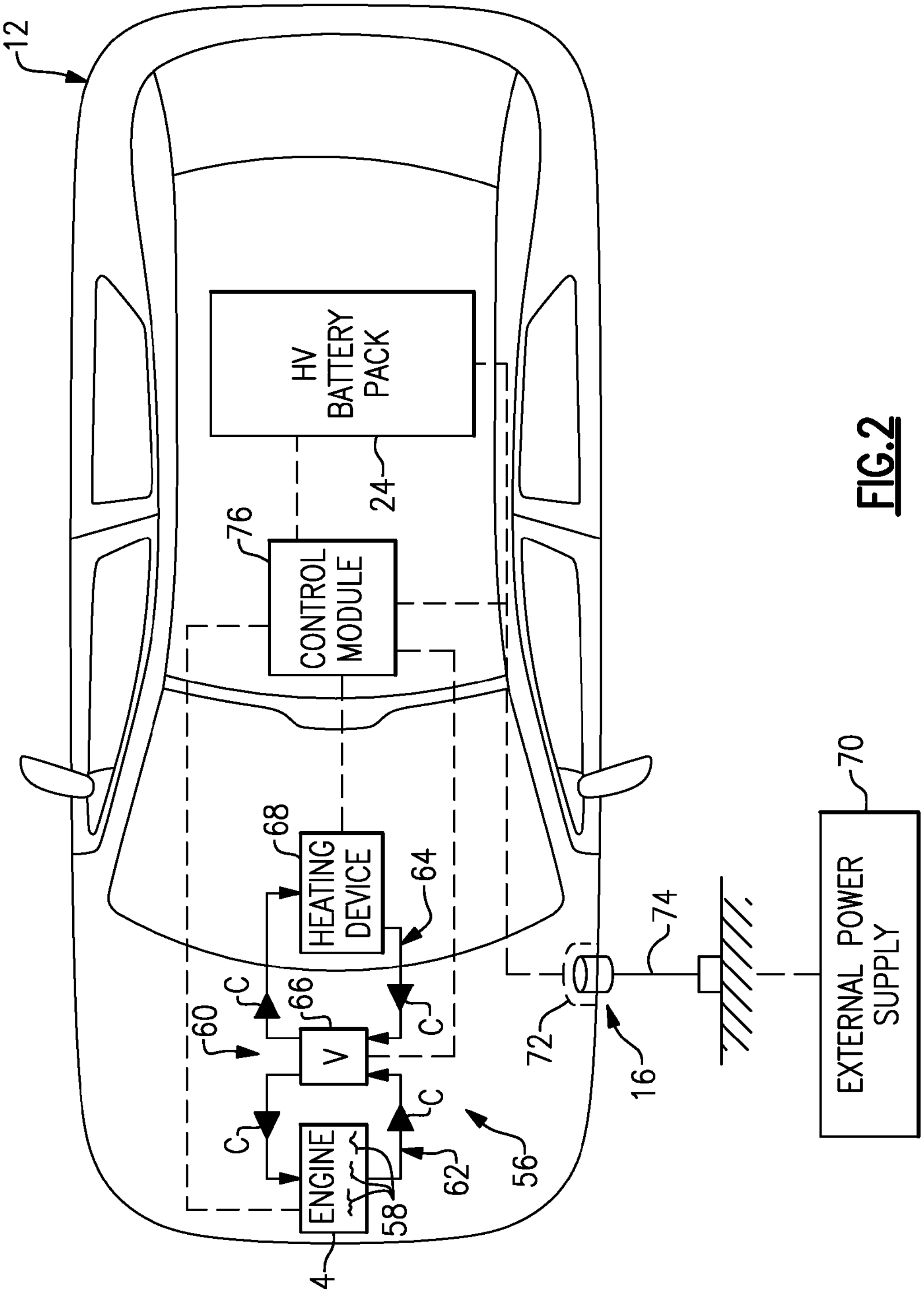

12
HV BATTERY PACK
24
CONTROL MODULE
76
HEATING DEVICE
68
64
66
V
60
C
ENGINE
58
62
56
14
72
16
74
EXTERNAL POWER SUPPLY
70

