United States District Court,
E.D. Texas, Marshall Division.

PAICE LLC,
Plaintiff.
v.
TOYOTA MOTOR CORP., Toyota Motor North America, Inc. and Toyota Motor Sales U.S.A., Inc,
Defendants.

Civil Action No. 2:07-CV-180 (DF)

Dec. 5, 2008.

Samuel Franklin Baxter, McKool Smith, Marshall, TX, Ahmed J. Davis, Fish & Richardson PC, Washington, DC, Garret Wesley Chambers, McKool Smith, Dallas, TX, John S. Goetz, Fish & Richardson, New York, NY, for Plaintiff.

Justin Kurt Truelove, Patton Tidwell & Schroeder, LLP, Texarkana, TX, George E. Badenoch, John Flock, Kevin J. Prey, Sheila Mortazavi, Thomas R. Makin, Kenyon & Kenyon LLP, New York, NY, Jeffrey S. Gerchick, T. Cy Walker, Kenyon & Kenyon DC, Washington, DC, for Defendants.

CLAIM CONSTRUCTION ORDER

Construing Terms in U.S. Patent Nos. 5,343,970**,** 7,104,347**, and** 7,237,634

DAVID FOLSOM**, District Judge.**

Before the Court are Paice's Opening Brief on Claim Construction (Dkt. No. 46), Toyota's Responsive Claim-Construction Brief (Dkt. No. 47), and Paice's Reply Brief on Claim Construction (Dkt. No. 51). Also before the Court are the Local Patent Rule (LPR) 4-3 Joint Claim-Construction and Prehearing Statement (Dkt. No. 45) and the LPR 4-5 Joint Claim-Construction Chart (Dkt. No. 55). A claim-construction hearing, in accordance with Markman v. Westview Instruments, 52 F.3d 967 (Fed.Cir.1995) (en banc), af'd, 517 U .S. 370 (1996), was held in Texarkana on September 10, 2008. *See* Dkt. No. 58 (hearing transcript). After hearing argument of counsel and reviewing the relevant pleadings, presentation materials, other papers, and case law, the Court finds the disputed terms of the patents-in-suit should be construed as set forth herein.

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I. BACKGROUND

This is the second lawsuit between these parties over the same technology, which relates to hybrid vehicles. *See* Civil Action No. 2:04-CV-211. In the previous lawsuit, Paice asserted claims from U.S. Patent Nos. 5,343,970 ('970 Patent), 6,209,672 ('672 Patent), and 6,554,088 ('088 Patent) against Toyota for infringement by certain Toyota's vehicles. Id.; Dkt. No. 1.

In the present lawsuit, Paice contends certain new hybrid vehicles made by Toyota infringe claims of the '970 Patent and that all Toyota hybrid vehicles infringe two other patents, U.S. Patent Nos. 7,104,347 ('347 Patent) and 7,237,634 ('634 Patent) (collectively, the "patents-in-suit"). These patents are entitled "Hybrid Electric Vehicle," "Hybrid Vehicles," and "Hybrid Vehicles," respectively. The '347 Patent issued from a division of the application that became the '088 Patent, and the'634 Patent issued from a division of the application that became the '347 Patent. '347 Patent, at [60] (filed Mar. 7, 2003); '634 Patent, at [60] (filed Jan. 13, 2006).

The claim construction in this case involves analyzing terms that have never been construed as well as terms that have been previously construed by this Court in the first lawsuit. Because of the technology overlap and the divisional nature of the patents-in-suit, there are also terms that have been previously construed in a different patent but that now appear in claims of the newly-asserted Paice patents. For additional background on the previous lawsuit, see Dkt. No. 91, Civil Action No. 2:04-CV-211 (claim-construction order).

II. LEGAL PRINCIPLES

A determination of patent infringement involves two steps: first, the patent claims are construed, and, second, the claims are compared to the allegedly infringing device. Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1455 (Fed.Cir.1998) (en banc). The legal principles of claim construction were reexamined by the Federal Circuit in Phillips v. AWH Corp., 415 F.3d 1303 (Fed.Cir .2005) (en banc). The Federal Circuit in *Phillips* expressly reaffirmed the principles of claim construction as set forth in Markman v. Westview Instruments, Inc., 52 F.3d 967 (Fed.Cir.1995) (en banc), *aff'd,* 517 U.S. 370 (1996), Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576 (Fed.Cir.1996), and Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc., 381 F.3d 1111 (Fed.Cir.2004). Claim construction is a legal question for the courts. Markman, 52 F.3d at 979.

The Court, in accordance with the doctrines of claim construction which it has outlined in the past, will construe the claims of the Paice Patents below. *See Pioneer v. Samsung,* No. 2:07-CV-170, Dkt. No. 94, at 2-8 (E.D. Tex. filed Mar. 10, 2008) (claim-construction order).

III. PATENTS-IN-SUIT

The patents-in-suit are directed to particular features of electric/combustion engine hybrid drive systems. The '970 Patent issued on September 6, 1994 from an application filed on September 21, 1992. The patent generally discloses and claims a hybrid vehicle, including an internal combustion engine and one electric motor, both of which can provide torque to the wheels of the vehicle through a controllable torque transfer unit, and that can recharge storage batteries for the motor. The direction of torque transfer is controlled by a microprocessor responsive to the mode of operation of the vehicle. The '970 Patent abstract reads:

An improved hybrid electric vehicle includes an internal combustion engine and an electric motor. Both the motor and the engine provide torque to drive the vehicle directly through a controllable torque transfer unit. Typically at low speeds or in traffic, the electric motor alone drives the vehicle, using power stored in

batteries; under acceleration and during hill climbing both the engine and the motor provide torque to drive the vehicle; and in steady state highway cruising, the internal combustion engine alone drives the vehicle. The internal combustion engine is sized to operate at or near its maximum fuel efficiency during highway cruising. The motor is operable as a generator to charge the batteries as needed and also for regenerative braking. No transmission is employed. The motor operates at significantly lower currents and higher voltages than conventionally and has a rated power at least equal to that of the internal combustion engine. In this manner a cost efficient vehicle is provided, suffering no performance disadvantage compared to conventional vehicles.

