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Hon. Jeffrey Kessler
Under Secretary of Commerce for Industry and Security
U.S. Department of Commerce
1401 Constitution Avenue NW
Washington, DC 20230

Re: Notice of Request for Public Comments on Section 232 National Security Investigation of Imports of Robotics and Industrial Machinery (Docket No. 250924-0161; XRIN 0694-XC138)

The Consumer Technology Association (CTA) appreciates the opportunity to comment on the Section 232 investigation into robotics and industrial machinery. Representing over 1200 member companies across the U.S. technology industry which support 18 million U.S. jobs, CTA shares the Administration's goals of enhancing industrial resilience and technological leadership. Robotics and industrial machinery are foundational to U.S. competitiveness and national security. Any resulting actions for this investigation must be narrowly tailored, evidence-based, and avoid unintended harm to U.S. manufacturers or downstream industries and consumers. In this regard, CTA urges the Bureau of Industry and Security (BIS) to exclude consumer robotics, educational robotics kits, AI-integrated service robots, industrial robots and machinery, and automated guided vehicles (AGVs) from any trade actions.

CTA's Experience with Robotics and Industrial Machinery

CTA has developed industry-backed standards and research that inform our recommendations. ANSI/CTA-2088.2¹ outlines baseline cybersecurity practices for consumer robotics. Our whitepaper, *Consumer Robotics: Landscape and Opportunities*,² highlights market potential and industry challenges, while *Robotics: Current Landscape & Consumer Perceptions*³ offers insights into consumer sentiment and global use cases.

¹ Consumer Technology Association, *CTA Publishes ANSI/CTA-2088.2, Baseline Cybersecurity for Private Consumer Robotics*, (May 2023), <https://www.cta.tech/standards-news/cta-publishes-ansicta-20882-baseline-cybersecurity-for-private-consumer-robotics/>

² Consumer Technology Association, *Consumer Robotics: Landscape and Opportunities*, (March 2021), <https://www.cta.tech/standards/cta-5302/>

³ Consumer Technology Association, *Robotics: Current Landscape & Consumer Perceptions*, (May 5, 2019), <https://shop.cta.tech/collections/research/products/robotics-current-landscape-consumer-perceptions>

CTA's market research shows strong consumer adoption and growing demand for robotics across a range of applications. In 2025, one in five U.S. households plan to purchase a robotic vacuum,⁴ while one-quarter of consumers are interested in robotic companions that can support aging populations.⁵ Nearly half of Americans also express favorable views toward autonomous delivery systems, underscoring broad acceptance of robotics in everyday life.⁶ CTA's *Future of Travel and Hospitality Technology* report further found that two in five consumers would welcome service robots, highlighting the potential for robotics to enhance experiences across industries.⁷ At CES and beyond, CTA's research and showcases illustrate how robotics are being transformed by artificial intelligence (AI). AI integration enables robotics and industrial machinery to perform predictive maintenance, adapt to changing conditions, and automate complex tasks. These advancements not only expand practical applications but also position the U.S. as a leader in next-generation technology. However, tariffs on AI-driven robotics would risk slowing this progress, undermining innovation and weakening U.S. competitiveness in a rapidly advancing global market.

Robotics: A Strategic Asset for U.S. Industry

Robotics and industrial machinery are horizontal technologies that drive productivity across industries, including manufacturing, mobility, agriculture, energy, logistics, and healthcare. These technologies are essential to U.S. efforts to strengthen our industrial base and address workforce shortages in critical sectors. Embodied AI – the integration of advanced AI models with robotic systems – represents a major emerging trend in AI globally. Countries that lead in embodied AI will set the pace for the next century's manufacturing technology and drive economic progress across sectors. American companies currently lead the world in foundational AI modeling and software capabilities, key strategic advantages in AI innovation, but manufacturing of robots and their critical subcomponents is currently dominated by foreign supply chains.

