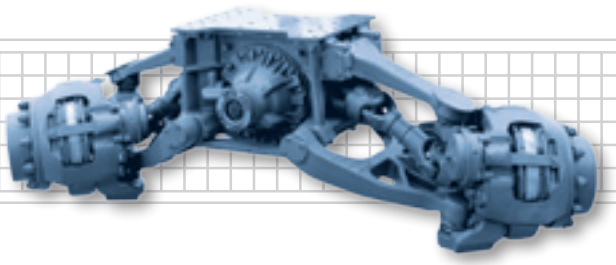
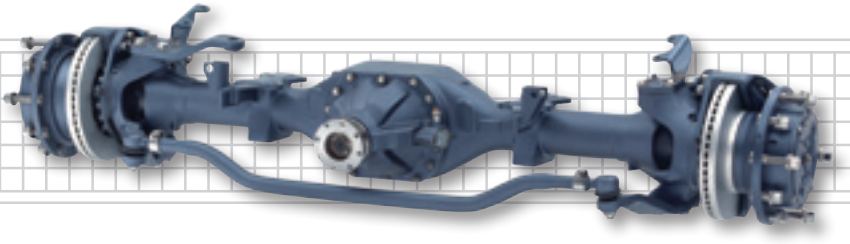
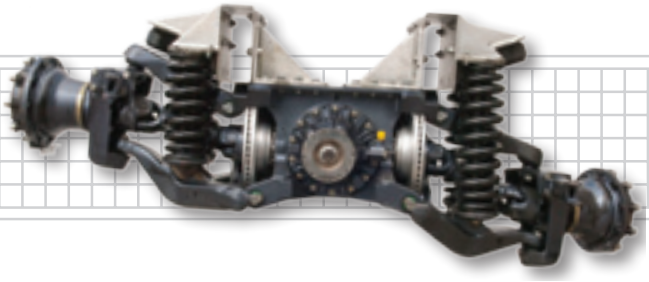
AxleTech® International
A GENERAL DYNAMICS COMPANY

HIGH SPEED PLANETARY DRIVETRAIN SOLUTIONS







AxleTech International
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MEETING THE DEMAND FOR HIGH-SPEED CROSS-COUNTRY MOBILITY

Whether called upon to provide a field-proven commercial product "off the shelf," create a custom design for combat and tactical wheeled vehicles (CTWV), or provide a proven system for on-road and off-road specialty vehicles, you are assured that AxleTech International driveline products are built to meet the demands of today's high-speed, high mobility applications. Robust designs, high-quality materials, expert craftsmanship and rapid service parts availability make AxleTech products the choice of leading prime contractors, acquisition commands, and original equipment manufacturers around the world. Our axles, transfer cases and suspension systems have earned their reputation for automotive performance, mobility, maneuverability, maintainability and safety in both defense and commercial applications through demanding testing and proven field performance around the world.

Features include:

- Impact resistant energy absorbing materials
- High-dynamic shock load 5G™ axles for up-armoring and increased payloads
- Braking, traction differential and torque management technologies; optional ABS and Central Tire Inflation

HIGH-SPEED PLANETARY STEER AXLES

AxleTech's 3000, 4000 and 5000 Series steer axles deliver the rugged durability you need, with a wide range of gear reduction options to fit a variety of applications. Built to be compatible with their matching single and tandem rigid axles, they give you maximum flexibility in load capacities from 9,200 pounds up to 32,000 pounds per axle, including severe-duty 5G™ axles.

All of the 3000, 4000 and 5000 Series axles feature optional central tire inflation capability, ABS, optional traction differentials and torque management technologies, and a variety of brakes, flange and yoke options. AxleTech 3000, 4000 and 5000 Series steer axles come standard with double cardan axle shaft U-joints, and ball-stud tie rod assemblies are permanently lubricated.

SINGLE RIGID PLANETARY AXLES

The AxleTech 3000, 4000 and 5000 Series rigid or "beam" axles, featuring capacities from 9,900 – 55,100 pounds, are ideal for high-mobility applications. They are engineered to withstand demanding environments and are available with overall gear ratios from 4.35 – 28.0:1.

The axles meet a wide range of traction conditions and handle high driveline torque. They are designed for excellent in-field durability, low maintenance and a long lifecycle. They also offer design flexibility with a host of mounting configurations available.

TANDEM RIGID PLANETARY AXLES

Tandem planetary axles are ideal for rough terrain, heavy loads and other demanding situations. These axles offer outstanding durability and value with load hauling capacities to 150,000 pounds.

Standard spiral bevel gearing and planet gears in rugged, high-strength axle housings, lead to a durable, low-maintenance reliability. A variety of tracks and mounting centers are available.

INDEPENDENT SUSPENSION AXLE SYSTEMS (ISAS™)

AxleTech has applied the same high-speed planetary technology used in our 3000, 4000, and 5000 Series axle systems to provide state-of-the-art independent suspension planetary axle systems (ISAS) for high-mobility and maneuverability applications. Our ISAS delivers an average cross-country speed gain that is 2-3 times faster than what is attainable with beam axles. ISAS is ideally suited for all maneuver, tactical, logistic, engineering, and utility vehicles in military and commercial vocational applications

The double-wishbone design provides unrivaled ride control and handling with superior cross-country mobility and safety in all operating environments.

ISAS is designed for both commercial and military applications to optimize your requirements for protection, payload, and performance. ISAS applications can be configured for both medium- and heavy-duty vehicles. You have the option of conventional wheel-mounted drum brakes, inboard or outboard disc brakes, integrated central tire inflation, ABS, optional stability enhancement with torque management and traction technologies, and a variety of suspension system configurations, including active and semi-active systems.

With improved steering and maximum tire-to-ground contact, the ISAS system delivers better track control in rough terrain. Improved suspension flexibility and greater wheel travel mean improved ride quality for the driver, crew, and payload, as well as safety and driver efficiency at higher off-road speeds.

AxleTech has proven applications in axle capacity ranges from 7,700 to 27,500 pounds. Whether your payloads involve hauling, armoring, or other vocational requirements, AxleTech's ISAS can meet your needs.

