MILES & STOCKBRIDGE P.C.

September 12, 2011

**VIA E-MAIL, FEDERAL RULEMAKING PORTAL,**
**AND OVERNIGHT COURIER**

Regulatory Policy Division
Bureau of Industry and Security, Room 2099B
U. S. Department of Commerce
14th St. and Pennsylvania Avenue
Washington, DC 20230

**Re: Continental Tire and Continental Automotive Comments**
**On Proposed Revisions to the EAR**
**Parts and Components of Military Vehicles**
**Docket No: 110310188-1335-01, BIS-2011-0015**

Dear Sir/Madam:

We respectfully submit this comment letter on behalf of Continental Tire the Americas LLC (**"Continental Tire"**) and Continental Automotive, Inc. (**"Continental Auto**") (collectively with their affiliates and subsidiaries, **"Continental"**) to provide comments on the Commerce Department's proposed revisions to the Export Administration Regulation (**"EAR"**) dated July 15, 2011 (the "**proposed rules**"). As described below, Continental contributes materially to the U.S. market for automotive parts and components, including a broad range of products that are suitable for use on military and other vehicles.

Continental is most appreciative of and supports the Commerce Department's work to reform the U.S. export control system and believes that a number of the concepts embodied in the proposed rules are helpful to bring U.S. export controls into line with 21st Century realities. Even so, Continental is concerned that the proposed rules do not do enough to advance the U.S. government's announced goal of "building higher walls around fewer products." **In addition, Continental submits that the proposed rules would have a number of unintended consequences, such as continuing to make it expensive and difficult for the U.S. military to obtain the sorts of commercially available parts and components that are available for consumer and commercial vehicles around the globe. Indeed, foreign militaries would continue to enjoy greater access to these commercial parts and components than the U.S. military.** The proposed rules would also leave unnecessary compliance burdens in place for companies like Continental.

## BACKGROUND ON CONTINENTAL

With global sales in excess of $20 billion in 2010, Continental is among the world's leading automotive suppliers. Continental supplies vehicle manufacturers and the aftermarket with products such as tires, brake systems, speedometers, engine temperature sensors, tire pressure monitoring systems, instrument clusters, and other vehicle parts and components. Many parts and components produced by Continental require some adaptation or implementation work for each vehicle application but use identical technology regardless of the vehicle application.

Continental currently has operations in approximately 45 countries and has a major U.S. presence, with several dozen U.S. locations and over 10,000 employees throughout the U.S. Continental has significant research and development, engineering, testing, and sales facilities located in Michigan, Illinois, Pennsylvania, New Jersey, New Hampshire, Texas, New Mexico, Alabama, Georgia, North Carolina, South Carolina, and Virginia.

As a supplier of automotive parts and components to many of the world's leading automotive original equipment manufacturers (**"OEMs"**) and the automotive aftermarket, Continental is well positioned to provide high quality, affordable, and tested products for the U.S. military market without the delay, expense, and risk associated with the development of automotive parts and components "from scratch." However, Continental's typical engineering and production teams for implementing these commercial parts could include foreign engineers employed by Continental both inside and outside the U.S. and production teams within Continental affiliates located inside and outside the U.S.

The U.S. export control regime that currently regulates military parts and components has severely limited Continental's ability to contribute its commercially available technologies to the production of the next generation of U.S. military vehicles, as well as the repair, upgrading, and modernization of the U.S. military's existing vehicle fleet. As a practical matter, under the proposed rules as drafted, Continental would have limited opportunity to provide even commercially available technologies to the U.S. government without the changes requested in this comment letter.

## EXECUTIVE SUMMARY

The proposed rules would modernize U.S. export controls relating to military vehicle parts and components in some respects, particularly by removing most such items from the International Traffic in Arms Regulations ("**ITAR**") United States Munitions List ("**USML**") and placing them on the EAR's Commerce Control List ("**CCL**"). Unfortunately, however, the proposed rules would continue the prior policy of restrictively regulating **most** commercial parts that have been modified — even in militarily insignificant ways — for use on a military vehicle.

The Commerce Department has proposed to reduce the export control restrictions applicable to 17 types of parts and components that it recognizes (in proposed ECCN 0A606.y) have "little or no military significance" (the **"Less Regulated List"**). While Continental agrees that the items on the list lack military significance, this proposed approach is arbitrary in that there are literally **thousands** of other types of parts and components that lack military significance that are not on the list, and no criteria were set forth in the proposed rules for determining whether a part or component had military significance. Many commercial products that are available worldwide on products such as SUVs, passenger cars, heavy trucks, light trucks, and construction equipment did not make the proposed Less Regulated List.

In addition, while the Commerce Department has proposed that certain parts and components are not militarily significant **as equipment** and should not be controlled for NS, RS, or UN reasons,[1] it has not proposed a corresponding reduction in the reasons for control for related production equipment, materials, software, and technology.

Further, many commercial automotive technologies require at least some adaptation or configuration for use on specific vehicles. This adaptation or configuration work generally requires some basic information about the vehicle or other component. However, under the proposed rules, even militarily insignificant information could remain subject to strict export controls.

Contrary to the Commerce Department's intent, the proposed rules, as drafted, would:

(a) result in continued unnecessary regulation of many militarily insignificant automotive parts and components that did not make the Less Regulated List in the proposed rules;
(b) undermine the Commerce Department's stated goal of building and enforcing higher walls around fewer items;
(c) render commercially available technologies more expensive and harder to obtain for U.S. military vehicles than for passenger cars, SUVs, trash trucks, and foreign military vehicles;
(d) run counter to Federal Acquisition Regulation ("**FAR**") principles that favor the acquisition of "commercial items" "to the maximum extent practicable;" and
(e) continue to impose unnecessary compliance burdens on Continental and other similarly situated automotive parts and components manufacturers and suppliers with respect to militarily insignificant products.

The above disadvantages would be further exacerbated by the fact that parts modified for military vehicles would likely involve limited production runs/volumes that make it even harder

[1] As explained in section 738.2 of the EAR, "NS" stands for "National Security, "RS" stands for "Regional Stability," "UN" stands for "United Nations Embargo," and "AT" (as used below in these comments) stands for "Anti-Terrorism."

to absorb compliance and licensing costs. This will make it even less likely that suppliers will be able to provide modified commercial parts (with even militarily insignificant changes) at commercial prices.

**As a practical matter, if the proposed rules go into effect without modification, many U.S. military vehicles will likely continue to lack commercially available capabilities broadly available for passenger cars, SUVs, construction equipment, and commercial trucks such as trash trucks. Even foreign militaries would be better equipped.**

In these respects, the proposed rules would perpetuate a harmful situation that currently already exists under a separate set of regulations (the ITAR), rather than help U.S. national security interests. The time has come to remove unnecessarily broad export controls and focus meaningfully on high-priority military and "dual use" technologies — not commercial technologies that are already common features on passenger vehicles and garbage trucks around the world.

Once the current export reform initiative has been implemented, if a license or license exception is **still** required to develop and export modified commercial parts (with no militarily significant changes) and components to all countries except Canada, the current reform initiative will substantially fail to achieve its purposes. Moreover, unless revised to focus primarily on enumerating and controlling **only** militarily significant technologies, the tone that the proposed rules set for the migration of other items from the ITAR to the EAR would discourage further efforts to reform the export control system.

It is time to bring U.S. export controls fully up-to-date and focus on militarily significant technologies. In addition, the U.S. military deserves access to commercially available automotive parts and components and the benefits of commercial pricing on par with what is available on passenger cars, commercial trucks, construction vehicles, trash trucks, and foreign militaries. **This is not just an export control issue; it is an opportunity to provide better access and pricing to the U.S. military on commercially available technologies, and ultimately, to better serve the U.S. warfighter.**

Please note that Continental is not asking that the Commerce Department remove NS, RS, or UN controls from such militarily significant items as weapons systems; armor, threat detection systems; and command, control, and communications systems. These items should, and would if Continental's suggested changes to the proposed rules are adopted, remain subject to strict U.S. export controls under the ITAR and EAR.

In these comments, Continental proposes several alternatives that would enable the Commerce Department to accomplish the transition of military vehicle parts and components from the ITAR to the EAR while avoiding the negative outcomes mentioned above. In particular, Continental proposes:

(a) that the final rules should provide a positive list of the parts and components or functionalities that **are** militarily significant rather than listing just a few items that have been determined to **lack** military significance;

(b) in the alternative, that certain commercial parts and components supplied by Continental be added to the Less Regulated List;

(c) that "technology node" controls relating to form, fit, and function data necessary to provide militarily insignificant parts and components to the U.S. military be relaxed; and

(d) that certain conforming changes be made to the proposed rules.

These comments break down into the following major sections:

I. Elements of the proposed rules that Continental supports

II. Proposed ways to improve the overall regulatory approach embodied by the proposed rules to better advance the interests of the United States

III. Summary of requested product-specific changes to the proposed rules — Continental is proposing to add the following categories of products (the "**Commercial Products**") to the proposed list of products deemed to have little or no militarily significance, and to make other conforming changes:

1. Gauges such as Speedometers
2. Instrument Panels/Clusters
3. Vehicle/Engine Sensors such as Tachometers
4. Vehicle/Engine Monitoring/Displays such as Check Engine Lights
5. Electronic Braking Systems
6. Multiplexing Systems to Limit Vehicle Wiring
7. Tire Pressure Monitoring Systems
8. Certain Items/Data Relating to Tires (Not Including Run-Flats)

IV. Request for specific changes to the proposed rules

V. Exhibits providing information about the Commercial Products

Continental appreciates your consideration of these very important issues. To the extent appropriate and helpful, I would be happy to meet with you in-person or by phone to discuss these comments to the proposed rules. Contact information is contained at the end of this comment letter.

## I. ELEMENTS OF THE PROPOSED RULES THAT CONTINENTAL SUPPORTS

Continental agrees with several fundamental ideas embodied in the proposed rules.

First, Continental wholeheartedly agrees with the conclusion of the Commerce and State Departments that most military vehicle parts and components need not be regulated by the ITAR and should instead be subject to Commerce Department jurisdiction. Moreover, Continental agrees that military vehicle parts and components that have little or no military significance need not be regulated as if the disclosure to foreign nationals of information about basic automotive technologies somehow imperils U.S. national security interests, even if those parts and components are "specially designed" for the military vehicle.

Second, Continental agrees that the parts and components listed in proposed ECCN 0A606.y have little or no military significance. As discussed below, however, this proposed Less Regulated List is arbitrary in the sense that it includes a few such items but excludes many others. The way to reduce regulation of such parts and components in a reasonable and non-arbitrary manner would be for U.S. regulators to list the technologies, parts, and components that should be controlled for NS, RS, and UN reasons on the Less Regulated List and to control others solely for AT reasons. Under this approach, the burden of enforcing and complying with NS, RS, and UN level U.S. export controls with respect to items that can be found in commercially available cars, trucks and construction equipment worldwide would be substantially minimized.

Third, although the Commerce Department has not described in the proposed rules exactly what factors it used to determine that the products identified on the Less Regulated List lack military significance, such parts and components have some or all the following in common: (1) they are widely used in civilian **and** military vehicles alike; (2) without these products, many military **and** civilian vehicles could not function at all; (3) they do not include offensive weaponry; armor; threat detection systems; or military command, control, and communications systems; (4) they do not include items that control or monitor offensive weaponry, armor, threat detection systems, or military command control and communications systems; and (5) they are available from foreign sources in many locations around the world. Continental agrees that the foregoing are all significant reasons to limit any regulation of such parts and components only to AT controls.

Finally, Continental believes there is a substantial opportunity to use the currently proposed regulatory reforms to advance a related U.S. policy set forth in FAR Part 12: favoring the acquisition of "commercial items" for U.S. government use "to the maximum extent

practicable."[2] By reducing the export control restrictions applicable to commercial items, particularly in a more consistent manner, the U.S. could advance that objective considerably, resulting in reduced costs to taxpayers and increased access to commercially available technologies as the U.S. acquires military vehicles and modernizes its existing fleet.

## II. PROPOSED WAYS TO IMPROVE THE OVERALL REGULATORY APPROACH EMBODIED BY THE PROPOSED RULES

### A. The proposed rules are unduly restrictive because they regulate parts and components that have no military significance even when they are "specially designed" for use on a military vehicle.

Using fuel gauges as an example, there are two reasons why the proposed rules would continue to excessively restrict even commercially available products such as fuel gauges. First, fuel gauges are not specifically listed on the Commerce Department's proposed Less Regulated List. If these products are modified even slightly for use on a military vehicle, they may possibly fit within the definition of "specially designed" under the proposed rules and thus would be controlled by ECCN 0A606.x rather than ECCN 0A606.y — even though the slight changes required have no military significance.

Second, even if a fuel gauge were not modified at all, implementing these products on a military vehicle could still require some basic information about the application that would continue to be regulated for NS, RS, and UN reasons. For example, the determination of which fuel gauge to use and the testing of that fuel gauge would require basic information about the shape of the applicable military vehicle's dashboard, available voltage to run the gauge, and other basic information needed to ensure that this run-of-the-mill commercial technology works properly on the military vehicle ("**form, fit, and function" information**). That information would likely be subject to U.S. export controls under proposed subcategory 0E606 relating to technology required for the development, production, or use of equipment, parts, and components controlled by ECCN 0A606.[3]

Under the proposed rules, many suppliers of automotive parts and components could not provide even a fuel gauge or anti-lock braking system for U.S. military use without first dealing with

[2] See, e.g., FAR 12.101(c) ("Agencies shall… [r]equire prime contractors and subcontractors at all tiers to incorporate, to the maximum extent practicable, commercial items or non-developmental items, as components of items supplied to the agency.").

[3] As addressed more fully below, the proposed rules appear to control more strictly "technology" relating to parts and components that have "little or no military significance" under ECCN 0A606.y than they control the underlying products themselves — as subject to NS, RS, and UN controls, not just AT controls. This is not logical, and we assume that the intent of the Commerce Department was to include a subcategory within 0E606 to provide for less restrictive controls on technology relating to parts and components with little or no military significance.

significant export control issues. In particular, the supplier would need to obtain numerous licenses or confirm numerous license exceptions relating to foreign affiliates, foreign suppliers, and foreign employees. This would be necessary because foreign persons from all countries except Canada would need a license to have form, fit, and function information relating to the military vehicle or its other parts and components.

Continental submits that there is a clear correlation between the high price the U.S. military has had to pay for even basic vehicle parts and components in the past and the severe export restrictions that have applied in this area. As a practical matter, because the proposed rules as drafted do not significantly reduce the complexity and expense of complying with U.S. export control regulations, fewer companies would be willing or able to compete for the U.S. military's procurement of, for example, anti-lock brakes for its existing fleet of military vehicles or new vehicles. This would result in less innovation, lower performance braking for the warfighter than for fire engines and the average foreign military vehicle, and higher costs incurred by the U.S. military due to decreased competition. This would harm, rather than help, U.S. national security interests.

**B. Instead of including a list of items determined not to have military significance, the rules should identify the parts and components that the U.S. government has determined to <u>have</u> military significance. The proposed approach arbitrarily singles out a few parts and components for advantageous treatment.**

To avoid arbitrarily singling out only a few of the many militarily **insignificant** parts and components that merit control only for AT reasons, the Less Regulated List should be replaced with a **positive** list of items the U.S. government has determined to be militarily significant. As drafted, the proposed rules identify 17 types of parts and components that are **not** militarily significant. However, there are thousands if not tens or hundreds of thousands of automotive parts and components that are basically the same whether they appear in a military vehicle, a passenger car, an SUV, a construction vehicle, a heavy truck, a light truck, or a performance race car. For meaningful export control reform to occur, industry should not be tasked with the burden of identifying all of the types of parts and components in their portfolios that are not militarily significant (even when "specially designed" for use on a military vehicle) and proving that such parts and components are militarily insignificant. Although Continental is, in this comment letter, providing evidence that some of the parts and components it manufactures are **not** militarily significant, the only non-arbitrary way to subject militarily insignificant parts and components to less regulation would be for the Commerce Department and other U.S. government agencies to identify the parts and components (or functionalities) that **are** militarily significant.

If militarily insignificant parts and components are left off of the Less Regulated List, the list will simply be an arbitrary collection of a few of the numerous types of militarily insignificant

parts and components that are found on military vehicles and are also found on vehicles throughout the world, including passenger cars, SUVs, heavy duty trucks, construction vehicles, trash trucks, and fire engines.

Unless the proposed rules are revised to provide a positive list of militarily significant items, or revises to list all items that lack military significance, even items on the Less Regulated List will continue to be difficult to obtain. For example, the proposed Less Regulated List includes tires (other than run-flats), but does not include wheels. Listing tires without listing wheels would result in little practical benefit in terms of increasing the U.S. military's access to commercial tire pricing and quality, because many of the leading suppliers would still need to treat drawings and specifications relating to the wheels (*i.e.*, basic form, fit and function information) as subject to export controls. This could require licenses and/or verified license exceptions for a worldwide work force — a real challenge in an increasingly global and interconnected economy. If tires (other than run-flats) are on the list, the wheels on which they are mounted should also be, because they are no more militarily significant than the tires. Otherwise, consumer off-road vehicle users will continue to have better access to a variety of advantageously priced, commercially available wheels and tires than the U.S. military.

Although the Less Regulated List could theoretically be expanded to include many of the numerous other types of parts and components that have no military significance, as a practical matter, identifying all of these parts and components could pose an insurmountable task for the U.S. government and industry and further delay the regulatory reforms that the Commerce and State Departments are working so hard to advance.

Continental submits that the only non-arbitrary manner in which to reduce regulation of parts and components that lack military significance would be to create a positive list of those parts and components or functionalities which truly merit control. Instead, the proposed rules use a "shotgun" approach of regulating all military vehicle parts and components as if they were militarily significant unless they appear on the Less Regulated List. Again, this is not consistent with the U.S. government's announced desire to "build higher walls around fewer products," and does not treat suppliers of militarily insignificant parts and components in a fair and equal manner.

### C. The proposed rules as drafted improperly use "complexity" and "age of technology" as a substitute for "military significance."

While Continental appreciates the Commerce Department's creation of subcategory "y" within proposed ECCN 0A606 for items determined to have "little or no military significance," this proposed Less Regulated List, unless greatly expanded, appears to equate complexity and the age of a technology with military significance. The proposed rules do not set forth in detail how the Commerce Department identified the items currently on the proposed Less Regulated List. However, it would appear that all of the items on the list are "simple" parts and components that

have been around for a long time. For example, latches and hinges are listed as well as gaskets and O-rings, filters, and cooling system hoses. No electronic parts or components are listed, with the possible exception of batteries and alternators/generators (if those can be considered "electronic" in some sense).

While Continental agrees that the parts and components on the proposed Less Regulated List have little or no military significance, there are many **other** parts and components that are more complex and/or more recently developed that also have little or no military significance and are in widespread use around the globe on vehicles such as passenger cars, trash trucks, and foreign military vehicles. Examples include electronic tire pressure monitoring systems, related dashboard indicators, electronic braking systems to enhance stopping performance, multiplexing systems to lower wiring costs and manufacturing time, and the other Commercial Products. Some of these products are more complex than, for example, air filters, and involve electronics, but they are not more "militarily significant" in any meaningful sense than the products already on the proposed Less Regulated List, or any more necessary for vehicle function. The fact that a particular product is complex or contains electronic components does not necessarily make the product "militarily significant."

Similarly, high performance or precision manufacturing, by themselves, are also not valid criteria for determining whether a product is militarily significant. Many of the products already on the proposed Less Regulated List have high performance features and are manufactured to extremely tight manufacturing tolerances from carefully engineered materials and designs. Particularly when a high performance or precisely manufactured part or component is already commercially available around the globe, treating the part or component as militarily significant only serves to reduce the U.S. military's access to the part, because of "deemed export" controls and other factors mentioned above.

Brake system components provide an example of how the proposed rules improperly equate complexity with military significance. The Commerce Department has proposed to place brake calipers, discs, and certain other brake components on the Less Regulated List. These products have been in use for decades if not over a century.[4] Electronic braking systems ("**EBS**"), however, are a newer and more complex commercially available technology and are not included on the Less Regulated List as drafted. Continental respectfully argues that brake systems (including EBS) that enhance the performance of underlying brake components (*i.e.*, brake calipers, discs, and certain other brake components) are no more militarily significant than those underlying brake components, even if EBS technology is not as old. EBS systems are deployed around the world on many different types of vehicles as described below. Many U.S. military vehicles currently lack anti-lock braking (a type of EBS), in part because it has been difficult for commercial suppliers to provide this commercially available technology to the U.S. military

[4] Without these products, many military vehicles would simply be inoperable, so it is clear that the Commerce Department believes an item can be militarily insignificant even though it is necessary to vehicle function.

without having to deal with the complexity and cost of export control licensing and compliance issues. The U.S. military deserves access to this technology for the safety of service persons and others, and the protection of U.S. military property (the military vehicles themselves).

Similarly, lighting systems, fuses, and components are listed on the proposed Less Regulated List, but not commercially available multiplexing electrical systems, multiplexing systems can replace most relays and fuses and control lighting and other functions in commercial trucks, buses, and trash trucks. Multiplexing is a newer technology than running separate wires all the way through a vehicle for each and every component. Even so, having a lighter, more efficient, and more easily manufactured vehicle is not militarily significant. There is nothing inherent in the technology that the U.S. needs to regulate for NS, RS, or UN reasons. And the U.S. military deserves access to this lower-priced option for its cargo trucks and other vehicles without the price and availability of multiplexing systems being negatively affected by unnecessary export and "deemed export" restrictions.

As discussed below, there are other existing export controls that would eliminate any perceived risk in putting the Commercial Products on the Less Regulated List. For example, existing ITAR and EAR provisions already control technologies such as resistance to jamming, military and "dual use" encryption, communications technologies, and other features in contexts that include (but are broader than) the automotive area.

Continuing to treat the complexity and age of a technology as if they had any necessary relevance to military significance will result in rules that will have an adverse impact on the U.S. military by making it more difficult, expensive and time consuming, and even commercially impracticable to procure and deploy important safety technologies such as anti-lock brakes on the U.S. military vehicle fleet where appropriate.

In addition, while the parts and components currently on the Less Regulated List all appear simple at first glance, many of them are in fact highly engineered, incorporate carefully selected materials with precisely crafted properties, and are manufactured to exacting tolerances. Thus, any use of "complexity" as a substitute for military significance is highly problematic even for those items already on the Less Regulated List.