'970 Patent, at [57].

The '347 Patent issued September 12, 2006 from an application filed on March 7, 2003. '347 Patent, at [22], [45]. The patent generally discloses and claims a hybrid electric vehicle that includes an internal combustion engine and two separate electric motors, both of which may be used as traction motors to drive the wheels or generators to charge the battery as appropriate. '347 Patent, col. 17, ll. 20-35. A microprocessor, or other controller, controls the torque transfer to provide "highly efficient operation over a wide variety of operating conditions, and while providing good performance." Id. at col. 17, ll 9-14. This microprocessor also controls the flow of energy, whether electrical energy from the battery bank or chemical energy stored as combustible fuel. Id. at col. 17, ll. 14-17. The abstract from the '347 Patent reads:

A hybrid vehicle comprises an internal combustion engine, a traction motor, a starter motor, and a battery bank, all controlled by a microprocessor in accordance with the vehicle's instantaneous torque demands so that the engine is run only under conditions of high efficiency, typically only when the load is at least equal to 30% of the engine's maximum torque output. In some embodiments, a turbocharger may be provided, activated only when the load exceeds the engine's maximum torque output for an extended period; a two-speed transmission may further be provided, to further broaden the vehicle's load range. A hybrid brake system provides regenerative braking, with mechanical braking available in the event the battery bank is fully charged, in emergencies, or at rest; a control mechanism is provided to control the brake system to provide linear brake feel under varying circumstances.

'347 Patent, at [57].

The '634 Patent issued July 3, 2007 from an application filed January 13, 2006. '634 Patent, at [22], [45]. The '634 Patent is subject to a terminal disclaimer. Id. The '634 Patent is a division of the application that became the '347 Patent; therefore, the '634 Patent disclosure is substantially similar to that contained in the '347 Patent. The abstracts are identical and thus won't be repeated. *Compare* '347 Patent, at [57] *with* '634 Patent, at [57].

IV. U.S. PATENT NO. 5,343,970

A. Overview

Paice has asserted claims 11 and 39 of the '970 Patent against Toyota in this lawsuit. Dkt. No. 46, at 18. Only one term, "controllable torque transfer unit" (CTTU) FN1 remains in dispute. *See* Dkt. No. 55-2, at 4-5.

FN1. To avoid duplicity, the Court refers the parties to the Court's prior claim-construction order for the specific claim language and analysis regarding the '970 Patent and more specifically, the CTTU term. *See*

Dkt. No. 91, Civil Action No. 2:04-CV-211, at 15-20.

B. Claim Construction

1. "controllable torque transfer unit"

a. Parties' Positions

The parties propose the following constructions for "controllable torque transfer unit," which is present in claims 11 and 39. Dkt. No. 55-2, at 2, 4. Claim 39 depends from claim 38, which depends from claim 32. *Id.* at 4.

Paice	Toyota
A multi-input device or component that is controlled to transfer variable amounts of torque.	Means-plus-function term, having: **Function:** to control the transfer of torque from two inputs to an output. **Structure:** gear box illustrated in Fig. 11

Paice contends this term needs no construction because it has already been construed by this Court in the previous litigation. *Id.* Paice further argues there is no justification for the Court to deviate from its prior construction because (1) the Court was correct in the first instance, and (2) Toyota has already had a full and fair opportunity to litigate the meaning of the term. *Id* .

Toyota admits that this Court previously construed the CTTU term but contends collateral estoppel does not apply in this instance because the Federal Circuit did not reach the construction of the terms when the previous litigation was on appeal. Dkt. No. 47, at 13.

b. Court's Construction

Regardless of whether collateral estoppels applies to the construction of this term, the Court finds no reason to deviate from its previous construction. Accordingly, as the Court previously ruled, the term "**controllable torque transfer unit**" means "**a multi-input device or component that is controlled to transfer variable amounts of torque (rotary force)**". *See* Dkt. No. 91, at 17-20, Civil Action No. 2:04-CV-211.

2. "means for performing the following functions responsive to input commands and monitored operation of said vehicle"

The parties have agreed on a meaning for this term, which appears in claim 39. The proposed construction is:

A computerized control device and associated components for selecting an operating mode [mode or state of operation determined by the source and/or direction of the flow of energy and/or torque (rotary force) in the system] and controlling the engine, motor and battery to implement that mode.

Dkt. No. 55-2, at 5. **The Court has no reason to disagree and therefore adopts the parties' construction.**

V. U.S. PATENT NO. 7,104,347

A. Overview

Paice has asserted claim 7, which depends from claim 1, against Toyota. Dkt. No. 46, at 22. Claim 7 depends from claim 1. For reference, the asserted claims read (disputed terms emphasized):

1. A hybrid vehicle, comprising:

an internal combustion engine ***controllably coupled*** to road wheels of said vehicle;

a first electric motor connected to said engine nd [sic] operable to start the engine responsive to a control signal;

a second electric motor connected to road wheels of said vehicle, and operable as a motor, to apply torque to said wheels to propel said vehicle, and

as a generator, for accepting torque from at least said wheels for generating current;

a battery, for providing current to said motors and accepting charging current from at least said second motor; and

a controller for controlling the flow of electrical and mechanical power between said engine, first and second motors, and wheels,

wherein said controller starts and operates said engine when torque require [sic] to be produced by said engine to propel the vehicle and/or to drive either one or both said electric motor(s) to charge said battery is at least equal to a ***setpoint (SP)*** above which said engine torque is efficiently produced, and wherein the torque produced by said engine when operated at said ***setpoint (SP)*** is substantially less than the maximum torque output (MTO) of said engine.