FEATURES AI

HIGH SPEED PLANETARY STEER AND RIGID AXLES

3000 Rigid and Steer Axles • 4000 Rigid and Steer Axles • 5000 Rigid and Steer Axles

Features	Benefits
Optimized axle housing design	Provides improved vehicle installation/ground clearance
Wedge, S-cam brakes and dry disc brake options	Proven stopping capability and dependability
Outboard mounted brake drums on wedge and cam brakes	Provides easier brake maintenance without planetary wheel end removal
Wide range of overall axle ratios available	Match OEM vocational requirements
Cast steel, fabricated steel and ductile iron axle housings	High strength to meet requirements for capacity, performance and weight
Common mounting with steer and rigid axles and other axle families	Permit single wheel fitment on vehicle when selecting common hub mountings on axles
Traction differential options available	Standard, limited slip, and air actuated Driver Controlled Differential Lock available to meet vocational needs
ABS optional	Improves vehicle on-road control when braking
Optional wheel hub mountings available	Match various OEM requirements
Central tire inflation optional	Permits increased off-road flotation
Drop-Gear carrier option	Reduced driveline angles and high clearance vehicle
Potential to incline carrier pinion input up to 6 degrees	Capability to improve driveline angles in short wheelbase vehicle installations
Needles on planetary pinion gears	Proven for high speed applications
Double carden axle shafts standard	Permits high steer angle capability up to 45 degrees possible
7 degree inclined king pins standard	Provides for improve on-road steering and handling
2 degree camber standard	Flexible adaptation to OEM installation
Taper roller bearing at lower king pin bushing	Reduced steer effort and increased durability

ND BENEFITS

INDEPENDENT SUSPENSION AXLE SYSTEMS (ISAS™)

3000 Series ISAS™ • 4000 Series ISAS™ • 5000 Series ISAS™

Features	Benefits
High speed planetary wheel end	More ground clearance at differential and higher shaft capacity
Controlled geometry double wishbone design	Improved steering, ride control and handling
Wide axle ratio range (differential and wheel ends)	Higher speed, gradeability, and overall performance
Optional traction and torque management technologies	Provides stability, control and unsurpassed mobility in all terrain conditions
ABS option	Improves safety and survivability
Integrated central tire inflation (CTI)	Permits off-road maneuverability and mobility when needed
Wedge, S-cam, and air disc brake options	Proven stopping capability and dependability
Outboard mounted brake drums on wedge and cam brakes	Maintainability and sustainability, provides easier brake service without planetary wheel end removal
Double cardan axle shafts for steer axle	Permits tighter turning radius (e.g., useful in urban combat zones and other high-performance situations), more durability and better NVH
Inboard brakes (hydraulic or air) available on 5000 Series	Weight saving, better packaging, improved NVH, ease of service
Progressive rate coil springs, air/coil or hydraulic struts	High performance suspension design flexibility
Inclined kingpins	Provides improved vehicle steering and handling
Multi-wheel steer	Improved maneuverability with tight turning radius
Ground bevel gears	Improved NVH, higher durability
Sealed-for-life suspension joints and bearings	Reduced maintenance costs
Design based on AxleTech's family of beam axles	Commonality in differentials, wheel ends, and brakes means better availability of parts
Longest ISAS design & production history	Proven, robust designs and manufacturing processes available in both North America & Europe

TECHNOLOGY A

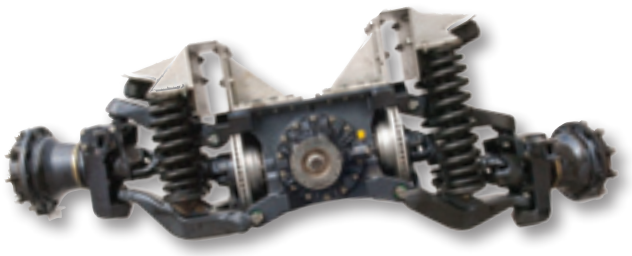
INDEPENDENT SUSPENSION AXLE SYSTEM (ISAS™)

High-Mobility & Maneuverability Applications

- Best ride quality on tough terrain
- Applications in axle capacity ranges: 7,700 To 27,500 lbs/axle
- Modular or integrated construction
- ABS and CTIS ready
- Safety & driver efficiency at higher off-road speeds

AxleTech provides state-of-the-art independent suspension planetary axle systems (ISAS™) for applications requiring high-mobility and maneuverability. The double-wishbone design provides unrivaled ride control and handling with superior cross-country mobility and safety in all operating environments.

The ISAS™ offers the most optimal approach for meeting your requirements for protection, payload and performance. The system is designed for both commercial and military applications; and can be configured for either medium or heavy-duty vehicles. You have the option of conventional wheel-mounted drum brakes, inboard or outboard disc brakes, integrated central tire inflation, ABS, optional stability enhancement with torque management and traction technologies, and a variety of progressive rate coil springs and high-capacity hydraulic struts.



Protection

With improved steering and maximum tire-to-ground contact, the ISAS™ system delivers better control in rough terrain. Improved suspension flexibility and greater wheel travel mean improved ride quality for the driver, crew, and payload, as well as safety and driver efficiency at higher off-road speeds.

Payload

AxleTech has proven applications in axle capacity ranges from 7,700 to 27,500 pounds (3,500 to 12,500 kilograms).Whether your application involves hauling on improved roads or off-highway, AxleTech's ISAS™ can get you and your payload where it needs to be.

Performance

AxleTech has applied the same high-speed planetary technology used in our 3000, 4000, and 5000 Series axle systems to deliver an average cross-country speed gain that is 2-3 times faster than what is attainable with beam axles. ISAS™ is ideally suited for severe duty commercial and military vocational applications.