Finally, electronics should not be treated as having military significance simply because they are electronics. If certain electronics control or monitor threat detection, defensive technology such as armor, weaponry, or command control and communications technology, obviously such electronics would be militarily significant. Continental is not asking the Commerce Department to further relax export controls on electronics geared to such military functions. However, an electronic device that simply tells the driver of a military vehicle the temperature of the engine, the internal or external temperature surrounding and inside a vehicle, or the tire pressure level of a tire is a different matter. These technologies are widely available today on vehicles sold commercially throughout the world and are not militarily significant. It would be arbitrary to

finalize the proposed rules in a manner that does not recognize the pervasive presence of electronic devices in the automotive industry that have little or no military significance.

**D. International commitments of the U.S. do not require strict regulation of more "complex" vehicle components that are not militarily significant.**

The proposed rules implicitly recognize that U.S. international commitments do not require strict export regulation of automotive parts and components that lack militarily significance. Continental wholeheartedly agrees with this conclusion and offers the following analysis with respect to the Wassenaar Arrangement ("**WA**") in particular.

The WA is a multilateral arrangement among 40 countries ("**Participating States**") with a stated purpose of "contributing to international security by promoting transparency and greater responsibility in transfers of conventional arms and dual-use goods and technologies, thus preventing destabilizing accumulations." Participating States have committed to (i) maintaining responsible export control policies, and (ii) exchanging information regarding exports of controlled goods/technologies.

The basic structure of the WA includes the following salient features:

- The WA affords Participating States broad discretion in complying with their obligations under the WA. The decision to transfer or deny transfer of any item controlled by the WA is the sole responsibility of each Participating State. Measures with respect to the WA are generally taken in accordance with national legislation and policies, and are implemented on the basis of national discretion.

- Practical implementation of the WA by each Participating State varies from country to country based on national procedures. The decision to transfer or deny an item is the sole responsibility of each Participating State and the WA **does not** impede bona fide civil transactions.

- While Participating States must use "extreme vigilance" in their control regimes for items identified as very sensitive under the WA, items listed on the "Very Sensitive List" found in the WA's Annex 2 (*e.g.*, stealth technology materials, equipment related to submarine detection, advanced radar, advanced jet engine technology) are not at issue in these comments.

- A primary focus of the WA is to restrict/control/monitor items that are "major or key elements" for the indigenous development, production, etc. of military capabilities, "**not items that are generally commercially applied materials or components."**[5]

Within these basic WA parameters, the WA provides broad discretion to the United States and other nations as to **how** they will control items listed on the WA's list of controlled items. Thus, it is completely consistent with U.S. international obligations for the U.S. to treat parts and components of military vehicles that are not militarily significant as being subject to export restrictions only to those countries with respect to which the U.S. has imposed comprehensive trade sanctions or embargoes.

In particular, for commercial parts and components that are widely available, even if these parts and components are modified to work on military vehicles, there is nothing within the WA that obligates the U.S. to control these items.

**E. Rules should focus on whether particular parts and components have specific military functionality, most notably any interaction with offensive systems, armor, or military command/control/communications technologies.**

Two of the announced goals of the current export reform initiative are (1) to promote greater certainty concerning the application of U.S. export controls, and (2) to relax controls on items that no longer merit strict control. The proposed rules do have the effect of advancing certainty concerning the classification of military vehicle parts and components in a sense. This certainty, however, comes at the expense of continuing unnecessarily strict export controls on many products and components that are basically the same as commercially available equivalents modified in insignificant ways for military use.

Examples of parts and components that lack military significance but must generally be modified for each vehicle on which they are used include (a) anti-lock braking systems that are common on passenger cars and other vehicles around the world, (b) multiplexing systems used on buses and trucks, (c) wheels that are similar to those used on off-road, farming, or construction vehicles, and (d) the other Commercial Products identified above and below.

Another way to provide certainty concerning the application of the proposed rules would be to substitute a positive list of militarily **significant** products and technologies for the proposed list of items that are militarily **insignificant**.

[5] Criteria for the Selection of Dual-Use Goods and Technologies for the Sensitive List (as updated at the December 2004 Plenary meeting of the WA's Participating States).

**F. Rules should address form, fit, and function information needed to provide commercially available parts and components.**

With respect to militarily insignificant products, the proposed rules do not give permission to OEMs, vehicle integrators, or lower tier subcontractors to disclose even basic form, fit, and function information to commercial parts and component suppliers to enable these suppliers to determine whether their off-the-shelf products can be used with U.S. military vehicles, or make any necessary adjustments.

For example, if Continental needed to know the size and shape of an opening in a military vehicle engine where the engine temperature sensor would be inserted into the engine, under both the current rules **and** the proposed rules, an integrator would likely instruct Continental that it could not disclose this information to a foreign affiliate of Continental or to foreign nationals who work for Continental without first obtaining a license from the Commerce Department to do so or verifying that a license exception would apply. However, there is nothing militarily significant about the minor differences between vehicles that must be taken into account in order to adjust or adapt basic commercial technologies for the same use in different types of vehicles.

Unnecessary regulation of such form, fit, and function information would effectively preclude many commercial suppliers from competing in the market for U.S. military vehicle parts and components — even parts and components that are listed as militarily insignificant in the proposed rules. Continued regulation of such products for exportation to all countries but Canada would also be a major roadblock that would likely hinder the cost reduction and quality increases that would arise from less restrictive treatment of this militarily insignificant "form, fit and function" information.

There are many other examples of how the U.S. military could continue to have limited access to commercially available parts and components if militarily insignificant form, fit, and function information required to supply these items is not substantially deregulated. If Continental was asked to develop a tire (not run-flat) for use on a U.S. military vehicle, under the proposed rules there is a question as to whether Continental could disclose "form, fit and function" information to a German engineer employed by Continental — such as the exact size of the vehicle's tire — unless an exception applies or a license has been obtained. However, wheels are not currently listed on the Less Regulated List. Thus, if Continental decided to participate in the project, Continental would be forced to obtain a license or verify an exception for every foreign affiliate and every foreign national employed by Continental involved in the project and sequester information about the wheel so that only U.S. nationals, U.S. affiliates, and licensed/excepted persons have access to it.

Continental is aware that if the proposed rules are finalized, Continental could theoretically seek to obtain licenses or verify license exceptions to disclose form, fit, and function information controlled by ECCN 0E606 to (a) the foreign nationals employed by Continental in the U.S, and

(b) Continental's foreign affiliates to allow them to be involved in the process of adapting a part or component for a U.S. military vehicle. However, if the technology at issue is not militarily significant, this should not be necessary, and imposing rules of this sort would only result in (a) the U.S. military having less access to commercially available technologies than private consumers, commercial vehicle users, and foreign militaries, and (b) an unnecessary and disadvantageous compliance burden for U.S. companies.

**Continental is, of course, not questioning the need to control form, fit, and function information about parts and components that are militarily significant or are already subject to control for other reasons under the EAR or ITAR, such as weapon systems; armor; threat detection systems; and command, control, and communications systems in military vehicles.** These systems should perhaps still be subject to export control under the ITAR or under the EAR for NS, RS, and UN reasons. The vast majority of the parts and components on military vehicles, however, are very similar to corresponding parts and components available commercially and should, therefore, not be controlled for NS, RS, or UN reasons, as they would be under the proposed rules. A fuel gauge that is available for trash trucks should be available as modified or U.S. military vehicle without the U.S. military paying a premium to make sure a German national in the U.S. does not discover how to make a fuel gauge or discover the function of a fuel gauge on a military vehicle. Information that reveals sensitive information about U.S. military vehicles should and would continue to be controlled under the ITAR and EAR under existing provisions of both sets of rules and under the proposed rules if the Commerce Department modifies them to reflect these comments.

To the extent that the Commerce Department is concerned about deregulating such form, fit, and function information, the Commerce Department should define which parts and components or functions of military vehicles **are** militarily significant, and continue to regulate form, fit, and function information with respect to those expressly identified parts, components or functions. Thus, if bullet proof windows are militarily significant, technical information about the bullet proof characteristics of such windows should and would continue to be controlled by the ITAR and/or EAR.

We note that the preamble to the proposed rules already uses the term form, fit, and function within the definition of "specially designed." Continental submits that this term has a commonly understood definition, but that the following definition based on the one provided at FAR 27.401 would be appropriate for use in the EAR, if the term must be defined in the EAR:

> Form, fit, and function information means data relating to items, components, or processes to enable physical and functional interchangeability, and data identifying source, size, configuration, mating and attachment characteristics, functional characteristics, and performance requirements.

Continental is proposing a technical note in Section IV below that would clarify that form, fit, and function information necessary to adapt militarily insignificant parts and components for use on a military vehicle would only be controlled for AT reasons — unless that information relates to something that is truly militarily significant, such as armor; weapons; threat detection systems; or military command, control, and communications systems. Continental recognizes that information relating to armor; weapons; threat detection systems; or military command, control, and communications systems would remain controlled under other categories of the ITAR or EAR, as discussed below. However, it would be arbitrary to control for NS, RS, and UN reasons information such as the voltage available for a speedometer, the size of the brake lines for an EBS project, or the size of a wheel for a tire acquisition.

**G. To the extent that there are any products or information that should be controlled outside of these parameters, they are already controlled by other aspects of the ITAR, EAR, or U.S. Sanctions regulations.**

To the extent the U.S. government is concerned that relaxing its controls on militarily insignificant parts and components would somehow help foreign governments and organizations, the U.S. already has ways of addressing exports of militarily insignificant products and information to such persons, including the EAR's "end use" and "end user" controls, U.S. trade sanctions, and AT controls. Continuing to treat militarily insignificant parts and components as militarily significant is not the solution to any problems in this area. The Commerce Department is already proposing to control items on the Less Regulated List solely for AT reasons. If other parts and components are not militarily significant, they should be subject to similarly relaxed controls.

In addition, to the extent that the Commerce Department provides a positive list of those items or functionalities that **do** have military significance, there would be no need to add to the list items that are controlled under other portions of the ITAR or EAR. For example, there would be no need to regulate command, control, and communications products as military vehicle components, because they are already regulated by existing ITAR Category XI(a)(5).

If the Commercial Department does decide to retain a Less Regulated List within ECCN OA606, even if a Commercial Product could be modified to be part of a militarily significant system, that would be no reason to exclude it from the Less Regulated List. To the extent a Commercial Product could somehow be modified in this manner, the Commercial Product would then be controlled as a part or component of that other system to the extent that parts and components of such other systems are already controlled. If parts of command, control, and communications systems are export-controlled and one of the Commercial Products is somehow adapted to function as part of a command, control, and communications system, the part would be controlled as a part of the system. Nothing is added to this by continuing to control militarily insignificant products for NS, RS, and UN reasons.

Similarly, with respect to equipment, technology, materials, production equipment, and software relating to parts and components that **are** militarily significant, Continental's proposal would not affect the export controls applicable to such information. These items would either (a) continue to be controlled under various existing ITAR and EAR categories, or (b) be controlled under proposed ECCNs 0B606, 0C606, 0D606 or 0E606. Continental is proposing technical notes, below, to ECCNs 6A606 and 6E606 which would make the potential application of other export control categories more apparent. This would mitigate any minimal risk that placing the Commercial Products on the Less Regulated List might lead to confusion on this point.

**H. It would be unreasonable and counter-productive for the Commerce Department to finalize the proposed rules without addressing the above issues, in light of readily available alternatives.**

For the reasons set forth above, it would be unreasonable and counter-productive for the U.S. to continue to regulate militarily insignificant parts and components that are available around the world for NS, RS, and UN reasons. This is particularly true in light of the fact that there are several viable alternatives that the Commerce Department could select.

For example, Continental is recommending that the rules be revised to provide either (a) a positive list of those parts and components which **are** militarily significant (for example, armor; threat detection, weaponry, and military command control and communications equipment); or (b) a list of the features that would render parts and components militarily significant; such as armor plating; incorporating weaponry mounts; incorporating features for threat detection; or incorporating military command, control, and communications technology, or (c) both.

In the alternative, Continental requests, that the Commercial Products and certain related items be included in the Less Regulated List and that form, fit, and function information necessary to provide these parts and components be regulated for only AT under the "technology" note of this ECCN.

These alternatives would allow companies that have foreign employees in the U.S. and abroad to provide commercial technologies more easily and cost effectively to the U.S. military, increasing the U.S. military's access to these technologies at a time when budgets are being tightened.

As discussed in greater detail above, the U.S. would gain nothing additional from its currently proposed approach over and above what it would gain from the alternatives proposed above. In fact, the U.S. would have much to lose from its proposed approach as compared to the alternatives set forth here, in terms of (a) prolonging the unnecessarily high cost of U.S. military vehicles, (b) making various commercial technologies less available to the U.S. military, (c) increasing the time required to provide commercial technologies to the U.S. military, (d) imposing needless burdens on industry, (e) undermining the objective of building "higher

walls around fewer items," and (f) defeating federal policies embodied in FAR Part 12 that favor the maximum practicable use of commercial items for U.S. government requirements.

## III. SUMMARY OF REQUESTED PRODUCT-SPECIFIC CHANGES TO THE PROPOSED RULES

As stated above, if the Commerce Department decides not to adopt a positive list of parts and components that **are** militarily significant as part of this rulemaking process, Continental respectfully submits that the following product categories (the "Commercial Products," as defined above) should be added to the list of parts and components that are **not** military significant as contained in ECCN 0A606.y:

1. Gauges;
2. Instrument Panels/Clusters;
3. Vehicle/Engine Sensors;
4. Vehicle/Engine Monitoring/Displays;
5. Electronic Braking Systems;
6. Multiplexing Systems;
7. Tire Pressure Monitoring Systems; and
8. Certain Items/Data Relating to Tires (Not Including Run-Flats).

In addition to adding the Commercial Products to the Less Regulated List, to promote the availability of the Commercial Products for U.S. military vehicle applications, the Commerce Department should limit "controls of basic form, fit, and function information necessary to provide these commercial technologies for military use. There is no military significance to such basic "form, fit and function" information and it should be controlled only for AT reasons as should the parts themselves. Similarly, the other "nodes" of ECCN 0A606 should be revised to include subcategories corresponding to subcategory "y" in ECCN 0A606, under which AT is the only reason for control.

Continental understands the need to leave in place existing ITAR and EAR controls that would continue to govern parts and components that truly are militarily significant. The proposed rules and the changes suggested here by Continental would leave such controls still in place.

### A. The Commercial Products and their functions explained.

The following chart sets forth a description of the Commercial Product families and their basic functions.

| Commercial Product | Product Function Comments |
|---|---|
| 1. Gauges | Engine & vehicle monitoring gauge systems ("Gauges") |

| Commercial Product | Product Function Comments |
|---|---|
| a. Tachometers<br>b. Temperature Gauges (Engine Coolant)<br>c. Pressure Gauges (Engine Oil)<br>d. Temperature Gauges (Engine Oil)<br>e. Air Temperature Indicator/Thermometer (Cabin and External)<br>f. Fluid Level Gauges (Engine Oil)<br>g. Pressure Gauges (Transmission Oil)<br>h. Temperature Gauges (Transmission Oil)<br>i. Temperature Gauges (Hydraulic Oil)<br>j. Pressure Gauges (Hydraulic Oil)<br>k. Fluid Level Gauges (Hydraulic Oil)<br>l. Fluid Level Gauges (Fuel)<br>m. Voltmeter (Battery)<br>n. Ammeter (Power Amperage)<br>o. Exhaust Gas Temperature (EGT) Gauges<br>p. Speedometers<br>q. Other Gauge products that do not interact with weapons; armor; threat detection systems; or military command, control, and communication systems | are common to most or all military and non-military vehicles alike. Gauge products display for the vehicle operator information regarding performance of the vehicle by receiving signals either directly from discrete Sensors or from a vehicle engine control unit or body controller unit ("**Control Unit**") via a digital signal. The gauge interprets or is affected by such signal information, which results in a prescribed response or reaction, namely, movement of a pointer (e.g., fuel level indicator) or other mechanical indicator, or display of the interpreted information on a liquid crystal display ("**LCD**") (e.g., miles travelled).<br><br>Gauge products are designed to show data regarding vehicle system status and functionality, including the temperature, pressure, and fluid levels of several different vehicle fluids (for example, engine oil, coolant, and gasoline); the voltage and amperage of electrical components such as vehicle batteries; exhaust gas; and speed. Gauges are in widespread use worldwide on numerous types of vehicles and most types of Gauges have been in use for decades if not for over a century.<br><br>There are numerous commercially available Gauge products, which are considered commodity products in the automotive market. The use of commercially available Gauges can significantly reduce vehicle cost and reduce design and manufacturing time.<br><br>As shown in Exhibit 1, Gauge products provide information to vehicle users about the normal operation and maintenance of vehicle mechanical and operational systems. |
| 2. Instrument Panels/Clusters ("IPCs")<br><br>a. Complete Dashboard with | IPC systems are common to many non-military and military vehicles alike and include clusters and groups of gauges that function together to provide the driver/operator with basic vehicle information about the vehicle, such as |

| Commercial Product | Product Function Comments |
|---|---|
| Instruments, Switches, and Displays<br>b. All-in-one units containing Gauges, Instruments, & /or Displays[6]<br>c. Stand-alone displays to show engine and system data | speed and engine temperature and fuel level all within an easily visible, small area. IPCs are designed to fit into the vehicle dashboard, or, in some instances, to stand alone in the cabin or cockpit area of the vehicle, for the purpose of housing various gauges, LCDs and other display units (collectively, "**Display Units**") in order to make available to the vehicle operator information regarding vehicle operations and performance. The Display Units receive signals either directly from discrete Sensors or from a vehicle Control Unit via a digital signal. The IPC system may be adapted to fit Display Units of various sizes and shapes and may also contain functionality such as light and audible alarms.<br><br>A typical IPC system consists of multiple Display Units connected to one or more discrete Sensors (separately addressed below), and Control Units directed to particular aspects of a vehicle's mechanical and operational systems. IPC systems have been in widespread world-wide commercial use for decades.<br><br>The use of commercially available IPCs can significantly reduce vehicle cost and reduce design and manufacturing time. As shown in Exhibit 2, IPC systems allow for real-time monitoring of multiple display units in order to facilitate normal functioning of vehicle mechanical and operational systems. |
| 3. Vehicle/Engine Sensors<br><br>a) Engine Speed Sensor<br>b) Temperature Sensor (Engine Coolant)<br>c) Pressure Sensor (Engine Oil)<br>d) Temperature Sensor (Engine Oil)<br>e) Air Temperature | Vehicle/engine monitoring sensors have been used commercially by OEMs and independent aftermarket providers on motor vehicles for the past century. Sensors (also called senders) are the "flip side" of gauges and instrument panels. They are needed for gauges and instruments to function correctly because they provide the "readings" displayed in gauges or used by Control Units.<br><br>Sensors can be divided into a number of different classifications based on either the function of the sensor or |

[6] Continental is not suggesting that displays, including GPS technology, be released from other controls which may or may not apply to such products by virtue of the presence of GPS, or that military command, control, and communications systems be released from other controls that may apply to them under the EAR or ITAR.

| Commercial Product | Product Function Comments |
|---|---|
| Sensor/Thermometer (Cabin and External)<br>f) Fluid Level Sensor (Engine Oil)<br>g) Pressure Sensor (Transmission Oil)<br>h) Temperature Sensor (Transmission Oil)<br>i) Temperature Sensor (Hydraulic Oil)<br>j) Pressure Sensor (Hydraulic Oil)<br>k) Fluid Level Sensor (Hydraulic Oil)<br>l) Fluid Level Sensor (Fuel)<br>m) Voltmeter Sensor (Battery)<br>n) Ammeter Sensor (Power Amperage)<br>o) Exhaust Gas Temperature (EGT) Sensor<br>p) Wheel Speed Sensor<br>q) Exhaust Sensors<br>r) Mass Airflow Sensors<br>s) Camshaft Position Sensors<br>t) Crankshaft Position Sensors<br>u) Other Sensors that do not interact with weapons systems; armor; threat detection systems; or military command, control, and communications systems. | the technology used in the sensor. Basic commercially available sensors ("**Sensors**"), such as those listed by function in the column to the left, reflect several different technologies, including level sensors (fuel, water, oil, etc.), frequency sensors (wheel speed, engine speed, etc.), composition sensors (e.g. exhaust gas sensors), resistive sensors (e.g., various temperature sensors and thermometers), and electronic sensors. Sensors include but are not limited to these types of sensors, none of which is specific to military vehicles.[7]<br><br>Sensors monitor specific engine/vehicle characteristics and send readings to a display device such as a Gauge or VMS, or to a Control Unit. The use of commercially available sensors can significantly reduce vehicle cost and reduce design and manufacturing time. These products can also significantly reduce repair and maintenance costs and increase safety.<br><br>As shown in Exhibit 3, there are various types of engine/vehicle Sensors, but their basic function is to collect engine/vehicle information for basic operation and maintenance of the vehicle. |
| 4. Vehicle/Engine | VMS products, such as high-beam or check engine |

[7] Commercially available sensors use several different technologies. In a resistive type, the sensor circuit is affected by the particular vehicle condition that is being measured and the output of the sensor is an electrical resistance. This resistance is sent to the Control Unit or gauge/cluster/panel and, depending on the resistance, the data level of the particular function is affected. A level type sensor operates in a similar fashion – based on the level of the particular fluid being measured, a certain resistance becomes part of the electrical circuit. A frequency sensor creates a frequency pulse based on rotation (either vehicle speed or engine speed). For example, a sensor that measures engine speed uses magnetic induction technology to sense gear teeth on an engine flywheel.

