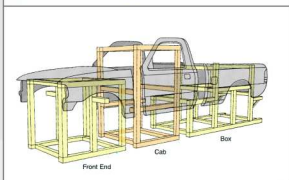
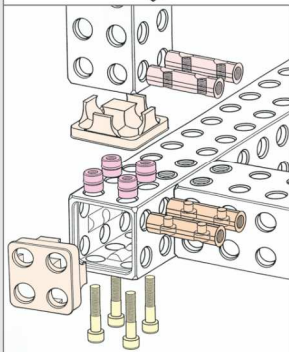
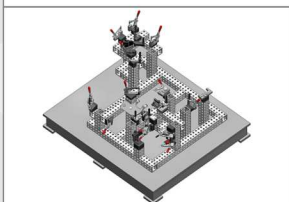
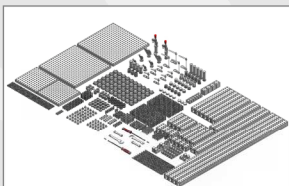


American Modular Tooling

C2
GAUGE & FIXTURE
Precision Modular Measurement & Testing Tools



**DECADES OF
EXPERIENCE**

**PROVEN
FIXTURING
EXCELLENCE**

AMERICAN MADE

C2 **GAUGE & FIXTURE** *American Modular Tooling*

- ⊕ Established in 1991, Paul W. Marino Gages, Inc. is dedicated to providing the finest quality products and professional services to our customers.
- ⊕ In 2018 PWMG created a partnership with C2 Machining in Kentwood Michigan, C2 Gage & Fixture, to sell and manufacture American Modular Tooling as well as design and build fixtures of all types.
- ⊕ Our 5,000 sq. ft. design and 20,000 sq. ft. manufacturing facility, located in Kentwood MI, is home to our sales, design and manufacturing groups and includes a working showroom with demonstration and learning facilities.
- ⊕ Our customer service and sales groups are knowledgeable, professional and ready to assist you.
- ⊕ Our design group are specialists in several fields of design and support all typical file formats.
- ⊕ Our manufacturing and quality groups consist of knee mills, lathes, coordinate measuring systems and all associated equipment required for manufacturing with the future in mind.



C2 Gauge & Fixture, Kentwood Michigan

Widespread Acceptance

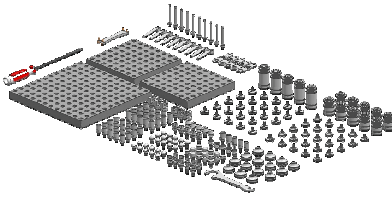
- | | | |
|------------------|-------------------|-----------------|
| ⊕ Aerospace | ⊕ Die Casting | ⊕ Ship Building |
| ⊕ Aircraft | ⊕ Electronics | ⊕ Steel |
| ⊕ Aluminum | ⊕ Instrumentation | ⊕ Tooling |
| ⊕ Automotive | ⊕ Machine Tool | ⊕ And growing |
| ⊕ Communications | ⊕ Medical | |
| ⊕ Defense | ⊕ Plastics | |

American Modular Tooling

The New Manufacturing

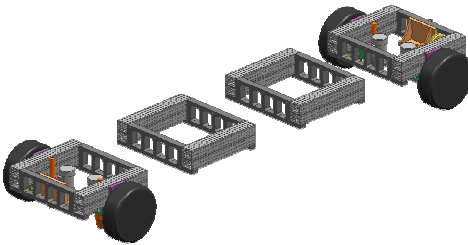
There is a worldwide movement to lean, efficient methods of manufacturing. The U.S. government is currently working with major manufacturers to implement modular, reconfigurable tooling. AMT fulfills the following:

- ⊕ Modular and reconfigurable
- ⊕ Rapid response and deployment
- ⊕ Light weight
- ⊕ Three E's...ecological, ergonomic and economic



AMT Advantages

- ⊕ Fixtures may be built rapidly and modified easily, resulting in immediate savings of time and money.
- ⊕ All components are completely reusable, unlike welded fixtures.
- ⊕ Aluminum is light in weight, resists corrosion and is ecologically sound
- ⊕ Modular elements make it easy to duplicate, or repeat, designs.
- ⊕ Large fixtures, such as body cubes, may be built in sections which can be assembled or dismantled quickly, permitting work at multiple locations.
- ⊕ A fixture may be assembled away from its site of design.



