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123	Class
396	Subclass
ISSUE CLASSIFICATION	

PATENT NUMBER  
**6763804**

# U.S. UTILITY PATENT APPLICATION

O.I.P.E. *W* PATENT DATE *JUL 20 2004*  
 SCANNED *Hkm1* O.A. *W*

APPLICATION NO. 09/973030	CONT/PRIOR	CLASS 7013	SUBCLASS 396	ART UNIT 3747	EXAMINER CASTRO
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APPLICANTS  
TITLE

Ross Pursifull

Electronic throttle servo overheat protection system

PTO-2040  
12/99

## PREPARED AND APPROVED FOR ISSUE

## ISSUING CLASSIFICATION

ORIGINAL		CROSS REFERENCE(S)					
CLASS	SUBCLASS	CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
123	396	123	399				
INTERNATIONAL CLASSIFICATION		313	635				
F02D	41/08						

☐ Continued on Issue Slip Inside File Jacket

*6-22-04* Formal Drawings *12* sheets *10-9-01*

<input checked="" type="checkbox"/> <b>TERMINAL DISCLAIMER</b>	DRAWINGS			CLAIMS ALLOWED	
	Sheets Drwg.	Figs. Drwg.	Print Fig.	Total Claims	Print Claim for O.G.
	2	2	1	120	201
<input type="checkbox"/> a) The term of this patent subsequent to _____ (date) has been disclaimed.	<i>Arnold Castro</i> 2-6-04 (Assistant Examiner) (Date)			NOTICE OF ALLOWANCE MAILED	
<input checked="" type="checkbox"/> b) The term of this patent shall not extend beyond the expiration date of U.S. Patent. No. <i>6,539,918</i>	<i>Mahmoud Gimie</i> MAHMOUD GIMIE PRIMARY PATENT EXAMINER ART UNIT 3747 (Primary Examiner) (Date)			ISSUE FEE <i>MT</i>	
<input type="checkbox"/> c) The terminal _____ months of this patent have been disclaimed.	<i>C. Cowan</i> 2/10/04 (Legal Instruments Examiner) (Date)			Amount Due \$1630.00	Date Paid 3/31/04
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VW EX1002

U.S. Patent No. 6,763,804

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JC821 U.S. PTO  
09/973030  
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INITIALS \_\_\_\_\_

## CONTENTS

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8. <i>Terminal Disclaimer (1)</i>	8-25-03	49. _____	
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11. <i>NOA</i>	2/9/04	52. _____	
12. _____		53. _____	
13. _____		54. _____	
14. _____		55. _____	
15. _____		56. _____	
16. _____		57. _____	
17. _____		58. _____	
18. _____		59. _____	
19. _____		60. _____	
20. _____		61. _____	
21. _____		62. _____	
22. _____		63. _____	
23. _____		64. _____	
24. _____		65. _____	
25. _____		66. _____	
26. _____		67. _____	
27. _____		68. _____	
28. _____		69. _____	
29. _____		70. _____	
30. _____		71. _____	
31. _____		72. _____	
32. _____		73. _____	
33. _____		74. _____	
34. _____		75. _____	
35. _____		76. _____	
36. _____		77. _____	
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PATENT APPLICATION SERIAL NO. \_\_\_\_\_

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Bib Data Sheet

CONFIRMATION NO. 5130

SERIAL NUMBER 09/973,030	FILING DATE 10/09/2001  RULE	CLASS 123	GROUP ART UNIT 3747	ATTORNEY DOCKET NO. 199-1343 (VGT-0118 PUS)	
APPLICANTS Ross Dykstra Pursifull, Dearborn, MI; ** CONTINUING DATA ***** ** FOREIGN APPLICATIONS ***** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 11/08/2001					
Foreign Priority claimed <input type="checkbox"/> yes <input type="checkbox"/> no 35 USC 119 (a-d) conditions <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> Met after met Allowance Verified and Acknowledged _____ Examiner's Signature Initials		STATE OR COUNTRY MI	SHEETS DRAWING 2	TOTAL CLAIMS 22	INDEPENDENT CLAIMS 2
ADDRESS John S. Artz Artz & Artz, PC Suite 250 28333 Telegraph Road Southfield, MI 48034					
TITLE ELECTRONIC THROTTLE SERVO OVERHEAT PROTECTION SYSTEM					
FILING FEE  RECEIVED 1076	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees ( Filing ) <input type="checkbox"/> 1.17 Fees ( Processing Ext. of time ) <input type="checkbox"/> 1.18 Fees ( Issue ) <input type="checkbox"/> Other _____		

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PATENT APPLICATION  
ASSISTANT COMMISSIONER FOR PATENTS  
Washington, D. C. 20231

10-00-31

Case Docket No. 199-1343 (VGT 0118 PUS)  
Date: October 9, 2001

A

Transmitted herewith for filing is the patent application of Inventor(s):

Ross Dykstra Pursifull

For: ELECTRONIC THROTTLE SERVO OVERHEAT PROTECTION SYSTEM

Enclosed are:

- ☒ 2 sheet(s) of drawings (Figs. 1-2)
- ☒ Assignment and Cover Sheet
- ☒ Declaration and Power of Attorney
- ☒ Information Disclosure Statement, PTO Form 1449, and Copies of Citations
- ☒ Postcards (2)

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The filing fee has been calculated as shown below for OTHER THAN A SMALL ENTITY:

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Basic Fee				\$ 740
Total Claims	22-20	2	18	\$ 36
Indep Claims	2-3	0	84	\$ 0
Multiple Dependent Claims(s)	0		280	\$ 0
Presented				
Assignment Recordal			40	\$ 40
			TOTAL	\$ 816

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199-1343

## ELECTRONIC THROTTLE SERVO OVERHEAT PROTECTION SYSTEM

### TECHNICAL FIELD

[0001] The present invention relates generally to control systems for internal combustion engines, and more particularly, to an electronic throttle servo temperature protection system.

### BACKGROUND ART

[0002] Many previously known motor vehicle throttle controls have a direct physical linkage between an accelerator pedal and the throttle body so that the throttle plate is pulled open by the accelerator cable as the driver presses the pedal. The direct mechanical linkage includes biasing that defaults the linkage to a reduced operating position, in a manner consistent with regulations. Nevertheless, such mechanisms are often simple and unable to adapt fuel efficiency to changing traveling conditions, and add significant weight and components to the motor vehicle.

[0003] An alternative control for improving throttle control and the precise introduction of fuel air mixtures into the engine cylinders is accomplished by electronic throttle control. The electronic throttle control includes a throttle control unit that positions the throttle plate by an actuator controlled by a microprocessor based on the current operating state

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determined by sensors. The processors are often included as part of a powertrain electronic control that can adjust the fuel air intake and ignition in response to changing conditions of vehicle operation as well as operator control. Protection may be provided so that an electronic system does not misread or misdirect the control and so that unintended operation is avoided when portions of the electronic control suffer a failure.

[0004] Typically, the actuator or servomotor used to position the throttle plate is designed to have the maximum control effort available (motor voltage, current, duty cycle) to enhance throttle plate position response. Having a large control effort continuously available or available for maximum effort could possibly lead to overstressing the system's physical components if a blockage of the throttle plate occurs or the mechanism encounters a mechanical limit. For example, a mechanical limit may be an open stop or a close stop. Specifically, the H-driver and the servomotor could overheat with sustained full control effort under some environmental conditions. In an effort to avoid permanent damage, some electronic systems shut down when they get to a threshold temperature.

[0005] The disadvantages associated with these conventional electronic throttle overheat protection techniques have made it apparent that a new technique for electronic throttle overheat protection is needed. The new technique should allow full control effort while



09973030-100901

preventing overheat conditions. The present invention is directed to these ends.

#### SUMMARY OF THE INVENTION

[0006] It is, therefore, an object of the invention to provide an improved and reliable electronic throttle servo temperature protection system. Another object of the invention is to allow full control effort while preventing overheat conditions.

[0007] In accordance with the above and other objects of the present invention, an electronic throttle servo overheat protection system is provided. In one embodiment of the invention, a method for controlling a positioning device associated with internal combustion engine control is provided. In accordance with the method, an electric motor actuates the positioning device. The positioning device is then commanded to change to a commanded position. The control effort required to change to the commanded position is detected. It is then determined whether the control effort exceeds a threshold for a predetermined time period. When the control effort exceeds the threshold for the predetermined time period, the control effort is reduced.

[0008] The present invention thus achieves an improved electronic throttle servo overheat protection system. The present invention is advantageous in that it will not cause mechanism failure or require

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significant and costly added robustness to the mechanism.

[0009] Additional advantages and features of the present invention will become apparent from the description that follows, and may be realized by means of the instrumentalities and combinations particularly pointed out in the appended claims, taken in conjunction with the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0010] In order that the invention may be well understood, there will now be described some embodiments thereof, given by way of example, reference being made to the accompanying drawings, in which:

[0011] FIGURE 1 is a block diagram of an electronic throttle servo overheat protection system in accordance with one embodiment of the present invention; and

[0012] FIGURE 2 is a flow chart depicting a method of providing electronic throttle servo overheat protection in accordance with one embodiment of the present invention.

#### BEST MODES FOR CARRYING OUT THE INVENTION

[0013] The present invention is illustrated herein with respect to an electronic throttle servo overheat protection system, particularly suited for the automotive field. However, the present invention is applicable to various other uses that may require electronic throttle servo overheat protection systems.

[0014] Referring to FIGURE 1, a motor vehicle powertrain system 10 including electronic throttle control system 12 includes an electronic control unit 14. In the preferred embodiment, the electronic control unit 14 includes a powertrain control module (PCM) 16, including a main processor and an electronic throttle monitor (ETM) 18, including an independent processor. The PCM and ETM each share sensors 19 and actuators that are associated with the powertrain system 17 and control module 16. Preferably, the electronic throttle monitor 18 includes a processor physically located within the powertrain control module housing, although a separate housing, separate locations and other embodiments can also be employed in practicing the invention. Moreover, while the electronic throttle monitor 18 and the powertrain control module 16 have independent processors, they preferably share the inputs and outputs of powertrain sensors 19 and actuators 21 and 34, respectively, for independent processing.

[0015] A wide variety of inputs are represented in the diagram of FIGURE 1 by the diagrammatic representation of redundant pedal position sensors 20. The sensors 20 are coupled through inputs 22 and are representative of many different driver controls that may demonstrate the demand for power. In addition, the electronic control unit 14 includes inputs 26a and 26b for detecting throttle position. A variety of ways for providing such indications are diagrammatically represented in FIGURE 1 by a first throttle position

sensor 24a and a redundant second throttle position sensor 24b to obtain a power output indication. As a result of the many inputs represented at 19, 22, 26a and 26b, the electronic controller 14 provides outputs for limiting output power so that the output power does not exceed the power demand. A variety of outputs are also diagrammatically represented in FIGURE 1 by the illustrated example of inputs to a throttle control unit 28 that in turn powers an actuator and motor interface 30 for displacing the throttle plate 34. For example, an actuator and interface may comprise redundant drive motors powering a gear interface to change the angle of the throttle plate 34 in the throttle body 36.

[0016] Likewise, the responsive equipment, such as a motor, may also provide feedback. For example, the motor effort sensor 38 or the throttle position sensors 24a and 24b may provide feedback to the throttle control unit 28, as shown at 37, 27a and 27b, respectively, to determine whether alternative responses are required or to maintain information for service or repair.

[0017] Referring to Figure 2, a flow chart depicting a method of providing electronic throttle servo overheat protection in accordance with one embodiment of the present invention is illustrated. In operation, the preferred method of the present invention is initiated at step 40 and immediately proceeds to step 42. In step 42, the controller preferably determines if the control effort has been more positive than a predetermined limit for at least a predetermined time period. Typically, an



09973030-100901

effort limit of approximately +6 volts and a contiguous time interval of about 300 milliseconds are used. Obviously, these values may vary as required. If the predetermined threshold has been exceeded, then the sequence proceeds to step 44.

[0018] A hold open mode is initiated at step 44 and then immediately continued in step 46. In step 46, the controller preferably determines if it has called for the hold open mode for less than a hard open time period. A person skilled in the art understands that the hard open time period may depend upon the voltage applied to the motor. For example, a given servo motor would not overheat under the following conditions:

Positioning Effort (volts)	Duration (seconds)
18	10
16	12
14	18
12	32
10	62
9	82
8	128
7	219
6	445
5	indefinite

These operating conditions may keep a motor at less than a threshold temperature to prevent overheating. For example, a threshold temperature may be 220 degrees Celsius.

09973030-100901

[0019] If the throttle plate has been in a hold open mode for less than the hard open time period, then the sequence proceeds to step 48. In step 48, the controller preferably applies a maximum opening control effort to the motor. In the hold open mode, a typical maximum opening control effort has a magnitude of +14.5 volts. Obviously, the magnitude of the effort may vary as required. Then, the sequence returns to step 46. If the throttle plate has been in the hold open mode for longer than the hard open time period, then the sequence proceeds to step 50.

[0020] In step 50, the controller preferably reduces the opening control effort applied to the motor to a moderate opening control effort. The moderate opening control effort can be applied to the motor for an indefinite period of time without permitting the motor to overheat. Typically, the moderate opening effort has a magnitude of approximately +5 volts. Then, the sequence returns to step 42.

[0021] Thus, the following sequence typically occurs when the controller is in the hold open mode. First, the system detects that it should go into the hold open mode. Then, full voltage is applied to clear or crush any small debris obstructing movement of the throttle plate. The voltage is reduced to approximately +5 volts to prevent the motor from overheating.

09973030-100901

[0022] If in step 42 the effort has not been more positive, then the sequence proceeds to step 52. In step 52, the controller preferably determines if the control effort has been more negative than a predetermined limit for at least a predetermined time period. Typically, an effort limit of approximately -6 volts and a contiguous time interval of about 300 milliseconds are used. If the predetermined threshold has been exceeded, then the sequence proceeds to step 54.

[0023] A hold close mode is initiated in step 54 and then immediately continued in step 56. In step 56, the controller preferably determines whether it has called for a hold close mode for less than a hard close time period. A typical time period is approximately 30 milliseconds. If the throttle plate has been in the hold close mode for less than the hard close time period, then the sequence proceeds to step 58.

[0024] In step 58, the controller applies a maximum closing control effort to the motor. In the hold close mode, a typical maximum closing control effort has a magnitude of -14.5 volts. Then, the sequence returns to step 56. If the throttle plate has been in the hold close mode for longer than the hard close time period, then the sequence proceeds to step 60.

[0025] In step 60, the controller reduces the closing control effort applied to the motor to a moderate closing control effort. The moderate closing control effort can be applied to the motor for an indefinite

09973030-100901

period of time without permitting the motor to overheat. Typically, a moderate control effort of approximately -5 volts is applied to the motor. Then, the sequence returns to step 52.

[0026] Thus, the following sequence typically occurs when the controller is in the hold close mode. First, full voltage is applied to clear or crush any small debris obstructing throttle plate movement. Then, approximately -5 volts is applied to hold the plate against the close stop for a period of time determined by the method of the present invention. A voltage approximately equal to -5 volts typically prevents the motor from overheating. Then the sequence returns to step 52.

[0027] If in step 52 the effort has not been more negative than a predetermined limit for a given time period, then the sequence proceeds to step 62. In step 62, the controller initiates a control normal mode. Subsequently, the sequence immediately proceeds to step 64 in which the controller controls the throttle plate normally. The sequence then returns to step 42.

[0028] The present invention thus achieves an improved and reliable electronic throttle servo overheat protection system by monitoring when the closing or opening control effort exceeds a threshold for a given amount of time. In this way, the present invention allows full control effort while preventing overheat conditions. Additionally, the present invention does



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not cause mechanism failure or require significant and costly added robustness to the mechanism.

[0029] From the foregoing, it can be seen that there has been brought to the art a new and improved electronic throttle servo overheat protection system. It is to be understood that the preceding description of the preferred embodiment is merely illustrative of some of the many specific embodiments that represent applications of the principles of the present invention. Clearly, numerous and other arrangements would be evident to those skilled in the art without departing from the scope of the invention as defined by the following claims.