FIG.2

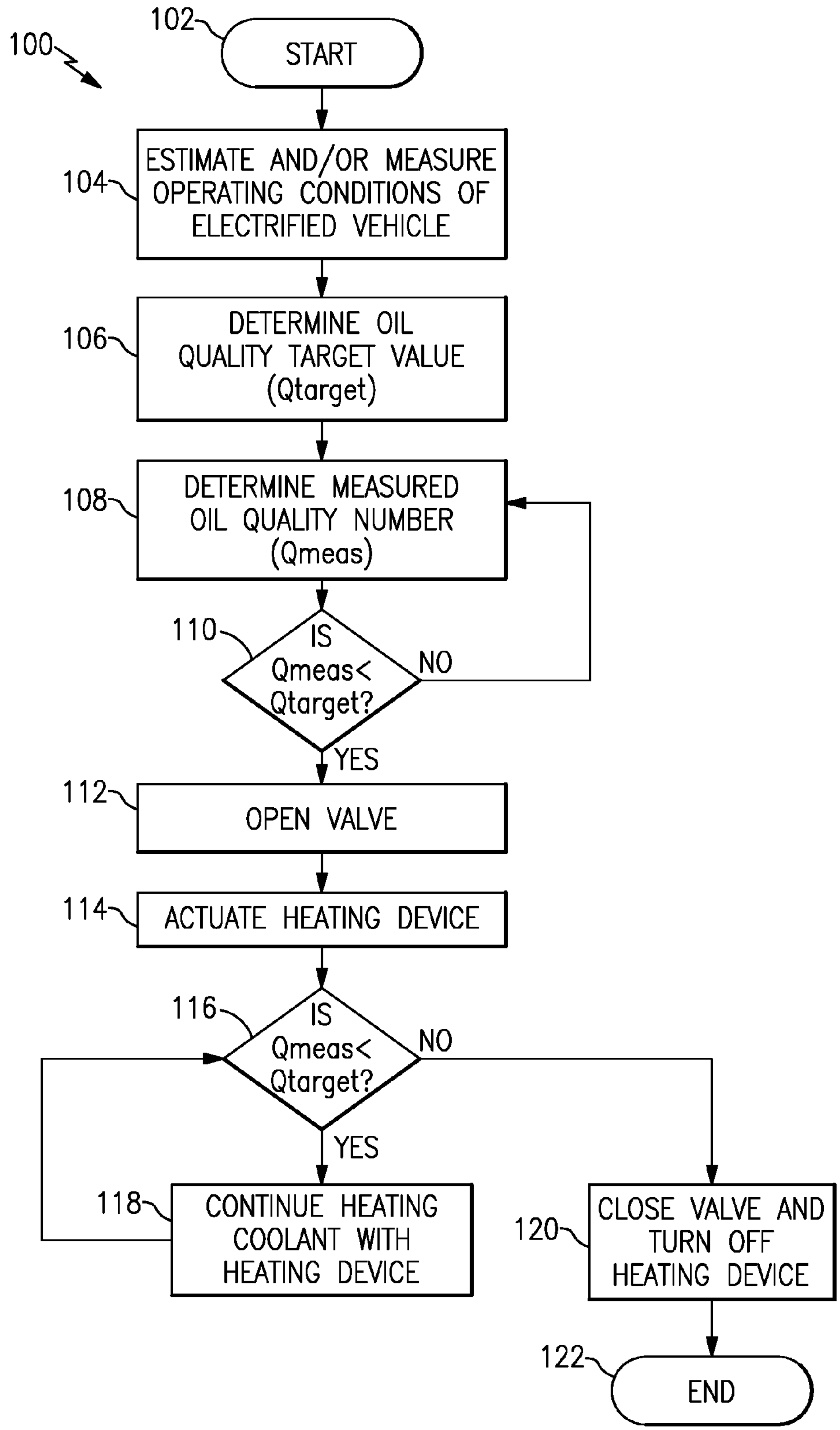

100
102
START
104
ESTIMATE AND/OR MEASURE OPERATING CONDITIONS OF ELECTRIFIED VEHICLE
106
DETERMINE OIL QUALITY TARGET VALUE (Qtarget)
108
DETERMINE MEASURED OIL QUALITY NUMBER (Qmeas)
110
IS Qmeas< Qtarget?
NO
YES
112
OPEN VALVE
114
ACTUATE HEATING DEVICE
116
IS Qmeas< Qtarget?
NO
YES
118
CONTINUE HEATING COOLANT WITH HEATING DEVICE
120
CLOSE VALVE AND TURN OFF HEATING DEVICE
122
END