7. The vehicle of claim 1, wherein said vehicle is operated in a plurality of operating modes responsive to the value for the ***road load (RL)*** and said ***setpoint SP,*** both expressed as percentages of the maximum torque output of the engine when normally-aspirated (MTO), and said operating modes include:

a ***low-load mode I,*** wherein said vehicle is propelled by torque provided by said second electric motor in response to energy supplied from said battery, while RL<SP,

a ***highway cruising mode IV,*** wherein said vehicle is propelled by torque provided by said internal combustion engine, while SP<RL<MTO, and

an ***acceleration mode V,*** wherein said vehicle is propelled by torque provided by said internal combustion engine and by torque provided by either or both electric motor(s) in response to energy supplied from said battery, while RL< MTO.

'347 Patent, col. 58, ll. 12-37, col 58, l. 58-col. 59, l. 8 (emphasis added).

B. Claim Construction

1. "controllably coupled"

a. Parties' Positions

The parties offer the following constructions for "controllably coupled." Dkt. No. 55-2, at 7. The parties' central dispute is whether or not a "clutch" is required.

Paice	Toyota
Plain meaning sufficient. Does not require construction. If construed, should not be limited to coupling through a clutch.	Connected through a clutch that is controlled to selectively connect or disconnect the engine from the road wheels.

Paice contends this term's plain and ordinary meaning is sufficient. Dkt. No. 46, at 24. Toyota, however, argues that an "ordinarily skilled artisan" would understand this term, as used in the '347 Patent, to mean "connected through a clutch that is controlled to selectively connect or disconnect the engine from the road wheels." Dkt. No. 47, at 15. The thrust of Toyota's argument is that because every embodiment described in the '347 Patent has the internal combustion engine (ICE) connected to the wheels of the vehicle through a clutch and because the term is not defined in the '347 Patent specification, one must look to the embodiments to define this term. Id. Further, argues Toyota, "ordinary meaning" is not applicable if that meaning strays from the scope of the originally-filed application. Id. (citing Schering Corp. v. Amgen Inc., 222 F.3d 1347, 1351-54 (Fed.Cir.2000)).

Paice responds that (1) Toyota's construction not only violates the plain and ordinary meaning of the term but also that (2) the intrinsic record clearly demonstrates the applicant never intended for "controllably coupled" to be limited to "controllably coupled through a clutch." Dkt. No. 51, at 13. Specifically, Paice notes that during prosecution, the term "controllably coupled" was added to three claims by preliminary amendment, two of which additionally recited "by a clutch" and one that did not. *Id*. at 12-13. In later amendments, the words "by a clutch" were explicitly deleted from those two claims and a new claim was added that recited "controllably coupled" without a clutch. *Id*. at 13.

b. Court's Construction

The Court finds the term "controllably coupled" should not be limited to a clutch. Toyota inappropriately seeks to read the "clutch" limitation into claim 1 when the plain language of the claim does not include it. *See* Cybor, 138 F.3d at 1471. Further, claim terms are to be given their plain and ordinary meaning absent a different meaning deliberately set forth in the intrinsic record. *See* K-2 Corp. v. Salomon S.A., 191 F.3d 1356, 1362-63 (Fed.Cir.1999). The Court agrees with Paice that *Schering* is not applicable here because, unlike the term at issue in *Schering* that had a changed meaning in the art, the term "controllably coupled" has not changed in meaning; hence, the originally-filed claims were never amended to raise a new matter question. Finally, the Court finds the doctrine of claim differentiation also indicates that "controllably coupled" should not be limited to a clutch, as dependent claim 21 specifically recites the clutch limitation. *See* '347 Patent, col. 60, ll. 14-16.

However, this term is clearly in dispute; the Court therefore has a duty under O2 Micro Int'l Ltd v. Beyond Innovation Tech. Co., Ltd., 521 F.3d 1351, 1362 (Fed.Cir.2008) to provide a construction. The '347 Patent

specification in several places describes a "clutch" as the mechanism by which the ICE is selectively connected to the road wheels. *See, e.g.,* '347 Patent, col. 17, ll. 28-33, col. 17, l. 58-col. 18, l. 2, col. 26, ll. 25-27, col. 27, ll. 6-20. The claim clearly does not recite a clutch; instead, the claim recites only the "controlled connection" between the ICE and the road wheels. This "controlled connection" refers to the selective connection between the ICE and the road wheels as controlled by a microprocessor or other controller. *See* '347 Patent, col. 25, ll. 53-66. "In each case, the engine is controllably disconnected from the road wheels by control of the clutch. Engagement of the clutch is controlled by the microprocessor." '347 Patent, col. 17, l. 66-col. 18, l. 2. Thus, what is claimed is the "selective connection/disconnection" and the "control" over that connection/disconnection, not the device (e.g., clutch) through which the selective connection is achieved.

Accordingly, the **Court construes** "**controllably coupled**" to mean "**selectively connected through a mechanism that is controlled by a microprocessor.**" Microprocessor is defined in the patent. *See* '347 Patent, col. 25, ll. 53-66.

2. "setpoint (SP)"

a. Parties' Positions

The parties offer the following constructions for "setpoint (SP)" that appears in asserted claim 7, which depends from claim 1. Dkt. No. 55-2, at 8. The primary disagreement between the parties is whether the setpoint is a value at which a transition between modes *must* occur and whether the setpoint is necessarily a torque value.

Paice	Toyota
A defined, but potentially variable value at which a transition between modes of operation may occur.	A value of torque that defines the transition point between the low-load mode I operating mode and the highway cruising mode IV.