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What is claimed is:

1           1. A method for controlling a positioning  
2 device of an internal combustion engine, the method  
3 comprising the steps of:  
4           providing an electric motor for actuating the  
5 positioning device;  
6           commanding the positioning device to change to a  
7 commanded position;  
8           detecting a control effort required to change to  
9 said commanded position;  
10          determining whether said control effort exceeds  
11 a threshold for a predetermined time period; and  
12          reducing said control effort when said control  
13 effort exceeds said threshold for said predetermined  
14 time period.

1 *Sub 2* 2. The method as recited in claim 1, wherein  
2 said threshold has an absolute value of 6 volts.

1           3. The method as recited in claim 1, wherein  
2 said predetermined time period is 300 milliseconds.

1           4. The method as recited in claim 1, wherein  
2 the step of commanding the positioning device to  
3 change to a commanded position, comprises commanding  
4 the positioning device to open to a commanded  
5 position in a hold open mode.

1 *Sub 5* 5. The method as recited in claim 4, further  
2 comprising the step of applying a maximum control  
3 effort to the positioning device for a hard open time  
4 period.

09973030-100901

1 *Sub B* 6. The method as recited in claim 5, wherein  
2 said maximum control effort is +14.5 volts.

1 7. The method as recited in claim 5, wherein  
2 said hard open time period is 30 milliseconds.

1 8. The method as recited in claim 1, wherein  
2 the step of commanding the positioning device to  
3 change to a commanded position, comprises commanding  
4 the positioning device to close to a commanded  
5 position in a hold close mode.

1 9. The method as recited in claim 8, further  
2 comprising the step of applying a maximum control  
3 effort to the positioning device for a hard close  
4 time period.

1 10. The method as recited in claim 9, wherein  
2 said maximum control effort is -14.5 volts.

*Sub A*

1 11. The method as recited in claim 9, wherein  
2 said predetermined time period is 30 milliseconds.

1 12. A system for controlling a positioning  
2 device of an internal combustion engine to prevent  
3 overheat conditions, the system comprising:

4 an electric motor for actuating the positioning  
5 device with a control effort;

6 a control effort detector coupled to said  
7 electric motor and detecting said control effort; and

8 a controller coupled to said electric motor and  
9 said control effort detector, said controller  
10 including control logic operative to command the  
11 positioning device to change to a commanded position,

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Sub  
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12 detect a control effort required to change to said  
13 commanded position, determine whether said control  
14 effort exceeds a threshold for a predetermined time  
15 period, and reduce said control effort when said  
16 control effort exceeds said threshold for said  
17 predetermined time period.

1 13. The system as recited in claim 12, wherein  
2 said threshold has an absolute value of 6 volts.

1 14. The system as recited in claim 12, wherein  
2 said predetermined time period is 300 milliseconds.

1 15. The system as recited in claim 12, wherein  
2 said controller further includes control logic  
3 operative to command the positioning device to open  
4 to a commanded position in a hold open mode.

1 16. The system as recited in claim 15, wherein  
2 said controller further includes control logic  
3 operative to apply a maximum control effort to the  
4 positioning device for said hard open time period.

1 17. The system as recited in claim 16, wherein  
2 said maximum control effort is +14.5 volts.

1 18. The system as recited in claim 16, wherein  
2 said hard open time period is 30 milliseconds.

1 19. The system as recited in claim 12, wherein  
2 said controller further includes control logic  
3 operative to command the positioning device to close  
4 to a commanded position in a hold close mode.



Sub. A2

1 20. The method as recited in claim 19, further  
2 comprising the step of applying a maximum control  
3 effort to the positioning device for a hard close  
4 time period.

1 Sub 21. The system as recited in claim 20, wherein  
2 said maximum control effort is -14.5 volts.

Sub. A3

1 22. The system as recited in claim 20, wherein  
2 said predetermined time period is 30 milliseconds.

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#### ABSTRACT

[0030] A method for controlling a positioning device (34) of an internal combustion engine includes the step of providing an electric motor (30) for actuating a positioning device (34). A user employs an actuator (21) to command the throttle plate (34) to change to a commanded position. A motor effort sensor (38) then detects a control effort required by the motor (30) to change to the commanded position. A throttle control unit (28) determines whether the control effort exceeds a threshold for a predetermined time period. If the control effort exceeds the threshold for the predetermined time period, the throttle control unit (28) actuates the motor (30) to reduce the control effort.

<b>DECLARATION AND POWER OF ATTORNEY - ORIGINAL APPLICATION</b>		Attorney's Docket No. 199-1343 (VGT 0118 PUS)		
<p>As a below named inventor, I hereby declare:          My residence, post office address and citizenship are as stated below next to my name;</p> <p>I verily believe I am the original, first and sole inventor or an original, first and joint inventor of the subject matter that is claimed and for which a patent is sought on the invention entitled</p> <p style="text-align: center;"><b>ELECTRONIC THROTTLE SERVO OVERHEAT PROTECTION SYSTEM</b></p> <p>the specification of which is attached hereto.</p> <p>I have reviewed and understand the contents of the specification identified above, including the claims.</p> <p>I acknowledge my duty to disclose information of which I am aware that is material to the examination of this application in accordance with Section 1.56(a), Title 37 of the Code of Federal Regulations; and</p> <p>as to application for patents or inventor's certificate on the invention filed in any country foreign to the United States of America, prior to this application by me or my legal representatives or assigns,</p> <p style="margin-left: 40px;"> <input checked="" type="checkbox"/> no such applications have been filed, or  <input type="checkbox"/> such applications have been filed as follows:         </p>				
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Address all correspondence and telephone calls to:

John S. Artz  
Artz & Artz, PC  
28333 Telegraph Road, Suite 250  
Southfield, MI 48034

Phone: 248-223-9500

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FULL NAME AND POST OFFICE ADDRESS OF INVENTOR:		CITIZENSHIP	SIGNATURE	DATE
Ross Dykstra Pursifull 21510 Donaldson Dearborn, MI 48124 US	Dearborn, MI 48124 US	U.S.A.		OCT 1 2001

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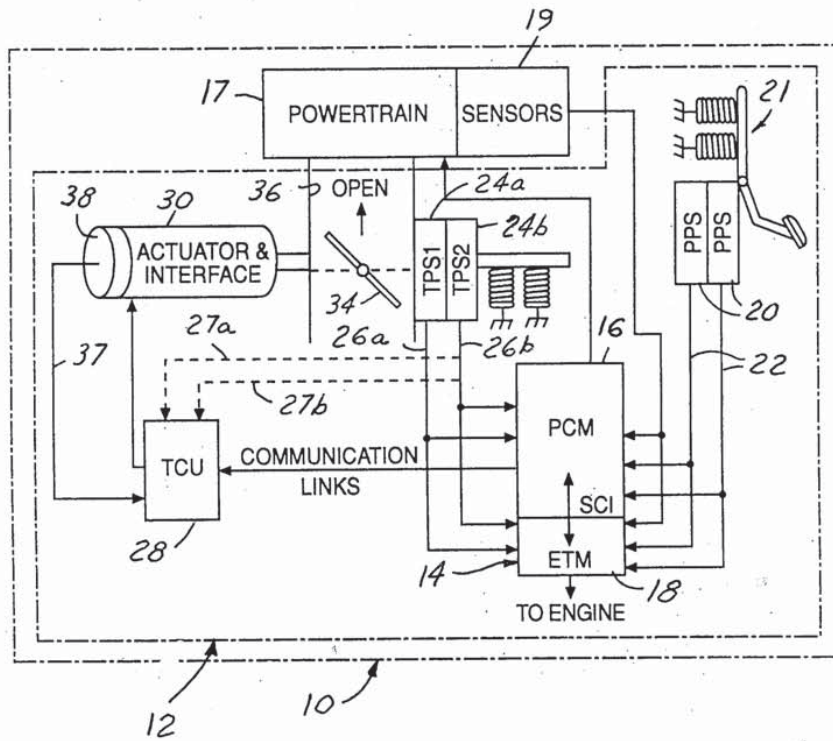


FIG. 1

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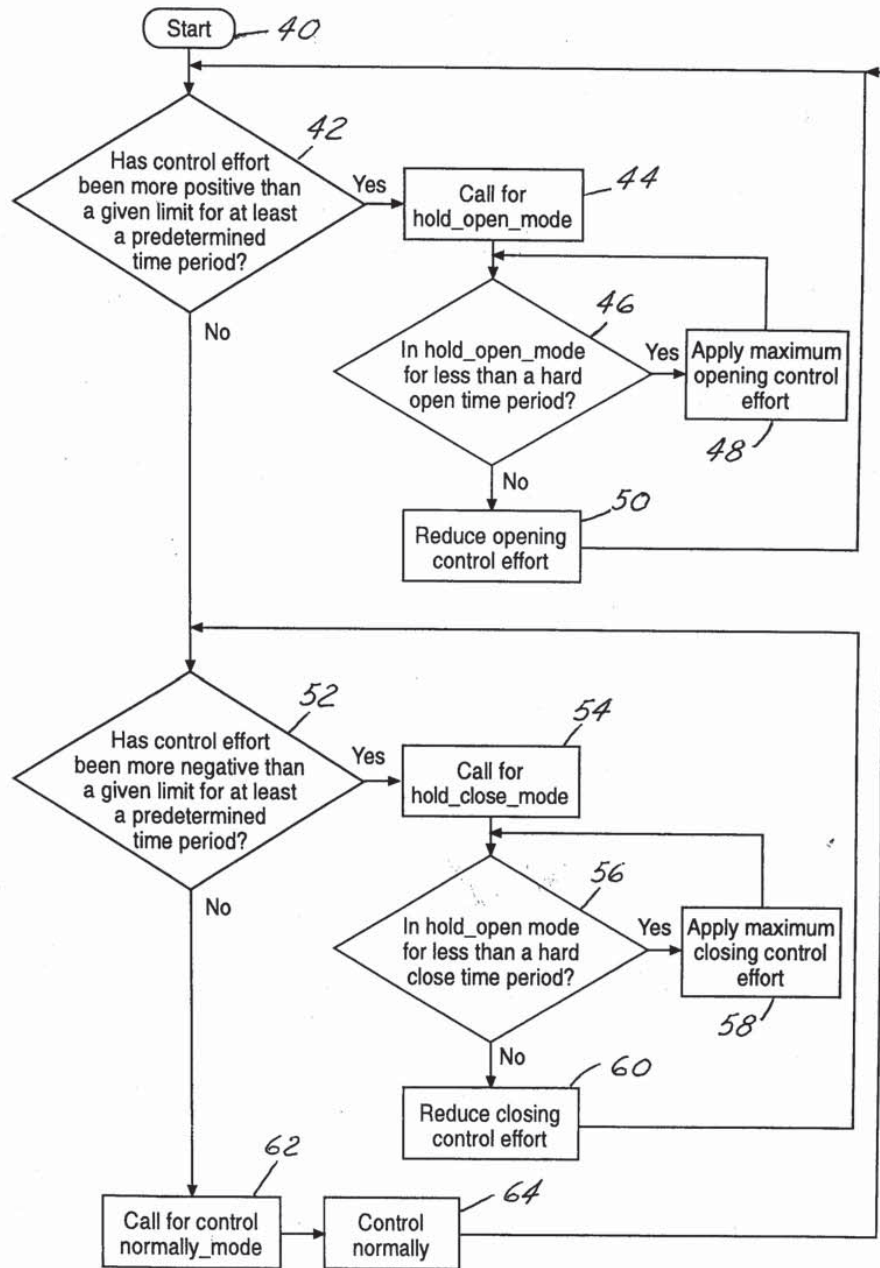


FIG. 2

09973030-100901

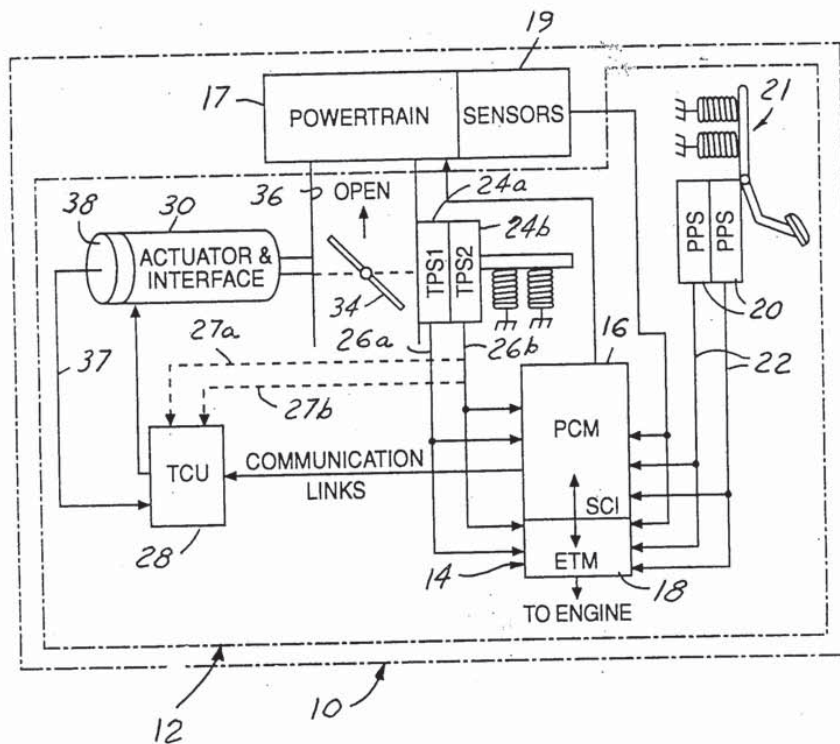


FIG. 1

09973030.100901

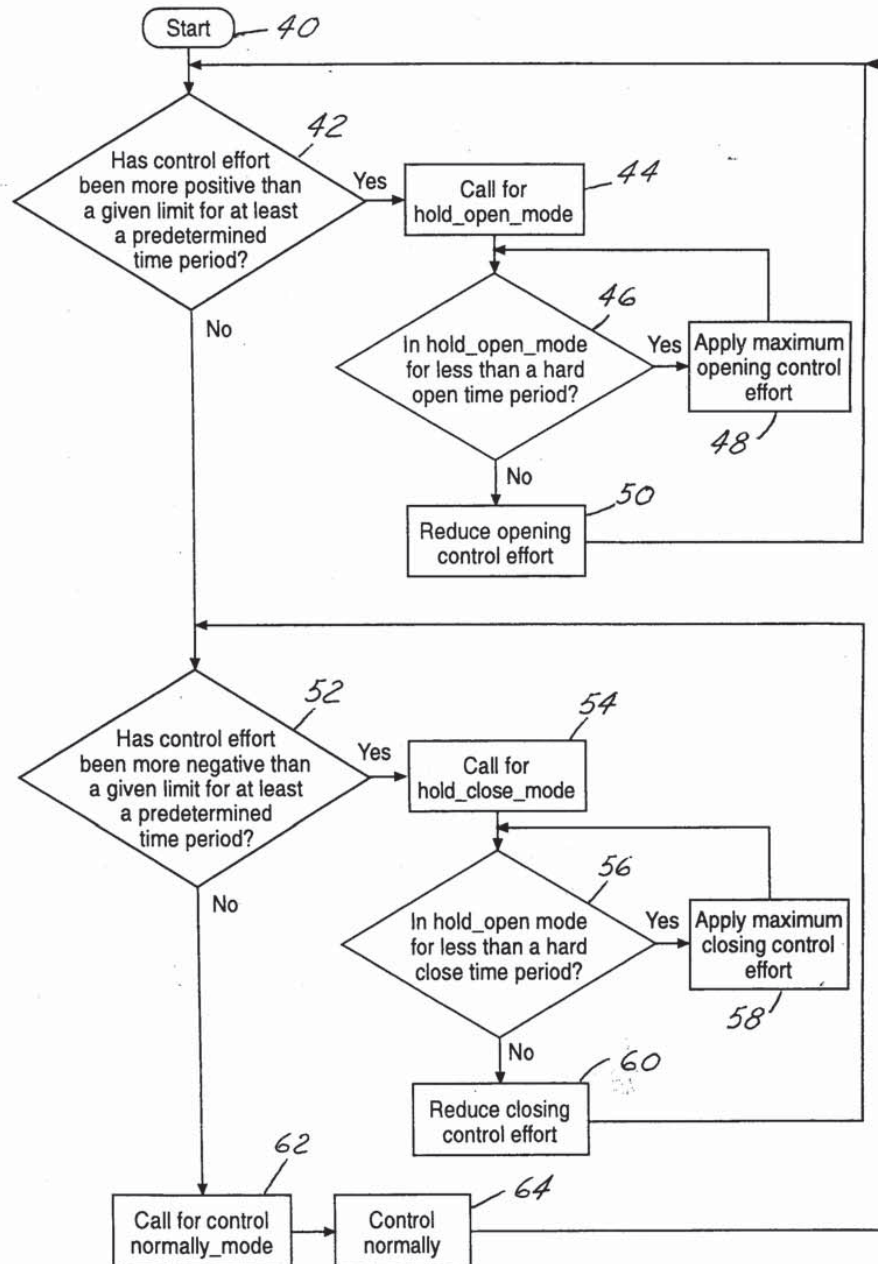


FIG. 2

TELEPHONE NO.