AMT is ideal for:

- | | | |
|---------------------------------------|---|--------------------------------------|
| ⊕ CMM Holding fixtures | ⊕ Checking fixtures, SPC and indicating | ⊕ Vacuum holding fixtures |
| ⊕ Attribute gages | ⊕ Body stacks, cube ups and bucks | ⊕ Multi-part pallet systems for CMMs |
| ⊕ Holding fixtures | ⊕ Armatures | ⊕ Shuttle systems |
| ⊕ Assembly fixtures | ⊕ Interior and exterior bucks | ⊕ Special machined details |
| ⊕ Welding fixtures | ⊕ Jigs and jiggling base plates | ⊕ Standard details |
| ⊕ Hand apply fixtures or gages | ⊕ Universal, multi-part holding devices | ⊕ Check rails, net pads, locators |
| ⊕ Layout fixtures | | ⊕ Clamping systems |
| ⊕ Checking fixtures, flush and feeler | | |

- ⊕ We have included several illustrations and photos of production AMT jobs throughout our catalog — refer to the Photo chapter on pages 139-150 for even more.

American Modular Tooling

Fast parts fixturing, rapid tool development, simplified machining and fast assembly make American Modular Tooling an ideal addition to the worldwide movement for lean, efficient methods of manufacturing. Every element has been designed for maximum efficiency and cross-system adaptability. Components are available individually, in kits or as custom fixtures designed and built per your part print.

Material Properties of AMT Components:

AMT "Construction Grade" Extruded Profiles and Locators

- ⊕ 6061-T6, Temper 6
- ⊕ KSI Tensile: 47,000 PSI
- ⊕ KSI Yield: 40,000 PSI
- ⊕ Hard Coat Anodized
- ⊕ Elongation Factor: 8%

AMT "Professional Grade" Extruded Profiles and Top Elements

- ⊕ 7075-T6, Temper 6
- ⊕ KSI Tensile: 78,000 PSI
- ⊕ KSI Yield: 68,000 PSI
- ⊕ Hard Coat Anodized
- ⊕ Elongation Factor: 6%

AMT "Special Duty" Extruded Profiles.

- ⊕ 6082-T6, Temper 6, Special Blend
- ⊕ KSI Tensile: 45,000 PSI
- ⊕ KSI Yield: 30,000 PSI
- ⊕ Hard Coat Anodized
- ⊕ Elongation Factor: 4.5–5.5%

AMT "Special Duty" Cast Products

- ⊕ 319, 0-T5 Sand Cast
- ⊕ KSI Tensile: 30,000 PSI
- ⊕ KSI Yield: 26,000 PSI
- ⊕ Hard Coat Anodized
- ⊕ Elongation Factor: 1.5%

AMT Connection Elements

- ⊕ 2024-T6
- ⊕ KSI Tensile: 69,000 PSI
- ⊕ KSI Yield: 57,000 PSI
- ⊕ Hard Coat Anodized
- ⊕ Elongation Factor: 10%

Benefits of the American Modular Tooling System

Manufacturing and Engineering:

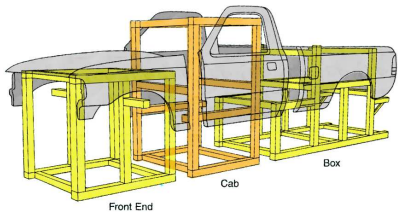
- | | |
|---------------------|--------------|
| ⊕ Facility Usage | 48% Less |
| ⊕ Lead Time | 60% Less |
| ⊕ Tooling Costs | 44% Less |
| ⊕ Tooling Labor | 60% Less |
| ⊕ Tool Design Costs | 50% Less |
| ⊕ Equipment Needs | 70% Less |
| ⊕ Reusable Material | 70% Reusable |

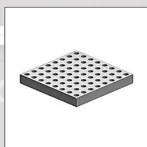
Manufacturing and Assembly:

- | | |
|-----------------------------|-------------|
| ⊕ Assembly Labor | 70% Less |
| ⊕ Through-put Increase | 45% More |
| ⊕ Accuracy of Assemblies | 50% Greater |
| ⊕ Periodic Inspection | 50% Less |
| ⊕ Reconfigurable | Priceless |
| ⊕ Modularity | Priceless |
| ⊕ Rapid Engineering Changes | Priceless |

Other Benefits:

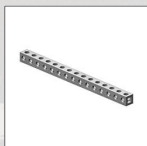
- ⊕ Fewer corrosion problems due to hard coat aluminum
- ⊕ Lower shipping costs due to lighter weight
- ⊕ Faster setup at customers facility
- ⊕ Good ROI on leasing of tool (70% reusable)
- ⊕ Can be used as temporary rate tool
- ⊕ Less space required for storage
- ⊕ Minimal maintenance requirements
- ⊕ Environmentally correct





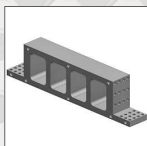
Grid Plates provide the basic structural foundation of almost any fixture.