| Commercial Product | Product Function Comments |
|---|---|
| Monitoring/Displays ("**VMS**")<br><br>a. Driver Information Displays (i.e., Image & Icon Display Unit)<br>b. Driver Warning TellTale Module (i.e., LED Warning Light Device)<br>c. Driver Audible Alert Module (i.e., Audible Message Device) | indicators on any passenger car, are commercially available standard equipment for most vehicles.<br><br>VMS products generally consist of a driver information Display Unit (*i.e.*, image and icon display units) that contains various lights and icons, as well as tell-tale modules that allow the functioning of LED warning lights and, in some cases, audible alerts (such as the "ding dong" that indicates a door is open or that lights have been left on, and the "click, click" that indicates a turn signal is on).<br><br>The function of VMS products is to make basic information about the vehicle, including its engine, available to the operator, and to help the operator to be aware of maintenance intervals, safety issues such as a seat belt that is not fastened, and operating parameters such as a low battery or open door.<br><br>The use of commercially available VMS products can significantly reduce vehicle cost and reduce design and manufacturing time. These products can also significantly reduce repair and maintenance costs and increase safety.<br><br>As shown in Exhibit 4, many VMS products include a combination of indicators located close together for easy viewing by a vehicle operator. |
| 5. Electronic Braking Systems ("**EBS**")<br><br>a) Brake control unit (Brake Controller)<br>b) Antilock braking systems (ABS)<br>c) Electronic stability control (ESC)<br>d) Traction control systems (TCS)<br>e) Electronic brakeforce distribution (EBD)<br>f) Vacuum Pumps used in EBS | EBS products are commercially available safety products designed to enhance the ability of a vehicle to stop and steer under less than perfect road and driving conditions. EBS systems include anti-lock braking systems, electronic stability control systems, traction control systems, and electronic brakeforce distribution systems. These systems are in widespread use worldwide on passenger cars, SUVs, and other vehicles.<br><br>A typical EBS system consists of a brake control unit ("**Brake Controller**"), wheel speed and brake pressure sensors, brake actuators and valves, and a pump. The Brake Controller consists of a motor, a hydraulic block, and a control module that receives signals from sensors to determine when wheels are moving at uneven speeds, how |

| Commercial Product | Product Function Comments |
|---|---|
| g) Brake Actuators used in EBS<br>h) Mechanical Pressure Components used in EBS<br>i) Wheel Speed Sensors used in EBS | much brake fluid pressure is applied, and similar data points.<br><br>EBS systems items are connected to other vehicle brake components and work with a standard brake pedal. Based on driving and operating conditions, the Brake Controller interprets the data and detects when instability is present. If brakes are applied, and any of the wheels lock up, the Brake Controller detects that the wheel is locking up and reacts by stopping brake pressure at that particular wheel location, allowing the wheel to turn and shifting braking pressure to other wheels. The system then successively pumps brake pressure at the slipping wheel to prevent further lock up while still using that wheel to help the vehicle stop. Similarly, if a vehicle begins to veer off the course where the front wheels are pointed (such as when a driver intends to turn on an icy road) but the vehicle starts to skid in a straight direction, the system assists the driver to regain control by coordinating brake pressure at different wheels.<br><br>EBS systems can help vehicles to stop more quickly on certain road surfaces, dramatically increasing safety and dramatically reducing the cost and severity of driver and passenger injuries and vehicle damage. The use of commercially available EBS products can significantly reduce vehicle cost and reduce design and manufacturing time. These products can also significantly increase safety and reduce repair costs.<br><br>Exhibit 5 is a layout diagram of a sample EBS system. |

| Commercial Product | Product Function Comments |
|---|---|
| 6. Multiplexing Systems<br><br>a. Central Control Unit<br>b. Multiplex Node<br>c. Display Node<br>d. Multiplex Switch<br>e. Instrument cluster/cockpit | Multiplexing systems are basically a way to reduce vehicle wiring complexity, weight, and cost. These systems are general purpose ways to transmit and process information from different parts of the vehicle in an efficient manner. This is far more cost effective, faster, and more reliable than wiring every vehicle electrical component separately, particularly on large vehicles.<br><br>Multiplex systems generally span the length of a vehicle and have "nodes" that wires can be plugged into at locations around the vehicle. As an example, on a city transit bus or trash truck, there may be nodes that that handle the external lighting, internal lighting, climate, suspension, air brake systems, etc. This reduces the need to run separate wiring through a vehicle for each and every electrical component. Multiplexing systems increase fuel efficiency by lowering vehicle weight. All of these nodes send and receive data to and from, and are ultimately linked to the central multiplexing control unit.<br><br>Multiplexing systems have functions that allow for distribution and/or processing of inputs, for example, the flip of a switch might cause four different tail lights to go on.<br><br>The use of commercially available multiplexing systems can significantly reduce vehicle cost and reduce design and manufacturing time.<br><br>Exhibit 6 contains various layout diagrams of multiplexing systems. |
| 7. Tire Pressure Monitoring Systems ("**TPMS**")<br><br>a. Tire Sensors<br>b. Antennas<br>c. TMPS Control Units (Receivers) | TPMS systems are a basic safety feature that is now required in many passenger and other commercially available vehicles. A TPMS system monitors a vehicle's tire pressure,[8] internal tire temperature and tire acceleration data (collectively, "**TPMS Data**") and alerts the operator of the vehicle of any significant under-inflation of the vehicle's tires and related safety problems. A TPMS |

[8] Some TMPS systems operate indirectly by calculating how wheel speed differs from one wheel to another and then concluding that the tire that is turning faster has lower tire pressure. Such systems are not in view here.

| Commercial Product | Product Function Comments |
|---|---|
| d. Harnessing<br>e. Display | system generally works as follows:<br><br>During the operation of a vehicle fitted with a TPMS system, TPMS Data is gathered by the TPMS system and transmitted via radio frequency (by means of an antenna located within a tire's filling valve) to a receiver unit within a vehicle Control Unit.<br><br>Once TPMS Data has been collected by the receiver unit, it is then transmitted through a wired connection to the vehicle's display unit, where it is displayed for viewing by the vehicle's driver. In addition to allowing the vehicle's driver to monitor the current status of TPMS Data, a TPMS system will activate warnings and alarms to be displayed on the vehicle's display unit when TPMS Data is outside of pre-programmed levels.<br><br>The use of commercially available TPMS products can significantly reduce vehicle cost and reduce design and manufacturing time.<br><br>Exhibit 7 shows a TPMS system diagram. |
| 8. Certain Items/Data Relating to Tires (Not Including Run-Flats) | While the Commerce Department has already proposed to include tires (other than run-flats) on its proposed Less Regulated List, as drafted, the proposed rules do not provide for similar treatment of (a) form, fit, and function information necessary to service the U.S. military tire market, or (b) a number of products related to tires, such as wheels, tire inflation systems, beadlock products,[9] and TPMS (separately addressed in these comments). Continental would propose that such information and products not be controlled for NS, RS, or UN reasons, but only for AT reasons.<br><br>The use of commercially available tires can significantly reduce the cost of a vehicle and its maintenance.<br><br>Exhibit 8 shows how tires operate with wheels, certain |

[9] The function of beadlock products is to keep the bead of a tire against the wheel to maintain tire inflation, particularly when operating with low tire inflation or off road.

| Commercial Product | Product Function Comments |
|---|---|
| | beadlock products, tire inflation systems, and TPMS systems. |

**B. The Commercial Products are in commercial use worldwide.**

Each of the Commercial Products is in widespread use throughout the globe:

| Commercial Product | Widespread use |
|---|---|
| 1. Gauges | It is difficult to imagine a vehicle produced and made available for consumer or commercial use that does not incorporate at least one Gauge product (e.g., fuel gauge or speedometer). All of the types of gauges listed above are commercially available on a worldwide basis, including for consumer and heavy duty uses. In some countries, certain Gauges are required by law to be present in passenger cars and/or other vehicles.<br><br>Treating basic commercially available Gauges that are modified for use on military vehicles as militarily significant will not materially reduce access to this technology by persons hostile to the U.S. Rather, it will reduce the U.S. military's access to this commercially available technology.<br><br>Continental is a leading manufacturer of Gauge products for use in a wide range of commercial and personal use vehicles, including, without limitation, heavy duty trucks, light duty trucks, off-highway construction equipment, passenger cars, sport utility vehicles ("**SUVs**"), all-terrain vehicles ("**ATVs**"), boats, motorcycles, commercial buses, fire engines and snow mobiles. |
| 2. Instrument Panels/Clusters | For more efficient manufacturing and operator use, many vehicles combine multiple gauges and VMS indicators in one or several locations on a dashboard using an IPC. IPCs are commercially available on a worldwide basis, including for consumer and heavy duty uses.<br><br>Treating basic commercially available IPCs that are modified for use on military vehicles as militarily significant will not materially reduce access to this technology by persons hostile to the U.S. Rather, it will reduce the U.S. military's access to this commercially available technology.<br><br>Continental is a leading manufacturer of IPC products for use in a |

| Commercial Product | Widespread use |
|---|---|
| | wide range of commercial and personal use vehicles, including, without limitation, heavy duty trucks, light duty trucks, off-highway construction equipment, passenger cars, SUVs, ATVs, boats, motorcycles, commercial buses, fire engines and snow mobiles. |
| 3. Vehicle/Engine Monitoring Sensors | Today, any vehicle that has an engine uses similar Sensor products to monitor engine performance. Many of these products have been in existence for over a century, first in mechanical form, then over the past 30 years, in electric form. All of the types of vehicle/engine Sensors listed above are commercially available on a worldwide basis, including for consumer and heavy duty uses.<br><br>Treating basic, commercially available Sensors that are modified for use on military vehicles as militarily significant will not materially reduce access to this technology by persons hostile to the U.S. Rather, it will reduce the U.S. military's access to this commercially available technology.<br><br>Continental is a leading manufacturer of vehicle/engine Sensor products for use in a wide range of commercial and personal use vehicles, including, without limitation, heavy duty trucks, light duty trucks, off-highway construction equipment, passenger cars, SUVs, ATVs, boats, motorcycles, commercial buses, fire engines and snow mobiles. |
| 4. Vehicle/Engine Monitoring/Displays | All of the types of vehicle monitoring/displays listed above are commercially available on a worldwide basis. VMS systems have been in widespread use around the world for decades, including for consumer and heavy duty uses. In some countries, certain warning lights are required by law to be present in passenger cars and/or other vehicles.<br><br>Treating basic commercially available VMS products that are modified for use on military vehicles as militarily significant will not materially reduce access to this technology by persons hostile to the U.S. Rather, it will reduce the U.S. military's access to this commercially available technology.<br><br>Continental is a leading manufacturer of VMS products for use in a wide range of commercial and personal use vehicles, including, without limitation, heavy duty trucks, light duty trucks, off-highway construction equipment, passenger cars, SUVs, ATVs, |

| Commercial Product | Widespread use |
|---|---|
| | boats, commercial buses, and snowmobiles. |
| 5. Electronic Braking Systems | EBS systems, as mentioned above, are in widespread use both inside and outside the U.S. All of the EBS system components listed above are commercially available around the globe, including for consumer and heavy duty uses. In some countries, certain EBS functions are required by law to be present in passenger cars and/or other vehicles. For example, as of 2007, ABS functionality (one type of EBS) is mandatory on all new passenger cars sold in the European Union. In addition, as of September 1, 2011, under National Highway Traffic Safety Administration ("**NHTSA**") regulations (Federal Motor Vehicle Standard 126), electronic stability control (a type of EBS) is required to be present on certain light vehicles sold in the U.S.<br><br>Treating basic commercially available EBS systems that are modified for use on military vehicles as militarily significant will not materially reduce access to this technology by persons hostile to the U.S. Rather, it will reduce the U.S. military's access to this commercially available technology.<br><br>Continental is a leading supplier of EBS products for use in a wide range of commercial and personal use vehicles, including, without limitation, various types of trucks, passenger cars, SUVs, and ATVs. |
| 6. Multiplexing Systems | Multiplexing systems are in widespread use in the commercial vehicle market around the world, especially for heavy trucks and buses. The multiplexing system components listed above are commonly used on many such applications. Multiplex systems have been in use for approximately a decade under the commercial J1939 SEA standard for electronic engine data.<br><br>Treating basic commercially available multiplexing systems that are modified for use on military vehicles as militarily significant will not materially reduce access to this technology by persons hostile to the U.S. Rather, it will reduce the U.S. military's access to this commercially available technology.<br><br>Continental is a leading supplier of multiplexing systems for large vehicles such as trucks and buses. |
| 7. Tire Pressure Monitoring Systems | TPMS systems have been in commercial use since the mid-1990s and are a commercially technology available around the globe for |

| Commercial Product | Widespread use |
|---|---|
| | consumer and commercial use. Pursuant to a law enacted on November 1, 2000, NHTSA adopted regulations mandating that certain types of vehicles (including passenger cars, multipurpose passenger vehicles, trucks, and certain buses) be equipped with TPMS systems. Standard No. 138.<br><br>Treating basic commercially available TPMS systems that are modified for use on military vehicles as militarily significant will not materially reduce access to this technology by persons hostile to the U.S. Rather, it will reduce the U.S. military's access to this commercially available technology.<br><br>Continental is a leading supplier of TPMS systems for passenger cars, light trucks, SUVs, and other vehicles. |
| 8. Certain Items/Data Relating to Tires (Not Including Run-Flats) | Tires and wheels have been used on vehicles for well over a century and there are numerous varieties that are available for the consumer and commercial markets around the globe.<br><br>Treating basic information about military vehicle tires, wheels, and related items as militarily significant will not materially reduce access to military vehicle wheels or tires by persons hostile to the U.S. Rather, it will reduce the U.S. military's access to commercially available tire and related products.<br><br>Continental is a leading supplier of tires for passenger cars, light and heavy trucks, SUVs, off-road, construction, heavy industrial, and other tires. |

### C. The Commercial Products have no military functionality.

The Commercial Products are valuable for vehicle safety and performance but have no military functionality, as summarized in the below chart:

| Commercial Product | Lack of Military Functionality |
|---|---|
| 1. Gauges | Gauges are standard operating equipment on virtually all vehicles today, whether commercial or military. Gauge products are valuable for monitoring basic vehicle parameters such as fuel and engine temperature; however, the Gauge products identified above have no significant military functionality. These products have no functionality for military customers that is materially different from the functionality provided to consumer or commercial |

| Commercial Product | Lack of Military Functionality |
|---|---|
| | customers.<br><br>The point of human interaction with a gauge is visual. Standard Gauge products lack any mechanical or electrical inputs or outputs that would interact with vehicle offensive systems; defensive systems; threat detection; or command and control communications systems. Further, Gauges are no more militarily significant than lighting systems, an item already on the proposed Less Regulated List. Being able to see the speed a vehicle is going is no more militarily significant than being able to see the road while driving at night. Both items serve purposes fundamental to most or all vehicles.<br><br>If a Gauge was somehow modified to monitor systems that are militarily significant, as discussed above, the Gauge would be controlled as a component of such a system (to the extent that other parts and components of such systems are already controlled under other ITAR or EAR categories.) |
| 2. Instrument Panels/Clusters | Continental IPCs were originally designed for commercial use on vehicles of all types including cars, trucks, fire engines, etc. IPCs, such as dashboard and instrument panel assemblies for trucks are standard equipment on virtually all vehicles manufactured today. These products have no functionality for military customers that is materially different from the functionality provided to consumer or commercial customers.<br><br>The point of human interaction with an IPC is visual. Instrument clusters (and Gauges such as fuel gauges, speedometers, and tachometers within an instrument cluster) have little or no militarily significance. These products do not interact with weapons; armor; threat detection systems; or military command, control, and communications systems. Further, IPCs are no more militarily significant than lighting systems, an item already on the proposed Less Regulated List. Finding the speedometer in an IPC and seeing the speed a vehicle is going is no more militarily significant than being able to see the road while driving at night. Both items serve purposes fundamental to most or all vehicles.<br><br>If an IPC was somehow modified to interact with systems that are militarily significant, as discussed above, the IPC would be controlled as a component of such a system (to the extent parts and |

| Commercial Product | Lack of Military Functionality |
|---|---|
| | components of such systems are already controlled under other ITAR or EAR categories). |
| 3. Vehicle/Engine Sensors | Basic vehicle/engine Sensors detect such common information as vehicle engine temperature, oil pressure, and similar information, and are a feature common to most vehicles. These products have no functionality for military customers that is materially different from the functionality provided to consumer or commercial customers.<br><br>Vehicle operators do not generally have a point of direct interaction with Sensors. Rather, Sensor data is generally displayed on gauges or used by vehicle Controller Units to ensure proper functioning of the vehicle, such the way consumer and commercial vehicles use exhaust gas information to adjust fuel and air mixture. Basic vehicle/engine Sensors do not interact with weapons, armor, threat detection systems, or military command, control, and communications systems. Further, basic Sensors are no more militarily significant than the items already listed on the proposed Less Regulated List.<br><br>If a Sensor was somehow modified to monitor systems that are militarily significant, as discussed above, the Sensor would be controlled as a component of such a system (to the extent parts and components of such systems are already controlled under other ITAR or EAR categories). |
| 4. Vehicle/Engine Monitoring/Displays | VMS and its underlying components and technology have been developed and designed for passenger cars and other personal and commercial motor vehicles and not for military vehicles. VMS products are used throughout the world in virtually all automotive applications. These products have no functionality for military customers that is materially different from the functionality provided to consumer or commercial customers.<br><br>Standard VMS products lack any mechanical or electrical inputs or outputs that would interact with weapons systems; armor; threat detection; or command, control, and communications systems. Further, VMS products are no more militarily significant than windows, an item already on the proposed Less Regulated List. Hearing an audible "ding, ding" when a seat belt is not fastened is no more militarily significant than being able to see an obstacle in the road out a window. Both items serve purposes fundamental to |

| Commercial Product | Lack of Military Functionality |
|---|---|
| | most or all vehicles.<br><br>If an IPC was somehow modified to monitor systems that are militarily significant, as discussed above, the Gauge would be controlled as a component of such a system (to the extent parts and components of such systems are already controlled under other ITAR or EAR categories). |
| 5. Electronic Braking Systems | EBS systems are commercially available safety features. While these systems have no military significance, they could be used to increase the safety of military vehicles, as with other vehicles. These products have no functionality for military customers that is materially different from the functionality provided to consumer or commercial customers.<br><br>The point of human interface for an EBS system is typically a brake pedal. EBS systems do not interact with vehicle weaponry, defensive armor, threat detection, or command control and communications equipment. Further, EBS systems are no more militarily significant than the brake components already on the proposed Less Regulated List. EBS systems allow the underlying brake components stop vehicles more quickly and allow the vehicle to function better under varying road and driving conditions.<br><br>If an EBS system was somehow modified to interact with systems that are militarily significant, as discussed above, the EBS system would be controlled as a component of such a system (to the extent parts and components of such systems are already controlled under other ITAR or EAR categories). |
| 6. Multiplexing Systems | Multiplexing systems are a way to reduce vehicle wiring and wiring installation costs for large vehicles while processing electrical inputs and outputs (for example, ensuring that several light bulbs turn on when a single switch is flipped). These systems also reduce delays and repair costs caused by re-wiring. Continental multiplexing systems use the commercial J1939 SEA standard for electronic engine data, which is an open standard.<br><br>Multiplexing systems are general purpose systems with no inherent military functionality, such as the wiring, fuses, and relays they frequently replace. Continental's multiplexing systems are not designed to interact with vehicle weaponry, defensive |

| Commercial Product | Lack of Military Functionality |
|---|---|
| | armor, threat detection, or command control and communications equipment. Further, multiplexing systems are no more militarily significant than the cables, cable assemblies, and connectors already on the proposed Less Regulated List. While multiplexing systems combine many cables and connectors and include processing modules, they too are general use products not specifically suited for military purposes as opposed to civilian use.<br><br>If a multiplex system was somehow modified to control militarily significant systems, as discussed above, the multiplexing system would be controlled as a component of such a system (to the extent parts and components of such systems are already controlled under other ITAR or EAR categories). |
| 7. Tire Pressure Monitoring Systems | TPMS and its underlying components and technology constitute safety systems and lack any military significance. TPMS systems are available worldwide on vehicles that do **not** have run-flat tires. Again, Continental does **not** propose to treat run-flat technology as militarily insignificant. Rather, Continental is proposing to treat widely available commercial TPMS systems as militarily insignificant.<br><br>TPMS is no more militarily significant or necessary to vehicle function than tires (other than run-flats), which are already on the Less Regulated List. Having a tire with adequate pressure in it is no more militarily significant than having a tire in the first place.<br><br>None of the components or technology comprising TPMS systems has any particular military function or purpose. TMPS systems do not interact with vehicle weaponry; armor; threat detection systems; or command, control, and communications equipment.<br><br>If a TPMS system was somehow modified to interact with systems that are militarily significant, as discussed above, the TPMS would be controlled as a component of such a system (to the extent parts and components of such systems are already controlled under other ITAR or EAR categories). |
| 8. Certain Items/Data Relating to Tires (Not Including Run-Flats) | Continental supports the Commerce Department's determination that tires (other than run-flats) have little or no military functionality.<br><br>Tire products and the vehicle systems with which they interact are |

| Commercial Product | Lack of Military Functionality |
|---|---|
| | commercial technology and are not specifically designed for military use. Tires and wheels do not interact with vehicle weaponry, defensive armor, threat detection, or command control and communications equipment. Similarly, the wheels on which tires are placed are no more militarily significant than the tires themselves.[10]<br><br>If a wheel was somehow modified to include armor or interact with systems that are militarily significant, as discussed above, the wheel would be controlled under ITAR or EAR categories relating to armor or as a component of the system with which the wheel interacted (to the extent parts and components of such systems are already controlled under other ITAR or EAR categories). |

As explained more fully above, to the extent that any of the Commercial Products are slightly more complex or involve newer technology than other items already on the Commerce Department's proposed Less Regulated List, there is no military significance inherent in that complexity or "newness." Any complexity in the Commercial Products as implemented for a U.S. military vehicle is common to all applications for these products, including those available around the world on passenger cars and other non-military vehicles. A decision not to place the Commercial Products on the Less Regulated List because of perceived complexity or "newness" would thus not be reasonable.

Continental also notes that all of the items on the proposed Less Regulated List are essential to the function of most vehicles, including most military vehicles. There is nothing about any of the Commercial Products that is more essential to vehicle function than the products already on the Less Regulated List. For example, TMPS systems that detect low tire pressure are not more necessary to vehicle function than axles and tires themselves.

