Control Solutions has been providing military systems for over 20 years. We are one of the first companies to provide heavy turret motor controllers for the armored HMMWs and MRAPs. Our Turret Control System (TCS) has been fielded on over 70,000 platforms.

The Warfighter relies on our products to reduce gunner fatigue and improve their safety, while keeping their eyes on the mission and hands on the weapon.

Control Solutions LLC is your one-stop solution provider for tough motion control problems. Our team of engineers and ISO-certified manufacturing personnel stand ready to quickly solve, design, and manufacture your custom solution today.
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Weapon-Mounted Turret Controllers and Accessories .......................Page 11
Founded in 1989, Control Solutions designed the first microprocessor-based DC motor controller used in the scooter industry. Since then, Control Solutions has grown to become the industry leader in motion-control solutions.

Today, that technology is used in our military products such as our Turret Control System (TCS) and Powered Door Systems (PDS). We have over 70,000 turret motion control systems fielded to the U.S. Government.

- Located in Aurora, IL USA
- 75 employees, 20 engineers
- Integrated design & manufacturing facility: 130,000 sq. ft.
- Products are “Made in USA” using an international supply chain
- Rapid growth has resulted from selection of CSLLC’s motion control technology for commercial and military markets
- Urgent operational requirements in Iraq and Afghanistan created a need for rugged, safety and survivability systems for tactical wheeled vehicles
- Rapid design, prototyping and delivery to meet extreme performance and environmental demands
- Fielded over 70,000 turret motion control systems to the U.S. Government
Features/Benefits

- Lightest powered turret on the market (165 lbs.)
- Motorized, hand-cranked and manual models available
- Common ring-mount solution for various vehicles
- Fixed or Flexible A-Frame Available
- Flexible A-Frame provides gun tilt range from -15 to +30 degrees
- Easy vehicle integration and installation
- Supports multiple weapon systems
- Optional gun shield and gunner protection kits in steel, ceramic or composite armor

Description

The CS5000 Series Turrets are the lightest turrets on the market today. The Lightweight Gun Turret (LGT) provides a one-piece system that can be easily mounted on almost any vehicle. The base turret weight is only 165 lbs (75kg) making it an ideal choice for tactical vehicles. Reducing the vehicle weight will continue to be a key requirement of military and police forces worldwide.

We have many configurations to choose from to fit your budget and needs. We have our base, hand-cranked version to a fully motorized turret with weapon mounted turret controllers, which allows the gunner to operate via a finger-tip or thumb controller without taking their eyes off the target.

The CS5000 table below shows the base unit and common specifications. This is a good starting point when trying to spec a turret for your vehicle.

CS5000 Series Common Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall weight, pounds (metric)</td>
<td>165 lbs (75kg) [without weapon or pintle mount]</td>
</tr>
<tr>
<td>Turret Ring Diameter, Inches (mm)</td>
<td>ID: 30.2 (768) – OD: 38.8 (978)</td>
</tr>
<tr>
<td>Vehicle rooftop mounting hole, Inches (mm)</td>
<td>36 (915) nominal using M10 bolts</td>
</tr>
<tr>
<td>Armament</td>
<td>Qualified with 7.62mm – 12.7mm – 40mm AGL, buffered mount recommended</td>
</tr>
<tr>
<td>Safe zone</td>
<td>No-fire zone can be installed preventing traverse of the LGT in this area</td>
</tr>
<tr>
<td>Protection for gunner</td>
<td>Can be modified to provide ballistic protection up to STANAG 4569 level 3</td>
</tr>
<tr>
<td>Overhead protection</td>
<td>Adjustable ballistic top cover protection can be installed</td>
</tr>
</tbody>
</table>

All specifications subject to change without notification.