Pages 7—16



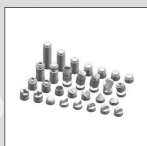
Light weight Hollows feature a channelled interior for high accuracy.

Pages 17—34



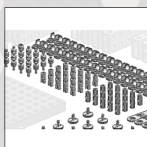
Special duty supports, gussets and foot plates provide added strength.

Pages 35—42



Locating and Clamping Elements hold and locate parts of many shapes and sizes.

Pages 43—72



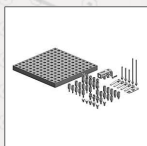
Connection Elements permit rapid assembly of fixtures.

Pages 73—86



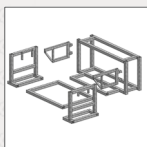
Tools and Storage Cabinets

Pages 87—92



Kits are designed to accommodate all varieties of fixturing requirements.

Pages 93—124



Studio Tools

Pages 125—138



Photos

Pages 139—150

American Modular Tooling

Testimonial of the Year:

Modular Tooling Reduces Fixturing Costs, Allows Conversion From One Make to Another.

"It's easy to learn, but there is so much there that you have to sort through it. Once you know what everything does, it's like working with one of those Erector® sets you had when you were a kid. It's very, very user friendly."

Bill Ralph, Quality Metalcraft, Inc.



"I would recommend it to anybody. You are better off sticking with the people who know what to do with it."

Two sided modular tool converted for reuse after its initial run for a different manufacturer.

"If it's going to cost us a measly \$3,000.00 to build a, say, \$100,000.00 fixture...we want to do it."

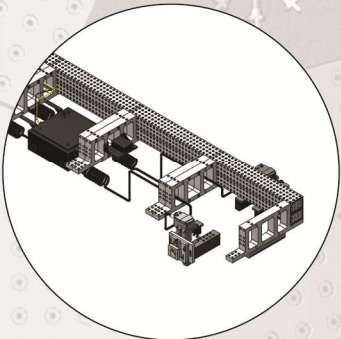
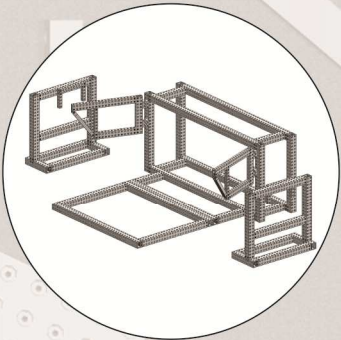
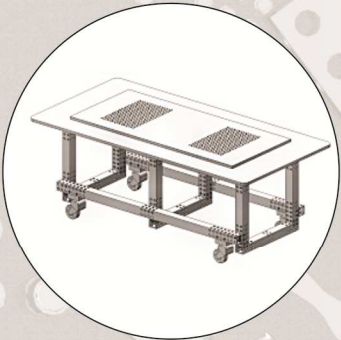


A close-up view showing a three-axis adjustable locating element holding a door in body position.

"It's part of our system now, they are definitely going to use it on the next big project. It should last for years."

Read the entire article in Quality Magazine, 2008 or online at www.qualitymag.com.