**D. To the extent the Commercial Products are modified for military use, those modifications are consistent with modifications typically available to commercial customers.**

Because of the significant expense and lead time involved in creating a new product system from scratch, various manufacturers including Continental create standard products which are then adjusted or modified for specific vehicles. Any modifications that would be necessary to use the Commercial Products on a military vehicle are of the same sort as modifications that would be

[10] Tires themselves (other than run-flats) are on the Less Regulated List and are therefore would not be controlled for NS, RS, and UN reasons even if they could, in theory, somehow be specially designed to interact with other vehicle systems that are militarily significant.

required to use the Commercial Products on new/different non-military vehicles, including heavy duty and off-road vehicles, as summarized in the below chart.

| Commercial Product | Modifications Typically Made for New Vehicle Application |
|---|---|
| 1. Gauges | The appearance, size, and input signal of a Gauge can be different from vehicle to vehicle. In high shock applications such as construction, Continental might recommend a Gauge product with a lens made of a plastic resistant to breakage. In the area of manufacturing methods, Continental can use a standard gluing process to seal the Gauge housing, or, to achieve a watertight seal, can use a laser welding process. Finally, certain methods can be used to ensure a fully watertight Gauge seal from the front side (e.g., laser welding) and from the rear side by using specially-sealed connectors. |
| 2. Instrument Panels/Clusters | IPCs are generally combinations of off-the-shelf Gauges and tell-tale displays (such as a check engine light). Military customers would have the same types of IPCs and Gauges to choose from as other customers, even if different vehicles have different combinations of Gauges and tell-tale displays. In high shock applications such as construction or off-road, Continental might recommend IPCs made of a type of plastic that is resistant to breakage. In the area of manufacturing methods, Continental can use a standard gluing process to seal an IPC housing designed for use in a commercial vehicle, or can use a lens laser welding process to achieve a watertight seal on an IPC that is designed for use in an extreme environment such as in a military vehicle. Finally, certain methods can be used to ensure a fully watertight seal from the front side (e.g., laser welding) and from the rear side by using specially-sealed connectors. |
| 3. Vehicle/Engine Sensors | Depending on the application, manufacturers can use different components, manufacturing methods, and designs to ensure that certain specification criteria are met. For example, manufacturers can use heavy duty components that can withstand higher or lower temperatures and temperature shocks, or higher vibration conditions and physical shocks. Manufacturers can also select component material for heavy duty applications, e.g., using a certain type of plastic for a sensor body that is highly resistant to breakage. In the area of manufacturing methods, Continental, for example, can use a fastener or a weld depending on the vibration and physical shock requirements. Finally, from a design standpoint, certain methods can be used to improve performance |

| Commercial Product | Modifications Typically Made for New Vehicle Application |
|---|---|
| | e.g., a sealed connector to ensure water-resistance. |
| 4. Vehicle/Engine Monitoring/Displays | VMS systems offer a variety of features, but the combinations of features used for military vehicles would be substantially similar to those made for commercial trucks, off-highway vehicles such as cranes, dump trucks, etc. For heavy duty uses, Continental already offers features such as improved water-resistance, improved resistance to hot and cold temperature extremes, and higher resistance to vibration and physical shocks. |
| 5. Electronic Braking Systems | Implementing an EBS system for a particular vehicle generally involves configuring the system to use work properly given the available voltages, size of brake lines, the basic suspension type, and the vehicle's weight into the system's software. Implementing an EBS system for a military vehicle would involve the same process and the configured system would not be materially different from a system used on another vehicle. |
| 6. Multiplexing Systems | Implementing a multiplexing system for a vehicle requires a determination about which component electrical signals are to be channeled through the system, the desired inputs and outputs for the system, and where to place system nodes. This would not be materially different for a military vehicle. Continental incorporates robust features into the various types of nodes and control units, such as water-resistance, resistance to dust penetration, a wide temperature operating range, and high vibration and physical shock resistance. |
| 7. Tire Pressure Monitoring Systems | Any modifications made to TPMS systems for use on military vehicles would be substantially similar to modifications made for other vehicles. Modifications made for heavy duty uses could include: placing the TPMS sensor in different locations to mitigate corrosion of the sensor, configuring the TPMS system to be able to read and translate higher tire pressures, and monitoring more tires. The modifications necessary to implement a TPMS system for a military vehicle would be substantially similar to the modifications made for other vehicles, including heavy duty vehicles. |
| 8. Certain Items/Data Relating to Tires (Not Including Run-Flats) | Military vehicle tires have features similar to other heavy duty tires. Continental supports the Commerce Department's decision to place tires (other than run-flats) on the Less Regulated List.<br><br>Just as tires specially designed for military use do not merit control for NS, RS, and UN reasons, Continental argues in these comments that other vehicle components that relate to tires should also be put on the Less Regulated List, including wheels, TPMS |

| Commercial Product | Modifications Typically Made for New Vehicle Application |
|---|---|
| | systems, tire inflation systems, and bead locks. The types of modifications that are made to these products for off-road and heavy duty uses are substantially similar to the types of changes that would be made for military use. Also, as stated above, to the extent that other features are included, such as armor-plating, those features would already be controlled by other provisions of the ITAR or EAR and dedicated controls for wheels, etc. would not be necessary. |

**E. Similar products are available outside the US**

The functionality available in the Commercial Products is available around the world on a wide variety of passenger and commercial vehicles.

| Commercial Product | Availability outside the U.S. |
|---|---|
| 1. Gauges | Virtually all vehicles produced today have gauges, including military vehicles produced for the U.S. military and other militaries. |
| 2. Instrument Panels/Clusters | Most of the major automobile and truck manufacturers operating throughout the world, as well as aftermarket manufacturers, offer IPC systems suitable for use in vehicles. IPC systems are also used, typically without material alteration, on U.S. and foreign military vehicles and equipment. |
| 3. Vehicle/Engine Sensors | Virtually any vehicle outside the U.S. that has an engine uses Sensor products to monitor engine performance. These products have been in existence for approximately 100 years, first in mechanical form, then over the past 30 years, in electric form. |
| 4. Vehicle/Engine Monitoring/Displays | Most or all vehicles manufactured inside and outside the U.S. have VMS systems in place. This is a commercial technology that has been available for decades globally. |
| 5. Electronic Braking Systems | Many of the major automobile and truck manufacturers operating in the United States, Europe, and Asia make EBS available to their customers on some or all vehicle models. EBS functionality is also available on motorcycles and other vehicles. |
| 6. Multiplexing Systems | Multiplex systems are used extensively throughout the world by heavy truck and bus manufacturers, fire engine manufacturers, and garbage truck manufacturers. |
| 7. Tire Pressure Monitoring Systems | TPMS systems are used extensively by automobile manufacturers around the world, including BMW, Honda, Hyundai, Kia, and Toyota. Almost all of the new vehicles sold today by the world's |

| Commercial Product | Availability outside the U.S. |
|---|---|
| | leading automobile manufacturers incorporate TPMS. TPMS is now considered a standard feature in the passenger car market, so much so that many automotive aftermarket companies have developed replacement components for TPMS as well as entire retrofit systems that can be adapted to vehicles manufactured without TPMS. |
| 8. Certain Items/Data Relating to Tires (Not Including Run-Flats) | Tires, wheels, and related products have been in widespread world-wide use in civil automobile applications for over a century. There are numerous commercially available "off-the-shelf" tire products, which are considered commodity products in the automotive market. |

There is no point in continuing to treat these globally available commercial technologies and products as subject to strict export controls. Doing so will not stop foreign militaries from acquiring these technologies or products. Even if there was a desire to avoid that outcome, other existing export restrictions suffice for that purpose, and continued regulation of the Commercial Products for NS, RS, and UN reasons (when they are modified for military vehicles) will only harm U.S. industry and national security interests by making it harder and more expensive for the U.S. military to obtain these technologies in light of export control restrictions.

**F. The above arguments also apply with respect to other vehicle parts/components with which the Commercial Products interact.**

Just as the Commercial Products have no significant military functionality, the systems and components with which they interact have no significant military functionality. Just like these products systems, the other systems and components that they touch and with which they interact are in widespread commercial use both inside and outside the U.S. and do not merit control for NS, RS, and UN reasons. Other vehicle parts and components that the Commercial Products touch or interact with are listed below in Section IV.

**G. The Commerce Department should relax controls on basic form, fit, and function data necessary to implement the Commercial Products for U.S. military vehicle platforms.**

In the proposed rules, the Commerce Department has proposed that items covered by ECCN 0A606.y would be controlled only for AT reasons, but has not included a corresponding subcategory within the other "nodes" of this ECCN (i.e. 0B606, 0C606, 0D606, and 0E606). Continental would request that a corresponding subcategory be added to these other "nodes." Because these parts and components are not worthy of control for NS, RS, or UN reasons, neither are the related production equipment, materials, software, or technology.

Also, in the proposed rules, the Commerce Department has not proposed to add to the Less Regulated List basic form, fit, and function information about military vehicles. However, this information is often necessary to ensure that even a commercially available part or component is properly implemented on a military vehicle. **Unless the proposed rules are revised to reflect this, controlling items on the Less Regulated List only for AT reasons is not likely to have a material beneficial effect on the availability of the Commercial Products to the U.S. military. This is because suppliers would still be subject to NS, RS, and UN controls with respect to the basic form, fit, and function information that is often necessary to provide the Commercial Products to the U.S. military.**

The following chart summarizes the types of form, fit, and function information typically needed for either (a) verification of functionality for an off-the-shelf product or (b) adaptation of a Commercial Product for use on a military **or** non-military vehicle:

| Commercial Product | Form, Fit, and Function Information Generally Used |
|---|---|
| 1. Gauges | A standard Gauge implementation process initially involves collecting basic variables about a vehicle, such as the space available for Gauge products on the dashboard and in other areas in the cabin or cockpit area, and the type of input provided by the Sensor or Control Unit (e.g., the voltage of the signal). Such information is necessary to determine whether off-the-shelf Gauge products will work on the vehicle or whether modifications would need to be made to existing Gauge products to support this feature on the vehicle. This basic form, fit, and function information needed to set up a Gauge for a particular vehicle is not complex or militarily sensitive. The type and range of signal input is needed to properly specify the gauge type and the internal movement design. The size of the available hole(s) in the dashboard is needed to determine the size of the gauge, although gauge sizes are standard in the commercial market. |
| 2. Instrument Panels/Clusters | The type and range of signal input is needed to properly specify the cluster type and the internal movement design. The geometry of the dashboard is needed to determine the size and shape of the cluster. |
| 3. Vehicle/Engine Sensors | Required form, fit, and function information includes the type and range of data that needs to be sensed; the mounting location (to verify the Sensor will fit, etc.), the associated type of display device; the connector type (to verify correct output). |
| 4. Vehicle/Engine Monitoring/Displays | The type and range of signal input is needed to properly specify the display type and values. The geometry of the dashboard is needed to determine the size and shape of the display. |
| 5. Electronic Braking | A standard EBS implementation process involves collecting basic |

| Commercial Product | Form, Fit, and Function Information Generally Used |
|---|---|
| Systems | variables about a vehicle, such as its weight, available brake pressure, available brake fluid type and flow rates, size of brake fluid lines, steering angle parameters, and basic suspension type to determine whether an off-the-shelf EBS system will work on the vehicle or whether modifications would need to be made to existing EBS systems to support this safety feature on the vehicle. Generally, an EBS manufacturer would also need to know how much space is available for the Brake Controller unit and other variables to verify that there is sufficient space in the vehicle for the Brake Controller and that it can be mounted properly. This basic form, fit, and function information needed to set up an EBS system for a particular vehicle is not militarily significant. |
| 6. Multiplexing Systems | Implementing a multiplexing system for a vehicle requires information about which component electrical signals are to be channeled through the system, the desired inputs and outputs for the system, where to place system nodes, and similar information. |
| 7. Tire Pressure Monitoring Systems | To adapt a TPMS system for a particular vehicle, suppliers generally require information regarding the general layout of the vehicle, the number of wheels/tires on the vehicle, recommended tire pressure, and the locations of the vehicle Control Unit and receiver mountings. |
| 8. Certain Items/Data Relating to Tires (Not Including Run-Flats) | In order to select an appropriate tire product for use with a vehicle, whether for use by the military or private sector, it is necessary to determine the size of the wheels, any required structural reinforcements, desired tread pattern, and the environmental conditions (to the extent that they are known) to which the Tire product will be subjected (maximum speed, overall inflated diameter, and overall inflated width), approved rim specifications, vehicle axle loads, and tire weight requirements. In addition, if a TPMS, beadlock, or tire inflation system is to be used, information about those systems would also be provided about these items to assist in tire selection and implementation. |

**H. There are safety, maintenance, and related reasons for adding the Commercial Products to the list of items with "little or no military significance."**

The following table summarizes some of the additional reasons why U.S. national security and other interests would be advanced by modifying the proposed rules as proposed in this comment letter:

| Commercial Product | Additional Rationale(s) for Amendments to Proposed Rules |
|---|---|
| 1. Gauges | Gauges provide a basic set of knowledge parameters necessary for safe vehicle operation. When a military vehicle is running at too many RPMs, is exceeding the desired speed, or is low on fuel, a gauge should show this to the driver as detected by a Sensor. To help ensure safe operation and appropriate maintenance of military vehicles, it is in the interests of the U.S. military to have such Gauge technologies available for its vehicle fleet. |
| 2. Instrument Panels/Clusters | Like gauges, IPCs provide a basic set of knowledge parameters necessary for safe vehicle operation. When a military vehicle is running at too many RPMs, is exceeding the desired speed, or is low on fuel, an instrument panel should show this to the driver as detected by a Sensor. To help ensure safe operation and appropriate maintenance of military vehicles, it is in the interests of the U.S. military to have IPC technologies available for its vehicle fleet. |
| 3. Vehicle/Engine Sensors | Like gauges and IPCs, Sensors provide a basic set of knowledge parameters necessary for safe vehicle operation. When a military vehicle is running at too many RPMs, is exceeding the speed limit, or has low fuel, a Sensor should show this to the driver by way of a gauge or instrument cluster. To help ensure safe operation and appropriate maintenance of military vehicles, it is in the interests of the U.S. military to have Sensor technologies available for its vehicle fleet. |
| 4. Vehicle/Engine Monitoring/Displays | Vehicle monitoring displays provide basic information essential to safe and efficient operation of the vehicle. When a military vehicle has a door open with a light draining the battery, has tripped a repair diagnostic ("check engine") code, has reached a maintenance interval, or suffers from other conditions shown in standard vehicle monitoring/displays, our nation's military personnel deserve to have access to this information just as readily as commercial vehicle users. To help ensure safe operation and appropriate maintenance of military vehicles, it is in the interests of the U.S. military to have VMS technologies available for its vehicle fleet. |
| 5. Electronic Braking Systems | EBS systems can dramatically increase safety at limited expense. Our men and women in uniform deserve ready access to commercially available EBS safety-related technology at a price that taxpayers can afford, and use of EBS on military vehicles would not give EBS any more inherent military significance. To help ensure safe operation of military vehicles, it is in the interests of the U.S. military to have EBS technologies available for its |

| Commercial Product | Additional Rationale(s) for Amendments to Proposed Rules |
|---|---|
| | vehicle fleet. |
| 6. Multiplexing Systems | Multiplexing could greatly reduce the cost associated with military vehicle electronics systems, reducing the need for component-specific wiring and relays. To help ensure that its vehicles are lighter, are easier to maintain, and take longer to manufacture, it is in the interests of the U.S. military to have such Gauge technologies available for its vehicle fleet. |
| 7. Tire Pressure Monitoring Systems | This is a basic safety and maintenance feature. When a military vehicle has an under-inflated or flat tire, our nation's military personnel deserve to have access to this information just as readily as drivers of non-military vehicles. To help ensure safe operation and appropriate maintenance of military vehicles, it is in the interests of the U.S. military to have TPMS technologies available for its vehicle fleet. |
| 8. Certain Items/Data Relating to Tires (Not Including Run-Flats) | Tires are a recurring replacement item on military and non-military vehicles. To control expense, promote innovation, and encourage customer service, the market for tires should be opened as broadly as possible by placing related products such as wheels on the Less Regulated List and placing less strict regulations on form, fit, and function information necessary for tire production/verification. |

## IV. REQUEST FOR SPECIFIC CHANGES TO THE PROPOSED RULES

In light of the above, Continental would recommend and request that the following revisions be made to the proposed rules:

i. Revise the proposed rules to identify in ECCN 0A606 only those military vehicle parts and components or functionalities determined to have (as opposed to lack) military significance and control only those items for NS, RS, and UN reasons.

In the alternative:

ii. Add the following products to list of items with "little or no military significance."

| Commercial Product | Examples and Subcomponents |
|---|---|
| 1. Gauges | a. Tachometer<br>b. Temperature Gauge (Engine Coolant) |

| Commercial Product | Examples and Subcomponents |
|---|---|
| | c. Pressure Gauge (Engine Oil)<br>d. Temperature Gauge (Engine Oil)<br>e. Air Temperature Indicator/Thermometer (Cabin and External)<br>f. Fluid Level Gauge (Engine Oil)<br>g. Pressure Gauge (Transmission Oil)<br>h. Temperature Gauge (Transmission Oil)<br>i. Temperature Gauge (Hydraulic Oil)<br>j. Pressure Gauge (Hydraulic Oil)<br>k. Fluid Level Gauge (Hydraulic Oil)<br>l. Fluid Level Gauge (Fuel)<br>m. Voltmeter (Battery)<br>n. Ammeter (Power Amperage)<br>o. Exhaust Gas Temperature (EGT) Gauges<br>p. Speedometers<br>q. Other Gauge products that do not interact with weapons; armor; threat detection systems; or military command, control, or communication systems |
| 2. Instrument Panels/Clusters | a. Complete Dashboard with Instruments, Switches, and Displays<br>b. All-in-one units containing Gauges, Instruments, & /or Displays<br>c. Stand-alone displays to show engine and system data |
| 3. Vehicle/Engine Sensors | a. Engine Speed Sensor<br>b. Temperature Sensor (Engine Coolant)<br>c. Pressure Sensor (Engine Oil)<br>d. Temperature Sensor (Engine Oil)<br>e. Fluid Level Sensor (Engine Oil)<br>f. Air Temperature Sensor/Thermometer (Cabin and External)<br>g. Pressure Sensor (Transmission Oil)<br>h. Temperature Sensor (Transmission Oil)<br>i. Temperature Sensor (Hydraulic Oil)<br>j. Pressure Sensor (Hydraulic Oil)<br>k. Fluid Level Sensor (Hydraulic Oil)<br>l. Fluid Level Sensor (Fuel)<br>m. Voltmeter Sensor (Battery)<br>n. Ammeter Sensor (Power Amperage)<br>o. Exhaust Gas Temperature (EGT) Sensor |

| Commercial Product | Examples and Subcomponents |
|---|---|
| | p. Wheel Speed Sensor<br>q. Exhaust Sensors<br>r. Mass Airflow Sensors<br>s. Camshaft Position Sensors<br>t. Crankshaft Position Sensors<br>u. Other Sensors that do not interact with weapons systems; armor; threat detection systems; or military command, control, or communication systems |
| 4. Vehicle/Engine Monitoring/ Displays | a. Driver Information Displays (i.e., Image & Icon Display Unit)<br>b. Driver Warning TellTale Module (i.e., LED Warning Light Device)<br>c. Driver Audible Alert Module (i.e., Audible Message Device) |
| 5. Electronic Braking Systems | a. Hydraulic electronic control unit (Brake Controller)<br>b. Antilock braking systems (ABS)<br>c. Electronic stability control (ESC)<br>d. Traction control systems (TCS)<br>e. Electronic brakeforce distribution (EBD)<br>f. Vacuum Pumps used in EBS<br>g. Brake Actuators used in EBS<br>h. Mechanical Pressure Components used in EBS<br>i. Wheel Speed Sensors used in EBS |
| 6. Multiplexing Systems | a. Central Control Unit<br>b. Multiplex Node<br>c. Display Node<br>d. Multiplex Switch<br>e. Instrument cluster/cockpit |
| 7. Tire Pressure Monitoring Systems | f. Tire Sensors<br>g. Antennas<br>h. TPMS Control Units (Receivers)<br>i. Harnessing<br>j. Display |
| 8. Certain Items/Data Relating to Tires (Not Including Run-Flats) | [Tires (other than run-flats) are already on proposed Less Regulated List.] |

And

iii. Add other parts/components with which the Commercial Products interact or which they touch to list of items with "little or no military significance" (to extent not already on the list):

| **Commercial Product** | **Related Parts/Components that Product Interacts with or Touches** |
|---|---|
| 1. Gauges | Gauges touch or interact with various vehicle Sensors and/or Control Units to receive inputs to be displayed, switches to provide control and/or reset functionality to the cluster itself, and sometimes interact with a serial bus or discrete wiring to a Sensor. |
| 2. Instrument Panels/Clusters | IPCs touch or interact with various vehicle Sensors and/or the component gauges, the vehicle dashboard, Control Units to receive inputs to be displayed, switches to provide control and/or reset functionality to the cluster itself, and sometimes interacts with a serial bus or discrete wiring to a Sensor. |
| 3. Vehicle/Engine Sensors | Gauges touch or interact with the parts of the engine or vehicle where the phenomena being sensed occur, for example, an exhaust gas temperature Sensor is mounted in the exhaust system. Various vehicle gauges and/or the Control Unit to receive inputs to be displayed, switches to provide control and/or reset functionality to the Sensor itself, and sometimes interacts with a serial bus. |
| 4. Vehicle/Engine Monitoring/ Displays | This system will interact with various vehicle Sensors and/or the Control Unit to receive inputs to be displayed. Switches typically provide control and/or reset functionality to the display itself, although could interact with other vehicle systems via serial bus or discrete wiring. |
| 5. Electronic Braking Systems | EBS systems interact with or touch the following other vehicle parts and components: brake lines, brake fluid, brake fluid pumps, discs, drums, cylinders, pistons, wiring, brake lighting, wheels, tires, and Control Units (e.g., so that braking and acceleration do not occur simultaneously unless desired). |
| 6. Multiplexing | Multiplexing systems interact with vehicle wiring, |

| Commercial Product | Related Parts/Components that Product Interacts with or Touches |
|---|---|
| Systems | including wiring in the powertrain, chassis, driver information devices, etc. |
| 7. Tire Pressure Monitoring Systems | TPMS systems interact with the engine Control Unit to provide tire pressure, temperature, and acceleration data for informational purposes only. |
| 8. Certain Items/Data Relating to Tires (Not Including Run-Flats) | Tires touch or interact with the following additional vehicle parts and components:<br>a. Wheels<br>b. Beadlocks<br>c. TPMS systems<br>d. Air inflation systems |

And

iv. Add a subcategory "y" to ECCNs 0B606, 0C606, 0D606, and 0E606 for test, inspection and production equipment; materials; software; and technology, respectively, relating to items controlled by ECCN 0A606.y. Items controlled by these subcategories would be controlled only for AT reasons, as the Commerce Department has already proposed to control items in ECCN 0A606.y.

And

v. Insert a technical note to ECCN 0E606, indicating that form, fit, and function data needed to adapt products controlled by ECCN 0A606.y for use on a military vehicle is controlled only for AT reasons, unless it relates to certain sensitive items:

1. The form, fit, and function information necessary to design, modify, adapt, and configure parts and components listed in ECCN 0A606.y as having little or no military significance is controlled only for AT reasons. To the extent the form, fit, and function information relates to vehicle weapons; armor; threat detection systems; or military command, control, and communications systems, that information is controlled to the extent and in the same manner as "technology" or "technical data" concerning such item is controlled by the EAR or ITAR, respectively.