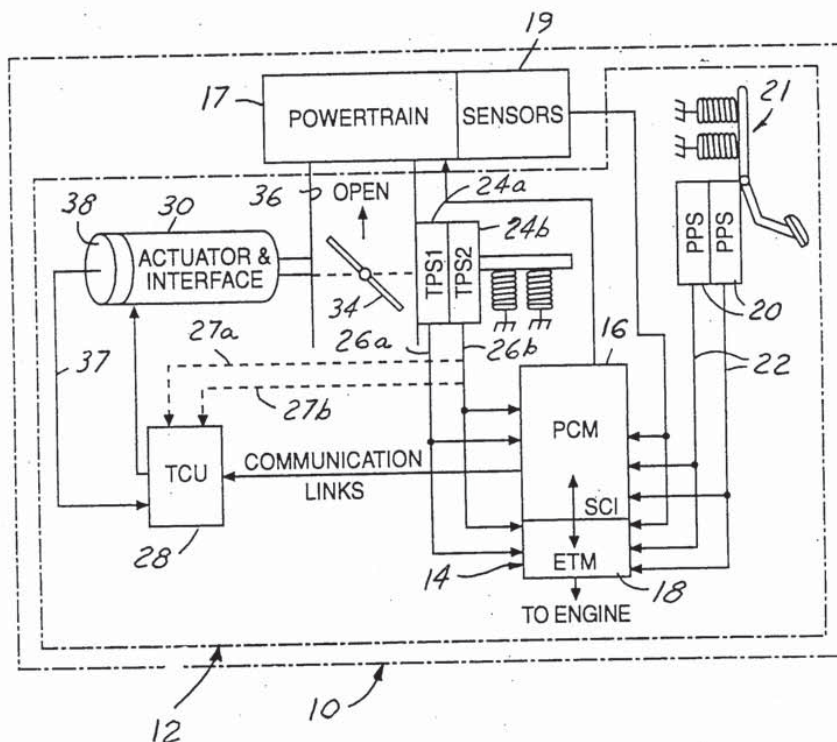


FIG.1

09973030-100901

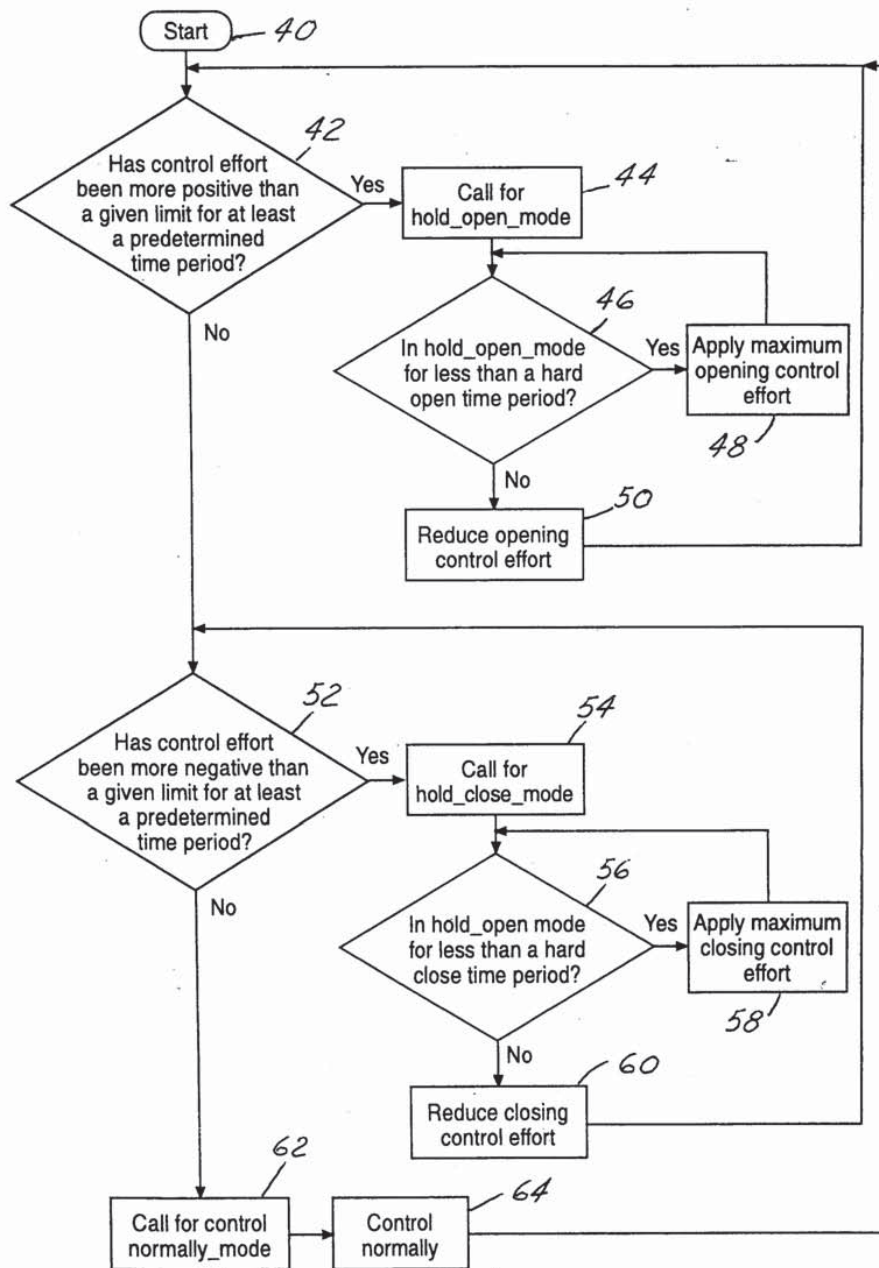


FIG. 2



#2  
JC821 U.S. PTO  
09/27/01  
10/09/01

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Ross Dykstra Pursifull  
Serial No. Unassigned  
Filed: Herewith  
For: ELECTRONIC THROTTLE SERVO OVERHEAT  
PROTECTION SYSTEM

Attorney Docket No: 199-1343 (VGT 0118 PUS)

I hereby certify that this correspondence is being deposited with the United States Postal Service via "Express Mail" under Label No. EL 856002582 US in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on:

10-9-01  
Date of Deposit

To Anne Croskey

*Jo Anne Croskey*  
Signature

DISCLOSURE STATEMENT  
UNDER 37 C.F.R. § 1.97

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

In compliance with 37 C.F.R. § 1.97, the art listed and identified on the attached Form PTO-1449 is being submitted herewith for consideration by the Examiner. A copy of each of the listed references is included herewith.

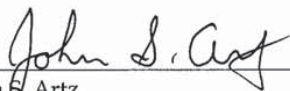
It is Applicant's opinion that the claims presently on file patentably distinguish the present invention from each of these references. The above references are being cited only in the interests of candor and without any admission that they constitute statutory prior art or contain matter which anticipates the invention or which would render the same obvious, either singly or in combination, to a person of ordinary skill in the art.

199-1343 (VGT 0118 PUS)

The Commissioner is authorized to charge any additional fees which may be required, or credit any overpayment, to Deposit Account No. 50-0476.

Respectfully submitted,

By:

  
John S. Artz  
Reg. No. 36,431  
28333 Telegraph Road, Suite 250  
Southfield, MI 48034  
(248) 223-9500

Attorney for Applicant(s)

Date: October 9, 2001

and Trademark Office: U.S. DEPARTMENT OF COMMERCE  
information unless it contains a valid OMB control number.

JC821 U.S. PRO  
09/973030  
10/09/01

[illegible][illegible]

Examiner Signature		Date Considered	4-15-03
-----------------------	---	--------------------	---------

<sup>1</sup> Unique classification designation number. <sup>2</sup> See attached Kinds of U.S. Patent Documents. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

3747  
PRE. Amtd.  
3/A

In re Application of:

R. Pursifull

Serial No.: 09/973,039

Filed: October 9, 2001

For: ELECTRONIC THROTTLE SERVO  
OVERHEAT PROTECTION SYSTEM

RECEIVED

OCT 15 2002  
TECHNOLOGY CENTER R3700

Attorney Docket No: 199-1343 (VGT 0118 PA)

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail to: Assistant Commissioner for Patents, Washington, D.C. 20231 on:

October 3, 2002  
Date of Deposit

*Jo Anne Crosskey*  
Signature

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

Please amend the application as follows:

In the Claims:

Kindly substitute claim 11 with the following:

A' 11. (Amended) The method as recited in claim 9, wherein said hard close time period is 30 milliseconds.

Kindly substitute claim 20 with the following:

A<sup>2</sup> 20. (Amended) The system as recited in claim 19, wherein said controller further includes control logic operative to command application of a maximum control effort to the positioning device for a hard close time period.

Kindly substitute claim 22 with the following:

A<sup>3</sup> 22. (Amended) The method as recited in claim 20, wherein said hard close time period is 30 milliseconds.



**REMARKS**

The Applicant wishes to thank the Examiner for considering the present application. The Applicant respectfully submits that the amendments requested above do not introduce new matter into the disclosure of the application and therefore are allowable.

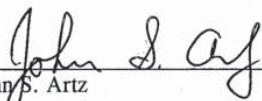
Regarding the amendments to claims 11 and 22, the Applicant submits that these amendments are adequately supported by the originally filed specification. In particular, the originally filed specification, on page 9, paragraph 23, discloses that the hold close time period is approximately 30 milliseconds in duration. Claims 11 and 22 have been amended to properly recite this limitation. Therefore, the Applicant submits that the claims 11 and 22, as amended, are proper and in an allowable condition.

Regarding the amendment to claim 20, the Applicant asserts that this amendment is proper because it is also supported by the application as originally filed. Specifically, claim 20 depends from claim 19, which in turn depends from independent claim 12. Both claims 12 and 19 relate to a system whereas claim 20 recites a method. The Applicant has amended claim 20 such that it correctly recites a system, rather than a method. The Applicant submits that claim 20, as amended, does not add new matter, and therefore is in an allowable condition.

In light of the above remarks, the Applicant respectfully submits that claims 11, 20, and 22 are in an allowable condition and that the amendments are fully supported by the application as originally filed.

Respectfully submitted,

ARTZ & ARTZ, P.C.

  
John S. Artz  
Reg. No. 36,431  
28333 Telegraph Road, Ste. 250  
Southfield, MI 48034  
Attorney for Applicant(s)

Date: October 3, 2002

**"VERSION WITH MARKINGS TO SHOW CHANGES MADE"****In the Claims:**

Kindly substitute claim 11 with the following:

11. (Amended) The method as recited in claim 9, wherein said hard close [predetermined] time period is 30 milliseconds.

Kindly substitute claim 20 with the following:

20. (Amended) The system [method] as recited in claim 19, wherein said controller further includes control logic operative to command application of [further comprising the step of applying] a maximum control effort to the positioning device for a hard close time period.

Kindly substitute claim 22 with the following:

22. (Amended) The method as recited in claim 20, wherein said hard close [predetermined] time period is 30 milliseconds.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/973,030	10/09/2001	Ross Dykstra Pursifull	199-1343 (VGT 0118 PUS)	5130

7590 04/22/2003  
John S. Artz  
Artz & Artz, PC  
Suite 250  
28333 Telegraph Road  
Southfield, MI 48034

EXAMINER

CASTRO, ARNOLD

ART UNIT

PAPER NUMBER

3747

DATE MAILED: 04/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/973,030	PURSIFULL	
	<b>Examiner</b>	<b>Art Unit</b>	
	Arnold Castro	3747	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) ☐ Responsive to communication(s) filed on \_\_\_\_.

2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) ☒ Claim(s) 1-22 is/are pending in the application.

    4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.

5) ☐ Claim(s) \_\_\_\_ is/are allowed.

6) ☒ Claim(s) 1,8 and 12 is/are rejected.

7) ☒ Claim(s) 2-7,9-11 and 13-22 is/are objected to.

8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All   b) ☐ Some \*   c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.

4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other:

## DETAILED ACTION

### *Double Patenting*

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 1, 8, and 12 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,539,918. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 1, 2, and 10 of patent contain additional steps over claims 1, 8, and 12 of patent application. The step of commanding the positioning



device to change to a full stop position ; and learning a positioning device voltage at said full stop position. It is has been held that omission of an element and its function is obvious If the function of the element is not desired. Ex parte Wu, 10 USPQ 2031 (Bd. Pat. App. & Inter. 1989See also In re Larson, 340 F.2d 965, 144 USPQ 347 (CCPA 1965) (Omission of additional framework and axle which served to increase the cargo carrying capacity of prior art mobile fluid carrying unit would have been obvious if this feature was not desired.); and In re Kuhle, 526 F.2d 553, 188 USPQ 7 (CCPA 1975) (deleting a prior art switch member and thereby eliminating its function was an obvious expedient). Thus it would be obvious not to complete the extra steps of claims 1, 2, and 10.

***Allowable Subject Matter***

3. Claims 2-7, 9-11, and 13-22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
4. Claims 1, 8, and 12 are allowable pending a timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) to overcome rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

**Conclusion**

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Pursifull US 6,488,006, Keegan 5,115,396 and Fujiyoshi JP 03226283 A are protection systems for servomotors.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arnold Castro whose telephone number is (703) 305-0039. The examiner can normally be reached on 7:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yuen Henry can be reached on (703) 308-1946. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9302 for regular communications and (703) 872-9303 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0861.



Arnold Castro  
Examiner  
Art Unit 3747

AC  
April 21, 2003

<b>Notice of References Cited</b>	Application/Control No. 09/973,030	Applicant(s)/Patent Under Reexamination PURSIFULL	
	Examiner Arnold Castro	Art Unit 3747	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-6,488,006	12-2002	Pursifull, Ross Dykstra	123/339.25
	B	US-5,115,396	05-1992	Keegan, Kevin R.	701/102
	C	US-6,539,918	04-1993	Pursifull	123/399
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

**FOREIGN PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

**NON-PATENT DOCUMENTS**

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

U.S. Patent and Trademark Office  
PTO-892 (Rev. 01-2001)

Notice of References Cited

Part of Paper No. 4



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re Application of:

Applicant(s): Ross Dykstra Pursifull  
Serial No: 09/973,030 Group Art Unit: 3747  
Filed: October 9, 2001 Examiner:  
For: ELECTRONIC THROTTLE SERVO OVERHEAT PROTECTION  
SYSTEM

Attorney Docket No: 199-1343 (VGT 0118 PUS)

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Box DD, Washington, D.C. 20231 on:

April 11, 2003  
Date of Deposit

To Anne Croskey

*Jo Anne Croskey*  
Signature

**SUPPLEMENTAL DISCLOSURE STATEMENT  
UNDER 37 C.F.R. § 1.56**

Assistant Commissioner for Patents  
Box DD  
Washington, D.C. 20231

**RECEIVED**

MAY 05 2003

TECHNOLOGY CENTER R3700

Sir:


In compliance with 37 C.F.R. § 1.56, the art listed and identified on the attached PTO Form 1449A is being submitted herewith for consideration by the Examiner. A copy of each of the listed references is included herewith as well as a copy of the foreign search report.

It is hereby certified that this Disclosure Statement is being submitted to the Patent Office within three (3) months from the date the International Search Report was received.

