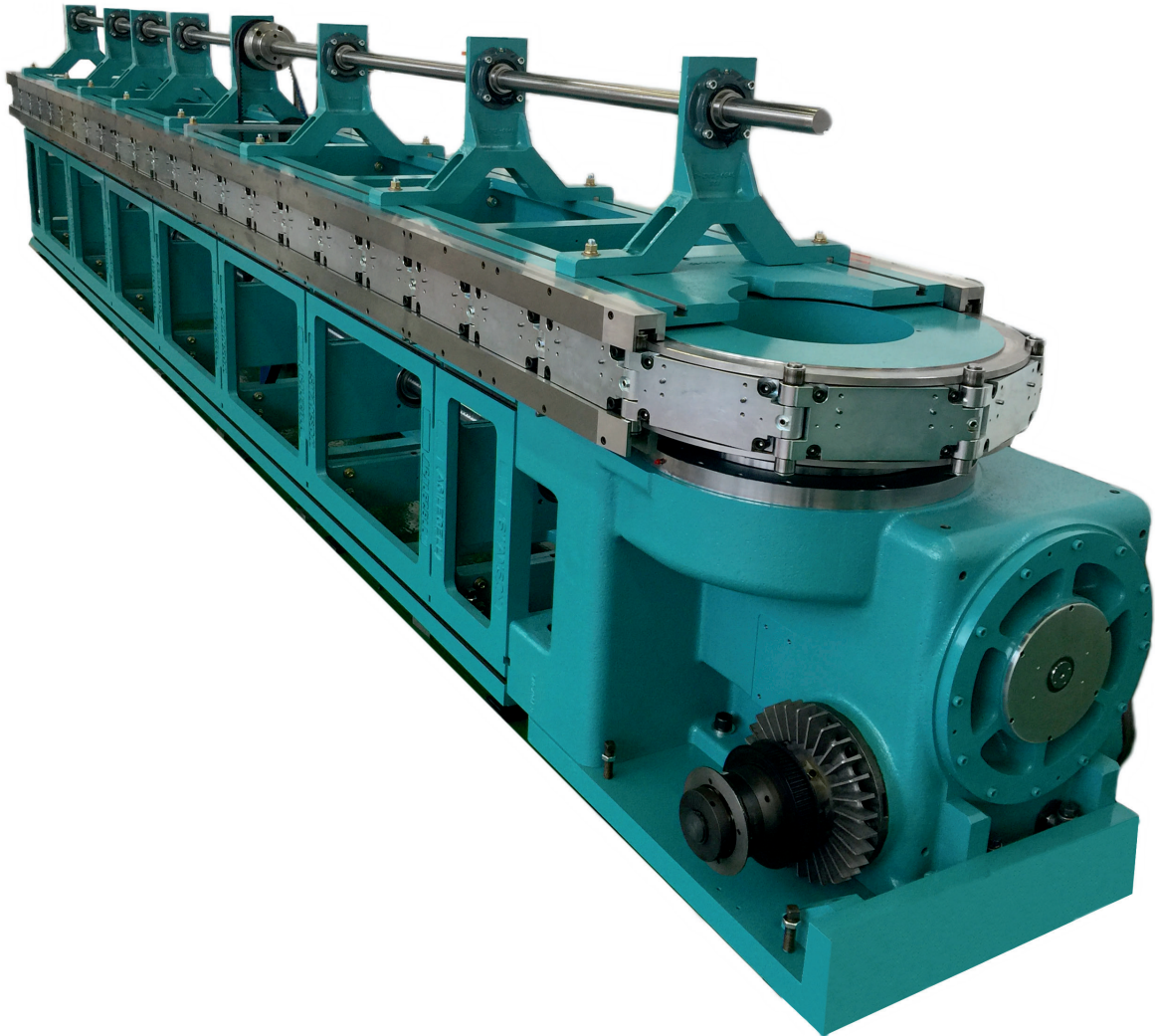




SWANSON

PRECISION LINK AGILE CONVEYORS



PRECISION LINK CONVEYORS

Product Guide

*New Paradigm for Designing Automatic Assembly,
Process, and Packaging Machines*



Our first Precision Link Chassis was produced over 55 years ago and has been often copied. Hundreds have been sold and successfully deployed in high-speed assembly and process applications where precise location was needed. Many industries: aerospace, appliance, automotive, consumer products, lighting, medical, ordinance, and pharmaceutical have benefited using a Swanson Precision Link Chassis.