FIG.3

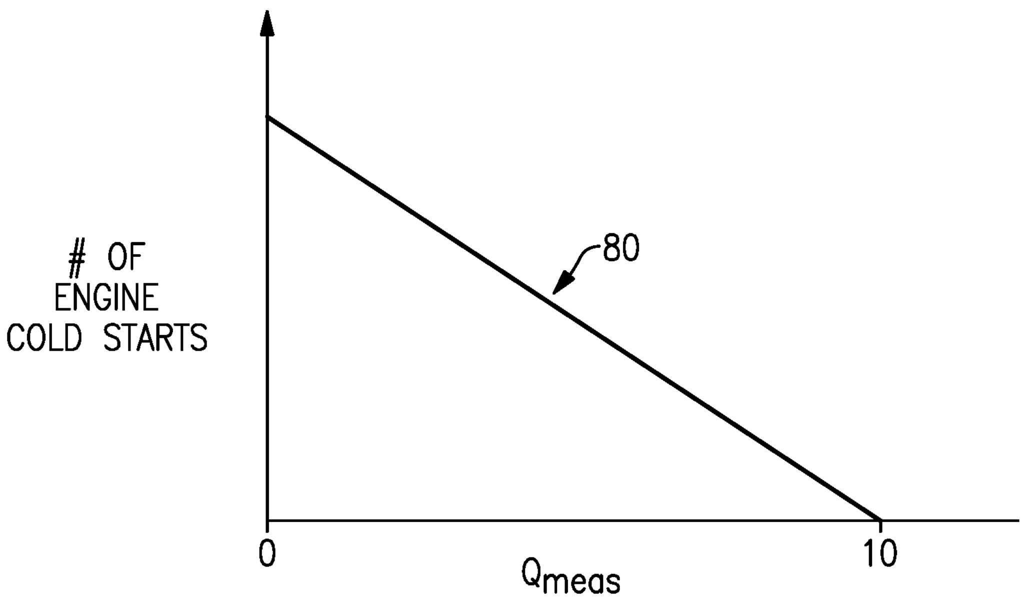


FIG.4

OIL MAINTENANCE STRATEGY FOR ELECTRIFIED VEHICLES

TECHNICAL FIELD

[0001] This disclosure relates to an oil maintenance strategy within a vehicle. The exemplary strategy includes actuating a heating device to augment heating of engine oil of the electrified vehicle in a manner that influences the quality of the engine oil.

BACKGROUND

[0002] The need to reduce automotive fuel consumption and emissions is well known. Therefore, vehicles are being developed that reduce or completely eliminate reliance on internal combustion engines. Electrified vehicles are one type of vehicle currently being developed for this purpose. In general, electrified vehicles differ from conventional motor vehicles because they are selectively driven by one or more battery powered electric machines. Conventional motor vehicles, by contrast, rely exclusively on the internal combustion engine to drive the vehicle.

[0003] Contaminants such as oil, gas and water must be periodically removed from the oil of an internal combustion engine to achieve efficient operation and for engine protection. Electrified vehicles equipped with internal combustion engines, such as hybrid vehicles, typically include a passive oil minder feature that forces the internal combustion engine into high power operation for a sufficient duration in order to help evaporate the contaminants Forced engine operation may be undesirable and time consuming.

SUMMARY

[0004] A method according to an exemplary aspect of the present disclosure includes selectively powering a heating device to augment heating of an engine oil associated with an engine of a vehicle in a manner that influences an oil quality value of the engine oil.

[0005] A further non-limiting embodiment of the foregoing method includes determining a measured oil quality value of the engine oil.

[0006] A further non-limiting embodiment of either of the foregoing methods includes estimating the measured oil quality value based on at least one operating condition of the internal combustion engine.

[0007] A further non-limiting embodiment of any of the foregoing methods includes estimating the measured oil quality value based on a number of cold starts of the internal combustion engine.

[0008] A further non-limiting embodiment of any of the foregoing methods includes comparing the measured oil quality value to an oil quality target value.

[0009] A further non-limiting embodiment of any of the foregoing methods includes continuing to actively monitor the measured oil quality value if the measured oil quality value exceeds the oil quality target value.

[0010] A further non-limiting embodiment of any of the foregoing methods includes powering the heating device with a battery pack.

[0011] A further non-limiting embodiment of any of the foregoing methods includes powering the heating device by running the engine at a power level that exceeds driver demanded power and then utilizing the excess power to power the heating device.

[0012] A further non-limiting embodiment of any of the foregoing methods includes opening a valve to allow coolant that is heated by the heating device to be communicated to the engine in order to heat the engine oil.

[0013] A further non-limiting embodiment of any of the foregoing methods includes closing the valve and turning the heating device OFF after a predefined amount of time.

[0014] A method according to another exemplary aspect of the present disclosure includes warming an engine coolant with heat generated by a heating device of a conditioning system configured to condition an engine of an electrified vehicle, and warming engine oil with the engine coolant to a temperature sufficient to remove contaminants from the engine oil.

[0015] A further non-limiting embodiment of the foregoing method includes opening a valve of the conditioning system to communicate the engine coolant heated by the heating device to the engine.

[0016] A further non-limiting embodiment of either of the foregoing methods includes comparing a measured oil quality value to an oil quality target value prior to warming the engine coolant.