It is Applicant's opinion that the claims presently on file patentably distinguish the present invention from each of these references. The above references are being cited only in the interests of candor and without any admission that they constitute statutory prior art or contain matter which anticipates the invention or which would render the same obvious, either singly or in combination, to a person of ordinary skill in the art.

The Commissioner is authorized to charge any additional fees, which may be required, or credit any overpayment, to Deposit Account No. 50-0476.

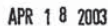
Respectfully submitted,

  
\_\_\_\_\_  
Vincent C. Ilagan  
Registration No. 53,053  
28333 Telegraph Road, Suite 250  
Southfield, MI 48034  
(248) 223-9500

Attorney for Applicant(s)

Date: April 11, 2003





PTO/SR/DRA (10-96) (MODIFIED)

Approved for use through 10/31/99. OMB 0651-0031

Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substituted Form 1449A-PTC

## Information Disclosure Statement

By Applicant

(use as many sheets as necessary)

Sheet	1		1
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**Complete if Known**

Application Number	09/973,030
Filing Date	October 9, 2001
Applicant	Pursifull
Group Art Unit	3747
Examiner Name	
Attorney Docket Number	199-1343 (VGT 0118 PUS)

## U.S. PATENT DOCUMENTS

[illegible]

## FOREIGN PATENT DOCUMENTS

[illegible]

PERFECTION

Examiner Signature		Date Considered	10-29-03
-----------------------	---	--------------------	----------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Unique citation designation number. <sup>2</sup> See attached Kinds of U.S. Patent Documents. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.



INVESTOR IN PEOPLE

Application No: GB 0220055.8  
Claims searched: 1-24

Examiner: Dave Mobbs  
Date of search: 20 February 2003

### Patents Act 1977 : Search Report under Section 17

#### Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-4, 8, 12-15, 19.	DE 3608555 A (Robert Bosch) - see particularly the abstract and claims 1 and 4.

#### Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

#### Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC<sup>V</sup>:

--

Worldwide search of patent documents classified in the following areas of the IPC<sup>7</sup>:

F02D
------

The following online and other databases have been used in the preparation of this search report:

EPODOC, JAPIO, WPI.
---------------------



INVESTOR IN PEOPLE

Your ref: P3509.P4/RAM  
Application No: GB 0220055.8  
Applicant: Visteon Global Technologies, Inc.  
Latest date for reply: 9 October 2003

Examiner: Dave Mobbs  
Tel: 01633 814812  
Date of report: 21 February 2003  
Page 1/1

## **Patents Act 1977**

### **Combined Search and Examination Report under Sections 17 & 18(3)**

#### **Novelty**

1. The invention as defined in claims 1 and 12 is not new because it has already been disclosed in the following document:

DE 3608555 A (Robert Bosch) - see particularly the abstract and claims 1 and 4.

#### **Inventive step**

2. The invention as defined in claims 2-4, 8, 13-15 and 19 is obvious in view of what has already been disclosed in the following document:

DE 3608555 A

3. The DE patent discloses all the requirements of claims 1 and 12. The parameters of 6 volts and 300 milliseconds required by claims 2, 3, 13 and 14 are threshold and time parameters which apply in the particular system which has been chosen by the applicants, and do not provide an inventive step over the disclosure of the system generally in the DE patent. Similarly, the features of claims 4, 8, 15 and 19 that the command parameter is issued in what is referred to as either a "hold open mode" or "hold close mode" do not provide an inventive step over the disclosure in the DE patent.

#### **Clarity and Support**

4. There is at present no clear link in claims 1 and 12 between the "control effort required to change to the commanded position" and the "electric motor". These claims should apparently specify that the electric motor provides this "control effort".

5. There is apparently no support in the description for the subject matter of claims 7, 11, 18 and 22.



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

3747  
#6/IPS  
7/3/03  
lu

re Patent Application of:

Applicant(s): Ross Dykstra Pursifull  
Serial No: 09/973,030 Group Art Unit: 3747  
Filed: October 9, 2001 Examiner:  
For: ELECTRONIC THROTTLE SERVO OVERHEAT PROTECTION SYSTEM

Attorney Docket No: 199-1343 (VGT 0118 PUS)

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Box DD, Washington, D.C. 20231 on:

April 10, 2003  
Date of Deposit

Jo Anne Croskey

*Jo Anne Croskey*  
Signature

SUPPLEMENTAL DISCLOSURE STATEMENT  
UNDER 37 C.F.R. § 1.56

Assistant Commissioner for Patents  
Box DD  
Washington, D.C. 20231

RECEIVED  
JUL 02 2003  
TECHNOLOGY CENTER R3700

Sir:

In compliance with 37 C.F.R. § 1.56, the art listed and identified on the attached PTO Form 1449A is being submitted herewith for consideration by the Examiner. A copy of each of the listed references is included herewith as well as a copy of the foreign search report.


It is hereby certified that this Disclosure Statement is being submitted to the Patent Office within three (3) months from the date the International Search Report was received.

It is Applicant's opinion that the claims presently on file patentably distinguish the present invention from each of these references. The above references are being

It is Applicant's opinion that the claims presently on file patentably distinguish the present invention from each of these references. The above references are being cited only in the interests of candor and without any admission that they constitute statutory prior art or contain matter which anticipates the invention or which would render the same obvious, either singly or in combination, to a person of ordinary skill in the art.

The Commissioner is authorized to charge any additional fees, which may be required, or credit any overpayment, to Deposit Account No. 50-0476.

Respectfully submitted,



Vincent C. Ilagan  
Registration No. 53,053  
28333 Telegraph Road, Suite 250  
Southfield, MI 48034  
(248) 223-9500

Attorney for Applicant(s)

Date: June 26, 2003



0051



Application No: GB 0223142.1  
Claims searched: 1-11

Examiner: Tyrone Moore  
Date of search: 27 March 2003

### Patents Act 1977 : Search Report under Section 17

#### Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-11	US 5809966 A (BOSCH GMBH ROBERT) See figures 1-5 and the description, especially in column 3 at line 13 to column 4 at line 10.
AE		US 6393350 B1 (FORD GLOBAL TECHNOLOGIES) Whole document

#### Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

#### Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC<sup>v</sup>:

G3N

Worldwide search of patent documents classified in the following areas of the IPC<sup>7</sup>:

B60K; F02D

The following online and other databases have been used in the preparation of this search report:

WPI, EPODOC, JAPIO.



INVESTOR IN PEOPLE

Your ref: P3508.P4/PAG  
Application No: GB 0223142.1  
Applicant: VISTEON GLOBAL TECHNOLOGIES, Inc.  
Latest date for reply: 16 October 2003

Examiner: Tyrone Moore  
Tel: 01633 813689  
Date of report: 27 March 2003  
Page 1/2

## Patents Act 1977

### Combined Search and Examination Report under Sections 17 & 18(3)

#### Novelty or inventive step

1. Although your statement of claim is set out clearly, it seems that it might not be new or that it might be obvious in view of what is disclosed in the following document:

US 5809966 A (BOSCH GMBH ROBERT) See figures 1-5 and the description, especially in column 3 at line 13 to column 4 at line 10.

2. You should consider this document carefully when amending your specification.
3. The cited document above claims a method for controlling a positioning device, this method is practically identical to that of this GB application with one exception, this being, an actual position of the throttle is specified instead of the commanded position of the throttle. However, in the description of Bosch (col.3, ln.13 to col.4, ln.10) an embodiment is described with wording which is substantially identical to the preferred embodiment described in this GB application (pages 8 to 10). It is therefore considered that as the scope of the embodiments described are the same, Bosch must therefore anticipate this application. Furthermore, there would appear to be no inventive step involved in applying a commanded position term in replacement of an actual position term.
4. The dependent claims of Bosch appear to be substantially identical to that of this GB application. Therefore claims 2-11 are also believed to be anticipated.

#### Clarity / Support - Section 14(5).

5. There appears to be an inconsistency with claim 1 and the description on page 8. Claim 1 clearly states the use of "a commanded position" for forming a drive signal for the motor, whereas in the description (pg.8, ln.14-20), the preferred embodiment describes a throttle control unit (TCU) which uses an actual position of the positioning device. The TCU then forms an output signal based on the actual position. Furthermore, there appears to be no embodiment describing the use of a commanded position of a positioning device used for forming an output signal.
6. There appears to be no antecedent for the term "commanded position" used in claim 1 at line 11.

An Executive Agency of the Department of Trade and Industry



Your ref: P3508.P4/PAG  
Application No: GB 0223142.1

Date of Report: 27 March 2003  
Page 2/2

[ Examination Report contd. ]

7. The term "region" used in claims 1 and 9 is considered to be unclear in scope, thus rendering the scope of these claims indeterminate.
8. The term "said current" used in claim 2, (pg.11, ln.21), appears to have no antecedent.
9. The term 'approximately' used in claim 2 (pg.11, ln.23) is unclear in scope. Furthermore the phrase 'approximately compensated' used at the above reference point is also unclear in its meaning and therefore casting doubt on the scope of this claim.
10. In claim 3, (pg.11, ln.26) there appears to be no antecedent for the term "the magnitude"
11. The statement of invention on page 3 is not fully consistent with the statement of claim.





37474

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Ross Pursifull

Serial No.: 09/973,030

Group Art Unit: 3747

Filed: October 9, 2001

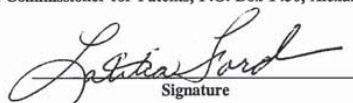
Examiner: Arnold Castro

For: **ELECTRONIC THROTTLE SERVO OVERHEAT  
PROTECTION SYSTEM**

Atty Docket: 199-1343 (VGT 0118 PUS)

I hereby certify that this correspondence is being deposited with the United States Postal Service as first-class mail in an envelope addressed to: Mail Stop Non-Fee Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on:

8/22/2003  
Date of Deposit

  
Signature

**RESPONSE TO OFFICE ACTION**

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

This is in response to the Office Action mailed April 22, 2003 in the above-identified application. This Response is being accompanied by a Petition for One Month Extension of Time and the appropriate fee and is therefore due on or before August 22, 2003.

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**REMARKS**

The Examiner rejected claims 1, 8, and 12 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,539,918. The Applicant appreciates the Examiner's indication that claims 2-7, 9-11, and 13-22, which are objected to as being dependent upon a rejected base claim, would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The Applicant also appreciates the Examiner's indication that claims 1, 8, and 12 would be allowable pending a timely filed terminal disclaimer.

Accordingly, the Applicant files herewith a terminal disclaimer in compliance with 37 CFR 1.321(c) to overcome the obviousness-type double patenting rejection.

It is therefore submitted that all objections and rejections of record have been overcome and that all pending claims are in addition for allowance. A notice of allowability is therefore earnestly solicited.

199-1343 (VGT 0118 PUS)


- 3 -

Serial No. 09/973,030

If the Examiner should have any questions, he is urged to contact the undersigned at 248-223-9500.

Respectfully Submitted

**ARTZ & ARTZ, P.C.**

A handwritten signature in cursive script, appearing to read "John S. Artz", is written over a horizontal line.

John S. Artz, Reg. No. 36,431  
28333 Telegraph Road, Suite 250  
Southfield, MI 48034  
(248) 223-9500

Dated: August 22, 2003

# **TERMINAL DISCLAIMER TO OBTAIN A DOUBLE PATENTING REJECTION OVER A PRIOR PATENT**

Docket Number (Optional)  
199-1343 (VGT 0118 PUS)

In re Application of: Ross Dykstra Pursifull

Application No.: 09/973,030

Filed: October 9, 2001

For: Electronic Throttle Servo Overheat Protection System

The owner\*, Visteon Global Technologies, Inc. of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. 154 and 173, as presently shortened by any terminal disclaimer, of prior Patent No. 6,539,918. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. 154 and 173 of the prior patent, as presently shortened by any terminal disclaimer, in the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ For submissions on behalf of an organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the organization.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

2. ☒ The undersigned is an attorney or agent of record.

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AUG 28 2003  
TECHNOLOGY CENTER R3700

John S. Artz 8/22/03  
Signature Date

John S. Artz

Typed or printed name

(248) 223-9500

Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

**WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**

\*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).  
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

This collection of information is required by 37 CFR 1.321. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)

Docket Number (Optional)  
199-1343 (VGT 0118 PUS)

In re Application of Ross Dykstra Pursifull

Application Number 09/973,030

Filed 10/09/2001

For ELECTRONIC THROTTLE SERVO OVERHEAT PROTECTION SYSTEM

Group Art Unit 3747

Examiner Arnold Castro

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and appropriate non-small-entity fee are as follows  
(check time period desired):

- ☒ One month (37 CFR 1.17(a)(1)) \$ 110.00  
☐ Two months (37 CFR 1.17(a)(2)) \$ \_\_\_\_\_  
☐ Three months (37 CFR 1.17(a)(3)) \$ \_\_\_\_\_  
☐ Four months (37 CFR 1.17(a)(4)) \$ \_\_\_\_\_  
☐ Five months (37 CFR 1.17(a)(5)) \$ \_\_\_\_\_

☐ Applicant claims small entity status. See 37 CFR 1.27. Therefore, the fee amount shown above is reduced by one-half, and the resulting fee is: \$ \_\_\_\_\_.

☒ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Commissioner has already been authorized to charge fees in this application to a Deposit Account.

☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 50-0476.  
I have enclosed a duplicate copy of this sheet.

I am the ☐ applicant/inventor

☐ assignee of record of the entire interest. See 37 CFR 3.71.  
Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).

☒ attorney or agent of record.

☐ attorney or agent under 37 CFR 1.34(a).  
Registration number if acting under 37 CFR 1.34(a) \_\_\_\_\_.

**WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**

August 22, 2003

Date

Signature

John S. Artz

Typed or printed name

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☐ Total of \_\_\_\_\_ forms are submitted.

Burden Hour Statement: This form is estimated to take 0.1 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

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# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/973,030	10/09/2001	Ross Dykstra Pursifull	199-1343 (VGT 0118 PUS)	5130
7590		11/05/2003	EXAMINER	
John S. Artz Artz & Artz, PC Suite 250 28333 Telegraph Road Southfield, MI 48034		CASTRO, ARNOLD		
		ART UNIT	PAPER NUMBER	
		3747		

DATE MAILED: 11/05/2003

9

Please find below and/or attached an Office communication concerning this application or proceeding.



<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/973,030	PURSIFULL, ROSS DYKSTRA	
	<b>Examiner</b>	<b>Art Unit</b>	
	Arnold Castro	3747	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) ☐ Responsive to communication(s) filed on \_\_\_\_.

2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) ☒ Claim(s) 1-22 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.

5) ☐ Claim(s) \_\_\_\_ is/are allowed.

6) ☒ Claim(s) 1-22 is/are rejected.

7) ☐ Claim(s) \_\_\_\_ is/are objected to.

8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All   b) ☐ Some \*   c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>5,6</u> .	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____. 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) 6) <input type="checkbox"/> Other:
---	---

## DETAILED ACTION

### *Double Patenting*

A timely filed terminal disclaimer filed a5 august 2003 is found to comply with 37 CFR 1.321(c). The obviousness-type double patenting rejection pertaining to claims 1, 8, and 12 is withdrawn.

### *Information Disclosure Statement*

1. The information disclosure statement (IDS) submitted on received April 18, 2003 was filed before the mailing date of the First Office Action on April 22, 2003. The submission is in compliance with the provisions of 37 CFR 1.97 b (3). Accordingly, the information disclosure statement is being considered by the examiner.
2. **NOTE:** Examiner would like to point out that if the first office action had been mailed five days earlier the statement submitted by applicant's attorney to comply with 37 CFR 1.97 e (1) would not have been accepted. A statement under this section must state "**That each item** of information contained in the information disclosure statement was **first cited** in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement" neither of these were met by applicants statement.
3. The information disclosure statement was received by OIPE on 30 June 2003 and placed in this case because first page listed Applicant as Ross Dykstra Pursifull and case Serial No. 09/973,030 with certified date of deposit of April 10, 2003 signed by Jo Anne Croskey. However, page 2 is signed by Vincent C liagan, who is not an attorney of record, on June 26, 2003. Page 3, the PTO-1449 is for SN 09/978,408 which is now

Patent number **6,612,287**. The first prior art 5,809,966 was considered in prosecution of that application however, the second prior art document is not of record in that case. The submitted IDS fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 for the reasons listed above and furthermore for not having a proper statement under 37 CFR 1.97 e (1) . It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 ¶ C(1).