See more on our website, pmargage.com



Grid Plates

Hollows

Special Duty

Locating & Clamping

Connection Elements

Tools & Storage

Fixturing Kits

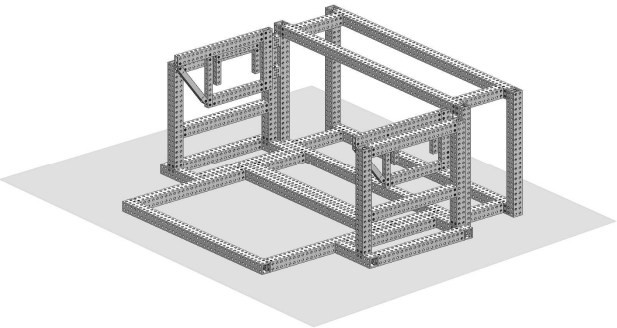
Studio Tools

Photos

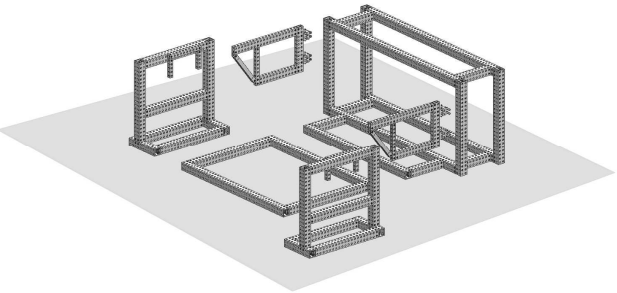
SOLUTIONS®
How it works:

Interior Buck

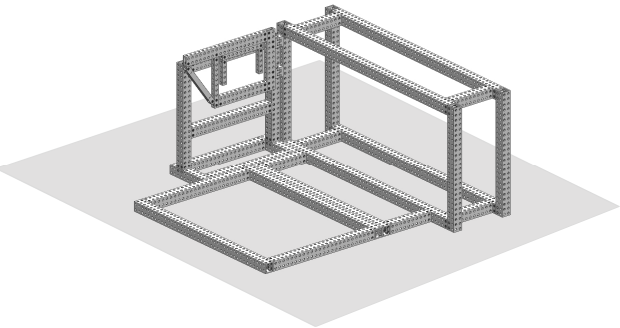
Let us help you design standard armature units for cross-platform use utilizing a common practice approach.



Buck



Buck Exploded



Billboard



Part No.	Dimensions	System
AMT-14556	Custom	25 / 40

AMT Car Instrument Panel Armature



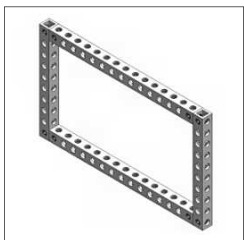
Part No.	Dimensions	System
AMT-14516	Custom	25 / 40

AMT Seat Platform.



Part No.	Dimensions	System
AMT-14517	Custom	25 / 40

AMT Door Trim Armature with functional hinge hardware, 800 x 480 mm



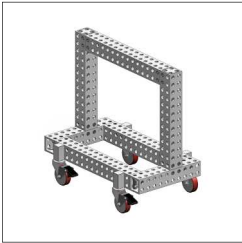
Part No.	Dimensions	System
AMT-14520	Custom	25 / 40

AMT Door Trim Panel Armature. Add hinge assembly AMT-14144 (page 136) if needed.



Part No.	Dimensions	System
AMT-14524	Custom	25 / 40

AMT Door Panel Jig with Door Attachment

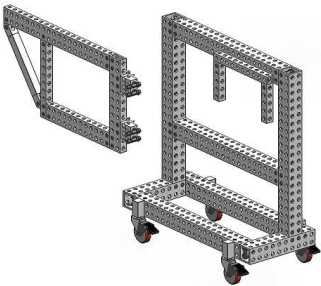


Part No.	Dimensions	System
AMT-14519	Custom	25 / 40

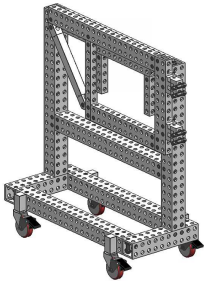
AMT Door Panel Jig.

SOLUTIONS®
How it Works

Door removes from
milling and sculpting
stand to allow for
functional open and
close operation.



Easy packaging.





Part No.	Dimensions	System
AMT-14530	Custom	25 / 40

AMT Tunnel Console Milling Jig

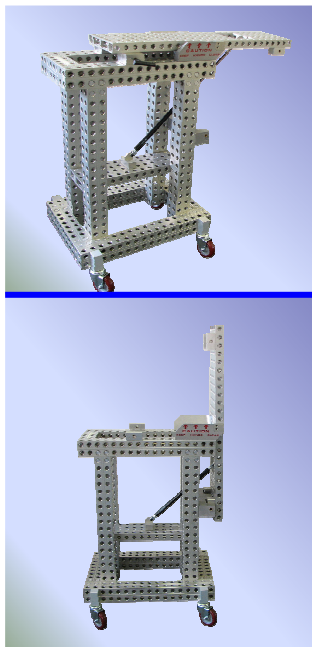
SOLUTIONS®

How it works

Handy tool for milling tunnel consoles. Allows pivot to 90° and 180° positions with high accuracy.