[0017] A further non-limiting embodiment of any of the foregoing methods includes warming the engine coolant if the measured oil quality value is less than the oil quality target value.

[0018] A further non-limiting embodiment of any of the foregoing methods includes turning the heating device OFF after a predefined amount of time if the measured oil quality value exceeds the oil quality target value.

[0019] An electrified vehicle according to another exemplary aspect of the present disclosure includes a battery pack configured to selectively power a set of drive wheels, an engine configured to selectively power the drive wheels, a conditioning system configured to condition the engine and a control system configured to control the conditioning system to influence an oil quality value of oil of the engine.

[0020] A further non-limiting embodiment of the foregoing electrified vehicle includes a heating device configured to heat an engine coolant that is used to heat the oil.

[0021] A further non-limiting embodiment of either of the foregoing electrified vehicles includes the heating device configured as a positive temperature coefficient (PTC) heater.

[0022] A further non-limiting embodiment of any of the foregoing electrified vehicles includes the control system configured to open a valve and actuate a heating device to influence the oil quality value of the oil.

[0023] A further non-limiting embodiment of any of the foregoing electrified vehicles includes a primary coolant loop and a secondary coolant loop.

[0024] The embodiments, examples and alternatives of the preceding paragraphs, the claims, or the following description and drawings, including any of their various aspects or respective individual features, may be taken independently or in any combination. Features described in connection with one embodiment are applicable to all embodiments, unless such features are incompatible.

[0025] The various features and advantages of this disclosure will become apparent to those skilled in the art from the following detailed description. The drawings that accompany the detailed description can be briefly described as follows.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] FIG. **1** schematically illustrates a powertrain of an electrified vehicle.

[0027] FIG. **2** illustrates a vehicle system of an electrified vehicle.

[0028] FIG. **3** schematically illustrates a control strategy for influencing the quality of engine oil used by an engine of an electrified vehicle.

[0029] FIG. **4** is a graphical representation of an engine oil quality measurement.

DETAILED DESCRIPTION

[0030] This disclosure details an exemplary oil maintenance strategy for controlling a vehicle equipped with an engine. A heating device may be selectively powered to influence the oil quality of engine oil. Once actuated, the heating device generates heat for warming an engine coolant that is passed through the engine. The engine coolant gives off heat to the engine oil through the engine structure to warm the engine oil. Warming the engine oil in this manner allows contaminants to be cleaned (e.g., boiled) out of the oil, thereby improving an oil quality value of the engine oil. The use of the auxiliary heating device can shorten the duration of the oil maintenance strategy, allowing the vehicle to return to a normal mode of operation sooner. These and other features are discussed in greater detail in the following paragraphs of this detailed description.

[0031] FIG. **1** schematically illustrates a powertrain **10** for an electrified vehicle **12**. In one non-limiting embodiment, the electrified vehicle **12** is a plug-in hybrid electric vehicle (PHEV). However, other electrified vehicles could also benefit from the teachings of this disclosure, including but not limited to, battery electric vehicles (BEV's) and hybrid electric vehicles (HEV's). The teachings of this disclosure are further applicable to conventional motor vehicles.

[0032] In one non-limiting embodiment, the powertrain **10** is a power-split powertrain system that employs a first drive system and a second drive system. The first drive system may include a combination of an engine **14** and a generator **18** (i.e., a first electric machine). The second drive system includes at least a motor **22** (i.e., a second electric machine) and a battery pack **24**. In this example, the second drive system is considered an electric drive system of the powertrain **10**. The first and second drive systems generate torque to drive one or more sets of vehicle drive wheels **28** of the electrified vehicle **12**. Although a power-split configuration is shown, this disclosure extends to any hybrid or electric vehicle including full hybrids, parallel hybrids, series hybrids, mild hybrids or micro hybrids.

[0033] The engine **14**, which in one embodiment is an internal combustion engine, and the generator **18** may be connected through a power transfer unit **30**, such as a planetary gear set. Of course, other types of power transfer units, including other gear sets and transmissions, may be used to connect the engine **14** to the generator **18**. In one non-limiting embodiment, the power transfer unit **30** is a planetary gear set that includes a ring gear **32**, a sun gear **34**, and a carrier assembly **36**.

[0034] The generator **18** can be driven by the engine **14** through the power transfer unit **30** to convert kinetic energy to electrical energy. The generator **18** can alternatively function as a motor to convert electrical energy into kinetic energy, thereby outputting torque to a shaft **38** connected to the power transfer unit **30**. Because the generator **18** is operatively connected to the engine **14**, the speed of the engine **14** can be controlled by the generator **18**.