***Allowable Subject Matter***

4. The indicated allowability of claim 1-22 is withdrawn in view of the newly discovered reference to Japan patent JP\$03226283A. Rejections based on the newly cited reference follow.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Fujiyoshi, Koji JP 03226283 A.



Koji discloses how to feed a maximum effective current from a servo amplifier and to make full use of the capacity of a semiconductor by limiting current to be fed to the servo amplifier so that the estimated junction temperature of the semiconductor will not be lower than a predetermined value. A current detector 6 directly detects the load current (i) of a servo motor 4 which is then fed back, as a current feedback signal If, to an observer 7 and a speed control section 1. Junction temperature of a semiconductor 3 is then estimated through the observer 7 based on the load current (i) of the servo motor 4 and the duration thereof. Current to be fed from the servo motor 4 is then limited so that the junction temperature does not exceed a predetermined value at any time thus protecting servo amplifier while feeding a maximum effective current thereto.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 2-11, and 13-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 03226283 A.

9. The parameters of 6 volts and 300 milliseconds required in claims 2,3,13,14 are threshold and time parameters which apply to the particular system which has been chosen by applicant. At the time the invention was made, it would have been an obvious matter of design choice to a person of ordinary skill in the art to use parameters of 6

volts and 300 milliseconds [because Applicant has not disclosed that parameters of 6 volts and 300 milliseconds provides an advantage, is used for a particular purpose, or solves a stated problem. Claims 2-7, 9-11, and 13-22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

**Conclusion**

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arnold Castro whose telephone number is (703) 305-0039. The examiner can normally be reached on 7:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yuen Henry can be reached on (703) 308-1946. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9302 for regular communications and (703) 872-9303 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0861.

  
Arnold Castro  
Examiner  
Art Unit 3747

  
Henry C. Yuen  
Supervisory Patent Examiner  
Group 3700

AC  
November 2, 2003



<b>Notice of References Cited</b>	Application/Control No. 09/973,030	Applicant(s)/Patent Under Reexamination PURSIFULL, ROSS DYKSTRA	
	Examiner Arnold Castro	Art Unit 3747	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-			
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

**FOREIGN PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N	JP403226283	10-1991	Japan	Fujiyoh, Koji	
	O					
	P					
	Q					
	R					
	S					
	T					

**NON-PATENT DOCUMENTS**

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

U.S. Patent and Trademark Office  
PTO-892 (Rev. 01-2001)

Notice of References Cited

Part of Paper No. 9

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re Application of:

Ross D. Pursifull

Serial No. 09/973,030

Group Art Unit: 3747

Filed: October 9, 2001

Examiner: Arnold Castro

For: ELECTRONIC THROTTLE SERVO OVERHEAT  
PROTECTION SYSTEM

Attorney Docket No: 199-1343 (VGT 0118 PUS)

I hereby certify that this correspondence is being transmitted via facsimile (703-872-9306) to  
Examiner Arnold Castro with the United States Patent and Trademark Office in Washington, D.C. on:

February 5, 2004  
Date of Deposit

Lisa A. Butler  
Printed Name

*Lisa A. Butler*  
Signature

RESPONSE TO OFFICE ACTION

Mail Stop Non-Fee Amendment  
Commissioner for Patents  
P. O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This is in response to the Office Action mailed November 5, 2003. This response is timely filed as it is being submitted within the three (3) month period set for response.

Please enter the following amendments and remarks:

B

Serial No. 09/973,030

2

199-1343 (VGT 0118 PUS)

In the Claims:

Claim 1 (Cancelled)

Claim 2 (Currently Amended): The method as recited in claim ~~[[1]]~~ <sup>23</sup>, wherein said threshold has an absolute value of 6 volts.

Claim 3 (Currently Amended): The method as recited in claim ~~[[1]]~~ <sup>23</sup>, wherein said predetermined time period is 300 milliseconds.

Claim 4 (Cancelled)

<sup>4</sup>  
Claim ~~5~~ (Currently Amended): The method as recited in claim ~~[[4]]~~ <sup>23</sup>, further comprising the step of applying a maximum control effort to the positioning device for a hard open time period.

<sup>5</sup>  
Claim ~~6~~ (Original): The method as recited in claim ~~5~~ <sup>4</sup>, wherein said maximum control effort is +14.5 volts.

<sup>6</sup>  
Claim ~~7~~ (Original): The method as recited in claim ~~5~~ <sup>4</sup>, wherein said hard open time period is 30 milliseconds.

<sup>7</sup>  
Claim ~~8~~ (Currently Amended): The method as recited in claim ~~[[1]]~~ <sup>23</sup>, wherein the step of commanding the positioning device to change to ~~[[a]]~~ <sup>said</sup> commanded position, comprises commanding the positioning device to close to ~~[[a]]~~ <sup>said</sup> commanded position in a hold close mode.

B

Serial No. 09/973,030

3

199-1343 (VGT 0118 PUS)

Claim <sup>8</sup>9 (Original): The method as recited in claim <sup>7</sup>8, further comprising the step of applying a maximum control effort to the positioning device for a hard close time period.

Claim <sup>9</sup>10 (Original): The method as recited in claim <sup>8</sup>9, wherein said maximum control effort is -14.5 volts.

Claim <sup>10</sup>11 (Previously Presented): The method as recited in claim <sup>8</sup>9, wherein said hard close time period is 30 milliseconds.

Claim 12 (Cancelled)

Claim <sup>12</sup>13 (Currently Amended): The system as recited in claim <sup>11</sup>[[12]] <sup>11</sup>24, wherein said threshold has an absolute value of 6 volts.

Claim <sup>13</sup>14 (Currently Amended): The system as recited in claim <sup>11</sup>[[12]] <sup>11</sup>24, wherein said predetermined time period is 300 milliseconds.

Claim <sup>14</sup>15 (Currently Amended): The system as recited in claim <sup>11</sup>[[12]] <sup>11</sup>24, wherein said controller further includes control logic operative to command the positioning device to open to <sup>11</sup>[[a]] <sup>11</sup>said commanded position in a hold open mode.

Claim <sup>15</sup>16 (Original): The system as recited in claim <sup>14</sup>15, wherein said controller further includes control logic operative to apply a maximum control effort to the positioning device for said hard open time period.

Serial No. 09/973,030

4

199-1343 (VGT 0118 PUS)

<sup>16</sup> Claim <sup>15</sup> 17 (Original): The system as recited in claim <sup>15</sup> 16, wherein said maximum control effort is +14.5 volts.

<sup>19</sup> Claim <sup>15</sup> 18 (Original): The system as recited in claim <sup>15</sup> 16, wherein said hard open time period is 30 milliseconds.

Claim 19 (Cancelled)

<sup>18</sup> Claim <sup>11</sup> 20 (Currently Amended): The system as recited in claim <sup>11</sup> [19] <sup>24</sup> 24, wherein said controller further includes control logic operative to command application of a maximum control effort to the positioning device for a hard close time period.

<sup>19</sup> Claim <sup>18</sup> 21 (Original): The system as recited in claim <sup>18</sup> 20, wherein said maximum control effort is -14.5 volts.

<sup>18</sup> Claim <sup>20</sup> 22 (Currently Amended): The ~~method~~ system as recited in claim <sup>20</sup> 20, wherein said hard close time period is 30 milliseconds.

<sup>1</sup> Claim <sup>1</sup> 23 (New): A method for controlling a positioning device of an internal combustion engine, the method comprising the steps of:

- providing an electric motor for actuating the positioning device;
- commanding the positioning device to change to a commanded position;
- detecting a control effort required to change to said commanded position;
- determining whether said control effort exceeds a threshold for a predetermined time period; and
- reducing said control effort when said control effort exceeds said threshold for said predetermined time period;



Serial No. 09/973,030

5

199-1343 (VGT 0118 PUS)

wherein commanding the positioning device to change to said commanded position comprises at least one of commanding the positioning device to open to a hold open mode and commanding the positioning device to close to a hold close mode.

<sup>11</sup>  
Claim ~~24~~ (New): A system for controlling a positioning device of an internal combustion engine to prevent overheat conditions, the system comprising:

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an electric motor for actuating the positioning device with a control effort;  
a control effort detector coupled to said electric motor and intended to detect said control effort; and

a controller coupled to said electric motor and said control effort detector, said controller including control logic operative to command the positioning device to change to a commanded position, detect a control effort required to change to said commanded position, determine whether said control effort exceeds a threshold for a predetermined time period, and reduce said control effort when said control effort exceeds said threshold for said predetermined time period;

wherein said controller further includes control logic operative to command the positioning device to close to said commanded position in a hold close mode.

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Serial No. 09/973,030

6

199-1343 (VGT 0118 PUS)

**REMARKS**

Claims 1-24 are currently pending in this application and are being retained with claims 1, 4, 8, 12, 15, and 19 being cancelled. New claims 23 and 24 have been added. Claims 2, 3, 5, and 8 have been amended to depend from claim 23. Also, claims 13-15 and 20 have been amended to depend from claim 24.

In the Office Action, the Examiner stated that the information disclosure statement ("IDS"), which was received by the OIPE on April 18, 2003, is in compliance with 37 CFR 1.97(b)(3) and is being considered by him. This IDS contains the Foreign Patent Document Number DE 3608555 A. Furthermore, the Examiner also stated that the IDS, which was received by the OIPE on June 30, 2003, was placed in the application file but was not considered as to the merits.

Regarding the merits, the obviousness-type double patenting rejection pertaining to claims 1, 8, and 12 has been withdrawn. However, the allowability of claims 1-22 has also been withdrawn in view of the newly discovered reference to Japan patent JP 03226283A ("the Koji patent"). Claims 1 and 12 stand rejected under 35 U.S.C. §102 as being anticipated by the Koji patent. Also, claims 2, 3, 13, and 14 are rejected under 35 U.S.C. 103 as being unpatentable over the Koji patent. Finally, claims 2-7, 9-11, and 13-22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claim.

By this Amendment, new claim 23 has been added including the limitations of the allowable dependent claim 4 and the rejected base claim 1. Also, claims 2, 3, 5, and 8 have been amended to depend from claim 23. It is therefore respectfully submitted that claim 23 and claims 2, 3, and 5-11, which depend from claim 23, are allowable.

Also by this Amendment, new claim 24 has been added having the limitations of allowable dependent claim 19 and the rejected base claim 12. In

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Serial No. 09/973,030

7

199-1343 (VGT 0118 PUS)

addition, claims 13-16 and 20 have been amended to depend from claim 24. Therefore, the Applicants respectfully submit that claim 24 and claims 13-18, 20-22, which depend from claim 24, are allowable.

The §102 Rejections:

Claims 1 and 12 stand rejected under 35 U.S.C. §102 as being anticipated by the Koji patent. However, by this Amendment, claims 1 and 12 have been cancelled and withdrawn from consideration. The limitations of claims 1 and 12 have been included in allowable claims 23 and 24, respectively. It is therefore respectfully submitted that the rejection of claims 1 and 12 is moot.

The §103 Rejections:


Claims 2, 3, 13, and 14 are rejected under 35 U.S.C. 103 as being unpatentable over the Koji patent. By this Amendment, claims 2 and 3 depend from allowable claim 23. Likewise, claims 13 and 14 depend from allowable claim 24. It is therefore respectfully submitted that claims 2, 3, 13, and 14 are allowable.

Conclusion:

In view of the foregoing amendments and remarks, the Applicant submits that all of the claims remaining in the case, namely claims 2, 3, 5-11, 13-18, and 20-24, are allowable. The Examiner is invited to telephone the Applicant's undersigned attorney at (248) 223-9500, if any unresolved matters remain.

Respectfully submitted,

ARTZ & ARTZ, P.C.

  
\_\_\_\_\_  
Vincent C. Ilagan  
Reg. No. 53,053  
28333 Telegraph Road, Ste. 250  
Southfield, MI 48034

Attorney for Applicants

Date: February 5, 2004

B

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of

Ross D. Pursifull

Group Art Unit: 3747

Serial No. 09/973,030

Filed: October 9, 2001

For: ELECTRONIC THROTTLE SERVO OVERHEAT PROTECTION  
SYSTEM

Attorney Docket No: 199-1343 (VGT 0118 PUS)

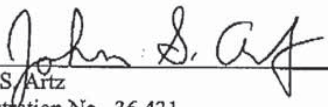
ASSOCIATE POWER OF ATTORNEY

Please recognize \*, Registration \*, as our Associate Attorney in the above-  
entitled application.

In the future, please address all correspondence and telephone inquiries to:

Artz & Artz, PC  
28333 Telegraph Road, Suite 250  
Southfield, MI 48034

Respectfully submitted,

  
John S. Artz  
Registration No. 36,431  
Artz & Artz, P.C.  
28333 Telegraph Road, Suite 250  
Southfield, MI 48034

Date: February 4, 2004

\* John A. Artz, Reg. No. 25,824  
John S. Artz, Reg. No. 36,431  
Kevin G. Mierzwa, Reg. No. 38,049  
Robert P. Renke, Reg. No. 40,783  
Angela M. Brunetti, Reg. No. 41,647  
Thomas E. Donohue, Reg. No. 44,660  
Steven W. Hays, Reg. No. 41,823  
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EXAMINER  
CASTRO, ARNOLD

ART UNIT 3747  
PAPER NUMBER

DATE MAILED: 02/09/2004

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/973,030	10/09/2001	Ross Dykstra Pursifull	199-1343 (VGT 0118 PUS)	5130

TITLE OF INVENTION: ELECTRONIC THROTTLE SERVO OVERHEAT PROTECTION SYSTEM

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1330	\$300	\$1630	05/10/2004

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/973,030	10/09/2001	Ross Dykstra Pursfull	199-1343 (VGT 0118 PUS)	5130

TITLE OF INVENTION: ELECTRONIC THROTTLE SERVO OVERHEAT PROTECTION SYSTEM

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nonprovisional	NO	\$1330	\$300	\$1630	05/10/2004

EXAMINER	ART UNIT	CLASS-SUBCLASS
CASTRO, ARNOLD	3747	123-396000

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09/973,030	10/09/2001	Ross Dykstra Pursifull	199-1343 (VGT 0118 PUS)	5130
7590 02/09/2004				
EXAMINER CASTRO, ARNOLD				
ART UNIT 3747			PAPER NUMBER	

John S. Artz  
Artz & Artz, PC  
Suite 250  
28333 Telegraph Road  
Southfield, MI 48034

DATE MAILED: 02/09/2004

**Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)**  
(application filed on or after May 29, 2000)

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ART UNIT PAPER NUMBER  
3747

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09/973,030	10/09/2001	Ross Dykstra Pursifull	199-1343 (VGT 0118 PUS)	5130

TITLE OF INVENTION: ELECTRONIC THROTTLE SERVO OVERHEAT PROTECTION SYSTEM

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nonprovisional	NO	\$1330	\$300	\$1630	05/10/2004

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09/973,030	10/09/2001	Ross Dykstra Pursifull	199-1343 (VGT 0118 PUS)	\$130

TITLE OF INVENTION: ELECTRONIC THROTTLE SERVO OVERHEAT PROTECTION SYSTEM

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1330	\$300	\$1630	05/10/2004

EXAMINER	ART UNIT	CLASS-SUBCLASS
CASTRO, ARNOLD	3747	123-396000

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If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

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Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (703) 305-1383. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.





14:57

ART RTZ LAW OFFICES

48 2239522 P.01/01

PART B - FEE(S) TRANSMITTAL

Completed and send this form, together with applicable fee(s), to: Mail

Mail Stop ISSUE FEE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
(703) 746-4000

or Fax

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 4 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Please Legibly print up with any corrections or see Block 1)

7398

02/09/2004

John S. Artz  
Artz & Artz, PC  
Suite 250  
28333 Telegraph Road  
Southfield, MI 48034

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO, on the date indicated below.