And

vi. Insert a technical note to ECCN 0A606, indicating that the presence of an item on the Less Regulated List does not mean that the item could not become subject to additional export control restrictions if it becomes a part of an item that is militarily significant:

1. To the extent a part or component is "specially designed" to control or be a part or component of a military vehicle component or other system that is controlled for other reasons under the ITAR or EAR, that part or component is controlled in the same manner as the item is controlled by the EAR or ITAR, respectively.

And

vii. Insert the following definition in Part 772 of the EAR

"Form, fit, and function information" means data relating to items, components, or processes to enable physical and functional interchangeability, and data identifying source, size, configuration, mating and attachment characteristics, functional characteristics, and performance requirements and testing."

## CONCLUSION

Continental appreciates the Commerce Department's work to reform the U.S. export control system and your consideration of the recommendations set forth above. I would be happy to meet with you in-person or by phone to discuss these comments. I can be reached by phone at 410-385-3459 or by e-mail at nhartland@milesstockbridge.com. Continental looks forward to the issuance of the final rules in a manner advantageous for the U.S. military, taxpayers, and other stakeholders such as Continental.

Respectfully Submitted,

/S/

Nathanael D. Hartland

Exhibits to Continental Tire and Automotive Comments
Commerce Department July 15, 2011 Proposed Rules

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Exhibit 2. Instrument Panels/Clusters
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Exhibit 5. Electronic Braking Systems
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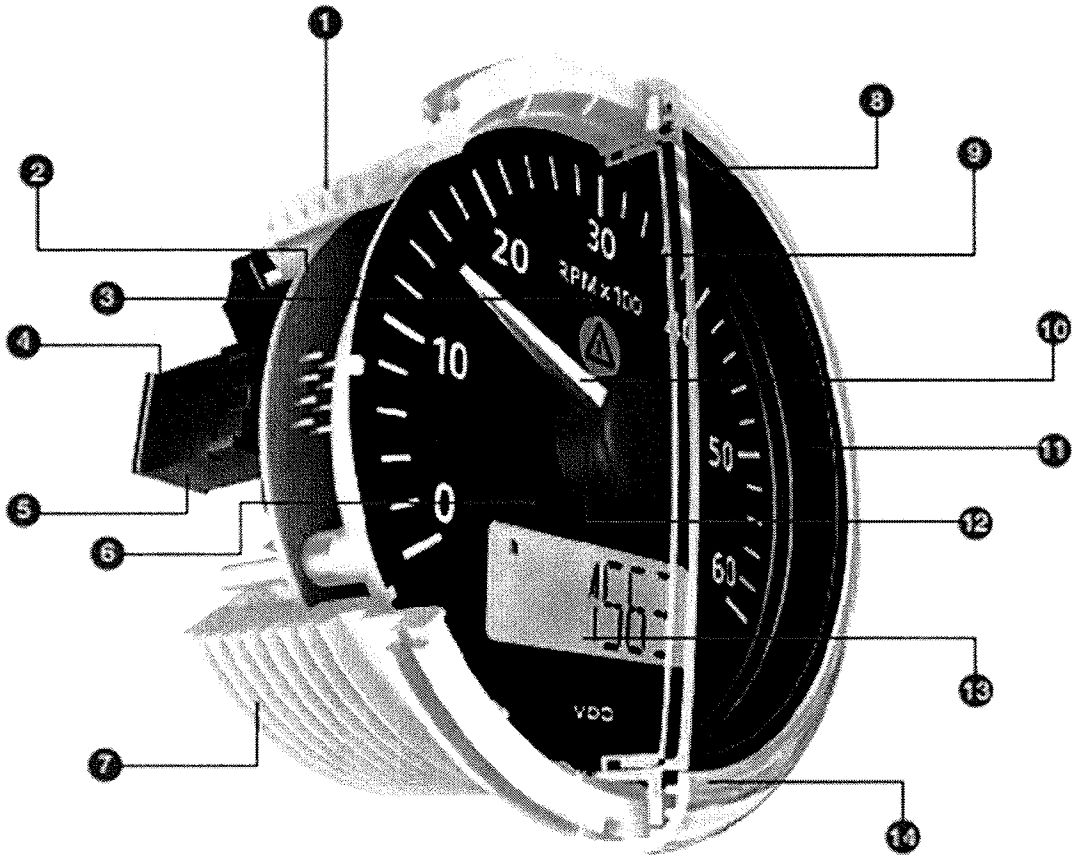
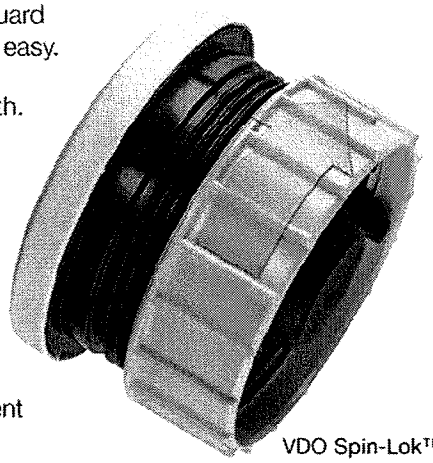
Exhibit 7. Tire Pressure Monitoring Systems
Exhibit 8. Items relating to Tires (other than Run-Flats)

**EXHIBIT 1: Gauges**

Following are images of and information about several commercially available Gauges.



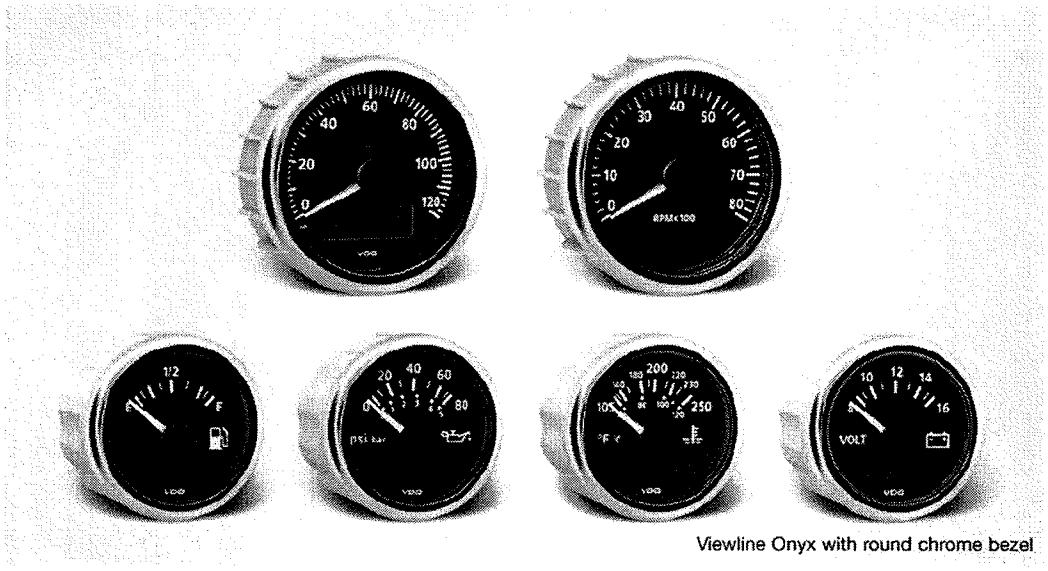
1. Spin-Lok™ mounting – a VDO innovation developed to safeguard against mounting panel warping and makes installation fast & easy.
2. Single PCB increases reliability and minimizes instrument depth.
3. Built-in LED warning indicator (up to 5) is programmable to OEM-specified function.
4. Single cavity connectors reduce wiring installation time.
5. Reverse polarity and over voltage protection virtually eliminate the possibility of installation failures.
6. VDO is one of the few companies in the world to design, patent and manufacture stepper motors and resistive movements.



VDO Spin-Lok™ mounting

7. Corrosion-free and flame retardant materials comply with manufacturer's latest specifications.
8. Laser welded lenses ensure the highest level of protection against water intrusion.
9. Dual domed lenses eliminate fogging – another VDO innovation.
10. LED lit pointers and "through dial lighting" minimize current consumption while optimizing nighttime viewing.
11. Detail finish ring enhances the overall appearance of finished instrument – a VDO exclusive.
12. Designed to withstand continuous 25 G vibrations and 100 G single shock, to ensure maximum reliability of each instrument.
13. Large, multifunction backlit LCD provides easy readout of programmed functions.
14. Customer installed bezels with nine style choices allow for greater styling differentiation between product lines.

# Viewline Onyx



Viewline Onyx with round chrome bezel

### Speedometer w/ LCD & Telltales

Speedometers feature 1-button auto calibration programming, user defined speed warning, left & right turn signals, e-brake warning and high-beam indicator.

LCD features odometer, trip odometer, voltage and clock. Accepts signal inputs from Hall Effect and inductive sender and most electronic controlled transmission outputs.

| Description | Size | On Dial | Mounting Spin-Lok™ | Warning Indicator | Bezel | Terminal | Voltage | Single Pack Part No. | 10 Pack Part No. |
|---|---|---|---|---|---|---|---|---|---|
| 120 MPH | 3 3/8" (85mm) dia | MPH | √ | √ | table 15 | table 18 | 12/24 | A2C53408268-S | A2C53408268-B |

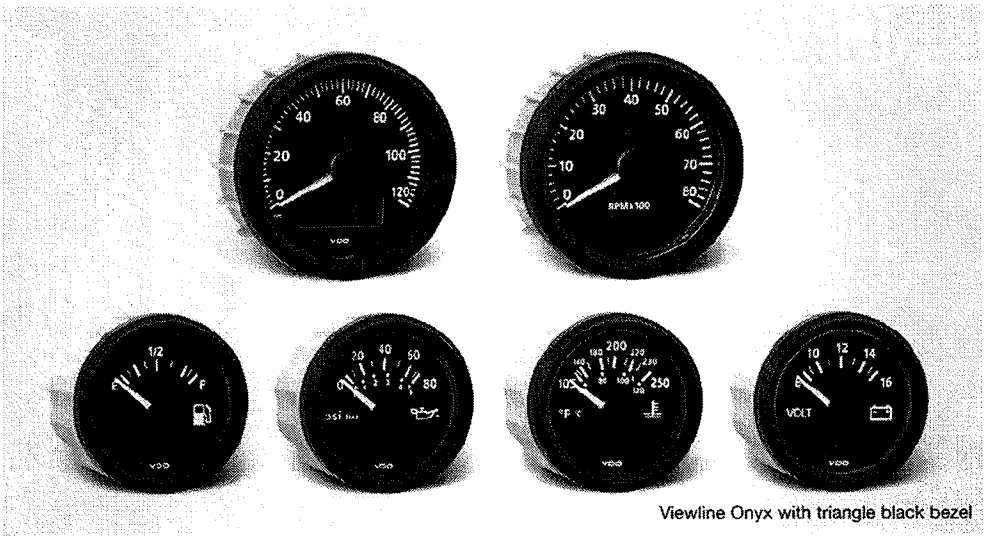
*See page 62 for speedometer senders*

### Standard Speedometer w/ LCD

Speedometers feature 1-button auto calibration programming and user defined speed warning. LCD features odometer, trip odometer, voltage and clock. Accepts signal inputs from Hall Effect and inductive sender and most electronic controlled transmission outputs.

| Description | Size | On Dial | Mounting Spin-Lok™ | Warning Indicator | Bezel | Terminal | Voltage | Single Pack Part No. | 10 Pack Part No. |
|---|---|---|---|---|---|---|---|---|---|
| 85 MPH/140 km/h | 3 3/8" (85mm) dia | MPH/ km/h | √ | √ | table 15 | table 18 | 12/24 | A2C53194748-S | A2C53194748-B |
| 120 MPH | 3 3/8" (85mm) dia | MPH | √ | √ | table 15 | table 18 | 12/24 | A2C53194759-S | A2C53194759-B |
| 160 MPH | 3 3/8" (85mm) dia | MPH | √ | √ | table 15 | table 18 | 12/24 | A2C53194765-S | A2C53194765-B |
| 85 MPH/140 km/h | 4" (110mm) dia | MPH/ km/h | √ | √ | table 16 | table 18 | 12/24 | A2C53194641-S | A2C53194641-B |
| 120 MPH | 4" (110mm) dia | MPH | √ | √ | table 16 | table 18 | 12/24 | A2C53194639-S | A2C53194639-B |

# Viewline Onyx



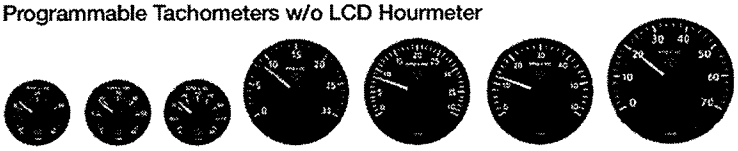
Viewline Onyx with triangle black bezel

## Programmable Tachometers w/ LCD Hourmeter

Programmable tachometers feature: User defined rev. limit warning, LCD display for total hours, resettable hours, voltage and clock. Accepts signal inputs from most electronic controlled ignitions with tachometer output terminal, standard coil ignition, alternator signal and 12V square wave applications.

| Description | Size | On Dial | Mounting Spin-Lok™ | Warning Indicator | Bezel | Terminal | Voltage | Single Pack Part No. | 10 Pack Part No. |
|---|---|---|---|---|---|---|---|---|---|
| 3,000 RPM | 3 3/8" (85mm) dia | RPMx100 | √ | √ | table 15 | table 18 | 12/24 | A2C53194789-S | A2C53194789-B |
| 4,000 RPM | 3 3/8" (85mm) dia | RPMx100 | √ | √ | table 15 | table 18 | 12/24 | A2C53194863-S | A2C53194863-B |
| 5,000 RPM | 3 3/8" (85mm) dia | RPMx100 | √ | √ | table 15 | table 18 | 12/24 | A2C53194867-S | A2C53194867-B |
| 6,000 RPM | 3 3/8" (85mm) dia | RPMx100 | √ | √ | table 15 | table 18 | 12/24 | A2C53194872-S | A2C53194872-B |
| 7,000 RPM | 3 3/8" (85mm) dia | RPMx100 | √ | √ | table 15 | table 18 | 12/24 | A2C53194881-S | A2C53194881-B |
| 8,000 RPM | 3 3/8" (85mm) dia | RPMx100 | √ | √ | table 15 | table 18 | 12/24 | A2C53194885-S | A2C53194885-B |
| 3,000 RPM | 4" (110mm) dia | RPMx100 | √ | √ | table 16 | table 18 | 12/24 | A2C53194597-S | A2C53194597-B |
| 4,000 RPM | 4" (110mm) dia | RPMx100 | √ | √ | table 16 | table 18 | 12/24 | A2C53194596-S | A2C53194596-B |
| 6,000 RPM | 4" (110mm) dia | RPMx100 | √ | √ | table 16 | table 18 | 12/24 | A2C53194593-S | A2C53194593-B |
| 8,000 RPM | 4" (110mm) dia | RPMx100 | √ | √ | table 16 | table 18 | 12/24 | A2C53194590-S | A2C53194590-B |

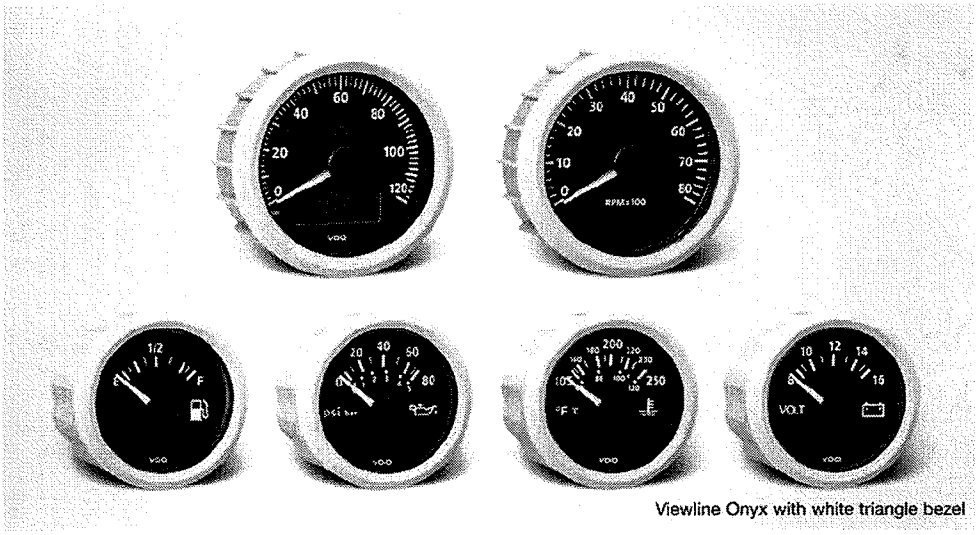
## Programmable Tachometers w/o LCD Hourmeter



Programmable tachometers feature: Accepts signal inputs from 2, 4, 6, 8, 10, 12 & 16 cylinder standard coil ignition, alternator signal and 12V square wave applications. User defined rev. limit warning and programming can be done using Viewline programming software (available separately).

| Description | Size | On Dial | Mounting Spin-Lok™ | Warning Indicator | Bezel | Terminal | Voltage | Single Pack Part No. | 10 Pack Part No. |
|---|---|---|---|---|---|---|---|---|---|
| 4,000 RPM | 2 1/16" (52mm) dia | RPMx100 | √ | √ | table 14 | table 17 | 12/24 | A2C53210903-S | A2C53210903-B |
| 6,000 RPM | 2 1/16" (52mm) dia | RPMx100 | √ | √ | table 14 | table 17 | 12/24 | A2C53210899-S | A2C53210899-B |

# Viewline Onyx



Viewline Onyx with white triangle bezel

### Programmable Tachometers w/o LCD Hourmeter (cont.)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 8,000 RPM | 2 1/16" (52mm) dia | RPMx100 | √ | √ | table 14 | table 17 | 12/24 | A2C53210895-S | A2C53210895-B |
| 3,000 RPM | 3 3/8" (85mm) dia | RPMx100 | √ | √ | table 15 | table 17 | 12/24 | A2C53218716-S | A2C53218716-B |
| 4,000 RPM | 3 3/8" (85mm) dia | RPMx100 | √ | √ | table 15 | table 17 | 12/24 | A2C53218722-S | A2C53218722-B |
| 6,000 RPM | 3 3/8" (85mm) dia | RPMx100 | √ | √ | table 15 | table 17 | 12/24 | A2C53218726-S | A2C53218726-B |
| 3,000 RPM | 4" (110mm) dia | RPMx100 | √ | √ | table 16 | table 17 | 12/24 | A2C53218711-S | A2C53218711-B |
| 4,000 RPM | 4" (110mm) dia | RPMx100 | √ | √ | table 16 | table 17 | 12/24 | A2C53218712-S | A2C53218712-B |
| 7,000 RPM | 4" (110mm) dia | RPMx100 | √ | √ | table 16 | table 17 | 12/24 | A2C53218713-S | A2C53218713-B |

### Fluid Temperature Gauges, electrical, 2 1/16" (52mm) dia

| Description | On Dial | Mounting Spin-Lok™ | Warning Indicator | Bezel | Terminal | Sender Table | Voltage | Single Pack Part No. | 10 Pack Part No. |
|---|---|---|---|---|---|---|---|---|---|
| 240°F | WATER °F | √ | √ | table 14 | table 17 | - | 12 | A2C53191359-S | A2C53191359-B |
| 250°F | °F | √ | √ | table 14 | table 17 | A | 12 | A2C53191360-S | A2C53191360-B |
| 250°F/120°C | °F/°C | √ | √ | table 14 | table 17 | A | 12 | A2C53191722-S | A2C53191722-B |
| 300°F/150°C | °F/°C | √ | √ | table 14 | table 17 | B | 12 | A2C53191723-S | A2C53191723-B |

### Outside Temperature Gauges, electrical, 2 1/16" (52mm) dia

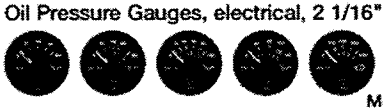
| Description | On Dial | Mounting Spin-Lok™ | Warning Indicator | Bezel | Terminal | Sender Table | Voltage | Single Pack Part No. | 10 Pack Part No. |
|---|---|---|---|---|---|---|---|---|---|
| -10°F/+120°F | °F | √ | √ | table 14 | table 17 | - | 12 | A2C53210847-S | A2C53210847-B |
| -10°F/+120°F Outside Temperature Sender | | | | | | | | 323-112 | 323-112B |

### Pyrometers, electrical, 2 1/16" (52mm) dia

| Description | On Dial | Mounting Spin-Lok™ | Warning Indicator | Bezel | Terminal | Sender Table | Voltage | Single Pack Part No. | 10 Pack Part No. |
|---|---|---|---|---|---|---|---|---|---|
| 250°F-1650°F | °F | √ | √ | table 14 | table 17 | - | 12 | A2C53210907-S | A2C53210907-B |
| 250°F-1650°F Pyrometer Sender | | | | | | | | 326-001 | |
| 13' Extension cable | | | | | | | | 326-002 | |

# Viewline Onyx

## Oil Pressure Gauges, electrical, 2 1/16" (52mm) dia



| Description | Ohm Range | On Dial | Mounting Spin-Lok™ | Warning Indicator | Bezel | Terminal | Sender Table | Voltage | Single Pack Part No. | 10 Pack Part No. |
|---|---|---|---|---|---|---|---|---|---|---|
| 80 PSI | 10-180 | psi | √ | √ | table 14 | table 17 | 1 | 12 | A2C53191383-S | A2C53191383-B |
| 80 PSI | 240-33 | psi | √ | √ | table 14 | table 17 | 2 | 12 | A2C53191384-S | A2C53191384-B |
| 80 PSI/5 bar | 10-180 | psi/bar | √ | √ | table 14 | table 17 | 1 | 12 | A2C53191733-S | A2C53191733-B |
| 80 PSI/5 bar | 240-33 | psi/bar | √ | √ | table 14 | table 17 | 2 | 12 | A2C53191402-S | A2C53191402-B |
| 100 PSI/7 bar | 240-33 | psi/bar | √ | √ | table 14 | table 17 | 4 | 12 | A2C53191734-S | A2C53191734-B |
| 150 PSI/10 bar | 10-180 | psi/bar | √ | √ | table 14 | table 17 | 5 | 12 | A2C53191736-S | A2C53191736-B |
| 150 PSI/10 bar | 240-33 | psi/bar | √ | √ | table 14 | table 17 | - | 12 | A2C53191735-S | A2C53191735-B |
| 400 PSI/25 bar | 10-180 | psi/bar | √ | √ | table 14 | table 17 | 7 | 12 | A2C53191737-S | A2C53191737-B |