ND INNOVATION

5G™ BEAM AXLE TECHNOLOGY

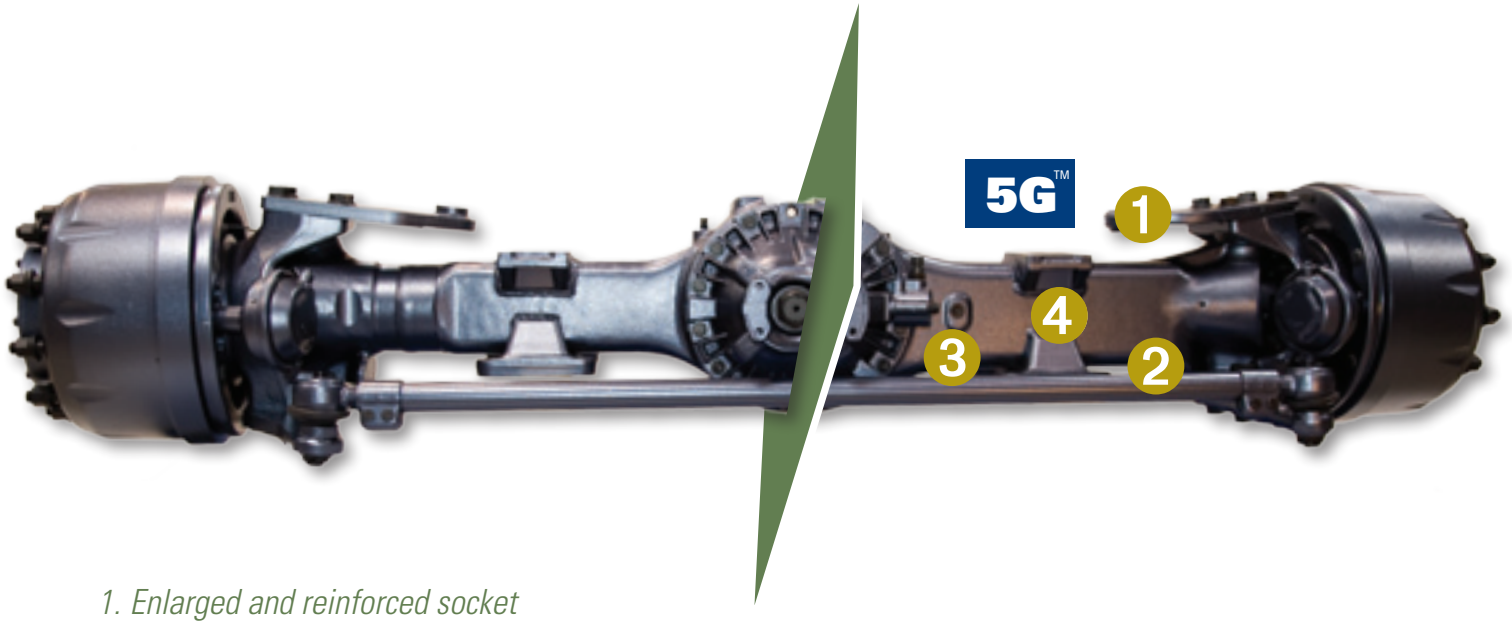
A Solution for Severe Duty Applications

Optimized for strength and toughness in the field – upgraded material and a strengthened overall structure that resists impact. Fully interchangeable design.

- Higher dynamic load capability
- Trunnion and king pin area reinforced to resist higher steering forces
- Housing wall thickness enhanced all around for higher dynamic load capability
- Cast steel has 2X the strength and ductility and is much lighter than ductile iron
- Lower trunnion king-pin re-designed and upgraded
- High strength forgings and cast steel components
- ABS and CTIS ready

COMPARE THE DIFFERENCE

Standard Commercial Axle vs. Axle with 5G™ Upgrade



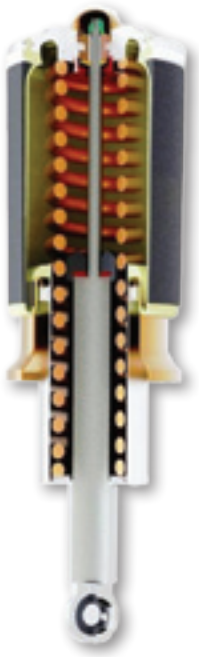
1. Enlarged and reinforced socket
2. Substantially increased section modulus
3. Optimized ham section for reduced housing stress
4. Increased wall thickness for higher dynamic load capability

TECHNOLOGY AND INNOVATION

HYBRID AIR/COIL SPRING STRUT ASSEMBLY

Air/Coil Spring Design Provides Superior Vehicle Mobility

Optimized for strength and toughness in the field – upgraded material and a strengthened overall structure that resists impact. Fully interchangeable design.



- Air-over-coil spring with integrated damper
- Designed for use on both commercial and military vehicles where superior mobility is demanded
- Adaptable with AxleTech's 3000, 4000, and 5000 Series Independent Suspension Axle Systems (ISAS™)
- Customizable to meet desired vehicle performance requirements
- Available with both passive and variable dampers
- Integrated coil spring provides vastly improved vehicle lift rates and spring rates with respect to competitive designs of similar size
- Internal coil provides redundant spring system - assures battlefield reliability
- Patents pending

4000 SERIES HIGH-SPEED PLANETARY WHEEL END

Proven Performance in All Terrain Conditions

- Larger, higher capacity spindle for improved load bearing capacity
- Improved durability reduces maintenance costs
- Withstands higher dynamic shock loading
- Lab testing qualified to 8,500 pounds per wheel end
- Vehicle durability testing at 52,000 pounds GVW
- Improves mobility, safety and survivability
- Ideally suited for up-armoring

Wheel End Specifications:

- Rating: 8,500 lbs
- Ratio: 4.28:1
- Brake: 15x5 upgraded wedge drum
- Wheel: 10 stud, 275 mm bolt circle
- CTIS equipped
- ABS option available
- Modular and interchangeable

ELECTRIC DRIVE PLANETARY WHEEL ENDS

AxleTech is constantly pushing the boundaries of high-speed planetary technology for drivetrain solutions. AxleTech recently developed an all-electric planetary wheel end. This patent pending design solution is a complete wheel end packaged with a sealed, modular, high gear reduction, high-speed planetary gear cluster along with a modular high-speed, low-torque electric wheel motor and a parking/emergency drum brake. This design provides all-electric drive traction and braking needs for high mobility, all-wheel-drive vehicles with independent suspensions.