The parties have some agreement on this term. Both parties agree that "setpoint" refers to a variable value that defines the transition point between operating modes. *Compare* Dkt. No. 46, at 24 *with* Dkt. No. 47, at 17.

Beyond that, Paice contends the term setpoint is clearly defined by the patent to be a value that is potentially variable over time that is used to indicate transition points between modes of operation. Dkt. No. 46, at 24-25 (citing '347 Patent, col. 58, ll. 29-33, col. 58, ll. 58-60, col. 58, ll. 38-40, col. 58, ll. 53-54, and col. 40, ll. 22-32). Toyota agrees that setpoint is potentially variable but argues that the specification mandates that the setpoint is expressed in terms of torque and that it must define the transition point between low-load mode I and highway cruising mode IV. Dkt. No. 47, at 17. Toyota cites to the '347 Patent, column 40, lines 47-55 for the basis of its argument.

b. Court's Construction

The Court finds Toyota's arguments unpersuasive. The portion of the patent specification Toyota cites for setpoint discusses a particular embodiment. Although it is possible that a setpoint may always be determined to be a torque value, there is nothing in the claims or specification that indicate a given setpoint value is actually represented in terms of torque. In fact, the specification clearly indicates that the state of charge of the battery bank, "expressed as a percentage of its full charge" is compared against setpoints, the result of

the comparisons being used to control the mode of the vehicle. ' 347 Patent, col. 40, ll. 28-31. Clearly a setpoint based on the battery charge status is not a torque value. *See also* '347 Patent, col. 41, ll. 10-19 ("It is also within the scope of the invention to make setpoint SP ... somewhat 'fuzzy' ").

As for Paice's other argument, that setpoints define where a transition *must* occur between modes, the Court is likewise unconvinced. The specification indicates that the invention embodies buffering setpoints with time such that a setpoint must be exceeded for a certain amount of time before a transition between modes occurs. *See* '347 Patent, col. 41, ll. 41-46 ("for example, mode IV might be entered from mode I only after the road load exceeded a first, lower setpoint SP for an extended period of time, so that the engine would be run for extended low-speed cruising"); id. at col. 58, l.. 41-47 (claim 3, including limitation that transition occurs only after setpoint is exceed "for at least a predetermined time"). Thus, the '347 Patent does not mandate that transitions necessarily occur solely because a setpoint is reached. Because there can be other factors, such as time, that determine whether a transition will indeed occur, the "must" limitation should not be read into the claim. Accordingly, the Court construes "**setpoint (SP)**" to mean "**a definite, but potentially variable value at which a transition between operating modes may occur.**"

3. "road load (RL)"

a. Parties' Positions

The parties offer the following constructions for "road load (RL)" that appears in claim 7, which depends from claim 1. Dkt. No. 55-2, at 8. This term also appears in claim 215 of the '634 Patent. Id. at 10. This term was construed in the previous litigation. *See* Dkt. No. 91, at 41, Civil Action No. 2:04-CV-211. The parties principal dispute is whether the construction should include the notion that instantaneous torque may be positive or negative.

Paice	Toyota
The instantaneous torque required for propulsion of the vehicle.	The instantaneous torque required for propulsion of the vehicle, which must be capable of being either positive or negative.

Paice contends the Court's previous construction is binding on Toyota in this case and that the Court appropriately considered the notion that the term can be positive or negative in the previous litigation by including the modifying term "instantaneous" to torque. Dkt. No. 51, at 17. Toyota argues it is not collaterally estopped from disputing this term because the Federal Circuit did not reach the construction on appeal. Dkt. No. 47, at 19. Toyota contends the Court should adopt Toyota's proposed construction from the previous case or its proposed definition here. *Id*. Importantly, argues Toyota, the construction should include the fact that the value can be positive or negative. *Id*. At the claim-construction hearing, Paice did not dispute that road load could be positive or negative, and Paice had no problem with the positive/negative distinction being added to the construction, although Paice did not feel it was necessary. Dkt. No. 58, at 54-57.

b. Court's Construction

The Court adopts its previous construction but adds the positive/negative distinction in the construction to clarify what is meant by "instantaneous" in the construction. Accordingly, the Court construes "**road load**" to mean "**the instantaneous torque required for propulsion of the vehicle, which may be positive or negative in value.**"

4. "low-load mode I"

a. Parties' Positions

The parties offer the following constructions for "low-load mode I" that appears in claim 7, which depends from claim 1. Dkt. No. 55-2, at 9. This term was construed in the previous litigation. *See* Dkt. No. 91, Civil Action No. 2:04-CV-211. The parties' principal dispute is whether *all* torque to drive the road wheels must be provided by the electric traction motor.

Paice	Toyota
The mode of operation in which energy flows from the battery bank to the traction motor and torque flows from the traction motor to the road wheels.	An operating mode in which all torque is provided to the road wheels by the traction motor operating on electrical energy supplied by the battery bank.

Paice contends collateral estoppels bars reconstruction of this term. Dkt. No. 46, at 26. Further, Paice contends the term is clearly defined in the ' 347 Patent claims and that definition should be used. Id (citing '347 Patent, col. 58, ll. 64-67). Toyota makes the same argument it made in the previous case-that embodiment figures from the patent indicate this mode is a "motor-only" mode. Dkt. No. 47, at 22.

b. Court's Construction

The Court rejects Toyota's arguments here for the same reason the Court rejected them in the previous litigation. The '347 Patent claim 7 clearly defines this term. Accordingly, the Court construes "**low-load mode I**" to mean "**the mode of operation in which energy from the battery bank flows to the traction motor and torque (rotary force) flows from the traction motor to the road wheels.**"

5. "highway cruising mode IV"

a. Parties' Positions

The parties offer the following constructions for "highway cruising mode IV" that appears in claim 7, which depends from claim 1. Dkt. No. 55-2, at 9. This term was construed in the previous litigation. *See* Dkt. No. 91, at 41, Civil Action No. 2:04-CV-211. The parties' principal dispute is whether, in this mode, *all* torque is provided to the road wheels by the internal combustion engine.