Extend the capabilities of your 3 axis milling system with this tool.

Bars, bases and platforms are flat, square and parallel for both positions and locating on a plate



Part No.	Dimensions	System
AMT-14523	650 x 1500 x 800	25 / 40

AMT Studio Jig, milling and hand sculpting table.



Part No.	Dimensions	System
AMT-14575	1200 x 2000 x 800	25 / 40

AMT Modeling Table Jig, 1/3 scale, full model size for milling, sculpting and display. Other sizes and scales are available, specify when ordering..

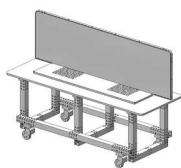
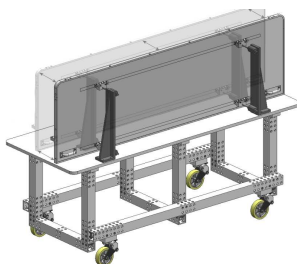


AMT Mirror Tables save time and money and offer excellent display and preview quality.

SOLUTIONS®

How it works

Optional, adjustable mirror moves away from the 1/2 scale model centerline for easy milling and hand sculpting applications.

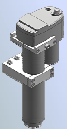
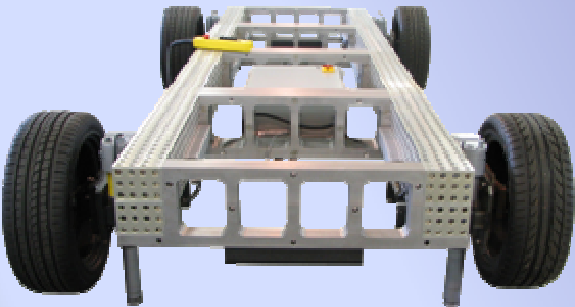


Part No.	Dimensions	System
AMT-14573	Custom	25 / 40
AMT-14574	Custom	25 / 40

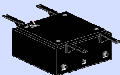
AMT Modeling Table with or without distortion free mirror. 1/3 scale, half model size for milling, sculpting and display. Contact us for other sizes and scales.

SOLUTIONS®
Ideas

Exterior Armature



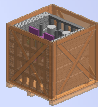
Actuator



Control Box



Hand Pendant



Shipping Box

SOLUTIONS®**How it Works**

This light weight, modular armature brings new opportunities to the pre-prototype and prototype industries, providing highly accurate work and attachment surfaces. Holes, precisely located in a grid pattern, are used to fasten other modular components to hold simulated protuberances or attach vehicle components.

Wood, polystyrene, clay, urethane, aluminum and other typical materials used to represent final surfaces may be applied in their raw state and machined while still on the armature structure. Initial weight limit is tested to 10,000 lbs; heavier load values are available upon request.

The Armature's modular construction allows for expansion in increments of 40mm in the following directions: (X) fore/aft, (Y) cross car and (Z) height. Adjustable wheel brackets, with production hubs, rotate freely allowing the armature to roll easily on standard wheels and tires and allow finer adjustments for wheel base and tread width:

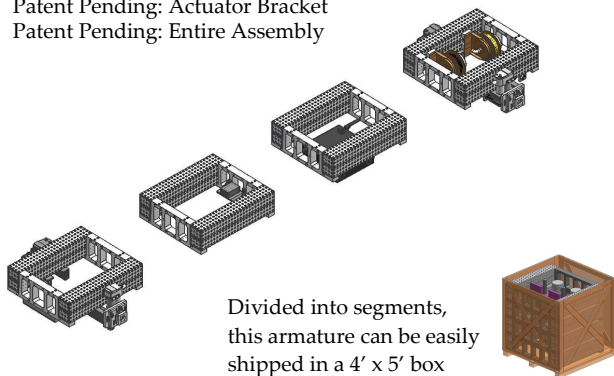
- j Cross car: 100mm (4 inch) on either side or combined right and left, 200mm (8 inch)
- j Fore/Aft: every 40mm hole-to-hole, and fine adjustment between holes of 20mm
- j Up/Down: 50mm (2 inch)

Auto-leveling is accomplished with linear actuators. Each actuator features 0-10" of movement up/down and an individual load capacity of 1½ tons, for a combined load of 12,000 lbs., a 24 volt motor, 110/230 AC power (no switch) and is PLC controlled for height. Leveling feedback is via high gain electronic inclinometer. Auto-leveling is achieved by moving the armature to the approximate height and pushing the single push button on the hand box to initiate the leveling sequence this is accomplished in less than two minutes. Tests have provided 0.010" levelness repeatedly. Actuators may be packaged inside or outside the frame and, in either case, behind the wheels if desired. Simple, clean presentation and easy assembly.