Lisa A. Butler (Date/Time/Place)  
Lisa A. Butler (Signature)  
02/21/04 (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/973,030	10/09/2001	Ross Dykstra Purifull	199-1343 (VGT 0118 PUS)	5130

TITLE OF INVENTION: ELECTRONIC THROTTLE SERVO OVERHEAT PROTECTION SYSTEM

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1330	\$300	\$1630	05/10/2004
EXAMINER		ART UNIT	CLASS-SUBCLASS		
CASTRO, ARNOLD		3747	123-396000		

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.332).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.  
☐ "Fee Address" indication (or "Fee Address" indication form PTO/SB/127; Rev 03-02, or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

John E. Kajander

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THIS PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the USPTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Visteon Global Technologies, Inc.

Dearborn, MI USA

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ individual ☒ corporation or other private group entity ☐ government

4a. The following fee(s) are enclosed:

- ☒ Issue Fee  
☐ Publication Fee  
☐ Advance Order - # of Copies

4b. Payment of Fee(s):

- ☐ A check in the amount of the fee(s) is enclosed.  
☐ Payment by credit card. Form PTO-2098 is attached.

☒ The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number 50-0476 (enclose an extra copy of this form).

Director for Patents is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.

(Authorized Signature)

(Date)

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant's registered attorney or agent, or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

This collection of information is required by 37 CFR 1.511. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Alexandria, Virginia 22313-1450.

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04/01/2004 AMHNDHF2 00000014 500476 09973030

01 FC:1501 1330.00 DA  
02 FC:1504 300.00 DA

TRANSMIT THIS FORM WITH FEE(S)

PAGE 22 \* RCVD AT 3/31/2004 2:58:22 PM [Eastern Standard Time] \* SVR:USPTO-EFRRF-2H \* DNS:7464000 \* CSID:248 2239522 \* DURATION (mm:ss):01:14 P.01

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QUERY CONTROL FORM		RTIS USE ONLY	
Application No. <u>09/973,030</u>	Prepared by <u>JG</u>	Tracking Number _____	
Examiner-GAU <u>Castro 3747</u>	Date <u>6-14-04</u>	Week Date _____	
	No. of queries <u>1</u>		

JACKET			
a. Serial No.	f. Foreign Priority	k. Print Claim(s)	p. PTO-1449
b. Applicant(s)	g. Disclaimer	l. Print Fig.	q. PTOL-85b
c. Continuing Data	h. Microfiche Appendix	m. Searched Column	r. Abstract
d. PCT	i. Title	n. PTO-270/328	s. Sheets/Figs
e. Domestic Priority	j. Claims Allowed	o. PTO-892	t. Other

[illegible]

## PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1  
 Stylesheet Version v1.2

EPAS ID: PAT4575384

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
MOBILE AUTOMOTIVE TECHNOLOGIES, LLC	08/28/2017
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	MICHIGAN MOTOR TECHNOLOGIES LLC
<b>Street Address:</b>	2360 ORCHARD LAKE ROAD SUITE 100
<b>City:</b>	SYLVAN LAKE
<b>State/Country:</b>	MICHIGAN
<b>Postal Code:</b>	48320
<b>PROPERTY NUMBERS Total: 42</b>	
<b>Property Type</b>	<b>Number</b>
Patent Number:	6345604
Patent Number:	6347680
Patent Number:	6379281
Patent Number:	6443128
Patent Number:	6510839
Patent Number:	6557540
Patent Number:	6561166
Patent Number:	6571157
Patent Number:	6581565
Patent Number:	6581574
Patent Number:	6588260
Patent Number:	6598581
Patent Number:	6607302
Patent Number:	6609497
Patent Number:	6612287
Patent Number:	6619106
Patent Number:	6644115
Patent Number:	6736122
Patent Number:	6741441
Patent Number:	6752741



Property Type	Number
Patent Number:	6757149
Patent Number:	6758885
Patent Number:	6763804
Patent Number:	6766788
Patent Number:	6817592
Patent Number:	6847882
Patent Number:	6856209
Patent Number:	6874362
Patent Number:	6976477
Patent Number:	6988031
Patent Number:	7089894
Patent Number:	7116081
Patent Number:	7124963
Patent Number:	7137577
Patent Number:	7143501
Patent Number:	7168637
Patent Number:	7191755
Patent Number:	7198207
Patent Number:	7293554
Patent Number:	7487761
Patent Number:	7712451
Patent Number:	7982358

#### CORRESPONDENCE DATA

Fax Number: (302)449-9010

*Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.*

Phone: 3024499010

Email: mmccclain@devlinlawfirm.com

Correspondent Name: TIMOTHY DEVLIN

Address Line 1: 1306 N. BROOM STREET

Address Line 2: 1ST FLOOR

Address Line 4: WILMINGTON, DELAWARE 19806

NAME OF SUBMITTER:	TIMOTHY DEVLIN
SIGNATURE:	/TIMOTHY DEVLIN/
DATE SIGNED:	08/31/2017
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 2

source=michmotorassn#page1.tif





**EXHIBIT B**

**U.S. PATENT ASSIGNMENT**

WHEREAS, Mobile Automotive Technologies, LLC, an Alabama limited liability company ("Assignor"), is the owner of (i) United States Patent and Patent Applications listed in Schedule A and the following (ii) through (iv) to the extent Assignor owns, controls or has the right to license or enforce them at any time: (ii) any patents or patent applications that claim priority directly or indirectly from any of the foregoing patent(s) in subsection (i), or from which priority is directly or indirectly claimed by any such patent(s) in subsection (i), or that have common priority with any such patent(s) in subsection (i); (iii) any foreign counterparts, foreign related patents, continuations, divisionals, continuations-in-part, extensions, substitutions, reissues, renewals and all results of oppositions, reexaminations, supplemental examinations, requests for continued examination and other review procedures of any of the foregoing in subsections (i) and (ii); and (iv) all patents issuing on patent applications covered by any of the foregoing subsections (i) through (iii) (together the "Assigned Patents").

WHEREAS, Michigan Motor Technologies LLC ("Assignee") is desirous of acquiring title in and to the Assigned Patents.

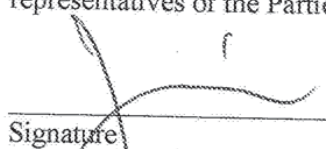
WHEREAS, Assignor is the owner of any and all right, title, and interest in and to the Assigned Patents.

WHEREAS, Assignor desires to sell, assign, and transfer all its right, title, and interest in the Assigned Patents to Assignee, and Assignee desires to obtain all such right, title, and interest in the Assigned Patents from Assignor.

NOW, THEREFORE, in consideration of good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, Assignor hereby sells, assigns, transfers and conveys unto Assignee, its permitted successors and assigns, all of Assignor's right, title, and interest in and to the Assigned Patents, together with all claims, demands, or causes of action that Assignor has or might have by reason of any infringement of the Assigned Patents prior to the effective date of this assignment, including the right to sue and collect damages for all past, present and future infringement and all lost profits resulting therefrom.

IN WITNESS WHEREOF, this Agreement has been executed by duly authorized representatives of the Parties on the dates below.

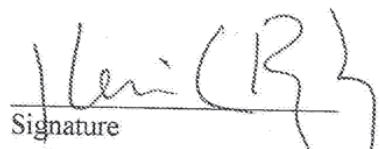
Signature

  
Name John Meli  
Mobile Automotive Technologies LLC

Date:

8/25/17

Signature

  
Name KEVIN C BRADY  
MICHIGAN MOTOR TECHNOLOGIES LLC

Date:

8/28/17

## SCHEDULE A

### Patents:

US6345604  
US6347680  
US6379281  
US6443128  
US6510839  
US6557540  
US6561166  
US6571157  
US6581565  
US6581574  
US6588260  
US6598581  
US6607302  
US6609497  
US6612287  
US6619106  
US6644115  
US6736122  
US6741441  
US6752741  
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US6758885  
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US6766788  
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US6988031  
US7089894  
US7116081  
US7124963  
US7137577  
US7143501  
US7168637  
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US7293554  
US7487761  
US7712451  
US7982358  
DE103 44 494.7-34  
GB2385013  
GB2422688  
JP4235485  
DE103 22 529.3

## PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1  
 Stylesheet Version v1.2

EPAS ID: PAT4575296

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT	
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT	
<b>CONVEYING PARTY DATA</b>		
<b>Name</b>		<b>Execution Date</b>
GODO KAISHA IP BRIDGE		11/02/2016
<b>RECEIVING PARTY DATA</b>		
<b>Name:</b>	MOBILE AUTOMOTIVE TECHNOLOGIES, LLC	
<b>Street Address:</b>	951 GOVERNMENT STREET, SUITE B	
<b>City:</b>	MOBILE	
<b>State/Country:</b>	ALABAMA	
<b>Postal Code:</b>	36604	
<b>PROPERTY NUMBERS Total: 42</b>		
<b>Property Type</b>	<b>Number</b>	
Patent Number:	6345604	
Patent Number:	6347680	
Patent Number:	6379281	
Patent Number:	6443128	
Patent Number:	6510839	
Patent Number:	6557540	
Patent Number:	6561166	
Patent Number:	6571157	
Patent Number:	6581565	
Patent Number:	6581574	
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Patent Number:	6619106	
Patent Number:	6644115	
Patent Number:	6736122	
Patent Number:	6741441	
Patent Number:	6752741	

Property Type	Number
Patent Number:	6757149
Patent Number:	6758885
Patent Number:	6763804
Patent Number:	6766788
Patent Number:	6817592
Patent Number:	6847882
Patent Number:	6856209
Patent Number:	6874362
Patent Number:	6976477
Patent Number:	6988031
Patent Number:	7089894
Patent Number:	7116081
Patent Number:	7124963
Patent Number:	7137577
Patent Number:	7143501
Patent Number:	7168637
Patent Number:	7191755
Patent Number:	7198207
Patent Number:	7293554
Patent Number:	7487761
Patent Number:	7712451
Patent Number:	7982358

#### CORRESPONDENCE DATA

Fax Number: (302)449-9010

*Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.*

Phone: 3024499010

Email: mmccclain@devlinlawfirm.com

Correspondent Name: TIMOTHY DEVLIN

Address Line 1: 1306 N. BROOM STREET

Address Line 2: 1ST FLOOR

Address Line 4: WILMINGTON, DELAWARE 19806

NAME OF SUBMITTER:	TIMOTHY DEVLIN
SIGNATURE:	/TIMOTHY DEVLIN/
DATE SIGNED:	08/31/2017
	This document serves as an Oath/Declaration (37 CFR 1.63).

**Total Attachments: 3**

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source=MobileAutoAmend-2#page3.tif







## PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1  
 Stylesheet Version v1.2

EPAS ID: PAT4575232

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT	
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT	
<b>CONVEYING PARTY DATA</b>		
<b>Name</b>		<b>Execution Date</b>
GODO KAISHA IP BRIDGE		09/02/2016
<b>RECEIVING PARTY DATA</b>		
<b>Name:</b>	MOBILE AUTOMOTIVE TECHNOLOGIES, LLC	
<b>Street Address:</b>	951 GOVERNMENT STREET, SUITE B	
<b>City:</b>	MOBILE	
<b>State/Country:</b>	ALABAMA	
<b>Postal Code:</b>	36604	
<b>PROPERTY NUMBERS Total: 42</b>		
<b>Property Type</b>	<b>Number</b>	
Patent Number:	6345604	
Patent Number:	6347680	
Patent Number:	6379281	
Patent Number:	6443128	
Patent Number:	6510839	
Patent Number:	6557540	
Patent Number:	6561166	
Patent Number:	6571157	
Patent Number:	6581565	
Patent Number:	6581574	
Patent Number:	6588260	
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Patent Number:	6609497	
Patent Number:	6612287	
Patent Number:	6619106	
Patent Number:	6644115	
Patent Number:	6736122	
Patent Number:	6741441	
Patent Number:	6752741	



Property Type	Number
Patent Number:	6757149
Patent Number:	6758885
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Patent Number:	7168637
Patent Number:	7191755
Patent Number:	7198207
Patent Number:	7293554
Patent Number:	7487761
Patent Number:	7712451
Patent Number:	7982358

#### CORRESPONDENCE DATA

Fax Number: (302)449-9010

*Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.*

Phone: 3024499010

Email: mmccclain@devlinlawfirm.com

Correspondent Name: TIMOTHY DEVLIN

Address Line 1: 1306 N. BROOM STREET

Address Line 2: 1ST FLOOR

Address Line 4: WILMINGTON, DELAWARE 19806

NAME OF SUBMITTER:	TIMOTHY DEVLIN
SIGNATURE:	/TIMOTHY DEVLIN/
DATE SIGNED:	08/31/2017
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 3

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source=MobileAutoSignedPAA#page3.tif

**EXHIBIT B**

**U.S. PATENT ASSIGNMENT**

WHEREAS, Godo Kaisha IP Bridge 1 ("Assignor"), is the owner of (i) United States Patent and Patent Applications listed in Schedule A and the following (ii) through (iv) to the extent Assignor owns, controls or has the right to license or enforce them at any time: (ii) any patents or patent applications that claim priority directly or indirectly from any of the foregoing patent(s) in subsection (i), or from which priority is directly or indirectly claimed by any such patent(s) in subsection (i), or that have common priority with any such patent(s) in subsection (i); (iii) any foreign counterparts, foreign related patents, continuations, divisionals, continuations-in-part, extensions, substitutions, reissues, renewals and all results of oppositions, reexaminations, supplemental examinations, requests for continued examination and other review procedures of any of the foregoing in subsections (i) and (ii); and (iv) all patents issuing on patent applications covered by any of the foregoing subsections (i) through (iii) (together the "Assigned Patents").

WHEREAS, Mobile Automotive Technologies, LLC, an Alabama limited liability company ("Assignee") is desirous of acquiring title in and to the Assigned Patents.

WHEREAS, Assignor is the owner of any and all right, title, and interest in and to the Assigned Patents.

WHEREAS, Assignor desires to sell, assign, and transfer all its right, title, and interest in the Assigned Patents to Assignee, and Assignee desires to obtain all such right, title, and interest in the Assigned Patents from Assignor.

NOW, THEREFORE, in consideration of good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, Assignor hereby sells, assigns, transfers and conveys unto Assignee, its permitted successors and assigns, all of Assignor's right, title, and interest in and to the Assigned Patents, together with all claims, demands, or causes of action that Assignor has or might have by reason of any infringement of the Assigned Patents prior to the effective date of this assignment, including the right to sue and collect damages for all past, present and future infringement and all lost profits resulting therefrom.

IN WITNESS WHEREOF, this Agreement has been executed by duly authorized representatives of the Parties on the dates below.

  
Signature

Hideyuki Ogata  
Name

Date: Sept. 2, 2016

  
Signature

KEVIN C. BRADY  
Name

Date: AUG 27, 2016

## SCHEDULE A

### Patents:

US6345604  
US6347680  
US6379281  
US6443128  
US6510839  
US6557540  
US6561166  
US6571157  
US6581565  
US6581574  
US6588260  
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US6607302  
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US6612287  
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US7124963  
US7137577  
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US7191755  
US7198207

US7293554  
US7487761  
US7712451  
US7982358

DE103 44 494.7-34  
GB2385013  
GB2422688  
JP4235485



## PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1  
 Stylesheet Version v1.2

EPAS ID: PAT4630877

<b>SUBMISSION TYPE:</b>	RESUBMISSION
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT
<b>RESUBMIT DOCUMENT ID:</b>	504528590
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
GODO KAISHA IP BRIDGE	11/02/2016
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	MOBILE AUTOMOTIVE TECHNOLOGIES, LLC
<b>Street Address:</b>	951 GOVERNMENT STREET, SUITE B
<b>City:</b>	MOBILE
<b>State/Country:</b>	ALABAMA
<b>Postal Code:</b>	36604
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Patent Number:	6612287
Patent Number:	6619106
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Patent Number:	6736122
Patent Number:	6741441

Property Type	Number
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Patent Number:	7089894
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Patent Number:	7293554
Patent Number:	7487761
Patent Number:	7712451
Patent Number:	7982358

**CORRESPONDENCE DATA**

Fax Number: (302)449-9010

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Correspondent Name: TIMOTHY DEVLIN

Address Line 1: 1306 N. BROOM STREET

Address Line 2: 1ST FLOOR

Address Line 4: WILMINGTON, DELAWARE 19806

NAME OF SUBMITTER:	TIMOTHY DEVLIN
SIGNATURE:	/Timothy Devlin/
DATE SIGNED:	10/06/2017
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 6

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source=MobileAutoSignedPAA#page3.tif

# AMENDMENT NO. 1 TO THE PATENT ASSIGNMENT AGREEMENT

This Amendment No. 1 (the "Amendment"), dated as of the latest execution date below, is entered into by Mobile Automotive Technologies, LLC, an Alabama limited liability company and Godo Kaisha IP Bridge 1, with its principal offices at c/o Sakura Sogo Jimusho, 1-11 Kanda Jimbocho, Chiyoda-ku, Tokyo 102-0083, Japan, and amends the Patent Assignment Agreement entered into by the parties, executed on September 2, 2016 (the "PTA"). Capitalized terms not defined herein are defined in the PTA.