Paice	Toyota
The mode of operation in which energy flows from the fuel tank into the engine and torque flows from the engine to the road wheels.	An operating mode in which all torque is provided to the road wheels by the ICE and the traction motor is depowered.

As with the previous term, Paice contends collateral estoppel applies and Toyota claims it does not. Dkt. No. 46, at 26; Dkt. No. 47, at 23. This term, like the previous, is explicitly defined in the '347 Patent and the Court previously rejected Toyota's similar arguments with respect to this term in the prior lawsuit. *See* '347 Patent, col. 59, ll. 1-3; Dkt. No. 91, at 43-44, Civil Action No. 2:04-CV-211.

b. Court's Construction

The Court finds no reason to deviate from its prior construction of this term, albeit from a different-yet

related-patent. Accordingly, the Court construes "**highway cruising mode IV**" to mean "**the mode of operation in which energy flows from the fuel tank into the engine and torque (rotary force) flows from the engine to the road wheels.**"

6. "acceleration mode V"

a. Parties' Positions

The parties offer the following constructions for "acceleration mode V" that appears in claim 7, which depends from claim 1. Dkt. No. 55-2, at 9. This term was construed in the previous litigation. *See* Dkt. No. 91, at 42, Civil Action No. 2:04-CV-211. The parties do not appear to have a dispute with this term. *See* Dkt. No. 47, at 23 ("Toyota does not necessarily disagree with Paice's effort to transfer and use the Court's prior definition ... from the earlier patent.").

Paice	Toyota
The mode of operation in which energy flows from the fuel tank into the engine and from the battery to at least one motor and torque flows from the engine and at least one motor to the road wheels.	An operating mode in which either or both motors can be powered and torque flows from either or both motors and the ICE to the road wheels.

Paice again claims collateral estoppels applies to this term and Toyota says it does not, for the same reason as the two previous terms. Dkt. No. 46, at 27; Dkt. No. 47, at 23.

b. Court's Construction

The Court finds no reason to deviate from its prior construction of this term, albeit from a different-yet related-patent. Accordingly, the Court construes "**acceleration mode V**" to mean "**the mode of operation in which energy flows from the fuel tank to the engine and from the battery bank to at least one motor and torque (rotary force) flows from the engine and at least one motor to the road wheels.**"

VI. U.S. PATENT NO. 7,237,634

A. Overview

Paice has asserted claims 215, 216, 295, 298, 303, 305, and 306 against Toyota. Dkt. No. 46, at 27. For reference, the asserted claims that contain disputed terms are reproduced below (disputed terms emphasized):

215. A method for controlling a hybrid vehicle, comprising:

determining instantaneous ***road load (RL)*** required to propel the hybrid vehicle responsive to an operator command;

operating at least one electric motor to propel the hybrid vehicle when the RL required to do so is less than a setpoint (SP);

operating an internal combustion engine of the hybrid vehicle to propel the hybrid vehicle when the RL required to do so is between the SP and a maximum torque output (MTO) of the engine, wherein the

engine is operable to efficiently produce torque above the SP, and wherein the SP is substantially less than the MTO; and

operating both the at least one electric motor and the engine to propel the hybrid vehicle when the torque RL required to do so is more than the MTO; and

regeneratively charging a battery of the hybrid vehicle when instantaneous torque output of the engine<the RL, when the RL is negative, and/or when braking is initiated by an operator of the hybrid vehicle.

295. A hybrid vehicle, comprising:

a controller capable of accepting inputs indicative of vehicle operating parameters and providing control signals in response to a control program;

a battery bank;

an internal combustion engine operable to provide propulsive torque to road wheels of said vehicle;

a first AC electric starting motor electrically coupled to said battery bank and mechanically coupled to said internal combustion engine, and responsive to commands from said controller for (a) accepting electrical energy from said battery bank and (b) providing electrical energy to said battery bank, such that said first electric motor can be controlled to (1) accept torque from said engine to charge said battery bank, and (2) accept energy from said battery bank to apply torque to said engine for starting said engine;

a second AC electric traction motor, electrically coupled to said battery bank and mechanically coupled to road wheels of said vehicle, and responsive to commands from said controller, for (a) accepting electrical energy from said battery bank and (b) providing electrical energy to said battery bank such that said second electric motor can be controlled to (1) accept energy from said battery bank to apply torque to said road wheels to propel said vehicle, and (2) accept torque from said road wheels to charge said battery bank;

a solid state inverter connected to the second AC motor for converting DC to AC and AC to DC;

wherein said controller is provided with signals responsive to the instantaneous road load experienced by said vehicle and to the state of charge of said battery bank, and controls operation of said engine and said first and second motors so that said vehicle is operated in a plurality of operating modes responsive to said signals; and

wherein energy originating at the battery is supplied to the solid state inverter at a voltage and current such that the ratio of voltage to current is at least about 2.5 to 1.