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TECHNICAL SPECIFICATIONS

Product Overview

3000 Series:
Independent Suspension Axle System

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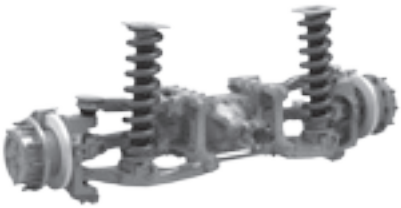
4000 Series:
Independent Suspension Axle System

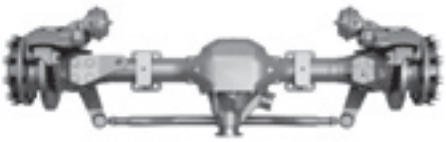


5000 Series:
Independent Suspension Axle System

3000 Series:
Planetary Steer Axle

3000 Series:
Planetary Rigid Axle

4000 Series:
Planetary Steer Axle

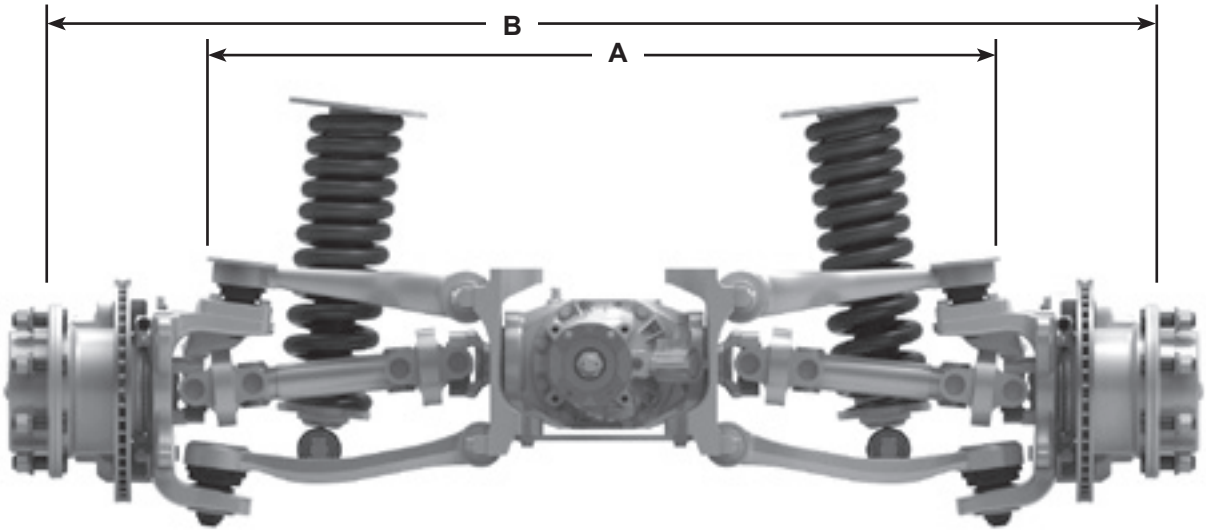


4000 Series:
Planetary Rigid Axle

5000 Series:
Planetary Steer Axle

5000 Series:
Planetary Rigid Axle

3000 Series: Independent Suspension Axle System



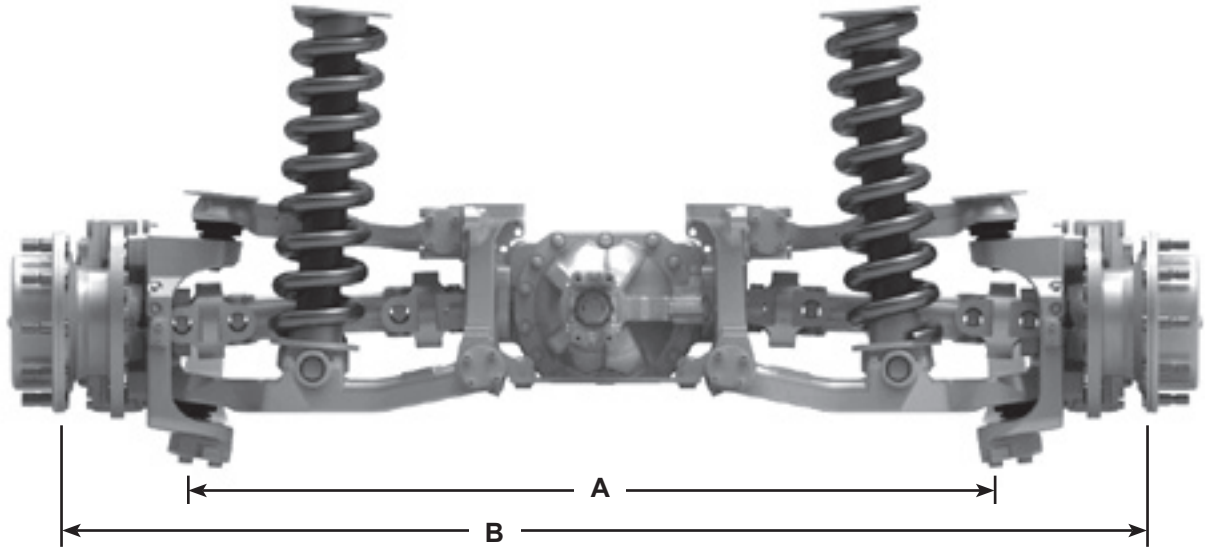
(1) Approval required on all applications
(2) Varies with brake/tire option

Approx. Weight 600kg

(1) Axle Capacity and Example Applications Pounds (kg)	Available Differentials	Overall Axle Ratio Range
7,700 - 12,000 (3,500 - 5,500) Off-Highway Truck Armored Mine Protected Vehicle	Standard, Limited Slip, Differential Lock	5.64 – 17.78

(A) King Pin Intersection Inches (mm)	(B) (2) Hub Flange/ Flange Inches (mm)	Brakes Inches (mm)	Minimum Rim Size Inches (mm)
53.0 (1,346)	78.4 (1,991)	15.75 x 1.2 (400 x 30) Hydraulic Disc Brake	19.5 (495) 20.0 (508)