Recent advancements in mobile AI-integrated robots (such as humanoids) that have not yet been widely deployed may raise specific national security concerns due to their ability to navigate into potentially sensitive locations, gather and transmit data from those locations, and that may have dual-use functionality. However, mobile AI-integrated robots have tremendous potential in delivering value to U.S. businesses and consumers and advancing U.S. technology and innovation leadership. The examples below demonstrate the breadth of robotics and industrial

⁴ Consumer Technology Association, *2025 U.S. Consumer Technology Ownership & Market Potential Study*, (May 2025), <https://shop.cta.tech/collections/research/products/2025-u-s-consumer-technology-ownership-market-potential>

⁵ Consumer Technology Association, *Aging in Place: Staying Connected with Technology*, (November 2024), <https://shop.cta.tech/products/aging-in-place-staying-connected-with-technology>

⁶ Consumer Technology Association, *Autonomous Delivery Systems: Consumer Awareness & Favorability*, (June 2020), <https://shop.cta.tech/products/autonomous-delivery-systems-consumer-awareness-and-favorability>

⁷ Consumer Technology Association, *The Future of Travel and Hospitality Technology*, (January 2023), <https://www.cta.tech/research/the-future-of-travel-and-hospitality-technology/>

machinery potentially covered by this investigation and the necessity of having a limited and clearly defined scope.

Robotics Products:

Robotics are programmable, computer-controlled mechanical systems used across industries to automate tasks, enhance productivity, and address workforce shortages. Examples include:

- **Industrial robots:** Robotic arms for welding, painting, assembly, palletizing, and machine tending in manufacturing (e.g., automotive, electronics, aerospace).
- **Collaborative robots (cobots):** Robots designed to work safely alongside humans in factories, warehouses, and laboratories.
- **Automated guided vehicles (AGVs):** Mobile robots for material transport in logistics, warehouses, and hospitals.
- **Painting Robots:** Automated machines designed to apply paint, coating, or finishes to surfaces with extreme accuracy and consistency (commonly used in the automotive industry).
- **Service robots:** Robots for cleaning, delivery, food preparation, and customer service in retail, hospitality, and healthcare.
- **Consumer robotics:** Robotic vacuums, lawn mowers, and educational robotics kits for home and school use.
- **Medical robots:** Surgical robots, robotic prosthetics (e.g., BionicM Bio Leg®), and rehabilitation devices.
- **AI-integrated robots:** Robots with machine learning for adaptive automation, predictive maintenance, and smart sensing.
- **Specialty robots:** Robots for agriculture (e.g., crop monitoring, harvesting), defense (e.g., surveillance, bomb disposal), and space exploration (e.g., Mars Rover).

Industrial Machinery Products:

Industrial machinery encompasses a wide range of equipment essential for manufacturing, processing, and automation. Key examples include:

- **CNC machining centers:** Computer-controlled machines for precision cutting, drilling, milling, and shaping of metals, plastics, and composites.
- **Turning and milling machines:** Equipment for producing cylindrical and complex parts in automotive, aerospace, and metalworking industries.
- **Grinding and deburring equipment:** Machines for finishing surfaces and removing excess material.
- **Industrial stamping and pressing machines:** Used for forming, shaping, and assembling components in high-volume production.
- **Automatic tool changers, jigs, and fixtures:** Devices that enable efficient switching of tools and precise positioning of workpieces.

- **Machine tools for cutting, welding, and handling workpieces:** Includes laser cutters, water-jet cutters, welding robots, and robotic handlers.
- **Application-specific specialty metalworking equipment:** Autoclaves, industrial ovens, metal finishing and treatment equipment, EDM (electrical discharge machining) machinery.
- **Material handling systems:** Conveyor belts, automated storage and retrieval systems, and robotic sorters.
- **Packaging machines:** Automated systems for packing, labeling, and palletizing products.

Defining the Scope: What Should Be Excluded

Any Section 232 action should be narrowly tailored to address genuine and well-defined national security risks, not to serve as a broad economic protection tool. Overly broad tariffs risk compounding cost pressures, undermining supply chain resilience, and shifting production offshore – contrary to the priority of strengthening U.S. industrial competitiveness.

Thus, CTA recommends excluding consumer robotics, educational robotics kits, and AI-integrated robots from the scope of the investigation. These products are essential to public benefit and innovation, and their inclusion would disproportionately impact small and medium-sized enterprises (SMEs) and startups. In addition, CTA urges BIS to exclude industrial robots, industrial machinery, automated guided vehicles (AGVs), and other complete computer-controlled mechanical systems, including LiDAR modules, from any trade action. These technologies are critical to U.S. industrial capacity, enable reshoring, and support globally competitive production. Because production lines have been optimized around these systems, replacing them would require years of reengineering, in turn delaying domestic investment and manufacturing expansion.

Excluding such machinery and robotics from any trade action would prevent unintended harm to U.S. manufacturers and ensure that Section 232 remedies remain focused on addressing genuine national security risks rather than constraining the very industries they aim to support.