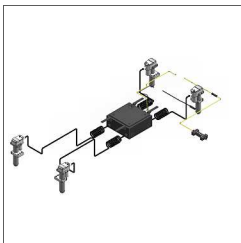
Patent No.: US 7,722,059 B1 Wheel Bracket Assembly

Patent Pending: Actuator Bracket

Patent Pending: Entire Assembly



Divided into segments,
this armature can be easily
shipped in a 4' x 5' box



Part No.	Dimensions	System
AMT-14690	—	25 / 40

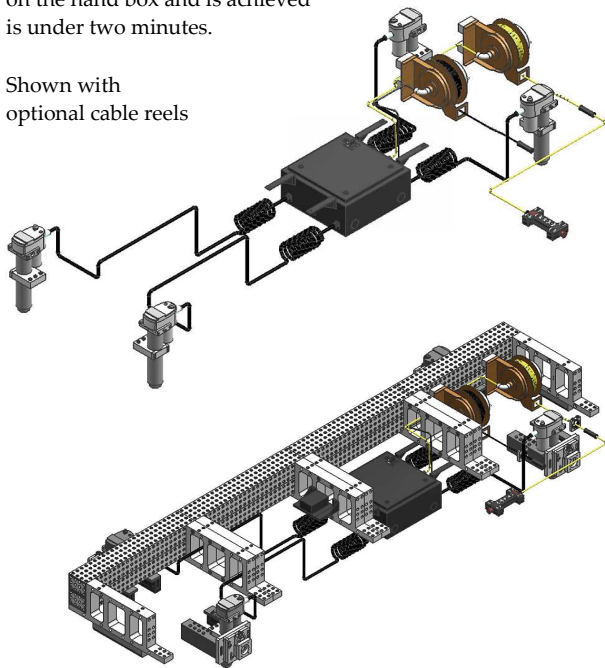
Leveling System: Hand Pendant / Controller / 4 Actuators with cables. Patent pending.

SOLUTIONS®

How it works

AMT Auto Leveling System with 12,000 lb capacity. Auto leveling is initiated with a push of the single button on the hand box and is achieved in under two minutes.

Shown with optional cable reels



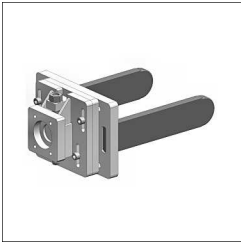
Hand Box



Control Box

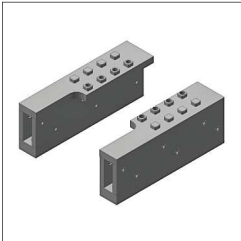


Actuator



Part No.	Dimensions	System
AMT-14660	—	25 / 40

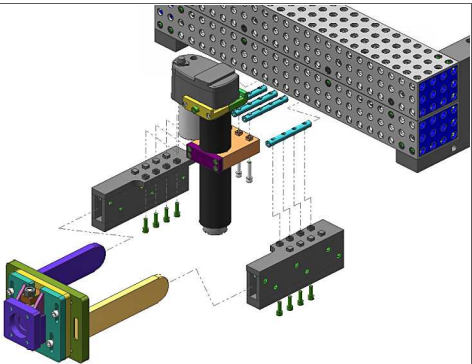
AMT Six-Way Adjustable Wheel Bracket. Steel fab—precision machined. Patent No.: US 7,722,059 B1.



Part No.	Dimensions	System
AMT-14659	—	25 / 40

AMT Wheel Guide Blocks, steel fab—precision machined. Patent No.: US 7,722,059 B1

SOLUTIONS®
How it works



Adjustable wheel brackets combined with wheel guide blocks provide a six –way adjustable wheel bracket. Locate and fasten along the armature to set wheelbase length. Patent No.: US 7,722,059 B1



Part No.	Dimensions	System
AMT-14541	80 x 80 x 20 mm	40

AMT Bubble Level Mounted On AMT Block. Includes all mounting hardware.