4000 Series: Independent Suspension Axle System



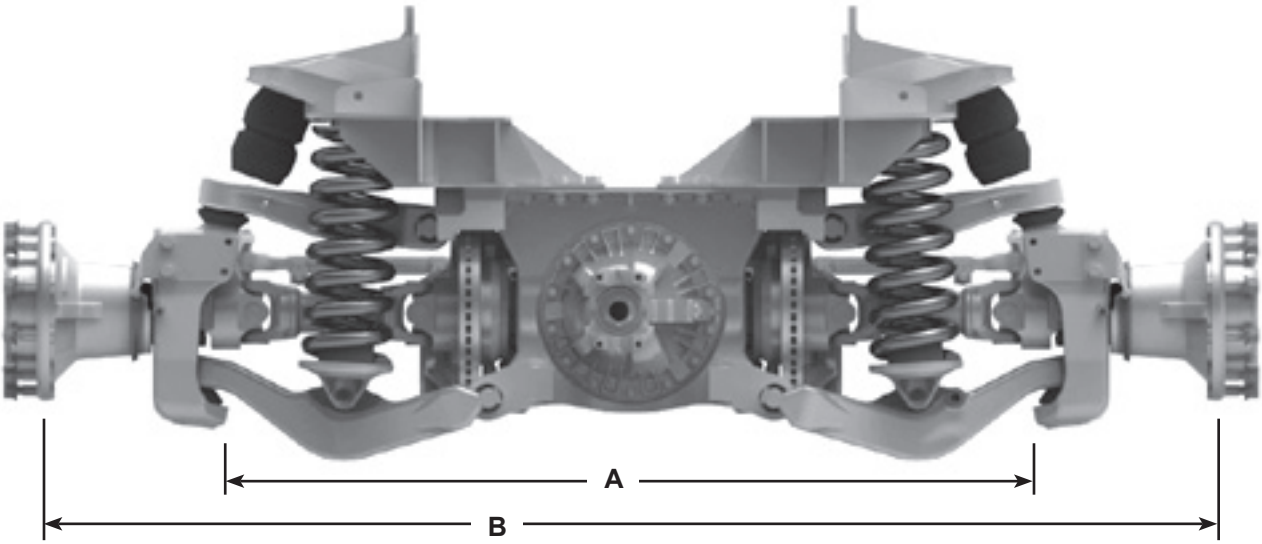
(1) Approval required on all applications
(2) Varies with brake/tire option

Approx. Weight 975kg

(1) Axle Capacity and Example Applications Pounds (kg)	Available Differentials	Overall Axle Ratio Range
13,245 - 22,000 (6,000 - 10,000) Off-Highway Truck Armored Mine Protected Vehicle	Standard, Limited Slip, Air Operated Differential Lock	3.9 – 28.0

(A) King Pin Intersection Inches (mm)	(B) (2) Hub Flange/ Flange Inches (mm)	Brakes Inches (mm)	Minimum Rim Size Inches (mm)
62.8 (1,596) 64.9 (1,650)	89.4 (2,270) 93.8 (2,383)	15.0 x 5.0 (381 x 127) Wedge Brake 15.2 x 1.8 (385 x 45) Air Disc Brake	19.5 (495) 20.0 (508)

5000 Series: Independent Suspension Axle System



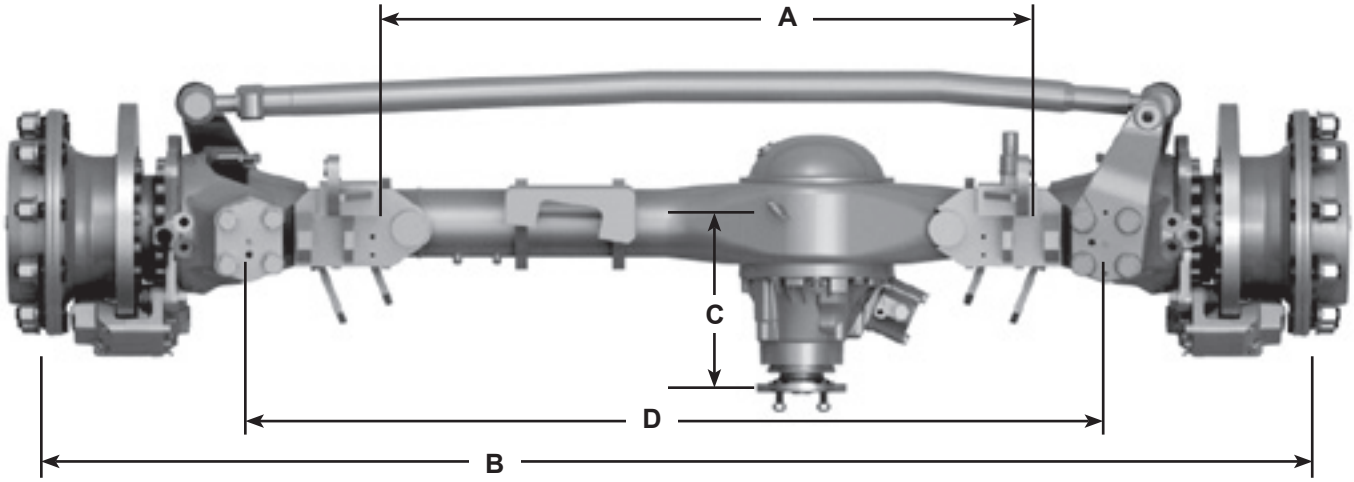
(1) Approval required on all applications
(2) Varies with brake/tire option

Approx. Weight 1200kg

(1) Axle Capacity and Example Applications Pounds (kg)	Available Differentials	Overall Axle Ratio Range
16,000 - 27,500 (7,300 - 12,500) Off-Highway Truck Armored Mine Protected Vehicle Emergency Vehicle	Standard, Limited Slip, Air Operated Differential Lock	4.8 – 28.0

(A) King Pin Intersection Inches (mm)	(B) (2) Hub Flange/ Flange Inches (mm)	Brakes Inches (mm)	Minimum Rim Size Inches (mm)
61.4 (1,561) 69.5 (1,764)	91.4 (2,321) 97.8 (2,484)	16.1 x 7.9 (410 x 200) Wedge Brake (O.B.) 16.5 x 7.0 (419 x 178) Cam Brake (O.B.) 16.9 x 1.8 (430 x 45) Air Disc Brake (O.B.) 15.4 x 1.8 (392 x 45) Air Disc Brake (I.B. shown) O.B. - Out Board Mounted Brake I.B. - In Board Mounted Brake	19.5 (495) 20.0 (508) 22.5 (572)