The parties agree to retroactively amend the PTA as follows:

1. Exhibit A to the PTA is hereby retroactively amended and restated in its entirety in the form of Exhibit A attached hereto.
2. The parties intend and agree that this Amendment shall be effective as of the Effective Date of the PTA with the same force and effect as if executed on that date. Except as expressly amended by this Amendment, all other terms, conditions and provisions of the PTA shall apply.

IN WITNESS WHEREOF, the parties have executed this Amendment through their duly authorized representatives.

Mobile Automotive Technologies, LLC

Godo Kaisha IP Bridge 1

By: 

By: 

Name: Kevin C. Brady

Name: Hideyuki Ogata

Title: Managing Member

Title: Executive Manager

Date: 10-21-2016

Date: 11-2-2016

**EXHIBIT A**

**Patents:**

- 1 US6345604
- 2 US6347680
- 3 US6379281
- 4 US6443128
- 5 US6510839
- 6 US6557540
- 7 US6561166
- 8 US6571157
- 9 US6581565
- 10 US6581574
- 11 US6588260
- 12 US6598581
- 13 US6607302
- 14 US6609497
- 15 US6612287
- 16 US6619106
- 17 US6644115
- 18 US6736122
- 19 US6741441
- 20 US6752741
- 21 US6757149
- 22 US6758885
- 23 US6763804
- 24 US6766788
- 25 US6817592
- 26 US6847882
- 27 US6856209
- 28 US6874362
- 29 US6976477
- 30 US6988031
- 31 US7089894
- 32 US7116081
- 33 US7124963
- 34 US7137577
- 35 US7143501
- 36 US7168637



37 US7191755  
38 US7198207  
39 US7293554  
40 US7487761  
41 US7712451  
42 US7982358  
43 DE103 44 494.7-34  
44 GB2385013  
45 GB2422688  
46 JP4235485  
47 DE103 22 529.3

**EXHIBIT B**

**U.S. PATENT ASSIGNMENT**

WHEREAS, Godo Kaisha IP Bridge 1 ("Assignor"), is the owner of (i) United States Patent and Patent Applications listed in Schedule A and the following (ii) through (iv) to the extent Assignor owns, controls or has the right to license or enforce them at any time: (ii) any patents or patent applications that claim priority directly or indirectly from any of the foregoing patent(s) in subsection (i), or from which priority is directly or indirectly claimed by any such patent(s) in subsection (i), or that have common priority with any such patent(s) in subsection (i); (iii) any foreign counterparts, foreign related patents, continuations, divisionals, continuations-in-part, extensions, substitutions, reissues, renewals and all results of oppositions, reexaminations, supplemental examinations, requests for continued examination and other review procedures of any of the foregoing in subsections (i) and (ii); and (iv) all patents issuing on patent applications covered by any of the foregoing subsections (i) through (iii) (together the "Assigned Patents").

WHEREAS, Mobile Automotive Technologies, LLC, an Alabama limited liability company ("Assignee") is desirous of acquiring title in and to the Assigned Patents.

WHEREAS, Assignor is the owner of any and all right, title, and interest in and to the Assigned Patents.

WHEREAS, Assignor desires to sell, assign, and transfer all its right, title, and interest in the Assigned Patents to Assignee, and Assignee desires to obtain all such right, title, and interest in the Assigned Patents from Assignor.

NOW, THEREFORE, in consideration of good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, Assignor hereby sells, assigns, transfers and conveys unto Assignee, its permitted successors and assigns, all of Assignor's right, title, and interest in and to the Assigned Patents, together with all claims, demands, or causes of action that Assignor has or might have by reason of any infringement of the Assigned Patents prior to the effective date of this assignment, including the right to sue and collect damages for all past, present and future infringement and all lost profits resulting therefrom.

IN WITNESS WHEREOF, this Agreement has been executed by duly authorized representatives of the Parties on the dates below.

  
Signature

Hideyuki Ogata  
Name

Date: Sept. 2, 2016

  
Signature

KEVIN C. BRADY  
Name

Date: AUG 27, 2016

## SCHEDULE A

### Patents:

US6345604  
US6347680  
US6379281  
US6443128  
US6510839  
US6557540  
US6561166  
US6571157  
US6581565  
US6581574  
US6588260  
US6598581  
US6607302  
US6609497  
US6612287  
US6619106  
US6644115  
US6736122  
US6741441  
US6752741  
US6757149  
US6758885  
US6763804  
US6766788  
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US6976477  
US6988031  
US7089894  
US7116081  
US7124963  
US7137577  
US7143501  
US7168637  
US7191755  
US7198207

US7293554  
US7487761  
US7712451  
US7982358

DE103 44 494.7-34  
GB2385013  
GB2422688  
JP4235485

# PATENT APPLICATION FEE DETERMINATION RECORD

Effective October 1, 2001

Application or Docket Number

09/97 3030

## CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	22	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	22 minus 20 =	* 2
INDEPENDENT CLAIMS	2 minus 3 =	* 0
MULTIPLE DEPENDENT CLAIM PRESENT <input type="checkbox"/>		

\* If the difference in column 1 is less than zero, enter "0" in column 2

## CLAIMS AS AMENDED - PART II

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus	**
Independent	*	Minus	***
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	* 21	Minus	** 22
Independent	* 3	Minus	*** 3
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus	**
Independent	*	Minus	***
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."

\*\*\*If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

SMALL ENTITY TYPE ☐ OR

OTHER THAN SMALL ENTITY

RATE	FEE	RATE	FEE
BASIC FEE	370.00	BASIC FEE	740.00
X\$ 9=		X\$18=	36.00
X42=		X84=	
+140=		+280=	
TOTAL		TOTAL	776.00

SMALL ENTITY OR

OTHER THAN SMALL ENTITY

RATE	ADDITIONAL FEE	RATE	ADDITIONAL FEE
X\$ 9=		X\$18=	
X42=		X84=	
+140=		+280=	
TOTAL ADDIT. FEE		TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE	RATE	ADDITIONAL FEE
X\$ 9=		X\$18=	
X42=		X84=	
+140=		+280=	
TOTAL ADDIT. FEE		TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE	RATE	ADDITIONAL FEE
X\$ 9=		X\$18=	
X42=		X84=	
+140=		+280=	
TOTAL ADDIT. FEE		TOTAL ADDIT. FEE	



# CLAIMS ONLY

SERIAL NO.

09/973030

FILING DATE

APPLICANT(S)

## CLAIMS

	AS FILED		AFTER 1st AMENDMENT		AFTER 2nd AMENDMENT	
	IND.	DEP.	IND.	DEP.	IND.	DEP.
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TOTAL IND.	2					
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TOTAL CLAIMS	22					

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	IND.	DEP.	IND.	DEP.	IND.	DEP.
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TOTAL CLAIMS						

\* MAY BE USED FOR ADDITIONAL CLAIMS OR ADMENDMENTS

L Number	Hits	Search Text	DB	Time stamp
-	29012	((electic or electrical) adj2 motor	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/04/14 11:00
-	1546	((internal adj combustion adj engine) and ((electic or electrical) adj2 motor)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/04/14 11:00
-	1253	((internal adj combustion adj engine) and ((electic or electrical) adj2 motor)) and (control controller ECU PCM )	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/04/14 11:02
-	17	((internal adj combustion adj engine) and ((electic or electrical) adj2 motor)) and (control controller ECU PCM )) and (exceed\$4 with ((time adj period) or duration))	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/04/14 11:06
-	0	((internal adj combustion adj engine) and ((electic or electrical) adj2 motor)) and (exceed\$4 with ((time adj period) or duration)) not (((internal adj combustion adj engine) and ((electic or electrical) adj2 motor)) and (control controller ECU PCM )) and (exceed\$4 with ((time adj period) or duration))	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/04/14 11:07
-	201	((electic or electrical) adj2 motor) and (exceed\$4 with ((time adj period) or duration)) not (((internal adj combustion adj engine) and ((electic or electrical) adj2 motor)) and (control controller ECU PCM )) and (exceed\$4 with ((time adj period) or duration))	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/04/14 11:09
-	120	(position adj sensor) and ((internal adj combustion adj engine) and ((electic or electrical) adj2 motor))	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/04/14 11:13
-	52409	(time or period) with (greater exceed\$3) with (threshold limit maximum)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/04/14 11:44
-	120	((position adj sensor) and ((internal adj combustion adj engine) and ((electic or electrical) adj2 motor))) and ((electic or electrical) adj2 motor)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/04/14 11:46
-	0	((position adj sensor) and ((internal adj combustion adj engine) and ((electic or electrical) adj2 motor))) and ((electic or electrical) adj2 motor)) not ((position adj sensor) and ((internal adj combustion adj engine) and ((electic or electrical) adj2 motor)))	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/04/14 11:45
-	48	((time or period) with (greater exceed\$3) with (threshold limit maximum)) and ((internal adj combustion adj engine) and ((electic or electrical) adj2 motor))	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/04/14 11:55
-	23	overheat adj protection adj system	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/04/14 12:10

-	6	"5936820"	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB USPAT	2003/04/14 12:01
-	10	("4399781"   "4924112"   "5431620"   "5509881"   "5838133"   "5838578"   "5872441"   "5936820"   "6014003"   "6100660"   "2001/0010453").PN.		2003/04/14 12:04
-	4	("5070426"   "5430636"   "5483167"   "5936820").PN.	USPAT	2003/04/14 12:09
-	150	overheat same throttle	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB USPAT	2003/04/14 12:10
-	66	overheat with throttle	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB USPAT	2003/04/17 07:43
-	1	("6539918").PN.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB USPAT	2003/04/14 12:13
-	2	("5947086"   "5992383").PN.	USPAT	2003/04/14 12:13
-	2	5947086.URPN.	USPAT	2003/04/14 12:14
-	9	5992383.URPN.	USPAT	2003/04/14 12:14
-	164	(318/635).CCLS.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB USPAT	2003/04/17 07:35
-	15	protect\$5.ab. and (((318/566) or (318/635)).CCLS.)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB USPAT	2003/04/17 07:35
-	2	overheat and (((318/566) or (318/635)).CCLS.)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB USPAT	2003/04/17 07:44
-	37	prevent\$3.ab. and (((318/566) or (318/635)).CCLS.)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB USPAT	2003/04/17 07:44
-	292	((318/566) or (318/635)).CCLS.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB USPAT	2003/04/17 07:49
-	2	("3226283").PN.	DERWENT	2003/04/17 07:54
-	2	("3226283").PN.	DERWENT	2003/04/17 07:54



ISSUE SLIP STAMP AREA (for additional cross references)

POSITION	INITIALS	ID NO.	DATE
FEE DETERMINATION	<i>Harte</i>		<i>10-11-01</i>
O.I.P.E. CLASSIFIER	<i>MS</i>	<i>842 10</i>	<i>10-25-01</i>
FORMALITY REVIEW			

INDEX OF CLAIMS

✓ ..... Rejected      N ..... Non-elected  
 = ..... Allowed      I ..... Interference  
 - (Through numeral) Canceled      A ..... Appeal  
 + ..... Restricted      O ..... Objected

Claim	Date
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If more than 150 claims or 10 actions  
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*1108*

# SEARCHED

Class	Sub.	Date	Exmr.
318	563	4-15-03	AC
318	565	4-15-03	AC
318	626	4-15-03	AC
123	396	4-15-03	AC
123	397	1	1
123	399	4-15-03	AC
123	339.15	4-15-03	AC
123	339.16	4-15-03	AD
123	568.24	4-15-03	AC
251	129.11	4-15-03	AC
251	129.12	4-15-03	AC
251	129.13	4-15-03	AC
318	566	4-17-03	AC
318	635	4-17-03	AC
update		9-4-03	AC
update		2-6-04	AC

# INTERFERENCE SEARCHED

Class	Sub.	Date	Exmr.
318	563, 565	4-4-03	AC
318	626, 635		
318	566		
123	396, 397		
1	399, 339.11		
123	339.16,		
123	568.24		
251	129.11		
1	1		
251	129.13	9-4-03	AC

# SEARCH NOTES (INCLUDING SEARCH STRATEGY)

	Date	Exmr.
EAST	4-14-03	AC

(RIGHT OUTSIDE)





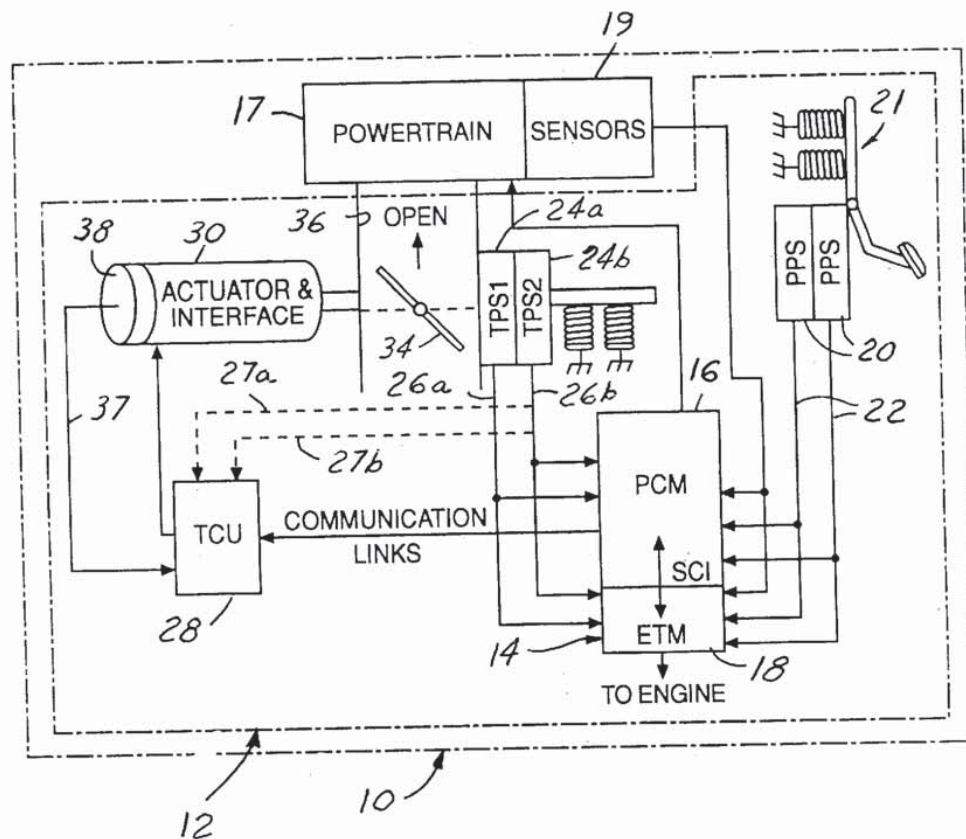
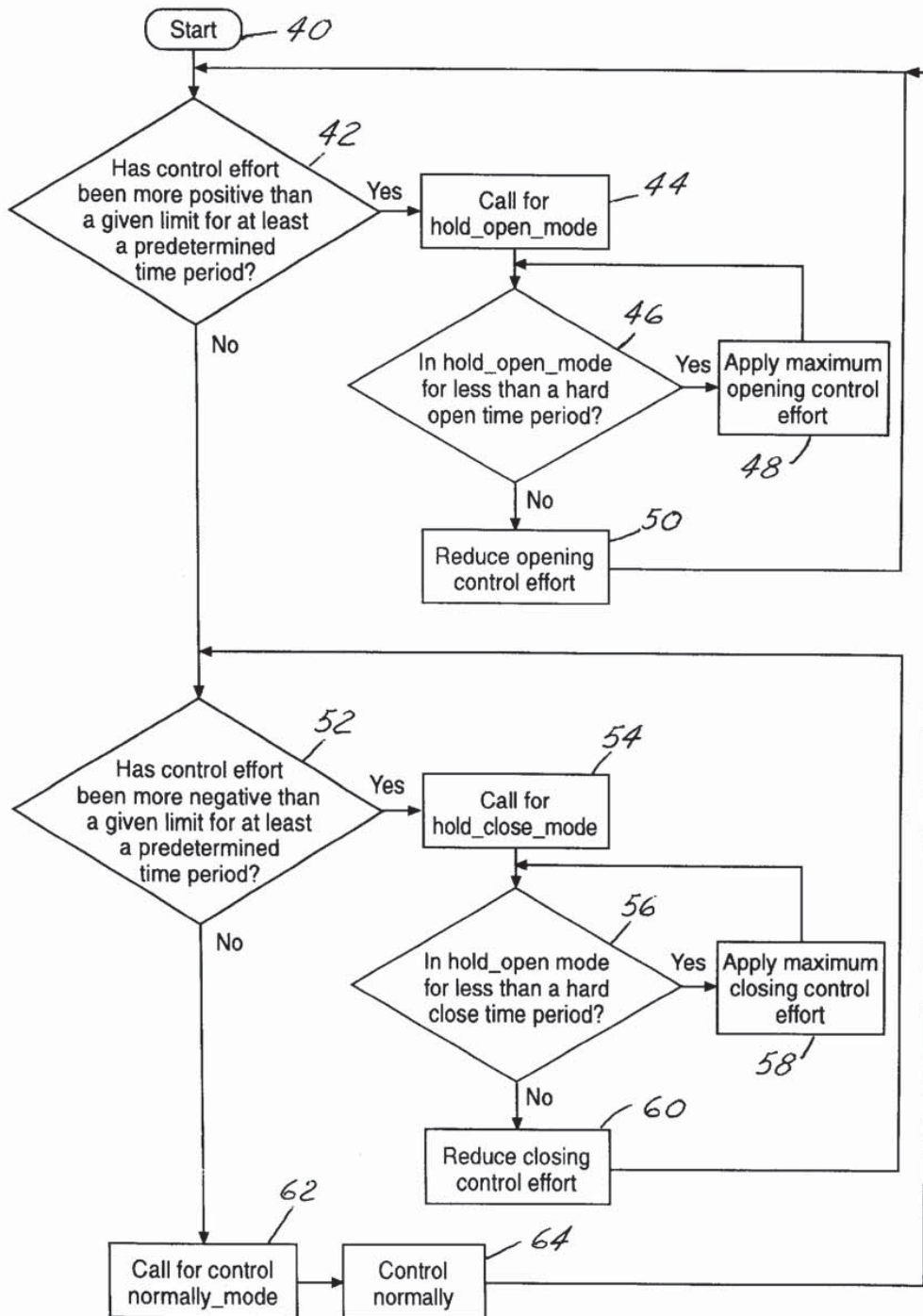