Avoiding Tariffs on Robotics and Machinery that Support U.S. Reshoring

To support the Administration's goal of strengthening domestic manufacturing and industrial resilience, Section 232 remedies should not inadvertently penalize companies seeking to relocate manufacturing activity to the United States. Similarly, Section 232 remedies should not disadvantage U.S. manufacturers that are building new U.S. industrial capacity. For instance, domestic manufacturers have expanded their use of complete computer-controlled systems such as LiDAR, as well as other mechanical sensors integrated into robotics and machinery, all to improve productivity. However, placing tariffs on robotics and industrial machinery, especially those already in the process of being imported, would undermine investments, stall new plant and equipment upgrades, and risk slowing the very manufacturing resurgence the Administration's policies aim to achieve. Finally, key components such as high-torque actuators,

harmonic drives, precision encoders, motor controllers, and sensor modules, currently only manufactured at scale in Asia, are needed to help develop U.S.-made robots at scale.

Tariffs on robotics and industrial machinery – products that constitute critical inputs in manufacturing – would significantly increase costs for equipment and machinery on factory floors, thereby discouraging investment into new U.S. production capacity and threatening jobs. This is underscored by the fact that domestic production of critical inputs alone is insufficient to sustain the needs of U.S. manufacturers. Currently, even if operating at full capacity, the U.S. manufacturing industry could only produce 84 percent of the inputs manufacturers need for production.⁸ Thus, 16 percent of manufacturing inputs must be imported in order for U.S. manufacturers to operate.⁹ In fact, in key sectors such as automotive manufacturing, domestic suppliers of critical machinery for manufacturing and assembly already suffer from overcapacity, illustrating the reality that current U.S. supply cannot meet growing demand for advanced machinery. Subjecting robotics and industrial machinery to tariffs would further prevent U.S. manufacturers from building, modernizing, and operating facilities.

CTA urges BIS to exclude from this investigation and any determination of action these robotics and machinery products that are being imported to the United States for domestic manufacturing purposes. Excluding these products rewards manufacturers that invest, expand, and create new jobs at home, while avoiding cost burdens that could stall investment and innovation.

Avoiding Tariffs on Robotics and Machinery Necessary for New U.S. Investments

As U.S. manufacturers expand their U.S. production capacity, access to industrial machinery and robotics is essential. In many instances, capital equipment may be sourced years in advance of factory construction, making re-sourcing in response to tariffs impossible. As a result, U.S. manufacturers face higher overnight costs, which may result in the delay or cancellation of planned investments. CTA urges BIS to exclude from this investigation any industrial machinery and robotics imported to support new U.S. factories, particularly for capital equipment sourced from trusted trade partners. Importing from overseas component suppliers today is essential to accelerate the industrial learning curve for the U.S. robotics supply chain and U.S. robotic integrators.

For example, to develop the most competitive AI models, the U.S. must quickly acquire large volumes of robots for AI training and model development. High tariffs would further strain supply chains, shipping, and logistics, making an already supply-constrained buildout even more difficult. Tariffs that restrict access to this ecosystem too early will undercut the very reshoring efforts they

⁸ National Association of Manufacturers, *To Drive Domestic Growth, Manufacturers Propose U.S. Manufacturing Investment Accelerator Program to Boost Access to Manufacturing Inputs*, (June 2025), <https://nam.org/to-drive-domestic-growth-manufacturers-propose-u-s-manufacturing-investment-accelerator-program-to-boost-access-to-manufacturing-inputs-34157/>

⁹ *Ibid.*

intend to promote. These impacts would be most severe during the early scale-up period, when domestic suppliers are not yet scaled to the necessary capacity.

Avoiding Tariff Stacking and Economic Harm

CTA's prior submissions on semiconductors, critical minerals, copper, polysilicon, unmanned aircraft systems (UAS), and commercial aircraft offer valuable insights. We have continually warned that tariff stacking compounds cost pressures and undermines supply chain resilience. Robotics rely on components (e.g., semiconductors, batteries, and permanent magnets) that are already subject to tariffs. Additional duties would increase compliance burdens, disincentivize domestic investment, shift production offshore, and raise costs for U.S. consumers and startups.

CTA urges BIS to avoid layering tariffs on robotics components already covered under other trade actions. We recommend exemptions for consumer robotics, educational robotics kits, and AI-integrated robots — products that are critical to innovation and often produced by SMEs with limited capacity to absorb tariff shocks.