3000 Series: Planetary Steer Axle



(1) Approval required on all applications
(2) Varies with brake/tire option

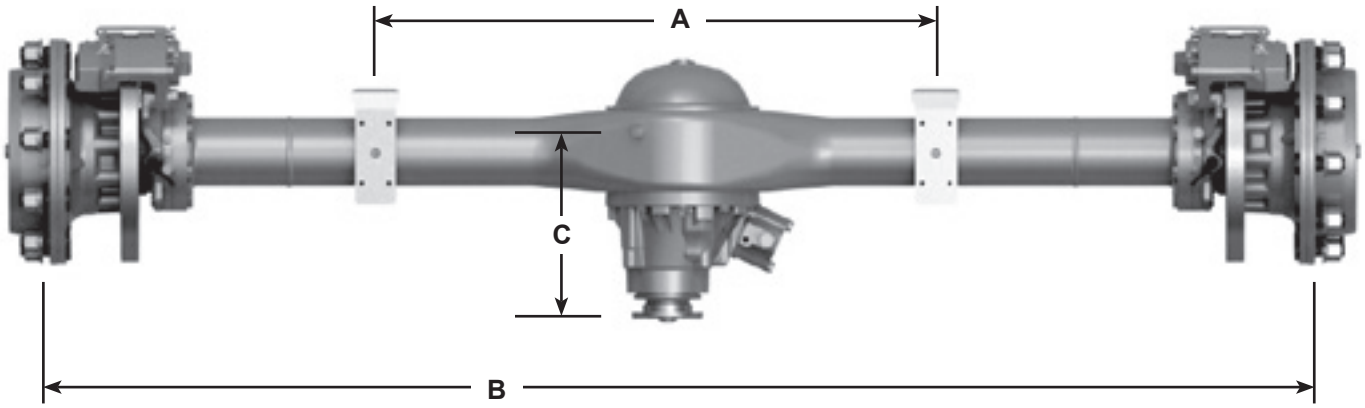
Approx. Weight 500kg

(1) Axle Capacity and Example Applications Pounds (kg)	Available Differentials	Available Overall Ratios	(C) Carrier Standout
9,200 -12,100 (4,200 -5,500) Off-Highway Truck Armored Mine Protected Vehicle	Standard or Differential Lock	5.1 - 28.0	1410 DIN Input Flange 11.7" (296.0mm)

(A) Axle Mounting Centers* Inches (mm)	(B) (2) Hub Flange/ Flange Inches (mm)	Tire Size Inches (mm)	Brakes	Planetary Wheel-End Ratio	(D) King Pin Intersection* Inches (mm)
24.0 (610) 32.3 (820) 29.7 (754) 35.0 (890)	73.0 (1,854) 83.2 (2,113) 80.1 (2035) 87.5 (2,223)	19.5 (495) 20 (508)	15 x 6 RSA (381 x 152) 14.6 x 1.18 HDB (370 X 30) 15.9 x 1.18 HDB (405 x 30) DB 22LT ADB (Rotor=16.2 (430))	3.22 3.55 5.6	48.8 (1,240) 57.6 (1464) 59.0 (1,499) 63.3 (1,609)

*Other Dimensions Available

3000 Series: Planetary Rigid Axle



(1) Approval required on all applications
(2) Varies with brake/tire option

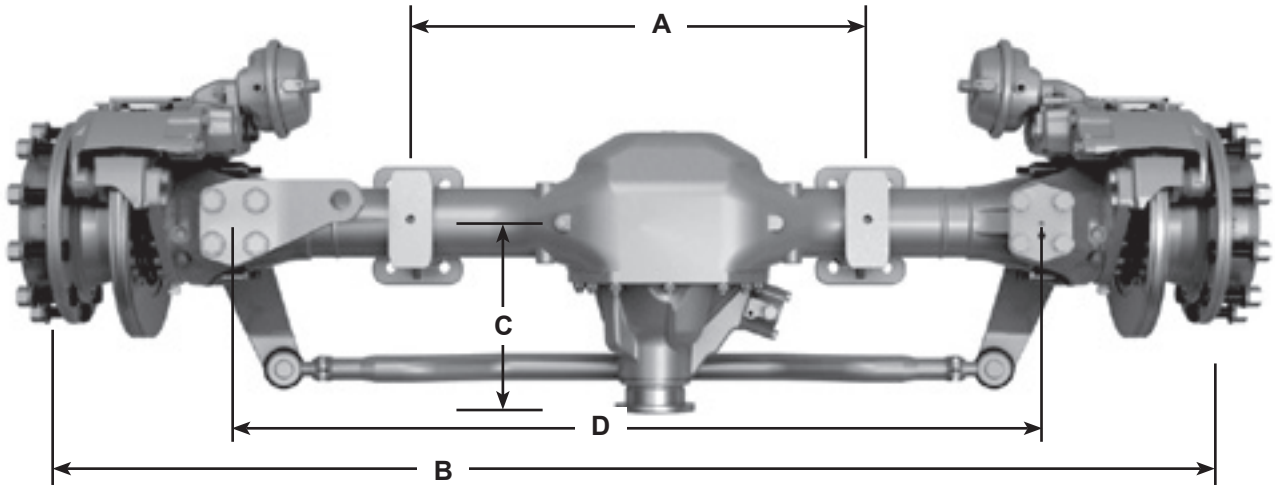
Approx. Weight 400kg

(1) Axle Capacity and Example Applications Pounds (kg)	Available Differentials	Available Overall Ratios	(C) Carrier Standout
9,900 - 12,500 (4,500 - 5,700) Off-Highway Truck Armored Mine Protected Vehicle	Standard or Differential Lock	5.1 - 28.0	1535 SAE Input Flange 11.02" (280.0mm)

(A) Axle Mounting Centers* Inches (mm)	(B) (2) Hub Flange/ Flange* Inches (mm)	Tire Size Inches (mm)	Brakes	Planetary Wheel-End Ratio
37.0 (940) 37.4 (950) 40.4 (1,025)	80 (2034) 81.9 (2,080) 89.8 (2,280) 95.1 (2,415)	19.5 (495) 20 (508)	15.0 x 6.0 RSA (381x152) 14.6 x 1.18 HDB (370 x 30) 15.9 x 1.18 HDB (405 x 30) DB 22LT ADB (Rotor = 16.2 (430))	3.22 3.55 5.60