298. A hybrid vehicle, comprising:

a controller capable of accepting inputs indicative of vehicle operating parameters and providing control signals in response to a control program;

a battery bank;

an internal combustion engine operable to provide propulsive torque to road wheels of said vehicle;

a first AC electric starting motor electrically coupled to said battery bank and mechanically coupled to said internal combustion engine, and responsive to commands from said controller for (a) accepting electrical energy from said battery bank and (b) providing electrical energy to said battery bank, such that said first electric motor can be controlled to (1) accept torque from said engine to charge said battery bank, and (2) accept energy from said battery bank to apply torque to said engine for starting said engine;

a second AC electric traction motor, electrically coupled to said battery bank and mechanically coupled to road wheels of said vehicle, and responsive to commands from said controller, for (a) accepting electrical energy from said battery bank and (b) providing electrical energy to said battery bank such that said second electric motor can be controlled to (1) accept energy from said battery bank to apply torque to said road wheels to propel said vehicle, and (2) accept torque from said road wheels to charge said battery bank;

a solid state inverter connected to the second AC motor for converting DC to AC and AC to DC;

wherein said controller is provided with signals responsive to the instantaneous road load experienced by said vehicle and to the state of charge of said battery bank, and controls operation of said engine and said first and second motors so that said vehicle is operated in a plurality of operating modes responsive to said signals; and

wherein energy originating at the battery is supplied to the solid state inverter at a maximum current of no more than 150 amperes.

305. A hybrid vehicle, comprising:

one or more wheels;

an internal combustion engine operable to propel the hybrid vehicle by providing torque to the one or more wheels;

a first electric motor coupled to the engine;

a second electric motor operable to propel the hybrid vehicle by providing torque to the one or more wheels;

a battery coupled to the first and second electric motors, operable to:

provide current to the first and/or the second electric motors; and

accept current from the first and second electric motors; and

a controller, operable to control the flow of electrical and mechanical power between the engine, the first and the second electric motors, and the one or more wheels;

wherein energy originating at the battery is supplied to the second motor at a peak voltage of at least about 500 volts; and

wherein the controller is operable to operate the engine when the power required from the engine to satisfy the road load experienced by the vehicle and/or to drive one or more of the first and second motors to charge the battery is at least equal to a minimum value at which power is efficiently produced by said engine but that is substantially less than the maximum power output of the engine.

306. A hybrid vehicle, comprising:

one or more wheels;

an internal combustion engine operable to propel the hybrid vehicle by providing torque to the one or more wheels;

a first electric motor coupled to the engine;

a second electric motor operable to propel the hybrid vehicle by providing torque to the one or more wheels;

a battery coupled to the first and second electric motors, operable to:

provide current to the first and/or the second electric motors; and

accept current from the first and second electric motors; and

a controller, operable to control the flow of electrical and mechanical power between the engine, the first and the second electric motors, and the one or more wheels;

wherein power originating at the battery is supplied to the second motor at a peak current no greater than about 150 amperes; and

wherein the controller is operable to operate the engine when the power required from the engine to satisfy the road load experienced by the vehicle and/or to drive one or more of the first and second motors to charge the battery is at least equal to a minimum value at which power is efficiently produced by said engine but that is substantially less than the maximum power output of the engine.

'347 Patent, col. 79, ll. 10-31 (claim 215), col. 87, ll. 28-67 (claim 295), col. 88, l. 43-col. 89, l. 14 (claim 298), col. 90, l. 51-col. 92, l. 24 (claim 305), col. 92, ll. 25-53 (claim 306) (emphasis added).

B. Claim Construction

The Court notes initially that the terms "road load (RL)" and "setpoint (SP)" are disputed with regard to this patent as well as the '347 Patent. The Court finds no reason to deviate from the constructions provided in its analysis of the '347 Patent. Accordingly, "**road load (RL)**" and "**setpoint (SP),**" as used in the '634 Patent, are construed to **have the same meanings as those provided by the Court in its discussion of the '437 Patent.**

1. "operating at least one electric motor to propel the hybrid vehicle when the RL required to do so is less than a setpoint (SP)"

a. Parties' Positions

The parties offer the following constructions for this term that appears in claim 215. Dkt. No. 55-2, at 10. As with the modes of operation discussed previously,FN2 the primary dispute between the parties is whether this claim requires the electric motor(s) be operated exclusively to propel the vehicle.

FN2. *See supra* Parts V.B.4-V.B.6.

Paice	Toyota
Operating at least one electric motor to propel the vehicle when the road load required to do so is less than a setpoint.	Operating only one or more electric motors to propel the vehicle when the determined RL is less than the SP.

Paice contends this term should be given its plain and ordinary meaning; no construction is necessary. Dkt. No. 46, at 28. Toyota argues the '634 Patent specification indicates that the motor(s) alone propel the vehicle when the road load is less than a certain setpoint. Dkt. No. 47, at 24 (citing ' 634 Patent, col. 20, l. 61-col. 21, l. 1). Toyota further contends Paice's construction impermissibly broadens claim 215 beyond the teachings of the specification. Id. at 24-25.

b. Court's Construction

The Court finds Toyota's construction impermissibly reads a limitation into the claim language. Although the specification does envision situations, as discussed with certain embodiments, where the engine may not run at all, the plain claim language, which is not contrary to the teachings of the specification, does not require such a limitation. Thus, the Court finds this term is clear and accordingly construes it to mean exactly what it says, namely: "**operating at least one electric motor to propel the hybrid vehicle when the road load required to do so is less than a setpoint .**" FN3

FN3. The Federal Circuit has stated that it is the district court's duty to resolve the disputes regarding the scope of a claim term. O2 Micro, 521 F.3d at 1362. However, the Federal Circuit has also noted that "district courts are not (and should not be) required to construe every limitation present in a patent's asserted claims." *Id*. While the Court has provided reasoning and findings regarding the subject terms, the Court finds that the actual claim terms are easily discerned by the fact finder and provide better clarity than any proffered alternative.

2. "operating an internal combustion engine of the hybrid vehicle to propel the hybrid vehicle when the RL required to do so is between the SP and a maximum torque output (MTO) of the engine, wherein the engine is operable to efficiently produce torque above the SP, and wherein the SP is substantially less than the MTO"

a. Parties' Positions

The parties offer the following constructions for this term that appears in claim 215. Dkt. No. 55-2, at 10. The primary dispute between the parties is whether claim 215 requires that *only* the engine propel the vehicle when the determined road load is between the setpoint and the maximum torque output (MTO) of the engine.