Visit our website: www.controls.com
Specifications

**Common for all models**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Current</td>
<td>12A (nominal) – 40A (stall)</td>
</tr>
<tr>
<td>Overall weight, pounds (metric)</td>
<td>165 lbs (75kg) [without weapon or pintle mount]</td>
</tr>
<tr>
<td>Turret Ring Diameter, Inches (mm)</td>
<td>ID: 30.2 (768) – OD: 38.8 (978)</td>
</tr>
<tr>
<td>Vehicle rooftop mounting hole, Inches (mm)</td>
<td>36 (915) nominal using M10 bolts</td>
</tr>
<tr>
<td>Armament</td>
<td>Qualified with 7.62mm – 12.7mm – 40mm AGL, buffered mount recommended</td>
</tr>
<tr>
<td>Adjustable gun mount A-frame</td>
<td>-15° to + 30°</td>
</tr>
<tr>
<td>Manual operation</td>
<td>Yes (if vehicle power fails)</td>
</tr>
<tr>
<td>Safe zone</td>
<td>No-fire zone can be installed preventing traverse of the LMGT in this area</td>
</tr>
<tr>
<td>Protection for gunner</td>
<td>Can be modified to provide ballistic protection up to STANAG 4569 level 3</td>
</tr>
<tr>
<td>Overhead protection</td>
<td>Adjustable ballistic top cover protection can be installed</td>
</tr>
</tbody>
</table>

**Model Selections**

<table>
<thead>
<tr>
<th>Model</th>
<th>Base</th>
<th>Power Train</th>
<th>Flex A-Frame</th>
<th>Fixed A-Frame</th>
<th>Hatch Cover</th>
<th>Hand Crank</th>
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</thead>
<tbody>
<tr>
<td>CS5200</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>CS5210</td>
<td>✔</td>
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<td>✔</td>
<td>✔</td>
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<td>CS5230</td>
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<td>CS5240</td>
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<td>✔</td>
</tr>
<tr>
<td>CS5330</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>CS5340</td>
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<td></td>
<td>✔</td>
</tr>
<tr>
<td>CS5350</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
</tbody>
</table>

= assemblies included.

**CS5200 Diagram**

Note: Specifications are subject to change without notice.
## Turret Assemblies

<table>
<thead>
<tr>
<th>Assemblies</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flex A-Frame</strong></td>
<td>Flexible frame provides gun tilt range from -15 to +30 degrees. The Flexible A-frame is ideal for urban or mountainous operational environments where engagement of the enemy from an elevated position is a concern. The Flexible A-Frame allows for easy/quick weapon height adjustment for gunners of varying height profiles.</td>
</tr>
</tbody>
</table>
| | - Supports multiple weapon systems  
| | - Light weight aluminum construction  
| **Fixed A-Frame** | Rigid sturdy frame |
| | - Supports multiple weapon systems  
| | - Light weight aluminum construction  
| **Hatch Cover** | Light weight hatch cover weighs only 35lbs. |
| | - Light weight aluminum construction  
| | - Can be modified to provide ballistic protection up to STANAG 4569 level 3  
| **Base** | Common on all CS5000 Series Light-Weight turrets. |
| | - Smooth bearing operation.  
| | - Light weight aluminum construction  
| **Power Train** | For all Motorized LWT |
| | - Built-in rotary slip ring that connects to vehicles power source, eliminates the need for turret batteries  
| | - Rotate 360° in less than 7 seconds  
| | - One finger operation using Control Solutions Weapon Mounted Gun Turret controllers  
| | - Light weight aluminum construction  
| **Hand Crank** | Manual hand crank for the CS5300 Series turrets. |
| | - No power needed.  
| | - Light weight aluminum construction  

### CS5200 Series Lightweight Motorized Gun Turrets

**CS5200** includes the following:
- Base Turret
- Flex A-Frame
- Hatch
- Power Train
  - Flexible A-Frame provides gun tilt range from -15 to +30 degrees.
  - Built-in rotary slip ring that connects to vehicles power source, eliminates the need for turret batteries.
  - One finger motorized operation using optional accessories CS3210A or CS3320 Weapon Mounted Turret controllers (WMTC)