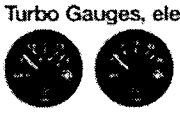
## Air Pressure Gauges, electrical, 2 1/16" (52mm) dia

| Description | Ohm Range | On Dial | Mounting Spin-Lok™ | Warning Indicator | Bezel | Terminal | Sender Table | Voltage | Single Pack Part No. | 10 Pack Part No. |
|---|---|---|---|---|---|---|---|---|---|---|
| 150PSI/1000kPA | 10-180 | AIR | √ | √ | table 14 | table 17 | — | 12 | A2C53191445-S | A2C53191445-B |

## Brake Pressure Gauges, electrical, 2 1/16" (52mm) dia

| Description | Ohm Range | On Dial | Mounting Spin-Lok™ | Warning Indicator | Bezel | Terminal | Sender Table | Voltage | Single Pack Part No. | 10 Pack Part No. |
|---|---|---|---|---|---|---|---|---|---|---|
| 150PSI/1000kPA | 10-180 | psi/kPa | √ | √ | table 14 | table 17 | — | 12 | A2C53191446-S | A2C53191446-B |

## Turbo Gauges, electrical, 2 1/16" (52mm) dia



| Description | Ohm Range | On Dial | Mounting Spin-Lok™ | Warning Indicator | Bezel | Terminal | Sender Table | Voltage | Single Pack Part No. | 10 Pack Part No. |
|---|---|---|---|---|---|---|---|---|---|---|
| 2 bar/30 PSI | 10-180 | bar/psi | √ | √ | table 14 | table 17 | 1 | 12 | A2C53191728-S | A2C53191728-B |
| 30 PSI | 10-180 | psi | √ | √ | table 14 | table 17 | 1 | 12 | A2C53191382-S | A2C53191382-B |

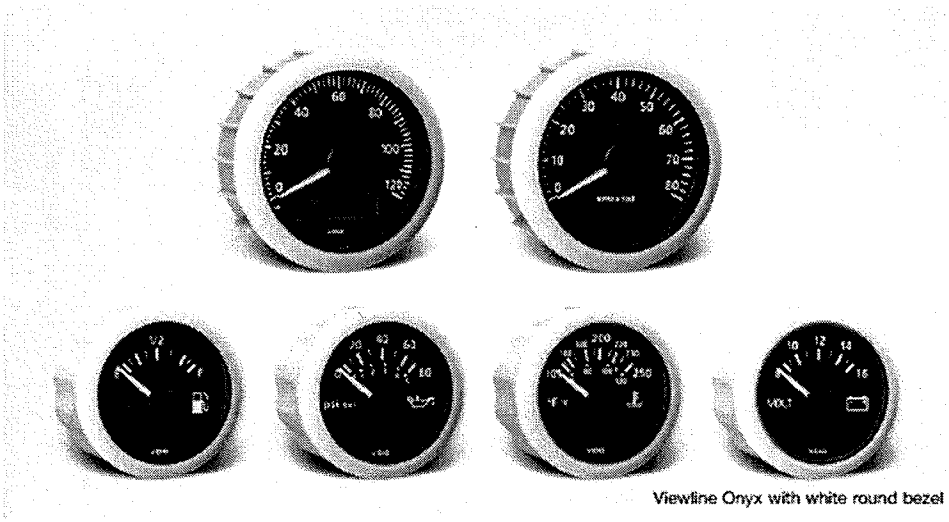
## Fuel Level Gauges, electrical, 2 1/16" (52mm) dia

| Description | Ohm Range | On Dial | Mounting Spin-Lok™ | Warning Indicator | Bezel | Terminal | Sender Table | Voltage | Single Pack Part No. | 10 Pack Part No. |
|---|---|---|---|---|---|---|---|---|---|---|
| For VDO sender | 10-180 | E-F | √ | √ | table 14 | table 17 | 9 | 12 | A2C53191757-S | A2C53191757-B |
| For U.S. sender | 240-33 | E-F | √ | √ | table 14 | table 17 | 10 | 12 | A2C53191758-S | A2C53191758-B |
| For GM sender (0-90) | 0-90 | E-F | √ | √ | table 14 | table 17 | 11 | 12 | A2C53191760-S | A2C53191760-B |
| For Tube type sender | 90-0 (adjustable) | E-F | √ | √ | table 14 | table 17 | 12 | 12 | A2C53191759-S | A2C53191759-B |

## Water Level Gauges, electrical, 2 1/16" (52mm) dia

| Description | Ohm Range | On Dial | Mounting Spin-Lok™ | Warning Indicator | Bezel | Terminal | Sender Table | Voltage | Single Pack Part No. | 10 Pack Part No. |
|---|---|---|---|---|---|---|---|---|---|---|
| Freshwater | 10-180 | WATER E-F | √ | √ | table 14 | table 17 | 13 | 12 | A2C53192574-S | A2C53192574-B |
| Freshwater | Capacitive | 0-1/1 | √ | √ | table 14 | table 17 | 13 | 12 | A2C53210954-S | A2C53210954-B |
| Blackwater | Capacitive | 0-1/1 | √ | √ | table 14 | table 17 | 13 | 12 | A2C53210834-S | A2C53210834-B |

# Viewline Onyx



Viewline Onyx with white round bezel

### Voltmeter, electrical, 2 1/16" (52mm) dia

| Description | On Dial | Mounting Spin-Lok™ | Warning Indicator | Bezel | Terminal | Voltage | Single Pack Part No. | 10 Pack Part No. |
|---|---|---|---|---|---|---|---|---|
| 8-16V | VOLT | √ | √ | table 14 | table 17 | 12 | A2C53191766-S | A2C53191766-B |
| 18-32V | VOLT | √ | √ | table 14 | table 17 | 24 | A2C53191767-S | A2C53191767-B |

### Ammeter, electrical, 2 1/16" (52mm) dia

| Description | Range | On Dial | Mounting Spin-Lok™ | Warning Indicator | Bezel | Terminal | Voltage | Single Pack Part No. | 10 Pack Part No. |
|---|---|---|---|---|---|---|---|---|---|
| 30 Amp | 30 / 0 / 30 | AMP | √ | √ | table 14 | table 17 | 12/24 | A2C53211039-S | A2C53211039-B |
| 60 Amp | 60 / 0 / 60 | AMP | √ | √ | table 14 | table 17 | 12/24 | A2C53210959-S | A2C53210959-B |
| 100 Amp | 100 / 0 /100 | AMP | √ | √ | table 14 | table 17 | 12/24 | A2C53210973-S | A2C53210973-B |
| 150 Amp | 150 / 0 / 150 | AMP | √ | √ | table 14 | table 17 | 12/24 | A2C53210957-S | A2C53210957-B |

***Note:*** *Viewline ammeters require external 60mv shunt, not included*

### Clocks, electrical, 2 1/16" (52mm) dia

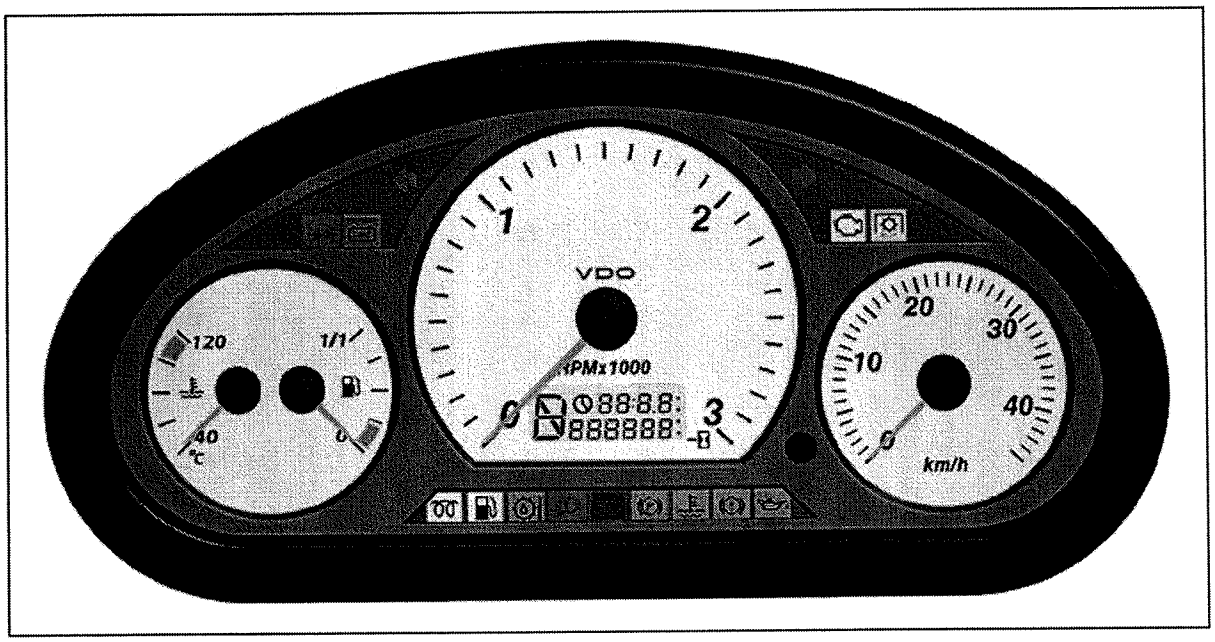
| Description | On Dial | Mounting Spin-Lok™ | Bezel | Terminal | Voltage | Single Pack Part No. | 10 Pack Part No. |
|---|---|---|---|---|---|---|---|
| Analog | - | √ | table 14 | table 17 | 12 | A2C53321687-S | A2C53321687-B |
| Analog | - | √ | table 14 | table 17 | 24 | A2C53321689-S | A2C53321689-B |

### Hourmeter, electrical, 2 1/16" (52mm) dia

| Description | Range | On Dial | Mounting Spin-Lok™ | Bezel | Terminal | Voltage | Single Pack Part No. | 10 Pack Part No. |
|---|---|---|---|---|---|---|---|---|
| Illuminated | 100,000 hrs | Hour | √ | table 14 | table 17 | 12/24 | A2C59510876-S | A2C59510876-B |

**EXHIBIT 2: Instrument Panels/Clusters**

Following are images of and information about various commercially available instrument panels/clusters:




**Description:**

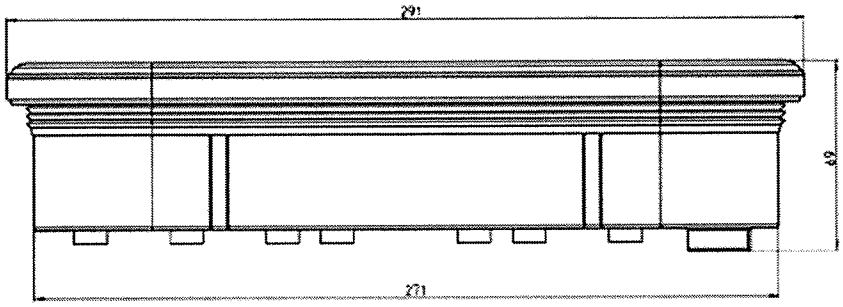
Analogue indication of engine speed, battery, road speed, temperature and fuel.

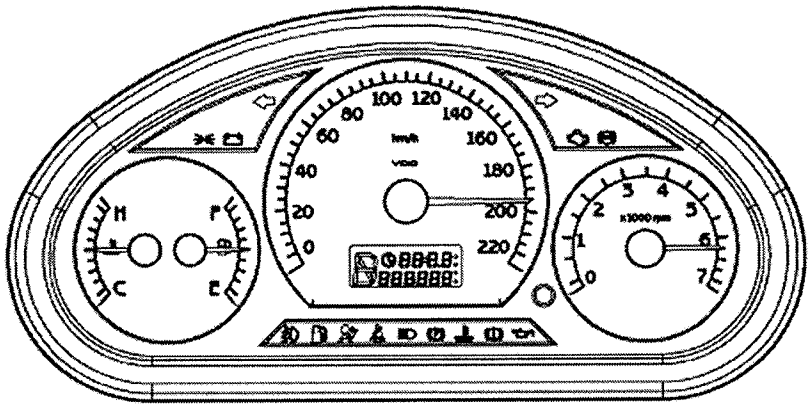
Digital indication of hour counter, odometer, trip odometer, trip hour counter, clock and gear shift.

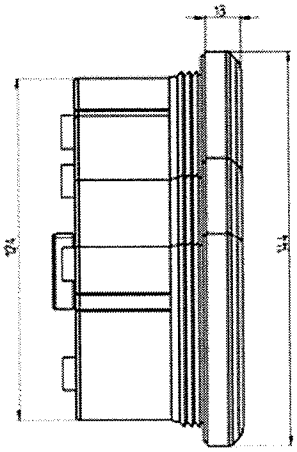
Indication of 15 warning lights.
Self test of 5 warning lights.

Programming with diagnosis interface (k-line).

# Dimensions



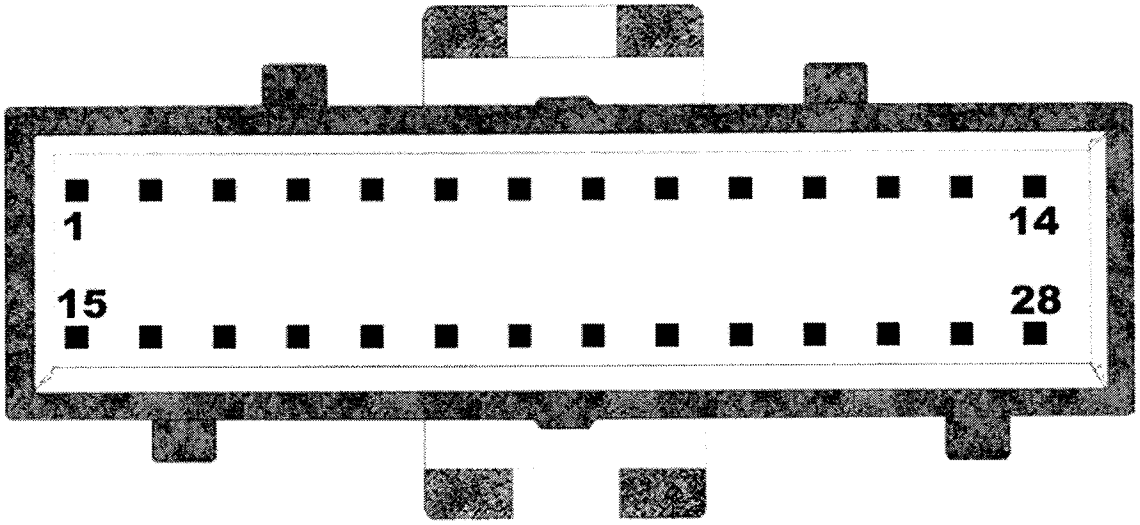




| | |
|---|---|
| Housing: | plastic, black |
| Lens: | scratch resistant |
| Dial: | backlight |
| Pointer: | translucent, red |
| Illumination: | green, LED |
| Connector: | GHW, Nr. 14137, 28 Pin |
| Inputs: | 2x frequency, 3x resistance, PWM |
| Outputs: | C3 - signal |

| | |
|---|---|
| Rated voltage: | 12 V and 24 V DC |
| Operating voltage: | 9 V to 16 V DC<br>18 V to 32 V DC |
| Current consumption: | 400 mA ± 20% |
| EMC: | DIN 40 839, 95/54-;<br>89/336-EWG, ISO 7637-1-2 |
| Operating Temp.: | -30°C to +75°C |
| Storage Temp.: | -40°C to +85°C |
| Operating Temp.<br>LC-Display: | -20°C to +65°C |

# Terminal connection




| Pin | Beschreibung / Description | Pin | Beschreibung / Description |
|---|---|---|---|
| 1 | Aux Sensor | 15 | k - Line / diagnostic |
| 2 | Kontrollleuchte_7 / Warn. Light_7 | 16 | Kontrollleuchte_11 / Warn. Light_11 |
| 3 | Kl.31 / GND (term. 31) | 17 | Kontrollleuchte_3 / Warn. Light_3 |
| 4 | Gangwahl- / Gear Shift - PRNDL | 18 | Kontrollleuchte_6 / Warn. Light_6 |
| 5 | Masse Analog / Analogue Ground | 19 | Kontrollleuchte_4 / Warn. Light_4 |
| 6 | Kontrollleuchte_1 / Warn. Light_1 | 20 | Kontrollleuchte_14 / Warn. Light_14 |
| 7 | C3 Ausg. / C3 Speed Out | 21 | Füllstand / Fuel Sensor |
| 8 | Kontrollleuchte_2 / Warn. Light_2 | 22 | Kontrollleuchte_12 / Warn. Light_12 |
| 9 | Kontrollleuchte_9 / Warn. Light_9 | 23 | Kühlwassertemp. / Coolant Temp. |
| 10 | Signal DZM / Signal Tachometer | 24 | Kontrollleuchte_13 / Warn. Light_13 |
| 11 | Kl.30 / Power Supply (term. 30) | 25 | Kontrollleuchte_5 / Warn. Light_5 |
| 12 | Kl.58d / Illumination (term. 58d) | 26 | Kontrollleuchte_8 / Warn. Light_8 |
| 13 | Kl.15 / Ignition (term. 15) | 27 | Signal Tacho / Speed Signal |
| 14 | Kontrollleuchte_15 / Warn. Light_15 | 28 | Kontrollleuchte_10 / Warn. Light_10 |

## Warning lights

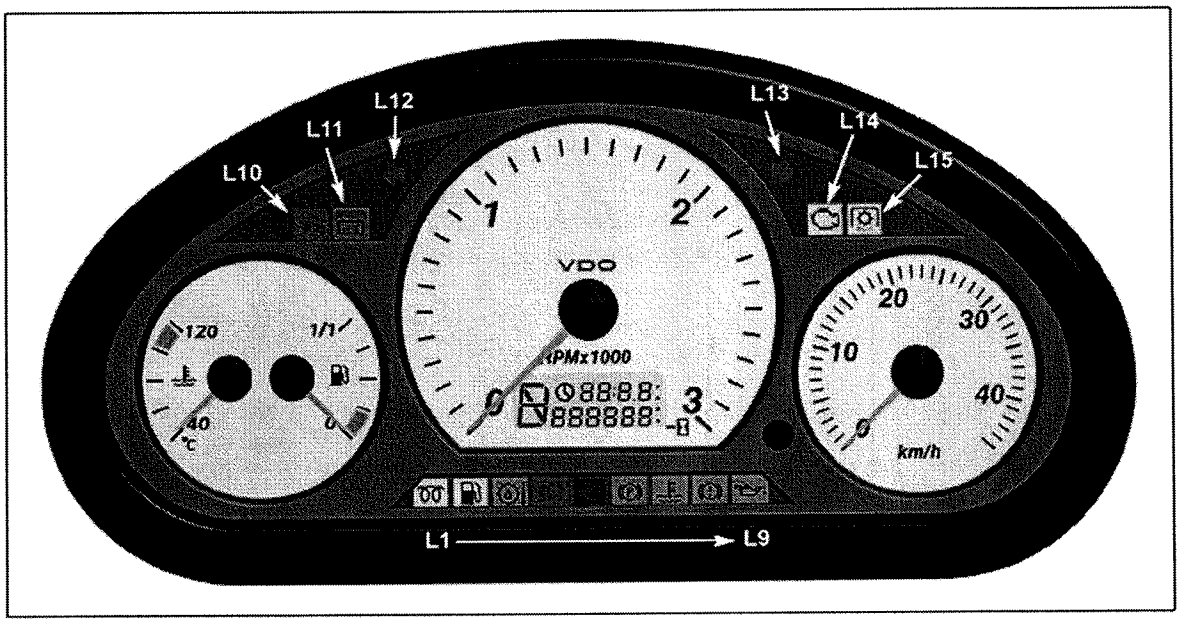


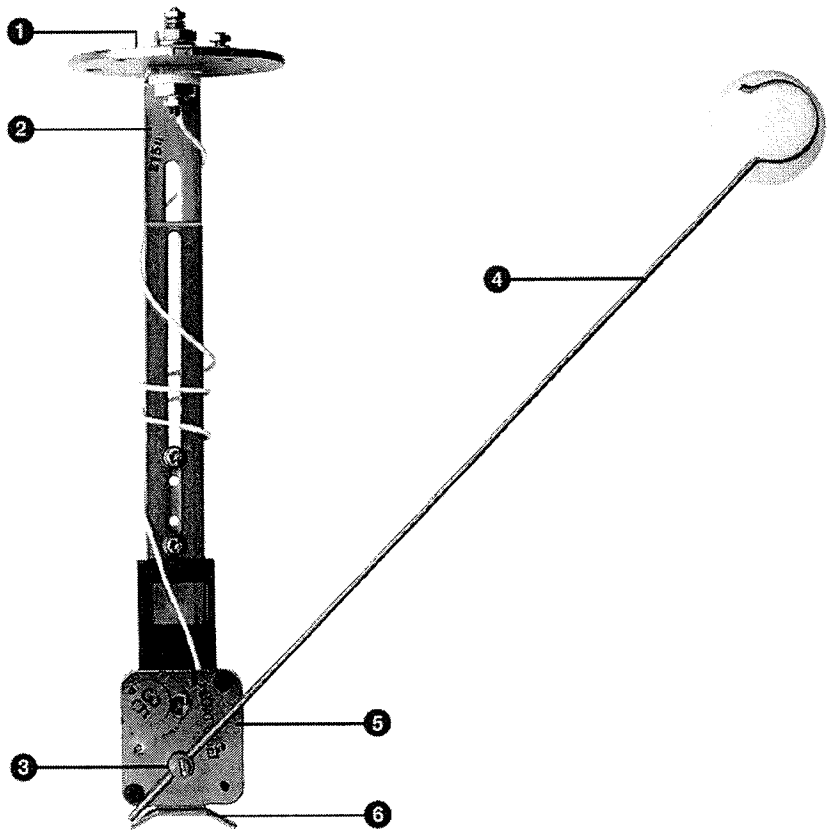
**EXHIBIT 3: Vehicle/Engine Monitoring Sensors**

This Exhibit provides images and information concerning various commercially available Sensors.