Building Global Alliances for Industrial Strength

International partnerships are essential to strengthening the U.S. robotics and industrial machinery sectors. As the Trump Administration has announced major investment funds through trade deals with the European Union, Japan, and South Korea, companies from these countries with U.S. production facilities will need to import machinery and equipment to support their new factories. Once this machinery is located in the United States, learning and expertise naturally transfers to U.S. workers who maintain, operate, repair, and develop replacement parts for this equipment, reducing potential supply chain vulnerabilities. In contrast, imposing tariffs or other import barriers on this machinery will undermine those deals and the resurgence in American manufacturing.

To enhance security and resiliency, the U.S. should deepen cooperation with trusted partners such as the UK, EU, Japan, Korea, and Taiwan. Coordinated efforts on R&D, supply chain diversification, and standards-setting can ensure reliable access to critical technologies, reduce dependence on subsidized Chinese suppliers, and strengthen long-term U.S. competitiveness in robotics.

Zero Tariff Treatment for Trusted Partners

Policies should prioritize “zero-for-zero” tariff treatment for critical manufacturing inputs, especially those being moved to the United States to enhance domestic capacity. This approach aligns with the broader goal of incentivizing U.S.-based investment and supporting supply chain resilience, rather than imposing additional costs that could deter companies from onshoring advanced manufacturing.

CTA therefore recommends that BIS should support zero-tariff treatment for robotics and machinery imports from trusted allies under frameworks such as Potential Tariff Adjustments for Aligned Partners (PTAAP). This approach incentivizes trade agreements that align with U.S. national security and industrial objectives.

No Tariffs on USMCA Qualifying Products

CTA urges BIS to ensure that robotics and industrial machinery products qualifying under the United States-Mexico-Canada Agreement (USMCA) are fully excluded from any Section 232 tariffs or related trade actions. These products meet stringent rules of origin and standards that align with U.S. economic and national security interests. Imposing additional tariffs on USMCA-compliant robotics and machinery would undermine regional supply chain integration, increase costs for U.S. manufacturers, and slow investment in North American industrial capacity. Maintaining duty-free treatment for these products supports domestic manufacturing, incentivizes reshoring, and strengthens resilient industrial networks across trusted trade partners.

Supply Chain Complexity and Traceability Challenges

CTA's supply chain studies show diversification away from China toward Vietnam, India, and Mexico.¹⁰ However, traceability remains difficult due to multi-tiered supplier networks and opaque sourcing practices. BIS should avoid enforcement mechanisms that rely on unrealistic traceability expectations.

Robotics manufacturing relies on a diverse array of inputs, components, and subassemblies sourced globally. Ensuring duty-free access to these inputs is critical for U.S. manufacturers to remain competitive, accelerate modernization, and expand output. Major categories of robotics inputs include:

- **Semiconductors and Electronic Components:**
Microprocessors, integrated circuits, printed circuit boards (PCBs), capacitors, resistors, sensors, and connectors are foundational to robot control systems, communications, and sensing capabilities.
- **Sensors:**
Vision sensors (cameras), proximity sensors, force/torque sensors, gyroscopes, and environmental sensors enable robots to perceive and interact with their environment, supporting tasks from object recognition to navigation and safety.
- **Actuators and Motors:**
Electric motors (servo, stepper), hydraulic and pneumatic actuators, and transmission systems provide the mechanical movement and precision required for robotic arms, mobile robots, and automated guided vehicles (AGVs).

¹⁰ Consumer Technology Association, *Building a Resilient U.S. Consumer Technology Supply Chain*, (September 2023), <https://www.cta.tech/research/building-a-resilient-us-consumer-technology-supply-chain/>

- **End Effectors and Tooling:**
Grippers, welding tools, suction devices, and other end-of-arm tooling (EoAT) allow robots to perform specialized tasks such as assembly, welding, painting, and material handling.
- **Power Supplies and Batteries:**
Reliable power sources, including advanced batteries and power management systems, are essential for mobile robots and autonomous systems.
- **Mechanical Structures and Chassis:**
Frames, joints, bearings, and mounting systems form the skeleton of robots, supporting durability, flexibility, and integration into industrial environments.
- **Software and Control Systems:**
Embedded processors, microcontrollers, and robotic operating systems (ROS) coordinate sensor data, execute commands, and enable advanced functions such as machine learning and predictive maintenance.
- **Specialty Materials:**
Rare earth elements (REEs), advanced alloys, and composite materials are often required for high-performance motors, sensors, and structural components.