**CS5210** includes the following:
- Base Turret
- Flex A-Frame
- Power Train
  - Flexible A-Frame provides gun tilt range from -15 to +30 degrees.
  - Built-in rotary slip ring that connects to vehicles power source, eliminates the need for turret batteries.
  - One finger motorized operation using optional accessories CS3210A or CS3320 Weapon Mounted Turret controllers (WMTC)

**CS5230** includes the following:
- Base Turret
- Fixed A-Frame
- Hatch
- Power Train
  - Built-in rotary slip ring that connects to vehicles power source, eliminates the need for turret batteries.
  - One finger motorized operation using optional accessories CS3210A or CS3320 Weapon Mounted Turret controllers (WMTC)

**CS5240** includes the following:
- Base Turret
- Fixed A-Frame
- Power Train
  - Built-in rotary slip ring that connects to vehicles power source, eliminates the need for turret batteries.
  - One finger motorized operation using optional accessories CS3210A or CS3320 Weapon Mounted Turret controllers (WMTC)

### CS5300 Series Lightweight Hand-Crank Gun Turret

**CS5300** includes the following:
- Base Turret
- Flex A-Frame
- Hatch
- Hand-Crank
  - Flexible A-Frame provides gun tilt range from -15 to +30 degrees.

**CS5310** includes the following:
- Base Turret
- Flex A-Frame
- Hand-Crank
  - Flexible A-Frame provides gun tilt range from -15 to +30 degrees.
CS5300 Series Lightweight Hand-Crank & Manual Gun Turret

CS5330 includes the following:
- Base Turret
- Fixed A-Frame
- Hatch
- Hand-Crank

CS5340 includes the following:
- Base Turret
- Fixed A-Frame
- Hand-Crank

CS5350 includes the following:
Entry level manual turret.
- Base Turret
- Fixed A-Frame
- Base Manual Locking Handle
**Lightweight Turret Applications**

The CS5000 Series of lightweight turrets are ideal for many uses including but not limited to, military police, SWAT, border guard posts and other vehicle applications where weight and center of gravity issues are of primary concern.

**Custom and Non-lethal Solutions**

We can design and configure our turrets for non-lethal applications as well.
Features/Benefits
- Supports payloads up to 2200 lbs.
- One finger motorized operation on the move
- Ideal for APC’s with ballistic steel gunner protection kits.
- Flexible A-Frame provides gun tilt range from -15 to + 30 degrees
- Common ring-mount solution for various vehicles
- Easy vehicle integration and installation
- Supports multiple weapon systems
- Self contained power slip ring allows turret to be powered from vehicle, eliminates the need for external batteries.
- Manual Override

Description
When your tactical wheeled vehicles need a larger turret capable of supporting heavier weapon systems, the Heavy Duty Turret (HDT) by Control Solutions meets those specifications.

With our line of turret accessories, slip rings, hatches, gun mounts, weapon-mounted controllers, spotlights, auxiliary power modules, gunner protection kits and more, the HDT system has the flexibility you can spec for your tactical vehicle.

About Us
Designing and manufacturing field-hardened systems to meet the challenges of the military for over 20 years. Control Solutions LLC, your rapid-response provider of motion control solutions.

Smoothly rotate the HDT via CS3210A weapon-mounted turret controller.
# Heavy Duty Turret (HDT)

## Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Heavy Duty Turret</strong></td>
<td></td>
</tr>
<tr>
<td>Maximum Supported Weight</td>
<td>2200 lbs.</td>
</tr>
<tr>
<td>Voltage</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Overall weight, pounds (metric)</td>
<td>490 lbs (222) [without weapon or pintle mount]</td>
</tr>
<tr>
<td>Turret Ring Diameter, Inches (mm)</td>
<td>ID: 30.7 (780) – OD: 45.25 (1150)</td>
</tr>
<tr>
<td>Vehicle interface mount plate inches (mm)</td>
<td>Overall OD: 45.25” (1148 mm), Vehicle Mount BC. Dia.: 42.25” Dia. (1073 mm) Qty. 20 clearance holes: .65” (16.51 mm). Required ID clearance: 37.25” (946 mm)</td>
</tr>
<tr>
<td>Gun Mount interface plate</td>
<td>Overall OD: 41.25” (1048 mm), B.C. Interface 40.13” (1019 mm) Qty. 18 0.50”-13UNC. Internal gunner clearance 30.7” (780 mm) Dia. minus gear drive train provisions.</td>
</tr>
<tr>
<td>Height above vehicle mount interface (fay surface)</td>
<td>Top plate surface: 3.3” (84 mm), Top Plate Bearing Cap 4.7” (119).</td>
</tr>
<tr>
<td>Depth below vehicle mount interface (fay surface)</td>
<td>Slip ring guard: 2.1” (53 mm), Bottom of drive unit: 6” (152 mm), Note: Distance manual drive wheel extends below bottom of drive unit depends on wheel diameter selected.</td>
</tr>
<tr>
<td>Armament</td>
<td>Can be manufactured to: NATO or Non-NATO specifications</td>
</tr>
<tr>
<td>Manual operation</td>
<td>Yes (if vehicle power fails)</td>
</tr>
<tr>
<td>Protection for gunner</td>
<td>GPK can be provided per customers specifications</td>
</tr>
<tr>
<td>Overhead protection</td>
<td>Ballistic hatch cover can be provided per customer specification.</td>
</tr>
</tbody>
</table>

## CS6400 Series Diagram

![Diagram of Heavy Duty Turret](image)

*Note: Specifications are subject to change without notice.*
Heavy Duty Turret Applications

The CS6400 HDT turret is ideal for the larger MRAPS and Armored Personnel Carriers that can support payloads up to 2200 lbs.
## Weapons-Mounted Turret Controllers and Accessories

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Description</th>
</tr>
</thead>
</table>
| CS3210A Weapon Mounted Turret Controller | - Maintain positive control through simultaneous turret and weapon control  
- Smooth two-direction turret slew control  
- Left-side or right-side mounting configurations on the M2 or MK19  
- Directly cabled to BPMTU/ITDS controller via Mil-C-5015  
- No tools needed to mount WMC |
| CS3300 Series Weapon Mounted Turret Controllers | - Durable hook & loop fastening system allows for secure mounting to different weapon stock shapes  
- Directly cabled to BPMTU/ITDS controller  
- CS3310 mounts to the right-hand side of the stock of the M240B weapon.  
- CS3320 mounts to the right-hand side of the stock of the M249 weapon  
- CS3330 mounts to the right-hand side of the M249 collapsible buttstock. |
| CS3209B Joystick | - Waterproof and dustproof  
- Gasket-sealed aluminum enclosure with magnetic base  
- EMI hardened  
- Designed and manufactured in the U.S.A.  
- Designed to comply with U.S. and European safety standards and regulations  
- Single axis, non contact hall-effect technology for long life  
- Used in conjunction with CSLLC’s CS3248 improved Turret Drive System motor controller, CS3208 BPMTU controller and all CS5200 Series Turrets |
| CS2152 TCS Auxiliary Power Module | - Provides in-turret power for gunner accessories  
- Includes 12V and 24V protected circuits for gunner station accessories  
- Includes 5V USB power outlet  
- Power is independent of vehicle battery  
- Sealed Connections allow for all-weather day and night operation  
- Compatible with weapons mounted controller |
| CS3460 Gun Turret Spotlight | - High-intensity white LED light and night-vision in same unit  
- Powerful LED white light visible for over 150 meters  
- Wide-angle IR light for use with night vision devices  
- Single-switch operation from Turret Auxiliary Module  
- Mounts easily onto either side of the O-GPK |
| CS5400 Large-diameter Turret Slip Ring | - Allows turret to be powered from vehicle batteries; eliminates turret batteries and reduces weight  
- Multiple data and video channels; simultaneous uplink & downlink  
- Floating design; isolated from vehicle vibrations  
- Environmentally sealed; retrofittable |
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