The current family of Precision Link Agile Chassis was designed for 21st century applications. This new generation of precise high-speed conveyors has been designed for the budget conscious project engineer who wants to control costs and reduce project risk. There is literally nothing else like our Agile Precision Link Conveyor ... anywhere.

Features

- Precise indexing accuracy
- Adaptable for many applications
- Expandable / Contractable in length
- Re-deployable in the future
- Cam actuated tooling available
- Robot friendly station design
- Multiple layout configurations
- Dimensionally Interchangeable component sections
- Individually serialized components for interchangeability
- Cast ductile iron with 10 times the vibration dampening of steel or aluminum

Configurations

- Carrousel
- Over and Under
- Vertical
- Parallel
- Perpendicular
- Co-Linear
- Piggyback
- Walking Beam
- Custom Layout

Work Transfer Drive Options

- Cam or Servo Drive
- Intermittent or Continuous Motion
- Cycle-on-Demand

Tool Actuation Options

- Cam
- Tool Plate
- Robotic
- Servo
- Pneumatic



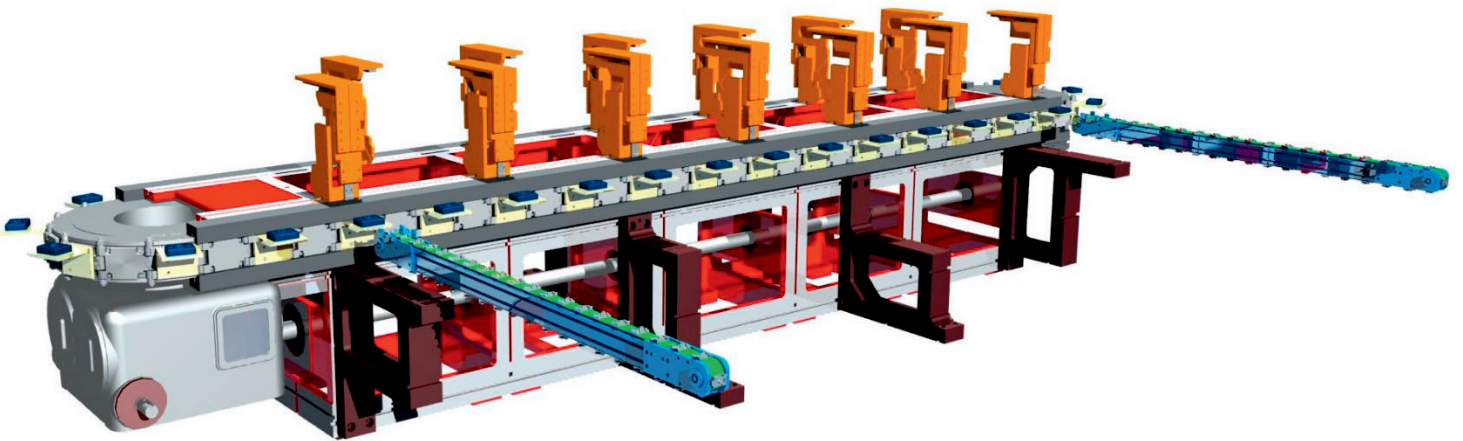
Why Swanson Precision Link Agile Chassis?

The Swanson Precision Link Agile Chassis is the newest and most novel machine chassis concept to be developed in the last 20 years. It totally changes the way machines are conceived. The result is simplicity, adaptability, and re-deployability. Major savings in design and development costs result while producing a more rigid, precise, and versatile machine.