Duty-free access to these inputs:

- **Reduces costs** for U.S. manufacturers, enabling investment in new production capacity and advanced technologies.
- **Supports supply chain resilience** by allowing flexible sourcing from trusted partners and mitigating risks from bottlenecks or geopolitical disruptions.
- **Accelerates innovation** by enabling rapid adoption of cutting-edge components and materials.
- **Rewards domestic investment** and job creation, as manufacturers can focus resources on expanding U.S. operations rather than absorbing tariff-related cost burdens.

Smarter Alternatives to Tariffs

CTA recommends strategic alternatives to tariffs, including leveraging Foreign Trade Zones (FTZs) and promoting bilateral trade facilitation agreements, enabling faster permitting of production facilities in the United States, and reducing the regulatory burdens of manufacturers of all sizes. These approaches strengthen domestic capabilities without imposing broad economic costs on businesses and consumers.

Removing Barriers to U.S. Exports

To strengthen the U.S. industrial and export base, BIS should work with USTR to reduce non-tariff barriers in key markets. These include conformity assessments, digital trade restrictions, and onerous border measures. The Administration's deals with key trading partners, including the UK, EU, and Japan are already making progress in addressing NTBs, but more can be done. The U.S.-EU trade framework offers a model for reducing regulatory burdens and expanding market

access for advanced technologies. CTA urges the Administration to prioritize addressing the EU's discriminatory and anti-innovation digital regulations, including the Digital Markets Act and Digital Services Act, and preventing and addressing harmful digital services taxes in its ongoing negotiations.

Preserving the Integrity of Section 232

CTA urges BIS to apply Section 232 judiciously and in strict alignment with its statutory intent: addressing genuine national security threats. Overuse or misuse of the statute risks undermining its credibility and inviting legal challenges. Section 232 was not designed to serve as a broad economic protection tool and applying it to robotics and industrial machinery without clear national security justification could set a precedent for economic protectionism under the guise of security.

CTA supports legislative efforts to restore Congressional authority over trade actions taken under Section 232 and emphasizes the importance of procedural transparency and stakeholder engagement. Unilateral actions under Section 232 have historically led to retaliation from allies, fracturing trust and cooperation. BIS should coordinate closely with USTR and the Department of State to mitigate diplomatic fallout and preserve strategic alliances.

Recommendations for BIS

To avoid unintended harm to consumers and innovators, CTA recommends the following:

- Continue to exempt covered products from any tariffs imposed under the International Emergency Economic Powers Act (IEEPA).
- Ensure that importers can import consumer robotics and industrial machinery duty-free through qualifying exemptions for USMCA-compliant products and products complying with rules of origin under other U.S. free trade agreements.
- Establish exemptions for repair/replacement items.
- Ensure that multiple Section 232 tariffs are not applied cumulatively to the same product.
- Provide simplified compliance frameworks and technical assistance for small firms.
- Allow for duty drawback so that U.S. manufacturers can export their products abroad without having to pay tariffs on imports of inputs for those devices.
- Provide opportunities for importers to defer duty payments and make payments in installments.

Conclusion

CTA urges the Bureau of Industry and Security to adopt a targeted, evidence-based approach in the Section 232 investigation of robotics and industrial machinery. CTA recommends excluding consumer robotics, educational robotics kits, AI-integrated robots, industrial robots and machinery, and automated guided vehicles (AGVs) from any trade actions. These technologies

are critical to strengthening U.S. industrial capacity, enabling reshoring, and supporting advanced manufacturing across key sectors such as automotive and electronics. CTA also strongly advises against imposing tariffs on robotics and machinery products that are imported to the United States for domestic manufacturing purposes.

To strengthen U.S. industrial resilience and competitiveness, CTA supports zero-tariff treatment for critical inputs from trusted partners, smarter alternatives to tariffs, and the removal of non-tariff barriers in key export markets. Above all, Section 232 should be applied judiciously, with transparency and stakeholder engagement, to address genuine national security risks without causing unintended harm to innovation, investment, and American jobs.

Sincerely,

A handwritten signature in black ink, appearing to read "Ed Brzytwa".

Ed Brzytwa
Vice President of International Trade
Consumer Technology Association

A handwritten signature in black ink, appearing to read "Michael Petricone".

Michael Petricone
Senior Vice President of Government Affairs
Consumer Technology Association