[0035] The ring gear **32** of the power transfer unit **30** may be connected to a shaft **40**, which is connected to vehicle drive wheels **28** through a second power transfer unit **44**. The second power transfer unit **44** may include a gear set having a plurality of gears **46**. Other power transfer units may also be suitable. The gears **46** transfer torque from the engine **14** to a differential **48** to ultimately provide traction to the vehicle drive wheels **28**. The differential **48** may include a plurality of gears that enable the transfer of torque to the vehicle drive wheels **28**. In one embodiment, the second power transfer unit **44** is mechanically coupled to an axle **50** through the differential **48** to distribute torque to the vehicle drive wheels **28**. In one embodiment, the power transfer units **30**, **44** are part of a transaxle **20** of the electrified vehicle **12**.

[0036] The motor **22** can also be employed to drive the vehicle drive wheels **28** by outputting torque to a shaft **52** that is also connected to the second power transfer unit **44**. In one embodiment, the motor **22** is part of a regenerative braking system. For example, the motor **22** can each output electrical power to the battery pack **24**.

[0037] The battery pack **24** is an exemplary electrified vehicle battery. The battery pack **24** may be a high voltage traction battery pack that includes a plurality of battery assemblies **25** (i.e., battery arrays or groupings of battery cells) capable of outputting electrical power to operate the motor **22**, the generator **18** and/or other electrical loads of the electrified vehicle **12**. Other types of energy storage devices and/or output devices can also be used to electrically power the electrified vehicle **12**.

[0038] In one non-limiting embodiment, the electrified vehicle **12** has two basic operating modes. The electrified vehicle **12** may operate in an Electric Vehicle (EV) mode where the motor **22** is used (generally without assistance from the engine **14**) for vehicle propulsion, thereby depleting the battery pack **24** state of charge up to its maximum allowable discharging rate under certain driving patterns/cycles. The EV mode is an example of a charge depleting mode of operation for the electrified vehicle **12**. During EV mode, the state of charge of the battery pack **24** may increase in some circumstances, for example due to a period of regenerative braking. The engine **14** is generally OFF under a default EV mode but could be operated as necessary based on a vehicle system state or as permitted by the operator.

[0039] The electrified vehicle **12** may additionally operate in a Hybrid (HEV) mode in which the engine **14** and the motor **22** are both used for vehicle propulsion. The HEV mode is an example of a charge sustaining mode of operation for the electrified vehicle **12**. During the HEV mode, the electrified vehicle **12** may reduce the motor **22** propulsion usage in order to maintain the state of charge of the battery pack **24** at a constant or approximately constant level by increasing the engine **14** propulsion. The electrified vehicle **12** may be operated in other operating modes in addition to the EV and HEV modes within the scope of this disclosure.

[0040] The electrified vehicle **12** may also include a charging system **16** for charging the energy storage devices (e.g., battery cells) of the battery pack **24**. The charging system **16** may be connected to an external power source (e.g., electrical grid, not shown) for receiving and distributing power throughout the vehicle. The charging system **16**

may also be equipped with power electronics used to convert AC power received from the external power supply to DC power for charging the energy storage devices of the battery pack **24**. The charging system **16** may also accommodate one or more conventional voltage sources from the external power supply (e.g., 110 volt, 220 volt, etc.).

[0041] The powertrain **10** shown in FIG. **1** is highly schematic and is not intended to limit this disclosure. Various additional components could alternatively or additionally be employed by the powertrain **10** within the scope of this disclosure.

[0042] FIG. **2** is a highly schematic depiction of a vehicle system **56** that may be employed by an electrified vehicle, such as the electrified vehicle **12** of FIG. **1**. The various components of the vehicle system **56** are shown schematically to better illustrate the features of this disclosure. These components, however, are not necessarily depicted in the exact locations where they would be found in an actual vehicle and are not necessarily shown to scale.

[0043] The vehicle system **56** is adapted to schedule and effectuate conditioning (e.g., warming) of oil **58** of the engine **14** in a manner that influences an oil quality value of the oil **58**. The oil quality value is a calibrated expression of the amount of contaminants, such as fuel and water, present in the oil **58**. In one non-limiting embodiment, the oil **58** is heated to a desired temperature to clean the oil **58** of the contaminants. Conditioning the oil **58** during certain vehicle conditions may improve the fuel efficiency, durability, customer satisfaction and electric range of the electrified vehicle **12**, among providing other potential benefits.

[0044] In one non-limiting embodiment, the exemplary vehicle system **56** includes the engine **14**, a conditioning system **60**, a high voltage battery pack **24**, a charging system **16** and a control module **76**. The engine **14** may be an internal combustion engine or any other type of engine. The engine **14** houses and circulates the oil **58**, which has an optimal operating temperature range, to lubricate the various components of the engine **14**.