Part No.	Dimensions	System
AMT-14540	80 x 40 x 80 mm	40

AMT Adjustable Foot Level Assembly. Includes all mounting hardware.



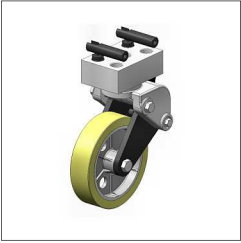
Part No.	Dimensions	System
AMT-14161	4"	25 / 40
AMT-14163	6"	25 / 40

AMT Caster Assembly, 4" or 6", without Brake. Assembly includes one shortened bolt, one lock and all mounting hardware.



Part No.	Dimensions	System
AMT-14162	4"	25 / 40
AMT-14164	6"	25 / 40

AMT Caster Assembly, 4" or 6", with Brake. Assembly includes one shortened bolt, one lock and all mounting hardware.



Part No.	Dimensions	System
AMT-14167	5" diameter	25 / 40

AMT Caster Assembly with soft, non-flattening wheels and shock absorbers. Includes all mounting hardware.



Part No.	Dimensions	System
AMT-14510	20 x 12 mm M12	Metric
AMT-14511	20 x 12 mm 1/4-13	English

AMT 80x80 Hollow to Plate Pin with Delrin® Washer. Ensures accurate alignment between a fixture and foot plate.



Part No.	Dimensions	System
AMT-14144	40 x 80 x 80 mm	40
AMT-17266	M10 x 43 Spare screw for hinge assembly	40

AMT Universal Clevis / Hinge made of tool steel. Packaged in sets of two, includes mounting hardware.



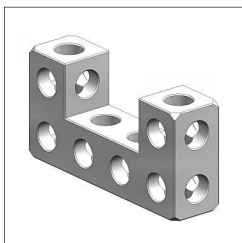
Part No.	Dimensions	System
AMT-14535	40 x 80 x 80	25 / 40

AMT 90° Door Stop Set , 1 each left hand and right hand.



Part No.	Dimensions	System
AMT-14505	—	25 / 40

AMT Steering Column Adapter Upper And Lower Mount Kit simulates your column with all positions available. Includes all mounting hardware.



Part No.	Dimensions	System
AMT-11520	25 x 50 x 100	25
AMT-11521	25 x 50 x 125	25

AMT Scale Model Mounting Block, designed to attach model to table, "U" shaped. Ideal for model display and wind tunnel testing applications.

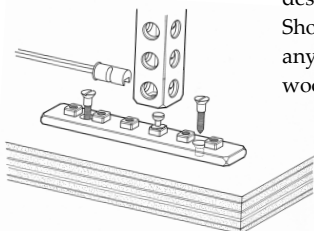


Part No.	Dimensions	System
AMT-14546	7 x 25 x 150 mm	25

AMT Wood Attachment Plate. Ideal for fastening wood and other substrates to AMT Hollows.

SOLUTIONS®

How it works

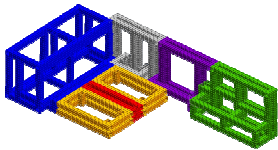


Wood Attachment Plates are designed for use with AMT Shortened Bolts. Please order any necessary AMT bolts or wood screws separately.

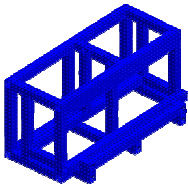
SOLUTIONS®
Ideas

Custom Interior
Armature Assemblies
Are our Specialty.

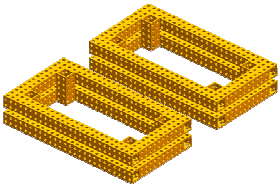
Assembly and design
services are available.



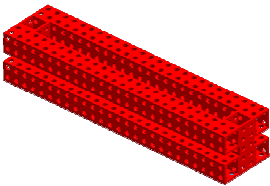
Interior Armature Assembly



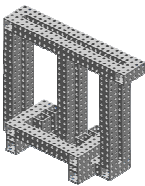
Instrument Panel



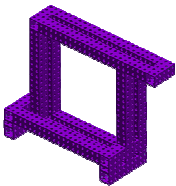
Seat Platforms



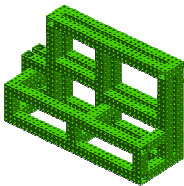
Tunnel Platform



Front Door Armature



Rear Door Armature



Bed / Rear Armature

Add AMT Adjustable
Leveling Feet, Bubble Level
and Casters to make this
armature portable and
accurately leveled when
removed for display.