Paice	Toyota
Operating an engine to propel the vehicle when the road load required to do so is between the setpoint and the maximum torque output of the engine.	Operating only the ICE to propel the vehicle when the determined RL is between the SP and the MTO of the engine.

Paice argues this term is clear from its plain and ordinary meaning; no construction is required. Dkt. No. 46, at 29. Toyota contends the patent specification clearly describes that only when the road load exceeds the MTO of the engine should the engine and other motor(s) act collectively. Dkt. No. 47, at 27. That is, when the road load is between the setpoint and the MTO of the engine, it is the engine alone that propels the vehicle. *Id*.

b. Court's Construction

Once again, Toyota attempts to import the "only" limitation into this claim. The Court agrees that the specification discusses situations where the engine may be the only propulsion source for the vehicle, but that is an embodiment and not what is claimed. Further, the claim language is not contrary to the specification's teachings. Therefore, the Court construes "**operating an internal combustion engine of the hybrid vehicle to propel the hybrid vehicle when the RL required to do so is between the SP and a maximum torque output (MTO) of the engine, wherein the engine is operable to efficiently produce torque above the SP, and wherein the SP is substantially less than the MTO**" to mean "**operating an engine to propel the vehicle when the road load is between the setpoint and the maximum torque output of the engine, where the engine can efficiently produce torque above the setpoint and where the setpoint is substantially less than the maximum torque output of the engine.**"

3. "operating both the at least one electric motor and the engine to propel the hybrid vehicle when the torque RL required to do so is more than the MTO"

a. Parties' Positions

The parties offer the following constructions for this term that appears in claim 215. Dkt. No. 55-2, at 10. The parties seem to have no real dispute with regard to this term. Rather, Toyota contests this term because it believes "its definition for this claim limitation is consistent with the specification, and that Paice's claim constructions tend to obscure the differences among the claimed modes." Dkt. No. 47, at 29.

Paice	Toyota
Operating both the at least one motor and the engine to propel the vehicle when the road load required to do so is more than the maximum torque output of the engine.	Operating both the one or more electric motors and the ICE to propel the vehicle when the determined RL is more than the MTO.

b. Court's Construction

Because the Court finds no real dispute between the parties with regard to this term, the Court construes "**operating both the at least one electric motor and the engine to propel the hybrid vehicle when the torque RL required to do so is more than the MTO**" to mean "**operating both the engine and at least one motor to propel the vehicle when the road load is more than the maximum torque output of the engine.**"

4. "wherein energy originating at the battery is supplied to the solid state inverter at a voltage and

current such that the ratio of voltage to current is at least about 2.5 to 1"

a. Parties' Positions

The parties offer the following constructions for this term that appears in claim 295. Dkt. No. 55-2, at 13. The central disputes between the parties are whether (1) the ratio of battery voltage to current must be *at least* 2.5 or more and (2) the ratio must hold at *every point in the system*.

Paice	Toyota
Controlled by plain meaning. Does not require the claimed ratio to exist "at every point in the system."	The ratio of battery voltage to current at every point in the system from the battery to the solid state inverter is at least 2.5 or more.

Paice argues the plain and ordinary meaning of the claim should be used here; no construction is necessary. Dkt. No. 46, at 31. Toyota contends the patent specification would lead an ordinarily-skilled artisan to construe the term as requiring the ratio to be at least 2.5 and that the ratio hold when measured at every point in the system. Dkt. No. 47, at 29 (citing '634 Patent, col. 50, ll. 44-50, col. 51, ll. 13-17).

b. Court's Construction

The Court finds Toyota's arguments unconvincing. The claim language specifically states that the energy to be measured originates at the battery and is supplied *to* the solid state inverter. The claim language further states that this measurement must be at least *about* 2.5 to 1. The citations Toyota provides to the specification refer to "useful" component sizing information and they do not state where in the system the ratio is to be measured. Additionally, the Court notes once again that the claims should not be limited to particular embodiments unless the inventor has indicated such a narrow construction. *See* LizardTech, Inc. v. Earth Res. Mapping, Inc., 433 F.3d 1373, 1376-77 (Fed.Cir.2006) (citing Phillips, 415 F.3d at 1326-27 (construing the term "baffle" broader than the narrower bullet-deflecting embodiments disclosed in the specification)). The Court finds no such narrow indication here.

The Court does find, however, that construction is necessary in order to clarify where the measurement should be taken. Accordingly, the Court construes "**wherein energy originating at the battery is supplied to the solid state inverter at a voltage and current such that the ratio of voltage to current is at least about 2.5 to 1**" to mean "**the energy originating at the battery, when measured in terms of voltage and current at the solid state inverter, has a ratio of voltage to current such that voltage is about 2.5 times greater, or more, than current.**"

5. "wherein energy originating at the battery is supplied to the solid state inverter at a maximum current of no more than 150 amperes"

a. Parties' Positions

The parties offer the following constructions for this term that appears in claim 298. Dkt. No. 55-2, at 15. The parties principally disagree about where the current measurement is made.

Paice	Toyota
Controlled by plain meaning. Does not require the claimed amperage to exist "at any point" as Toyota contends, and allows	The current measured at any point between the battery and the solid state

for certain instances (transients, e.g.) of exceeding 150 amps.	inverter cannot exceed 150 amps.