*Other Dimensions Available

4000 Series: Planetary Steer Axle



(1) Approval required on all applications
(2) Varies with brake/tire option

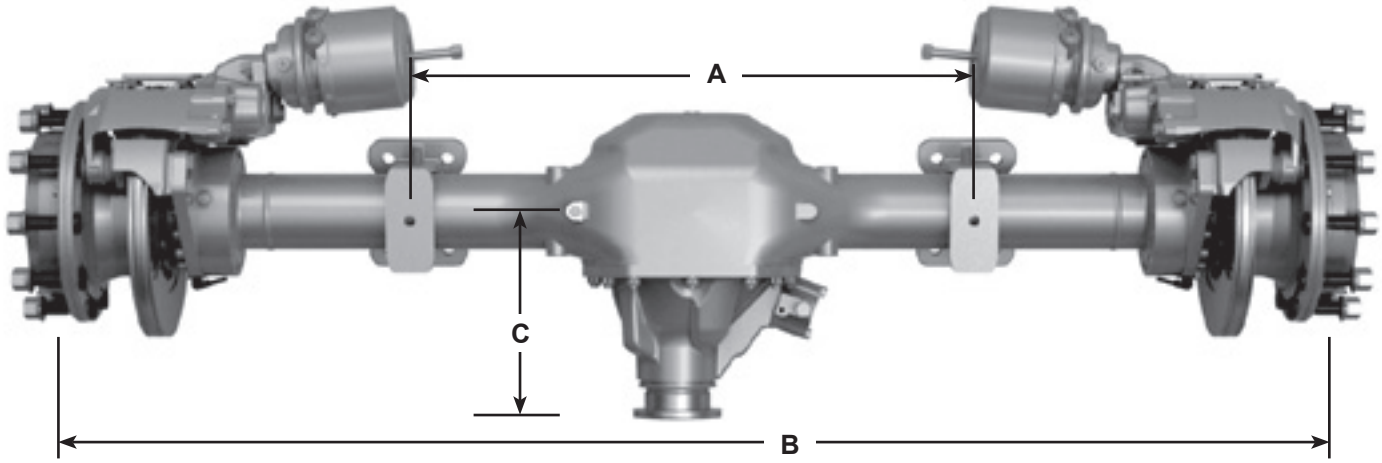
Approx. Weight 700kg

(1) Axle Capacity and Example Applications Pounds (kg)	Available Differentials	Available Overall Ratios	(C) Carrier Standout
14,300-19,800 (6,500-9,000) Off-Highway Truck Armored Mine Protected Vehicle On-Highway Truck	Standard, Limited Slip, Differential Lock	4.35 - 13.74	KV150 Input Flange 13.8" (350mm)

(A) Axle Mounting Centers* Inches (mm)	(B) (2) Hub Flange/ Flange Inches (mm)	Tire Size Inches (mm)	Brakes	Planetary Wheel-End Ratio	(D) King Pin Intersection* Inches (mm)
32.3 (820) 33.0 (838) 33.5 (850) 34.5 (876) 35.0 (890)	83.2 (2,113) 87.1 (2,212) 87.5 (2,223) 89.6 (2,276) 91.1 (2,314) 92.6 (2,352) 91.9 (2,334) 93.5 (2,374)	19.5 (495) 20.0 (508) 22.5 (572)	15.0 x 6.0 RDA (381x152) 15.9 x 1.18 HDB (405 x 30) 16.5 x 6.0 S Cam (419x152) 16.5 x 7.0 S Cam (419x178) 16.1x7.9 RDA (410x200) DB 22LT ADB (Rotor = 16.2 (430))	3.22 3.55 4.0 4.63 5.6	61.4 (1,560) 59.0 (1,499) 62.9 (1,598) 63.3 (1,609) 63.8 (1,620) 67.7 (1,720)

*Other Dimensions Available

4000 Series: Planetary Rigid Axle



(1) Approval required on all applications
(2) Varies with brake/tire option

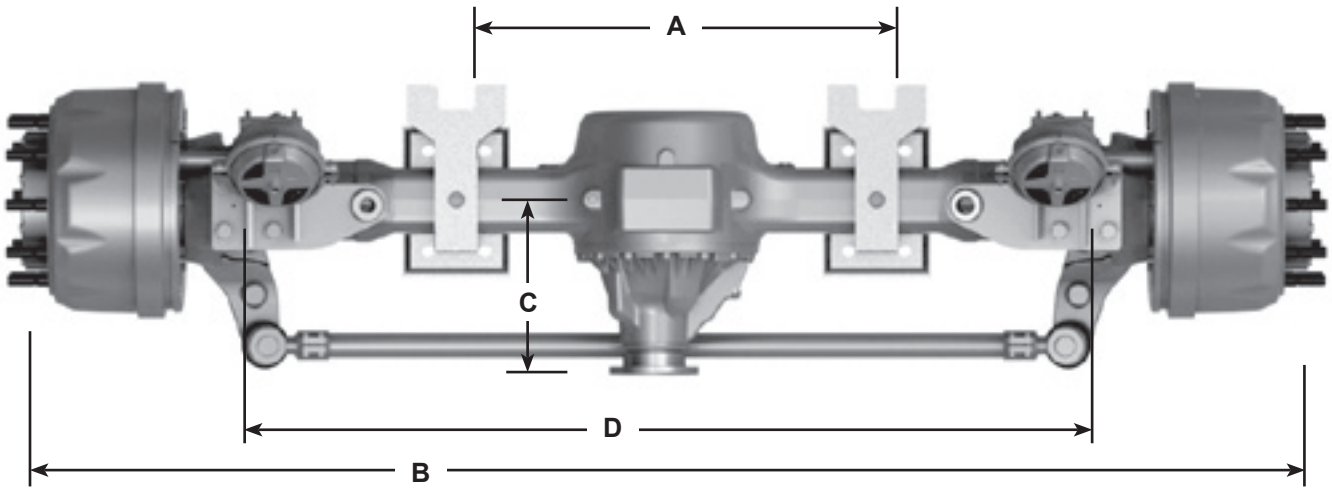
Approx. Weight 600kg

(1) Axle Capacity and Example Applications Pounds (kg)	Available Differentials	Available Overall Ratios	(C) Carrier Standout
14,300-22,000 (6,500-10,000) Off-Highway Truck Armored Mine Protected Vehicle On-Highway Truck	Standard, Limited Slip, Differential Lock	4.35 - 13.74	1535 SAE Input Flange 11.02" (280.0 mm)