FIG. 1

**FIG. 2**



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## ELECTRONIC THROTTLE SERVO OVERHEAT PROTECTION SYSTEM

### TECHNICAL FIELD

The present invention relates generally to control systems for internal combustion engines, and more particularly, to an electronic throttle servo temperature protection system.

### BACKGROUND ART

Many previously known motor vehicle throttle controls have a direct physical linkage between an accelerator pedal and the throttle body so that the throttle plate is pulled open by the accelerator cable as the driver presses the pedal. The direct mechanical linkage includes biasing that defaults the linkage to a reduced operating position, in a manner consistent with regulations. Nevertheless, such mechanisms are often simple and unable to adapt fuel efficiency to changing traveling conditions, and add significant weight and components to the motor vehicle.

An alternative control for improving throttle control and the precise introduction of fuel air mixtures into the engine cylinders is accomplished by electronic throttle control. The electronic throttle control includes a throttle control unit that positions the throttle plate by an actuator controlled by a microprocessor based on the current operating state determined by sensors. The processors are often included as part of a powertrain electronic control that can adjust the fuel air intake and ignition in response to changing conditions of vehicle operation as well as operator control. Protection may be provided so that an electronic system does not misread or misdirect the control and so that unintended operation is avoided when portions of the electronic control suffer a failure.

Typically, the actuator or servomotor used to position the throttle plate is designed to have the maximum control effort available (motor voltage, current, duty cycle) to enhance throttle plate position response. Having a large control effort continuously available or available for maximum effort could possibly lead to overstressing the system's physical components if a blockage of the throttle plate occurs or the mechanism encounters a mechanical limit. For example, a mechanical limit may be an open stop or a close stop. Specifically, the H-driver and the servomotor could overheat with sustained full control effort under some environmental conditions. In an effort to avoid permanent damage, some electronic systems shut down when they get to a threshold temperature.

The disadvantages associated with these conventional electronic throttle overheating protection techniques have made it apparent that a new technique for electronic throttle overheating protection is needed. The new technique should allow full control effort while preventing overheating conditions. The present invention is directed to these ends.

### SUMMARY OF THE INVENTION

It is, therefore, an object of the invention to provide an improved and reliable electronic throttle servo temperature protection system. Another object of the invention is to allow full control effort while preventing overheating conditions.

In accordance with the above and other objects of the present invention, an electronic throttle servo overheating protection system is provided. In one embodiment of the invention, a method for controlling a positioning device

2

associated with internal combustion engine control is provided. In accordance with the method, an electric motor actuates the positioning device. The positioning device is then commanded to change to a commanded position. The control effort required to change to the commanded position is detected. It is then determined whether the control effort exceeds a threshold for a predetermined time period. When the control effort exceeds the threshold for the predetermined time period, the control effort is reduced.

The present invention thus achieves an improved electronic throttle servo overheating protection system. The present invention is advantageous in that it will not cause mechanism failure or require significant and costly added robustness to the mechanism.

Additional advantages and features of the present invention will become apparent from the description that follows, and may be realized by means of the instrumentalities and combinations particularly pointed out in the appended claims, taken in conjunction with the accompanying drawings.

### BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention may be well understood, there will now be described some embodiments thereof, given by way of example, reference being made to the accompanying drawings, in which:

FIG. 1 is a block diagram of an electronic throttle servo overheating protection system in accordance with one embodiment of the present invention; and

FIG. 2 is a flow chart depicting a method of providing electronic throttle servo overheating protection in accordance with one embodiment of the present invention.

### BEST MODES FOR CARRYING OUT THE INVENTION

The present invention is illustrated herein with respect to an electronic throttle servo overheating protection system, particularly suited for the automotive field. However, the present invention is applicable to various other uses that may require electronic throttle servo overheating protection systems.

Referring to FIG. 1, a motor vehicle powertrain system 10 including electronic throttle control system 12 includes an electronic control unit 14. In the preferred embodiment, the electronic control unit 14 includes a powertrain control module (PCM) 16, including a main processor and an electronic throttle monitor (ETM) 18, including an independent processor. The PCM and ETM each share sensors 19 and actuators that are associated with the powertrain system 17 and control module 16. Preferably, the electronic throttle monitor 18 includes a processor physically located within the powertrain control module housing, although a separate housing, separate locations and other embodiments can also be employed in practicing the invention. Moreover, while the electronic throttle monitor 18 and the powertrain control module 16 have independent processors, they preferably share the inputs and outputs of powertrain sensors 19 and actuators 21 and 34, respectively, for independent processing.

A wide variety of inputs are represented in the diagram of FIG. 1 by the diagrammatic representation of redundant pedal position sensors 20. The sensors 20 are coupled through inputs 22 and are representative of many different driver controls that may demonstrate the demand for power. In addition, the electronic control unit 14 includes inputs 26a and 26b for detecting throttle position. A variety of ways for



3

providing such indications are diagrammatically represented in FIG. 1 by a first throttle position sensor 24a and a redundant second throttle position sensor 24b to obtain a power output indication. As a result of the many inputs represented at 19, 22, 26a and 26b, the electronic controller 14 provides outputs for limiting output power so that the output power does not exceed the power demand. A variety of outputs are also diagrammatically represented in FIG. 1 by the illustrated example of inputs to a throttle control unit 28 that in turn powers an actuator and motor interface 30 for displacing the throttle plate 34. For example, an actuator and interface may comprise redundant drive motors powering a gear interface to change the angle of the throttle plate 34 in the throttle body 36.

Likewise, the responsive equipment, such as a motor, may also provide feedback. For example, the motor effort sensor 38 or the throttle position sensors 24a and 24b may provide feedback to the throttle control unit 28, as shown at 37, 27a and 27b, respectively, to determine whether alternative responses are required or to maintain information for service or repair.

Referring to FIG. 2, a flow chart depicting a method of providing electronic throttle servo overheat protection in accordance with one embodiment of the present invention is illustrated. In operation, the preferred method of the present invention is initiated at step 40 and immediately proceeds to step 42. In step 42, the controller preferably determines if the control effort has been more positive than a predetermined limit for at least a predetermined time period. Typically, an effort limit of approximately +6 volts and a contiguous time interval of about 300 milliseconds are used. Obviously, these values may vary as required. If the predetermined threshold has been exceeded, then the sequence proceeds to step 44.

A hold open mode is initiated at step 44 and the immediately continued in step 46. In step 46, the controller preferably determines if it has called for the hold open mode for less than a hard open time period. A person skilled in the art understands that the hard open time period may depend upon the voltage applied to the motor. For example, a given servo motor would not overheat under the following conditions:

Positioning Effort (volts)	Duration (seconds)
18	10
16	12
14	18
12	32
10	62
9	82
8	128
7	219
6	445
5	indefinite

These operating conditions may keep a motor at less than a threshold temperature to prevent overheating. For example, a threshold temperature may be 220 degrees Celsius.

If the throttle plate has been in a hold open mode for less than the hard open time period, then the sequence proceeds to step 48. In step 48, the controller preferably applies a maximum opening control effort to the motor. In the hold open mode, a typical maximum opening control effort has a magnitude of +14.5 volts. Obviously, the magnitude of the effort may vary as required. Then, the sequence returns to step 46. If the throttle plate has been in the hold open mode for longer than the hard open time period, then the sequence proceeds to step 50.

4

In step 50, the controller preferably reduces the opening control effort applied to the motor to a moderate opening control effort. The moderate opening control effort can be applied to the motor for an indefinite period of time without permitting the motor to overheat. Typically, the moderate opening effort has a magnitude of approximately +5 volts. Then, the sequence returns to step 42.

Thus, the following sequence typically occurs when the controller is in the hold open mode. First, the system detects that it should go into the hold open mode. Then, full voltage is applied to clear or crush any small debris obstructing movement of the throttle plate. The voltage is reduced to approximately +5 volts to prevent the motor from overheating.

If in step 42 the effort has not been more positive, then the sequence proceeds to step 52. In step 52, the controller preferably determines if the control effort has been more negative than a predetermined limit for at least a predetermined time period. Typically, an effort limit of approximately -6 volts and a contiguous time interval of about 300 milliseconds are used. If the predetermined threshold has been exceeded, then the sequence proceeds to step 54.

A hold close mode is initiated in step 54 and then immediately continued in step 56. In step 56, the controller preferably determines whether it has called for a hold close mode for less than a hard close time period. A typical time period is approximately 30 milliseconds. If the throttle plate has been in the hold close mode for less than the hard close time period, then the sequence proceeds to step 58.

In step 58, the controller applies a maximum closing control effort to the motor. In the hold close mode, a typical maximum closing control effort has a magnitude of -14.5 volts. Then, the sequence returns to step 56. If the throttle plate has been in the hold close mode for longer than the hard close time period, then the sequence proceeds to step 60.

In step 60, the controller reduces the closing control effort applied to the motor to a moderate closing control effort. The moderate closing control effort can be applied to the motor for an indefinite period of time without permitting the motor to overheat. Typically, a moderate control effort of approximately -5 volts is applied to the motor. Then, the sequence returns to step 52.

Thus, the following sequence typically occurs when the controller is in the hold close mode. First, full voltage is applied to clear or crush any small debris obstructing throttle plate movement. Then, approximately -5 volts is applied to hold the plate against the close stop for a period of time determined by the method of the present invention. A voltage approximately equal to -5 volts typically prevents the motor from overheating. Then the sequence returns to step 52.

If in step 52 the effort has not been more negative than a predetermined limit for a given time period, then the sequence proceeds to step 62. In step 62, the controller initiates a control normal mode. Subsequently, the sequence immediately proceeds to step 64 in which the controller controls the throttle plate normally. The sequence then returns to step 42.

The present invention thus achieves an improved and reliable electronic throttle servo overheat protection system by monitoring when the closing or opening control effort exceeds a threshold for a given amount of time. In this way, the present invention allows full control effort while preventing overheat conditions. Additionally, the present invention does not cause mechanism failure or require significant and costly added robustness to the mechanism.



5

From the foregoing, it can be seen that there has been brought to the art a new and improved electronic throttle servo overheat protection system. It is to be understood that the preceding description of the preferred embodiment is merely illustrative of some of the many specific embodiments that represent applications of the principles of the present invention. Clearly, numerous and other arrangements would be evident to those skilled in the art without departing from the scope of the invention as defined by the following claims.

What is claimed is:

1. A method for controlling a positioning device of an internal combustion engine, the method comprising the steps of:

providing an electric motor for actuating the positioning device;

commanding the positioning device to change to a commanded position;

detecting a control effort required to change to said commanded position;

determining whether said control effort exceeds a threshold for a predetermined time period; and

reducing said control effort when said control effort exceeds said threshold for said predetermined time period;

wherein commanding the positioning device to change to said commanded position comprises at least one of commanding the positioning device to open to a hold open mode and commanding the positioning device to close to a hold close mode.

2. The method as recited in claim 1, wherein said threshold has an absolute value of 6 volts.

3. The method as recited in claim 1, wherein said predetermined time period is 300 milliseconds.

4. The method as recited in claim 1, further comprising the step of applying a maximum control effort to the positioning device for a hard open time period.

5. The method as recited in claim 4, wherein said maximum control effort is +14.5 volts.

6. The method as recited in claim 4, wherein said hard open time period is 30 milliseconds.

7. The method as recited in claim 1, wherein the step of commanding the positioning device to change to said commanded position, comprises commanding the positioning device to close to said commanded position in a hold close mode.

8. The method as recited in claim 7, further comprising the step of applying a maximum control effort to the positioning device for a hard close time period.

6

9. The method as recited in claim 8, wherein said maximum control effort is -14.5 volts.

10. The method as recited in claim 8, wherein said hard close time period is 30 milliseconds.

11. A system for controlling a positioning device of an internal combustion engine to prevent overheat conditions, the system comprising:

an electric motor for actuating the positioning device with a control effort;

a control effort detector coupled to said electric motor and intended to detect said control effort; and

a controller coupled to said electric motor and said control effort detector, said controller including control logic operative to command the positioning device to change to a commanded position, detect a control effort required to change to said commanded position, determine whether said control effort exceeds a threshold for a predetermined time period, and reduce said control effort when said control effort exceeds said threshold for said predetermined time period;

wherein said controller further includes control logic operative to command the positioning device to close to said commanded position in a hold close mode.

12. The system as recited in claim 11, wherein said threshold has an absolute value of 6 volts.

13. The system as recited in claim 11, wherein said predetermined time period is 300 milliseconds.

14. The system as recited in claim 11, wherein said controller further includes control logic operative to command the positioning device to open to said commanded position in a hold open mode.

15. The system as recited in claim 14, wherein said controller further includes control logic operative to apply a maximum control effort to the positioning device for said hard open time period.

16. The system as recited in claim 15, wherein said maximum control effort is +14.5 volts.

17. The system as recited in claim 15, wherein said hard open time period is 30 milliseconds.

18. The system as recited in claim 11, wherein said controller further includes control logic operative to command application of a maximum control effort to the positioning device for a hard close time period.

19. The system as recited in claim 18, wherein said maximum control effort is -14.5 volts.

20. The system as recited in claim 18, wherein said hard close time period is 30 milliseconds.

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