As with the previous term, Paice contends this term needs no construction; plain and ordinary meaning is sufficient. Dkt. No. 47, at 32. Toyota makes the same argument with respect to this term as it made with regard to the voltage/current ratio term immediately above.

b. Court's Construction

The Court rejects Toyota's arguments for the same reasons discussed with the previous term. The Court construes "**wherein energy originating at the battery is supplied to the solid state inverter at a maximum current of no more than 150 amperes**" to mean "**the energy originating at the battery, when measured at the solid state inverter, has a maximum current of 150 amperes.**"

6. "wherein energy originating at the battery is supplied to the second motor at a peak voltage of at least about 500 volts"

a. Parties' Positions

The parties offer the following constructions for this term that appears in claim 305. Dkt. No. 55-2, at 16. As with the previous terms, the parties principally disagree about where the current measurement is made. The arguments of the parties are the same as with the previous term so they will not be repeated here.

Paice	Toyota
Controlled by plain meaning. Does not require the claimed voltage to exist "at any point" as Toyota contends.	The voltage measured at any point between the battery and the second motor must sometimes rise to a peak of at least 500 volts.

b. Court's Construction

The Court, for the same reasons recited above, rejects Toyota's argument but believes that the term should be construed to clarify its meaning. Accordingly, the Court construes "**wherein energy originating at the battery is supplied to the second motor at a peak voltage of at least about 500 volts**" to mean "**the energy originating at the battery, when measured at the second motor, has a peak voltage of about 500 volts or greater.**"

7. "wherein power originating at the battery is supplied to a second motor at a peak current no greater than about 150 amperes"

a. Parties' Positions

The parties offer the following constructions for this term that appears in claim 305. Dkt. No. 55-2, at 13. As with the previous term, the parties principally disagree about where the current measurement is made. The arguments of the parties are the same as with the previous term so they will not be repeated here.

Paice	Toyota
Controlled by plain meaning. Does not require the claimed current to exist "at any point" as Toyota contends, and allows for certain instances (transients, e.g.) of exceeding 150 amps.	The current measured at any point between the battery and the second motor cannot exceed 150 amps.

b. Court's Construction

The Court, for the same reasons recited above, rejects Toyota's argument but believes that the term should be construed to clarify its meaning. Accordingly, the Court construes "**wherein power originating at the battery is supplied to a second motor at a peak current no greater than about 150 amperes**" to mean "**the energy originating at the battery, when measured at a second motor, has a peak current of about 150 amperes or less.**"

VII. CONCLUSION

The Court hereby **ORDERS** the claim terms addressed herein construed as indicated. The table below summarizes the Court's constructions:

Term	Court's Construction
	'***970 Patent***
"controllable torque transfer unit"	"**a multi-input device or component that is controlled to transfer variable amounts of torque (rotary force)**"
"means for performing the following functions responsive to input commands and monitored operation of said vehicle"	"**A computerized control device and associated components for selecting an operating mode [mode or state of operation determined by the source and/or direction of the flow of energy and/or torque (rotary force) in the system] and controlling the engine, motor and battery to implement that mode**"
	'***437 Patent***
"controllably coupled"	"**selectively connected through a mechanism that is controlled by a microprocessor.**"
"setpoint (SP)"	"**a definite, but potentially variable value at which a transition between operating modes may occur.**"
"road load (RL)"	"**the instantaneous torque required for propulsion of the vehicle, which may be positive or negative in value.**"
"low-load mode I"	"**the mode of operation in which energy from the battery bank flows to the traction motor and torque (rotary force) flows from the traction motor to the road wheels.**"
"highway cruising mode IV"	"**the mode of operation in which energy flows from the fuel tank into the engine and torque (rotary force) flows from the engine to the road wheels.**"
"acceleration mode V"	"**the mode of operation in which energy flows from the fuel tank to the engine and from the battery bank to at least one motor and torque (rotary force) flows from the engine and at least one motor to the road wheels.**"
	'***634 Patent***
"setpoint (SP)"	Same as above.
"road load (RL)"	Same as above.
"operating at least one electric motor to propel the hybrid vehicle when the RL required to do so is less than a setpoint (SP)"	"**operating at least one electric motor to propel the hybrid vehicle when the road load required to do so is less than a setpoint.**"
"operating an internal combustion engine of the hybrid vehicle to propel the hybrid vehicle when the RL required to do so is between the SP and a maximum	"**operating an engine to propel the vehicle when the road load is between the setpoint and the maximum torque output of the engine, where the**

torque output (MTO) of the engine, wherein the engine is operable to efficiently produce torque above the SP, and wherein the SP is substantially less than the MTO"	**engine can efficiently produce torque above the setpoint and where the setpoint is substantially less than the maximum torque output of the engine.**"
"operating both the at least one electric motor and the engine to propel the hybrid vehicle when the torque RL required to do so is more than the MTO"	" **operating both the engine and at least one motor to propel the vehicle when the road load is more than the maximum torque output of the engine.**"
"wherein energy originating at the battery is supplied to the solid state inverter at a voltage and current such that the ratio of voltage to current is at least about 2.5 to 1"	"**the energy originating at the battery, when measured in terms of voltage and current at the solid state inverter, has a ratio of voltage to current such that voltage is about 2.5 times greater, or more, than current.**"
"wherein energy originating at the battery is supplied to the solid state inverter at a maximum current of no more than 150 amperes"	"**the energy originating at the battery, when measured at the solid state inverter, has a maximum current of 150 amperes.**"
"wherein energy originating at the battery is supplied to the second motor at a peak voltage of at least about 500 volts"	"**the energy originating at the battery, when measured at the second motor, has a peak voltage of about 500 volts or greater.**"
"wherein power originating at the battery is supplied to a second motor at a peak current no greater than about 150 amperes"	"**the energy originating at the battery, when measured at a second motor, has a peak current of about 150 amperes or less.**"

IT IS SO ORDERED.

E.D.Tex.,2008.
Paice LLC v. Toyota Motor Corp.

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