[0045] The conditioning system **60** is configured to thermally manage the engine **14**. In one non-limiting embodiment, the conditioning system **60** includes a primary coolant loop **62** and a secondary coolant loop **64**. The primary coolant loop **62** and the secondary coolant loop **64** each circulate a coolant C, such as with a pump (not shown). Although not shown, the conditioning system **60** may additionally include one or more heat exchangers for conditioning the coolant C within the primary coolant loop **62** and/or the secondary coolant loop **64**. The secondary coolant loop **64** may be configured to both augment conditioning of the engine **14** and to condition the interior cabin of the electrified vehicle **12**. During some conditions, excess heat is transferred from the engine **14** to the coolant C within the primary coolant loop **62**. During other conditions, the secondary coolant loop **64** is fluidly connected to the primary coolant loop **62** to warm the oil **58** of the engine **14** by transferring heat from the coolant C into the oil **58**, as further discussed below.

[0046] A valve **66** controls the flow of coolant C between the secondary coolant loop **64** and the primary coolant loop **62**. For example, when the valve **66** is closed, the secondary coolant loop **64** is fluidly isolated or separated from the primary coolant loop **62**. The valve **66** may be selectively opened to fluidly connect or combine the secondary coolant loop **64** and the primary coolant loop **62**.

[0047] A heating device **68** may be positioned within the secondary coolant loop **64**. The heating device **68** is configured to selectively condition the coolant C within the secondary coolant loop **64**, such as by warming it. In one non-limiting embodiment, the heating device **68** is a positive temperature coefficient (PTC) heater positioned in direct contact with the coolant C. In another non-limiting embodiment, the heating device **68** is an electrically powered heating device. Other heating devices are also contemplated within the scope of this disclosure.

[0048] In one non-limiting embodiment, the heating device **68** is powered by grid power when the vehicle is "on-plug" (i.e., plugged into an external power source **70** when the vehicle is OFF). In another non-limiting embodiment, the heating device **68** is powered by the battery pack **24** when the vehicle is "off-plug" (i.e., unplugged from the external power source **70**) or during operation of the electrified vehicle **12**. In yet another non-limiting embodiment, the heating device **68** is powered by a self-contained energy storage device, such as a separate battery or special reserve power supply. In yet another non-limiting embodiment, the heating device **68** is powered by operating the engine **14** above driver demanded power and utilizing the excess power to power the heating device **68** rather than sending the excess power to the battery pack **24**.

[0049] The battery pack **24** may include one or more battery assemblies having a plurality of battery cells or other energy storage devices. The energy storage devices of the battery pack **24** store electrical energy that is selectively supplied to power various electrical loads residing on-board the electrified vehicle **12**. These electrical loads may include various high voltage loads (e.g., electric machines, etc.) or various low voltage loads (e.g., lighting systems, low voltage batteries, logic circuitry, etc.).

[0050] The charging system **16** may include a charging port **72** located on the electrified vehicle **12** and a cordset **74** that is operably connectable between the charging port **72** and the external power source **70**. The charging port **72** is adapted to selectively receive energy from the external power source **70**, via the cordset **74**, and then supply the energy to the battery pack **24** for charging the battery cells. If necessary, the charging system **16** may convert alternating current received from the external power source **70** to direct current DC for charging the high voltage battery pack **24**. The charging system **16** is also configured to establish maximum available charging currents for charging the battery pack **24**, among other operational parameters. The external power source **70** includes off-board power, such as utility/grid power, in one non-limiting embodiment.

[0051] The control module **76** may be part of an overall vehicle control unit, such as a vehicle system controller (VSC), or could alternatively be a stand-alone control unit separate from the VSC. In one non-limiting embodiment, the control module **76** is part of an engine control module (ECM) of the electrified vehicle **12**. The control module **76** includes executable instructions for interfacing with and commanding operation of the various components of the vehicle system **56** including, but not limited to, the engine **14**, the battery pack **24**, the charging system **16**, the valve **66** and the heating device **68**. The control module **76** may include multiple inputs and outputs for interfacing with the various components of the vehicle system **56**. The control module **76** may additionally include a processing unit and one or more types of memory for executing the various control strategies and modes of the vehicle system **56**.

[0052] In one non-limiting embodiment, the control module **76** is configured to selectively open the valve **66** and actuate the heating device **68** to augment warming the oil **58** of the engine **14**. Once the valve **66** is opened, heated coolant C from the secondary coolant loop **64** mixes with the coolant C of the primary coolant loop **62**. The heating device **68** adds additional heat to the coolant C that can then be used to warm the oil **58** to a temperature sufficient to clean the oil **58** of contaminants, thereby speeding up oil warm-up times. In another non-limiting embodiment, the control module **76** is configured to determine when to start and stop conditioning the engine **14** using the heating device **68**. In yet another non-limiting embodiment, the control module **76** is configured to determine when the start and stop charging the battery pack **24** and determine the charging rate that should be used. These are but several non-limiting examples of the many functions of the control module **76** of the vehicle system **56**.