American Modular Tooling

SYMBOL FOR:	ASME Y14.5M 1994	ISO
STRAIGHTNESS		
FLATNESS		
CIRCULARITY		
CYLINDRICITY		
PROFILE OF A LINE		
PROFILE OF A SURFACE		
ALL AROUND		(projected)
ANGULARITY		
PERPENDICULARITY		
PARALLELISM		
POSITION		
CONCENTRICITY (concentricity and coaxiality in ISO)		
SYMMETRY		
CIRCULAR RUNOUT		
TOTAL RUNOUT		
AT MAXIMUM MATERIAL CONDITION		
AT LEAST MATERIAL CONDITION		
REGARDLESS OF FEATURE SIZE	NONE	NONE
PROJECTED TOLERANCE ZONE		
TANGENT PLANE		(projected)
FREE STATE		
DIAMETER		
BASIC DIMENSION (theoretically exact dimension in ISO)		
REFERENCE DIMENSION (auxiliary dimension in ISO)	(50)	(50)
DATUM FEATURE		
DIMENSION ORIGIN		
FEATURE CONTROL FRAME		
CONICAL TAPER		
SLOPE		
COUNTERBORE/SPOTFACE		(projected)
COUNTERSINK		(projected)
DEPTH/DEEP		(projected)
SQUARE		
DIMENSION NOT TO SCALE	15	15
NUMBER OF PLACES	8A	8A
ARC LENGTH		
RADIUS	R	R
SPHERICAL RADIUS	SR	SR
SPHERICAL DIAMETER	SØ	SØ
CONTROLLED RADIUS	CR	NONE
BETWEEN		NONE
STATISTICAL TOLERANCE		NONE
DATUM TARGET		
TARGET POINT		

* May be filled or not filled

About Us

We are dedicated to presenting the finest quality products to industry while providing reliability and service. Our mission is to supply the technological advances that enable the manufacturing process to work faster, with higher precision, than past practices. We utilize methods that recognize global economic, ergonomic and ecological considerations.

Over the years our highly skilled personnel, consistency in service, quality and innovative ideas have proven to be our greatest assets.

Distributor Network

American Modular Tooling® products are sold through our highly valued distributor network, world-wide. We make all efforts to protect those relationships and are looking for additional qualified distribution networks in many areas of the world.

If you are unable to locate a distributor in your area, or are interested in becoming a distributor, please contact us at the numbers below.

Contact Us

Paul W. Marino Gages, Inc.

413 NE Baker Road.
Stuart, FL 34994
United States

Phone (800) 528.9785

Email: pwminc@pmargage.com
Web: pmargage.com
eShop: shoppwm.com

⊕ Technical Sales & Consultation

C2 Gauge & Fixture

4017 Brockton Drive SE
Kentwood, MI 49512
United States

Phone (616) 554.5222

Email: c2gauge.com/contact
Web: c2gauge.com

⊕ Sales ⊕ Design & Build
⊕ Manufacturing ⊕ Logistics

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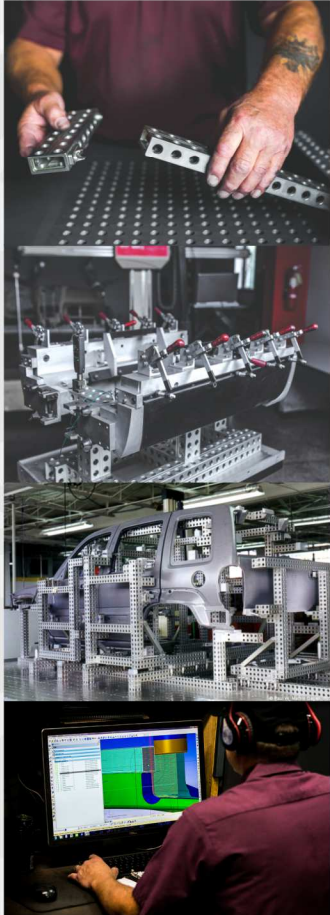
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American Modular Tooling

C2
GAUGE & FIXTURE
Precision Modular Measurement & Testing Tools



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EXPERIENCE**

**PROVEN
FIXTURING
EXCELLENCE**

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