# VDO ALAS Plated Steel 12/24V Adjustable Swing Arm Sender

Designed for severe duty use, each of these senders contains an SAE standard five hole metal mounting flange and body components which can be adjusted from 6" to 23" tank depth. Adaptable to right hand or left had swing arm. Each contains thick film resistor technology for greater resistance to wear associated with standard wire wound units. Each kit contains neoprene mounting gasket and mounting screws. For tanks without flange mounting holes our optional tank mounting kit may be used.

1. SAE 5-hole mounting flange can rotate to position sender for right or left hand swing.
2. Body constructed of plated steel to eliminate damage caused by fuel slosh.
3. Swing arm pivot uses oversized bearings for long life.
4. Adjustable for tank depths from 152mm to 584mm.
5. Wiper and thick film resistor are shielded from fuel slosh for maximum durability.
6. Float arm stops ensure wiper remains in contact with resistor board when tank is full or low.



## Table 9: Lever Arm Fuel Level Senders (10-180 Ohm)

| Description | Low Fuel Warning Contact | Mounting Diameter | Tank Depth Min (inches/ mm) | Tank Depth Max (inches/ mm) | Voltage | Reference # on sender | Single Pack Part No. | Bulk Pack Part No. |
|---|---|---|---|---|---|---|---|---|
| ALAS Plated Steel | No | 54mm | 6"/152mm | 23"/584mm | 6-24 | 1-551-004-082B | 226 001 | 226 001B |
| ALAS Plated Steel, with flange kit | No | 54mm | 6"/152mm | 23"/584mm | 6-24 | 1-551-004-082B | 226 002 | |
| ALAS I | Yes | 54mm | 5½"/140mm | 15¾/400mm | 6-24 | A2C53170774 | 226 162 | 226 162B |
| ALAS I | No | 54mm | 5½"/140mm | 15¾/400mm | 6-24 | A2C53170771 | 226 168 | 226 168B |
| ALAS II* | Yes | 80mm | 5½"/140mm | 15¾/400mm | 6-24 | A2C53278239 | 226 946 | 226 946B |

*see below for ALAS II return & draw tubes and installation kit (sold separately)

## Table 10:Lever Arm Fuel Level Senders (240-33 Ohm)

| Description | Low Fuel Warning Contact | Mounting Diameter | Tank Depth Min (inches/ mm) | Tank Depth Max (inches/ mm) | Voltage | Reference # on sender | Single Pack Part No. | Bulk Pack Part No. |
|---|---|---|---|---|---|---|---|---|
| ALAS Plated Steel | No | 54mm | 6"/152mm | 23"/584mm | 6-24 | 1-551-004-123D | 226 007 | |
| ALAS I | Yes | 54mm | 5½"/140mm | 15¾/400mm | 6-24 | A2C53170773 | 226 163 | 226 163B |
| ALAS I | No | 54mm | 5½"/140mm | 15¾/400mm | 6-24 | A2C53170770 | 226 169 | 226 169B |
| ALAS II* | Yes | 80mm | 5½"/140mm | 15¾/400mm | 6-24 | A2C53278250 | 226 973 | 226 973B |

*see below for ALAS II return & draw tubes and installation kit (sold separately)

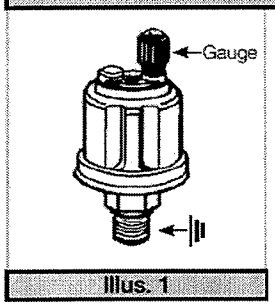
## Table 11:Lever Arm Fuel Level Senders (0-90 Ohm)

| Description | Low Fuel Warning Contact | Mounting Diameter | Tank Depth Min (inches/ mm) | Tank Depth Max (inches/ mm) | Voltage | Reference # on sender | Single Pack Part No. | Bulk Pack Part No. |
|---|---|---|---|---|---|---|---|---|
| ALAS Plated Steel | No | 54mm | 6"/152mm | 23"/584mm | 6-24 | 1-551-004-161D | 226 008 | |
| ALAS I | Yes | 54mm | 5½"/140mm | 15¾/400mm | 6-24 | A2C53170772 | 226 164 | 226 164B |
| ALAS I | No | 54mm | 5½"/140mm | 15¾/400mm | 6-24 | A2C53170769 | 226 170 | 226 170B |
| ALAS II* | Yes | 80mm | 5½"/140mm | 15¾/400mm | 6-24 | A2C53278251 | 226 975 | 226 975B |

*see below for ALAS II return & draw tubes and installation kit (sold separately)

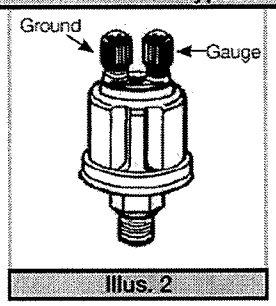
Pressure Sensors

**Types of Connections**



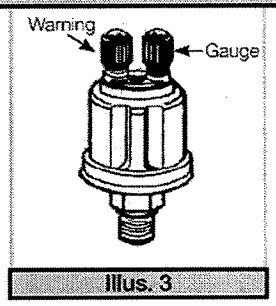

**Illus. 1**

Standard Ground: sender case to common ground; and Dual Station Standard Ground




**Illus. 2**

Floating Ground: isolated terminal to common ground; and Dual Station Floating Ground




**Illus. 3**

Standard Ground with Warning Contact

**Terminal Key**

All Pressure Senders have knurled nut terminals, except where noted:

* w/ .250" Spade terminal

** w/ M4 Stud

*** w/ 10-32 Stud

**Table 1: 80 PSI / 5 bar (10-180 Ohm)**

| Thread | Warning Contact (illus. 3) | Standard Ground (illus. 1) | Floating Ground (illus. 2) | Dual Station (illus. 1) | Dual Station Floating Ground (illus. 2) | # Stamped on Sender | Washer Required |
|---|---|---|---|---|---|---|---|
| 1/8-27 NPT | – | 360 003 | – | – | – | 29 / 4 | – |
| 1/8-27 NPT | – | – | 360 410 | – | – | 32 / 1 | – |
| 1/8-27 NPT | – | – | – | – | 362 001* | 1 / 1 | – |
| 1/8-27 NPT | 7.0 PSI | 360 009 | – | – | – | 30 / 23 | – |
| 1/8-27 NPT | – | – | – | 362 033* | – | 3 / 1 | – |
| 1/4-18 NPT | – | 360 005 | – | – | – | 29 / 8 | – |
| 1/4-18 NPT | 8.0 PSI | 360 019 | – | – | – | 30 / 20 | – |
| 1/4-18 NPT | – | – | 360 441B | – | – | 32 / 16 | – |
| M10 x 1K | – | 360 001 | – | – | – | 29 / 1 | – |
| M10 x 1K | 7.0 PSI | 360 006 | – | – | – | 30 / 2 | – |
| M10 x 1K | 10.0 PSI | 360 034 | – | – | – | 30 / 4 | – |
| M12 x 1.5 | – | 360 002 | – | – | – | 29 / 85 | X |
| M12 x 1.5 | 8.5 PSI | 360 007 | – | – | – | 30 / 6 | X |
| M14 x 1.5 | – | 360 027 | – | – | – | 29 / 26 | X |
| M14 x 1.5 | 7.1 PSI | 360 028 | – | – | – | 30 / 28 | X |

**Table 2: 80 PSI / 5 bar (240-33 Ohm)**

| Thread | Warning Contact (illus. 3) | Standard Ground (illus. 1) | Floating Ground (illus. 2) | Dual Station (illus. 1) | Dual Station Floating Ground (illus. 2) | # Stamped on Sender | Washer Required |
|---|---|---|---|---|---|---|---|
| 1/8-27 NPT | – | 360 801*** | – | – | – | AT 84200 | – |

**Table 3: 100 PSI / 7 bar (10-180 Ohm)**

| Thread | Warning Contact (illus. 3) | Standard Ground (illus. 1) | Floating Ground (illus. 2) | Dual Station (illus. 1) | Dual Station Floating Ground (illus. 2) | # Stamped on Sender | Washer Required |
|---|---|---|---|---|---|---|---|
| 1/8-27 NPT | – | 360 086*** | – | – | – | 655 | – |

Temperature Sensors

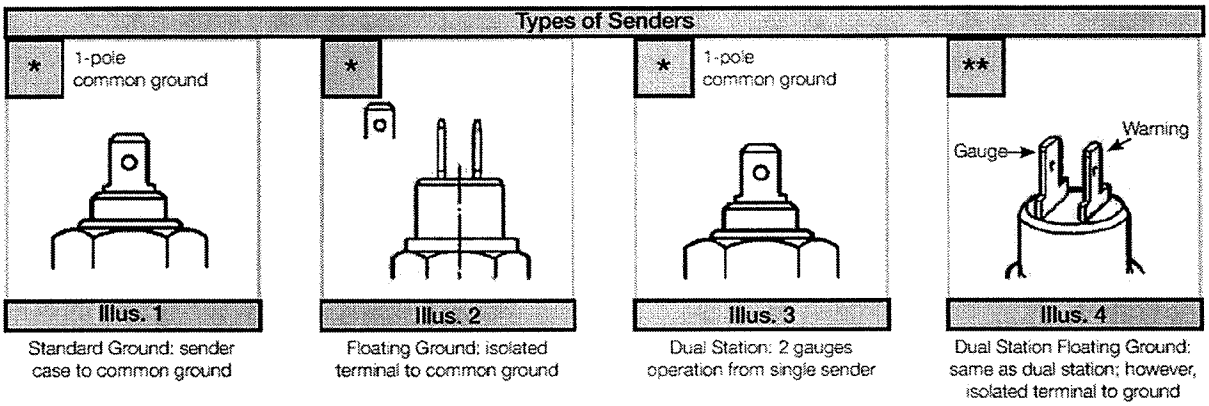
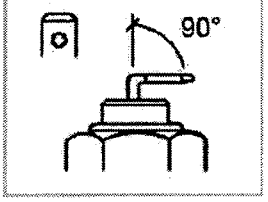



**Table A: 250° F / 120° C**

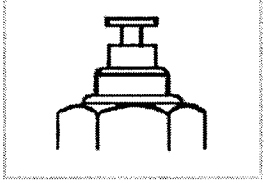
| Thread | Terminal Type | Warning Contact (illus. 4) | Standard Ground (illus. 1) | Floating Ground (illus. 2) | Dual Station (illus. 3) | Dual Station Floating Ground (illus. 2) | # Stamped on Sender | Washer Required |
|---|---|---|---|---|---|---|---|---|
| 1/8–27 NPT | Δ | – | 323 095 | – | – | – | 801 / 5 / 1 or 151 | – |
| 1/4–18 NPT | * | – | 323 420 | – | – | – | 801 / 1 / 9 | – |
| 1/4–18 NPT | * | – | – | – | 325 001 | – | 801 / 2 / 1 | – |
| 1/4–18 NPT | * | – | – | – | – | 325 002 | 805 / 3 / 1 | – |
| 3/8–18 NPT | * | – | 323 094 | – | – | – | 801 / 1 / 7 | – |
| 3/8–18 NPT | ◊ | – | 323 421 | – | – | – | 801 / 1 / 38 or 118 | – |
| 3/8–18 NPT | * | – | – | 323 479 | – | – | 805 / 1 / 5 | – |
| 3/8–18 NPT | * | – | – | – | – | 325 007 | 805 / 3 / 3 | – |
| 1/2–14 NPT | * | – | 323 093 | – | – | – | 801 / 1 / 10 | – |
| 1/2–14 NPT | ◊ | – | 323 419 | – | – | – | 801 / 1 / 16 or 116 | – |
| 1/2–14 NPT | ** | 205° F ± 5° F | 323 098 | – | – | – | 803 / 1 / 19 | – |
| 1/2–14 NPT | ** | 217° F ± 5° F | 323 099 | – | – | – | 803 / 1 / 25 or 315 | – |
| 1/2–14 NPT | ** | 230° F ± 5° F | 323 100 | – | – | – | 803 / 1 / 32 | – |
| 1/2–14 NPT | * | – | – | 323 478 | – | – | 805 / 1 / 4 or 514 | – |
| 5/8–18 NF-3 | ** | 209° F ± 5° F | 323 026 | – | – | – | 803 / 1 / 2 | – |
| 5/8–18 UNF | * | – | 323 422 | – | – | – | 801 / 1 / 8 | – |
| 5/8–18 UNF | * | – | – | – | – | 325 003 | 805 / 3 / 2 | – |
| 5/8–18 UNF | * | – | – | 323 483 | – | – | 805 / 1 / 2 | – |
| M10 x 1 | Δ | – | 323 088 | – | – | – | 801 / 17 / 1 | X |
| M14 x 1.5 | ◊ | – | 323 416 | – | – | – | 801 / 1 / 26 | X |
| M14 x 1.5 | * | – | – | 323 425 | – | – | 805 / 1 / 1 | X |
| M14 X 1.5 | ** | 205° F +-5° F | 323 102 | – | – | – | 801/1/6 | X |
| M16 x 1.5 | ** | 230° F ± 5° F | 323 028 | – | – | – | 803 / 1 / 7 | X |
| M16 x 1.5 | ◊ | – | 323 417 | – | – | – | 801 / 1 / 29 | X |
| M18 x 1.5 | * | – | 323 418 | – | – | – | 801 / 1 / 22 | X |

## Types of Connectors

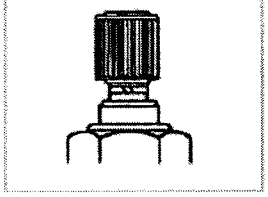
**S** 1-pole common ground




**Δ** 1-pole common ground



**◊** 1-pole common ground M4 stud or knurled nut



### Connection Key

- * Straight .250" spade terminal
- ◊ 4 mm screw stud
- S 90° angle .250" spade terminal
- Δ 56 Series "Packard" female terminal, unsealed w/ terminal housing
- ** Gauge .250" spade terminal; WARNING: .187" spade terminal

## Table B: 300° F / 150° C

| Thread | Terminal Type | Warning Contact (illus. 4) | Standard Ground (illus. 1) | Floating Ground (illus. 2) | Dual Station (illus. 3) | Dual Station Floating Ground (illus. 2) | # Stamped on Sender | Washer Required |
|---|---|---|---|---|---|---|---|---|
| 1/8–27 NPT | Δ | – | 323 057 | – | – | – | 801 / 9 / 1 or 191 | – |
| 1/4–18 NPT | ◊ | – | 323 058 | – | – | – | 801 / 4 / 17 | – |
| 1/4–18 NPT | * | – | – | 323 485 | – | – | 805 / 3 / 2 | – |
| 3/8–18 NPT | * | – | 323 059 | – | – | – | 801 / 4 / 15 or 145 | – |
| 1/2–14 NPT | ◊ | – | 323 060 | – | – | – | 801 / 4 / 6 | – |
| 1/2–14 NPT | ** | 250° F ± 5° F | 323 120 | – | – | – | 803 / 2 / 15 | – |
| 5/8–18 UNF | ◊ | – | 323 061 | – | – | – | 801 / 4 / 9 or 149 | – |
| M10 x 1 | Δ | – | 323 423 | – | – | – | 801 / 9 / 3 | X |
| M10 x 1.5 | Δ | – | 323 089 | – | – | – | 801 / 10 / 1 | X |
| M12 x 1.5 | Δ | – | 323 092 | – | – | – | 801 / 10 / 3 | X |
| M14 x 1.5 | S | – | 323 055 | – | – | – | 801 / 12 / 2 | X |
| M14 x 1.5 | ** | 266° F +-5° F | 323 121 | | | | 801 / 2 / 7 | X |
| M16 x 1.5 | S | – | 323 056 | – | – | – | 801 / 12 / 1 | X |
| M18 x 1.5 | S | – | 323 064 | – | – | – | 801 / 12 / 3 | X |

## Table C: 400° F / 200° C

| Thread | Terminal Type | Warning Contact (illus. 4) | Standard Ground (illus. 1) | Floating Ground (illus. 2) | Dual Station (illus. 3) | Dual Station Floating Ground (illus. 2) | # Stamped on Sender | Washer Required |
|---|---|---|---|---|---|---|---|---|
| 1/8–27 NPT | Δ | – | 323 050 | (Long probe, 5/8" long) Ford | | | 801 / 13 / 1 or 131 | – |
| 1/8–27 NPT | Δ | – | 323 086 | (Short probe, 3/8" long) GM | | | 801 / 18 / 1 or 181 | – |
| M10 x 1.5 | Δ | – | 323 091 | – | – | – | 801 / 3 / 1 | X |
| M10 x 1 | Δ | – | 323 090 | – | – | – | 801 / 3 / 2 | X |

*Senders available in bulk, please contact customer service for part number and detail.*
*Senders requiring sealing washer, as noted, are not supplied with sender.*

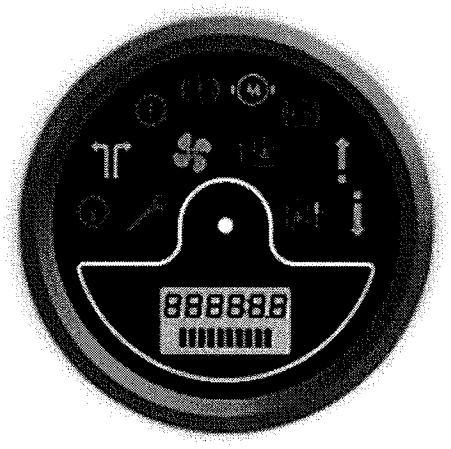
### Air, Cylinder & Exhaust Temperature Senders

| Description | Range | Thread | Terminal Type | Single Pack Part No. | Bulk Pack Part No. |
|---|---|---|---|---|---|
| Pyrometer, for Vision & Cockpit | 250°F to 1650°F | 1/4 NPT | #6 ring terminal | 323 892 | |
| Pyrometer, for Viewline & Severe Duty | 250°F to 1650°F | 1/4 NPT | #6 ring terminal | 326 001 | |
| Outside Temperature, Vision | -13°F to +250°F | M10x1.0 | M4 Stud | 323 087 | 323 087B |
| Outside Temperature, Viewline | -40°F to +185°F | — | Bare wire leads | 323 112 | 323 112B |
| Cylinder Head Temp | 100-600F | — | 14mm ring terminal | 323 701 | |
| Cylinder Head Temp | 100-600F | — | 12mm ring terminal | 323 705 | |

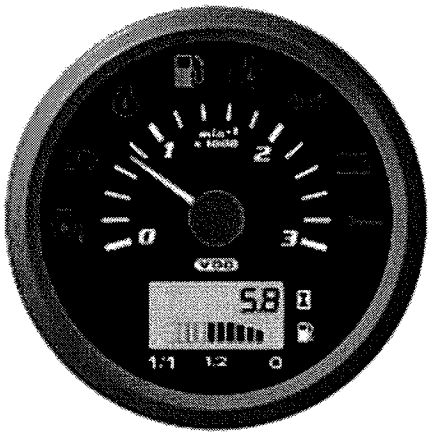
**EXHIBIT 4: Vehicle/Engine Monitoring Displays**

Following are images and information about commercially avaialble vehicle/engine monitoring displays:

**A. CIC Warning Lights:**




**B. CIC Analogue Indicator:**




**CIC Warning Lights**

| Function | Description |
|---|---|
| LC-Display | • TN Positive, MUX 1:4 |
| Illumination | • LCD: Amber LEDs (day- /nighttime illumination) |
| Warning symbols | • Up to 12 positions for warning indicators with coloured LEDs |

**EXHIBIT 5: Electronic Braking Systems**

This exhibit provides a layout diagram for various commercially available EBS systems.