[0053] FIG. **3**, with continued reference to FIGS. **1-2**, schematically illustrates a control strategy **100** for actively influencing the oil quality of the oil **58** used by the engine **14** of the electrified vehicle **12**. The oil quality is "influenced" in by removing contaminants from the oil **58** after the oil quality has fallen below a threshold value. The exemplary control strategy **100** may include actively monitoring an oil quality value associated with the oil **58** and then adjusting operation of the conditioning system **60** based on the monitored oil quality value. Of course, the electrified vehicle **12** is capable of implementing and executing other control strategies within the scope of this disclosure. In one non-limiting embodiment, the control module **76** is programmed with one or more algorithms adapted to execute the control strategy **100**, or any other control strategy. The control strategy **100** may be stored as executable instructions in the non-transitory memory of the control module **76**, in one non-limiting embodiment.

[0054] As shown in FIG. **3**, the control strategy **100** begins at block **102**. At block **104**, the control module **76** may estimate and/or measure various operating conditions of the electrified vehicle **12**. For example, the control module **76** may receive sensory feedback from one or more sensors associated with the vehicle system **56**. Exemplary operating conditions include, but are not limited to, engine **14** temperature, battery pack **24** state of charge (SOC), ambient conditions, etc.

[0055] Next, at block **106**, the control strategy **100** may determine an oil quality target value Q_{target}. The oil quality target value Q_{target} represents the threshold against which a measured oil quality value Q_{meas} is compared to determine whether the oil quality of the oil **58** of the engine **14** has deteriorated to such a level that corrective action is required. In one non-limiting embodiment, the oil quality target value Q_{target} is a quantitative value that can be expressed generically as an integer between the numbers **1** and **10**. The oil quality target value Q_{target} may be set at any value and is a design specific parameter of the control strategy **100**. In one non-limiting embodiment, the oil quality target value Q_{target} is stored in the memory of the control module **76**, such as within a look-up table. In another embodiment, the oil quality target value Q_{target} is a variable value that could change based on ambient temperatures, vehicle speed, etc.

[0056] Next, at block **108**, the measured oil quality value Q_{meas} associated with the oil **58** used by the engine **14** may be measured or inferred. The measured oil quality value Q_{meas} can be expressed generically as an integer between 0 and 10 and represents an estimate of the amount of contaminants within the engine oil, with '0' representing relatively poor oil quality and '10' representing relatively good oil quality, for example. The measured oil quality value Q_{meas} may be estimated based on one or more operating conditions of the electrified vehicle **12**. In one non-limiting embodiment, the operating conditions include the number of cold starts of the engine **14** (i.e., the number of times the engine **14** is forced into operation). The measured oil quality value Q_{meas} could be estimated based on a single engine parameter or a combination of engine parameters within the scope of this disclosure.

[0057] An exemplary plot **80** of the measured oil quality value Q_{meas} is shown in FIG. **4**. As illustrated, the measured oil quality value Q_{meas} (shown on the X-axis) may be a function of the number of engine cold starts (shown on the Y-axis). As also indicated by the plot **80**, the measured oil quality value Q_{meas} decreases as the number of cold starts increases. In other words, the measured oil quality value Q_{meas} is inversely related to the number of engine cold starts.

[0058] Referring again to FIG. **3**, the measured oil quality value Q_{meas} is next compared against the oil quality target value Q_{target} at block **110**. If the measured oil quality value Q_{meas} exceeds the oil quality target value Q_{target}, the control strategy **100** returns to block **108** and actively continues to monitor the measured oil quality value Q_{meas}.

[0059] If, however, the measured oil quality value Q_{meas} is determined to be less than the oil quality target value Q_{target} at block **110**, indicating that the oil quality has dropped below a desired threshold of quality, the control strategy **100** may proceed to block **112** by opening the valve **66**, thereby fluidly connecting the primary and secondary coolant loops **62**, **64** of the conditioning system **60**. The heating device **68** is powered ON at block **114** to augment warming of the oil **58** of the engine **14**. For example, actuating the heating device **68** warms the coolant C in the secondary coolant loop **64**, which has already been fluidly connected to the primary coolant loop **62** by virtue of opening the valve **66**. The warmed coolant C may therefore be communicated through the engine **14** for adding additional heat to the oil **58**. The oil **58** is heated to a temperature sufficient to clean the oil **58** of contaminants. In one non-limiting embodiment, the contaminants are boiled out of the oil **58** due to the additional heat that is added to the coolant C by the heating device **68**.