(A) Axle Mounting Centers* Inches (mm)	(B) (2) Hub Flange/ Flange* Inches (mm)	Tire Size Inches (mm)	Brakes	Planetary Wheel-End Ratio
38.7 (983) 39.4 (1,000) 40.5 (1,092) 41.3 (1.050)	71.0 (1,803) 81.7 (2,075) 86.2 (2,190) 87.6 (2,226) 88.0 (2,235) 90.6 (2,300)	19.5 (495) 20 (508) 22.5 (572)	15.0 x 7.0 RSA (381 x 178) 15.9 x 1.18 HDB (405 x 30) 16.5 x 6.0 S Cam (419x152) 16.5 x 7.0 S Cam (419x178) 16.1 x 7.9 RDA (410 x 200) DB 22LT ADB (Rotor = 16.2 (430))	3.22 3.55 4.0 4.63 5.6

*Other Dimensions Available

5000 Series: Planetary Steer Axle



(1) Approval required on all applications
(2) Varies with brake/tire option

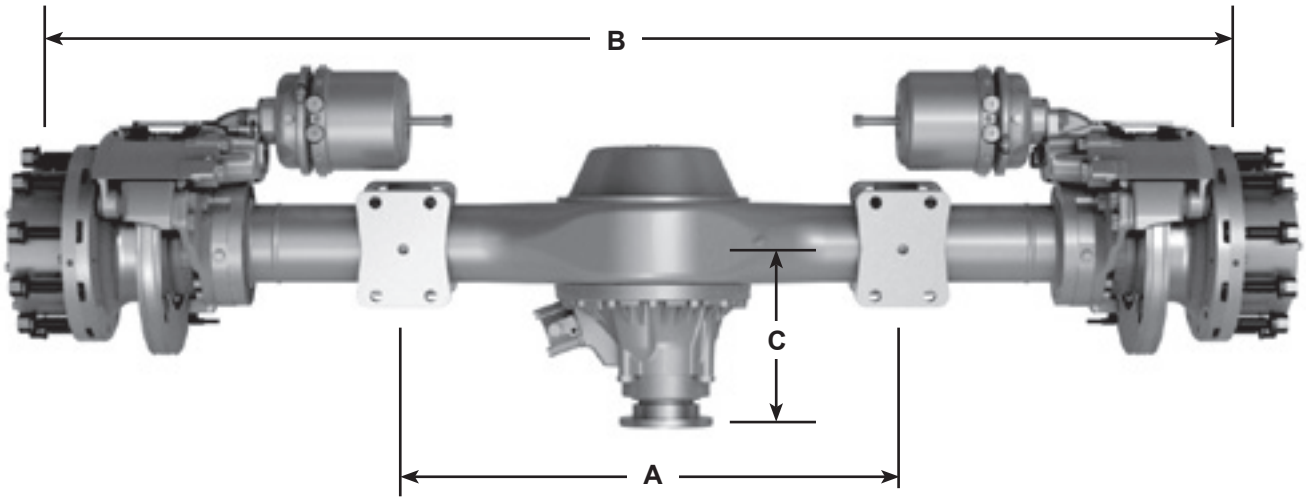
Approx. Weight 900kg

(1) Axle Capacity and Example Applications Pounds (kg)	Available Differentials	Available Overall Ratios	(C) Carrier Standout
21,000-32,000 (9,500-14,500) Ro-Ro Truck A.T. Crane On Highway	Standard, Limited Slip, Differential Lock	4.80-28.0	KV180 input flange = 13.8" (350mm)

(A) Axle Mounting Centers* Inches (mm)	(B) (2) Hub Flange/ Flange* Inches (mm)	Tire Size Inches (mm)	Brakes	Planetary Wheel-End Ratio	(D) King Pin Intersection* Inches (mm)
32.3 (820) 33.5 (850) 35.9 (911) (Hydrogas Suspension)	91.1 (2,314) 92.6 (2,352) 93.5 (2,374) 98.1 (2,492) 101.1" (2,569)	20 (508) 24 (610) 22.5 (572)	16.5 x 7.0 S Cam (419 x 178) 16.1 x 7.9 RDA (410 x 200) DB22 ADB (Rotor = 16.2 (430))	3.55 4.0 4.63 5.6	61.4 (1,560) 62.9 (1,598) 63.8 (1,620) 68.5 (1,740) 71.5 (1,815) 80.3 (2,040)

*Other Dimensions Available

5000 Series: Planetary Rigid Axle



(1) Approval required on all applications
(2) Varies with brake/tire option

Approx. Weight 800kg

(1) Axle Capacity and Example Applications Pounds (kg)	Available Differentials	Available Overall Ratios	(C) Carrier Standout
22,000-55,100 (10,000-25,000) Ro-Ro AWD Tow Tractor A.T. Crane	Standard, Limited Slip, Differential Lock	4.80-28.0	KV180 input flange = 13.8" (350mm)

(A) Axle Mounting Centers* Inches (mm)	(B) (2) Hub Flange/ Flange* Inches (mm)	Tire Size Inches (mm)	Brakes	Planetary Wheel-End Ratio
None 38.8 (986) 40.5 (1,029) 43.0 (1,092) 40.4 (1,025)	54.5 (1,385) 71.0 (1,803) 84.9 (2,156) 88.0 (2,235) 92.6 (2,352) 96.6 (2,455)	20 (508) 24 (610) 22.5 (572)	16.5 x 7.0 S Cam (419 x 178) 16.1 x 7.9 S Cam (419 x 178) 16.1" x7.9 RDA (410 x 200) 15.7" x 4.7 H (400 x 120) 19.7" x 7.0 RDA (500 x 180) DB 22 ADB (Rotor = 16.2 (430))	3.55 4.0 4.63 5.6

*Other Dimensions Available

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AxleTech International
A GENERAL DYNAMICS COMPANY

AxleTech International
1400 Rochester Road
Troy, MI 48083 USA
1-877-877-9717
Fax: 1-248-435-1990
www.axletech.com

AxleTech International SAS
4, Rue Jean Servanton
Boite Postale 656
42042 Saint Etienne Cedex 1
FRANCE
+33 477-92-88-00
Fax: +33 477-92-88-93

AxleTech do Brasil Sistemas Automotivos Ltda.
Avendia Joao Batista, 830
Centro-Osasco-SP
06097095
BRASIL
+55 11 3684-6641
Fax: +55 11 3684-6859

AxleTech Distribution Center
1400 Rochester Road
Troy, MI 48083 USA
Distribution Center: 1-877-547-3907
Aftermarket Technical Support: 1-800-540-2794

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