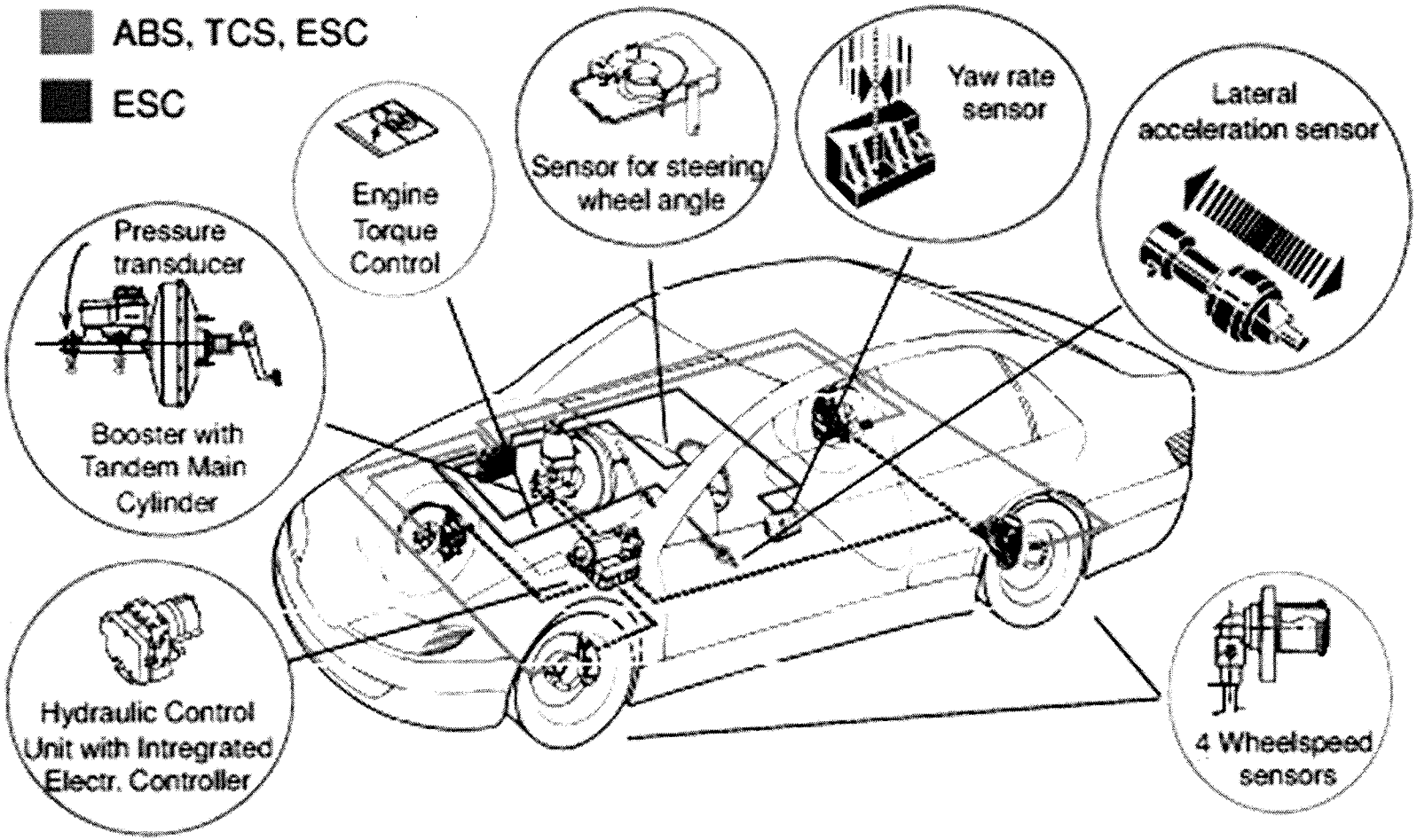
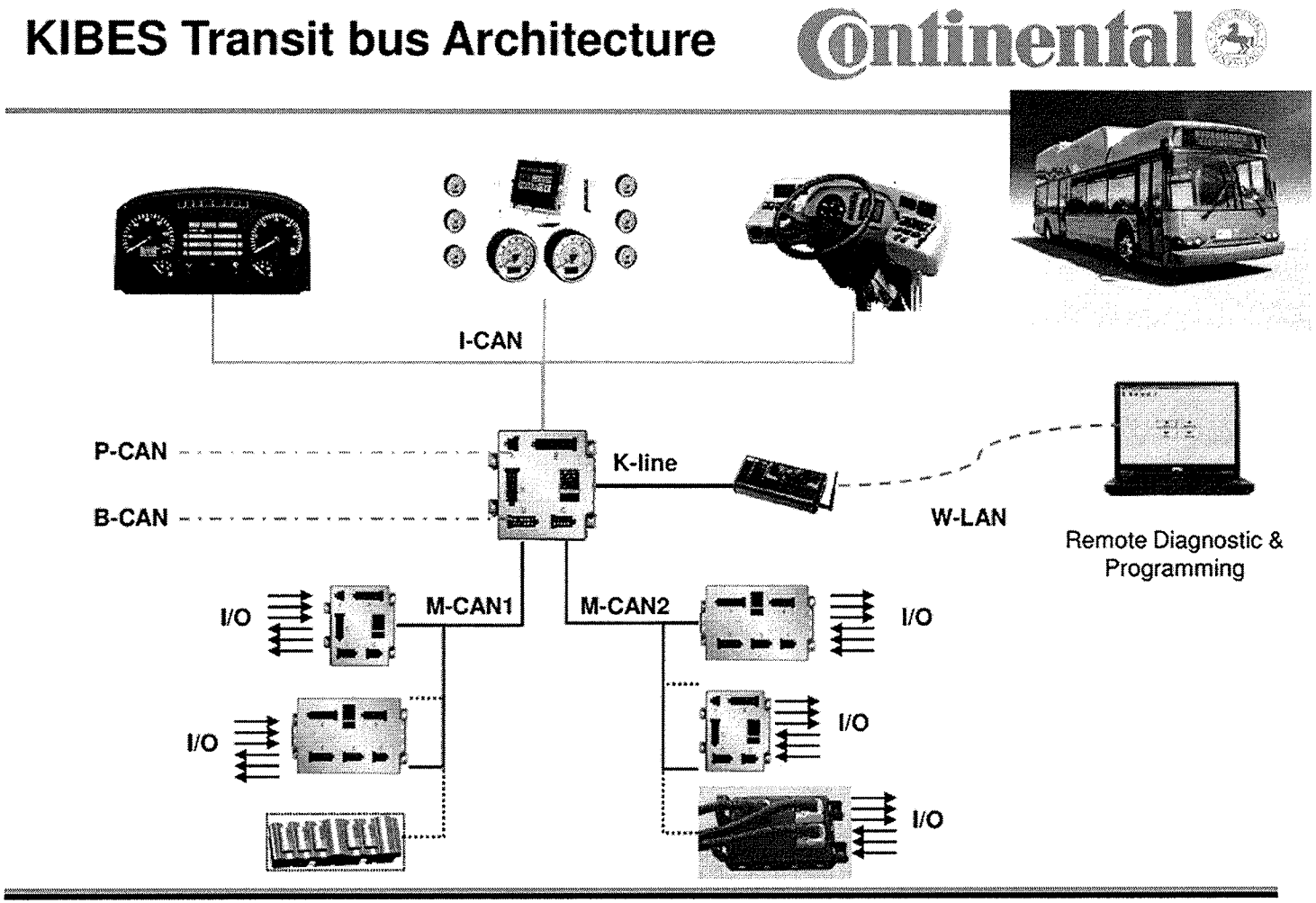
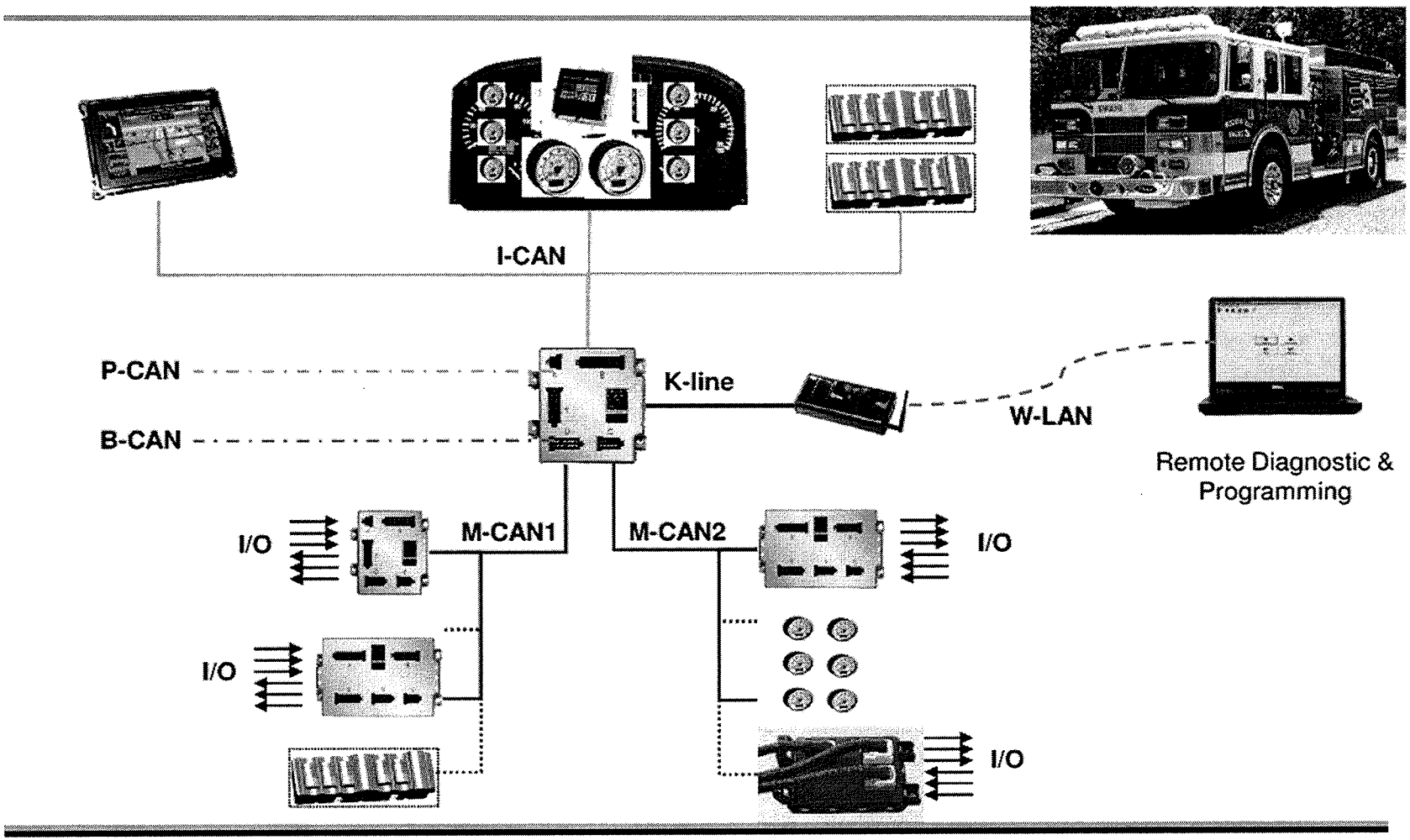


**EXHIBIT 6: Multiplexing Systems**

This Exhibit provides images and information concerning how multiplexing systems work.



# KIBES Fire Truck Architecture



# KIBES Garbage Truck Architecture

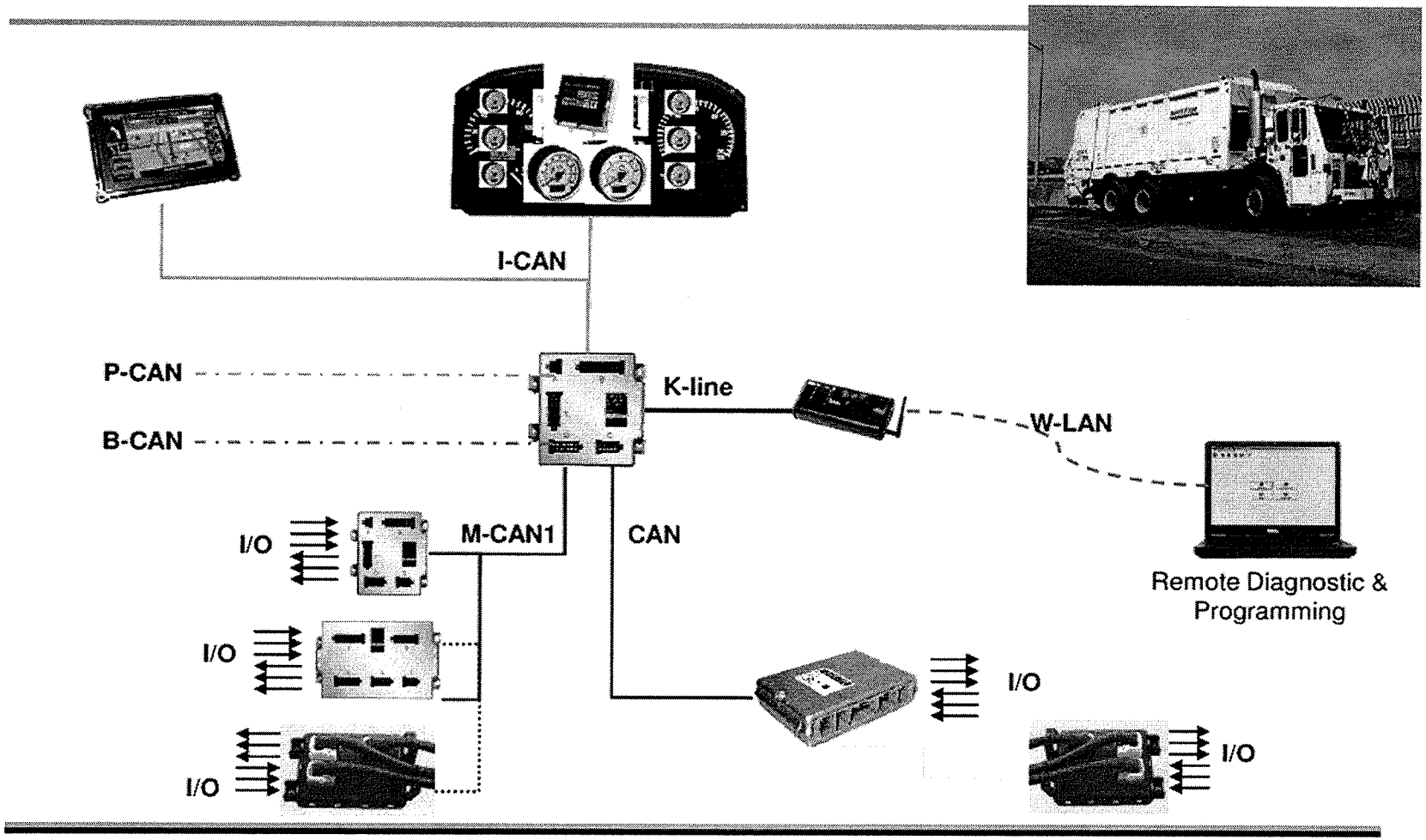
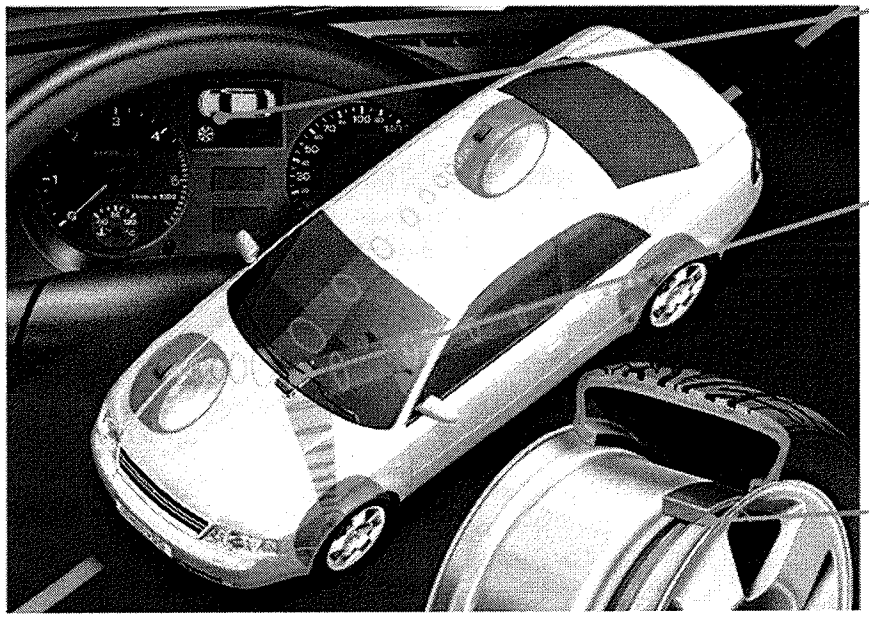


**EXHIBIT 7: Tire Pressure Monitoring Systems**

This exhibit provides images and information concerning commercially available tire pressure monitoring systems.

# Overview of a TPMS System



***Display Unit***

- Can be integrated
- Can be mounted in dashboard, cluster, roof console…

***Receiver Control Unit***

- Receives ASK/FSK Transmission
- Integration into BCM, SJB or stand alone unit
- For localized or non-localized Tire pressure sensing
- Onboard Antenna

***Wheel Unit***

- **Senses**
  - **Pressure**
  - **Temperature**
  - **Acceleration**

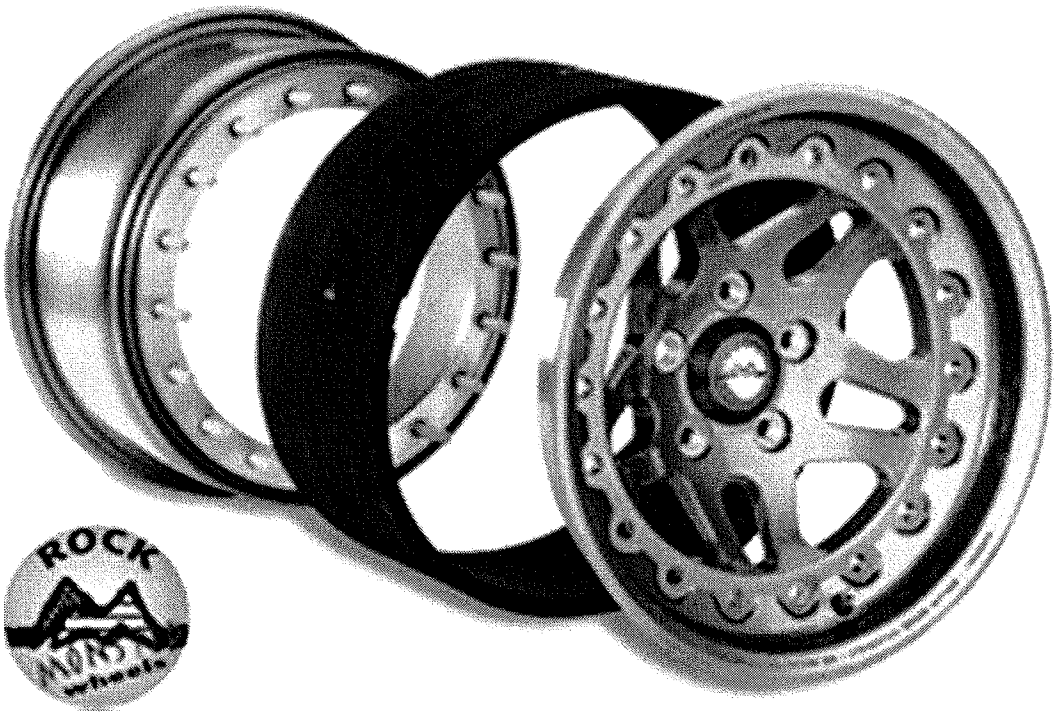
  **Transmitter**
- **LF trigger**

Continental

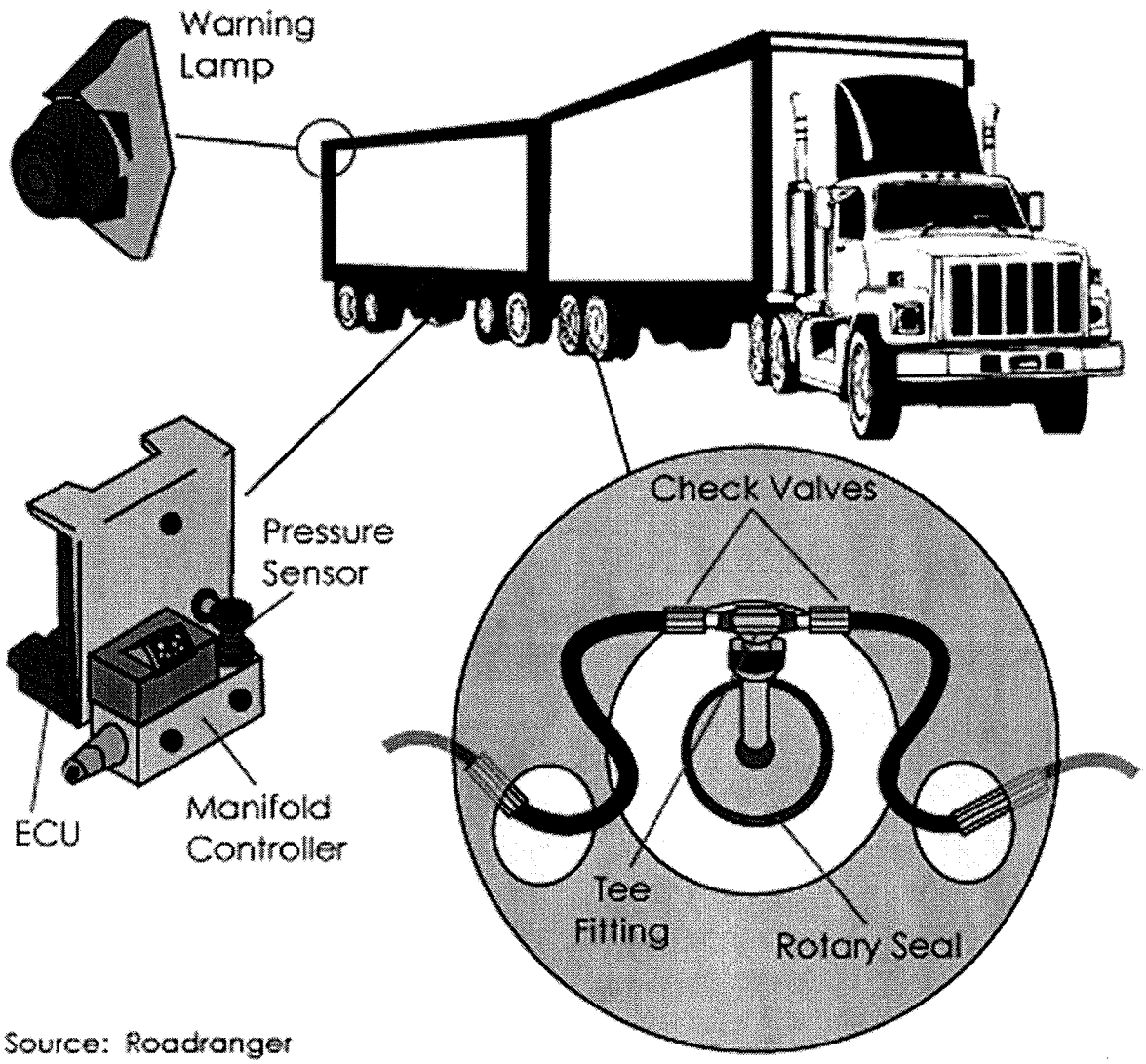
**EXHIBIT 8: Tires and Related Items**

This exhibit provides a diagram showing how tires interact with certain other vehicle parts and components, such as wheels, beadlocks, tire pressure monitoring systems, and tire inflation systems.

Wheels and Beadlocks (Interaction with Tires)



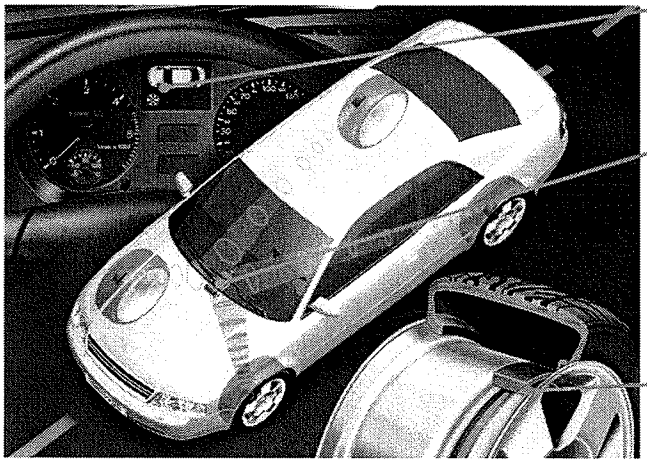
Tire Inflation Systems (Interaction with Tires)




Source: Roadranger

Tire Pressure Monitoring Systems (Interaction with Tires)

# Overview of a TPMS System



***Display Unit***

- Can be integrated
- Can be mounted in dashboard, cluster, roof console...

***Receiver Control Unit***

- Receives ASK/FSK Transmission
- Integration into BCM, SJB or stand alone unit
- For localized or non-localized Tire pressure sensing
- Onboard Antenna

***Wheel Unit***

- **Senses**
  - **Pressure**
  - **Temperature**
  - **Acceleration**

  **Transmitter**
- **LF trigger**

Continental