[0060] In one non-limiting embodiment, the heating device **68** is powered by the battery pack **24**, such as during a drive cycle of the electrified vehicle **12**. In another non-limiting embodiment, the heating device **68** is powered by the external power source **70**, such as during on-plug conditions in which the corset **74** is connected to both the charging port **72** and the external power source **70**. In this way, the oil **58** can be cleaned of contaminants whether or not the electrified vehicle **12** is currently in operation.

[0061] After a predefined amount of time, which may be programmed in the control module **76** or stored in another look-up table, the measured oil quality value Q_{meas} is again compared against the oil quality target value Q_{target} at block **116**. The control strategy **100** continues to warm the oil **58** by heating the coolant C with the heating device **68** at block **118** if the measured oil quality value Q_{meas} remains less than the oil quality target value Q_{target}. Alternatively, if the measured oil quality value Q_{meas} is determined to exceed the oil quality target value Q_{target} after the predefined amount of time, the valve **66** is closed and the heating device **68** is actuated OFF at block **120**. The control strategy **100** may then end at block **122**.

[0062] Although the different non-limiting embodiments are illustrated as having specific components or steps, the embodiments of this disclosure are not limited to those particular combinations. It is possible to use some of the components or features from any of the non-limiting embodiments in combination with features or components from any of the other non-limiting embodiments.

[0063] It should be understood that like reference numerals identify corresponding or similar elements throughout the several drawings. It should be understood that although a particular component arrangement is disclosed and illustrated in these exemplary embodiments, other arrangements could also benefit from the teachings of this disclosure.

[0064] The foregoing description shall be interpreted as illustrative and not in any limiting sense. A worker of ordinary skill in the art would understand that certain modifications could come within the scope of this disclosure. For these reasons, the following claims should be studied to determine the true scope and content of this disclosure.

We claim:

1. A method, comprising:

selectively powering a heating device to augment heating of an engine oil associated with an engine of a vehicle in a manner that influences an oil quality value of the engine oil.

2. The method as recited in claim **1**, comprising determining a measured oil quality value of the engine oil.

3. The method as recited in claim **2**, wherein determining the measured oil quality value includes estimating the measured oil quality value based on at least one operating condition of the internal combustion engine.

4. The method as recited in claim **3**, wherein the at least one operating condition is a number of cold starts of the internal combustion engine.

5. The method as recited in claim **2**, comprising comparing the measured oil quality value to an oil quality target value.

6. The method as recited in claim **5**, comprising continuing to actively monitor the measured oil quality value if the measured oil quality value exceeds the oil quality target value.

7. The method as recited in claim **1**, wherein the heating device is powered by a battery pack.

8. The method as recited in claim **1**, wherein the heating device is powered by running the engine at a power level that exceeds driver demanded power and then utilizing the excess power to power the heating device.

9. The method as recited in claim **1**, comprising opening a valve to allow coolant that is heated by the heating device to be communicated to the engine in order to heat the engine oil.

10. The method as recited in claim **9**, comprising closing the valve and turning the heating device OFF after a predefined amount of time.

11. A method, comprising:

warming an engine coolant with heat generated by a heating device of a conditioning system configured to condition an engine of an electrified vehicle; and

warming engine oil with the engine coolant to a temperature sufficient to remove contaminants from the engine oil.

12. The method as recited in claim **11**, comprising opening a valve of the conditioning system to communicate the engine coolant heated by the heating device to the engine.

13. The method as recited in claim **11**, comprising comparing a measured oil quality value to an oil quality target value prior to warming the engine coolant.

14. The method as recited in claim **13**, comprising warming the engine coolant if the measured oil quality value is less than the oil quality target value.

15. The method as recited in claim **14**, comprising turning the heating device OFF after a predefined amount of time if the measured oil quality value exceeds the oil quality target value.

16. An electrified vehicle, comprising:

a battery pack configured to selectively power a set of drive wheels;

an engine configured to selectively power said drive wheels;

a conditioning system configured to condition said engine; and

a control system configured to control said conditioning system to influence an oil quality value of oil of said engine.

17. The electrified vehicle as recited in claim **16**, wherein said control system includes a heating device configured to heat an engine coolant that is used to heat said oil.

18. The electrified vehicle as recited in claim **17**, wherein said heating device is a positive temperature coefficient (PTC) heater.

19. The electrified vehicle as recited in claim **16**, wherein said control system is configured to open a valve and actuate a heating device to influence said oil quality value of said oil.

20. The electrified vehicle as recited in claim **16**, wherein said conditioning system includes a primary coolant loop and a secondary coolant loop.

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