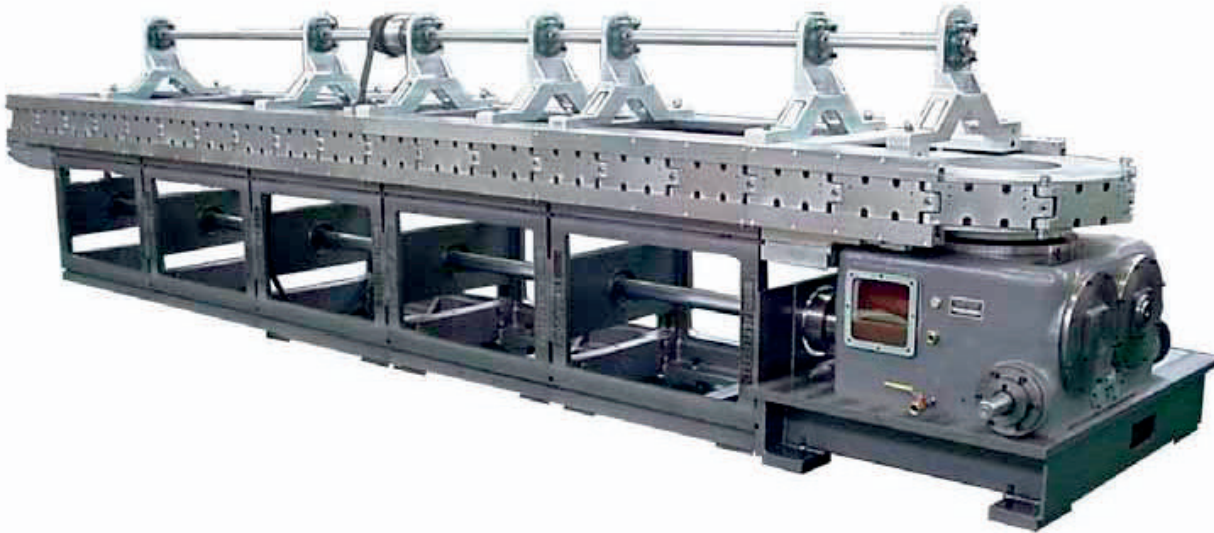
The simplicity of precision “modules” being used to design and build machines means that the project cost goes where there is functional value and not into irretrievable first-time design, build, and debug costs. To be able to expand the conveyor length on short notice gives flexibility during the design and development phases of the program.

Best of all, these components can be used over again. Interchangeability is warranted and is permanently recorded by individual component serial numbers. With the Precision Link *Agile Chassis* components there are no more “bone yards” of unusable old equipment, future machines are possible with minimal chassis cost. Designers now design with modern CAD and 3D technology. With *Agile Chassis* components a machine can be laid out in hours, not weeks or months. The *Agile Chassis* helps make programs more “sellable” to management and those in financial control.

The chassis is attractive, functional, affordable, adaptable, and exciting. Give us a call. Let us help you on your next project.



Large Precision Link Agile Chassis – the *Agiletran*® platform



The foundation of the *Agiletran* is the 36" (900 mm) support structure, which is available in two widths. With its cast ductile iron construction and precision machined features, it is dimensionally interchangeable with each structure individually serialized. The *Agiletran* can be made in virtually any length. It is easily broken down for shipment and plant installation.

Agiletrons, in carousel configuration, are equally friendly to both robotic tooling and cam synchronized tooling, and even hybrid combinations.

All tool mounting and precise location is accomplished with the unique Swanson T-key arrangements on the top and side tool plates.

Companion L-2 and L-3 cam index drives are self-contained and can drive power-take-off shafts for heavy loads and high speeds. We eliminate all outside mounted reducers, couplings, shafting, and pillow blocks with a 3" diameter power take off (PTO) shaft on the centerline of the machine.

Link sizes are available from 3" (75 mm) to 12" (300 mm): all individually serialized and 100% dimensionally certified. Swanson-pioneered precision links are proven reliable after tens of millions of production cycles.



CAM Index Drives – the *Agiledrive*®

Agiledrives contain all the power train elements for both high-capacity cam actuated work transfer and synchronized tool actuation. These extra-rugged drive units are especially applicable to Swanson *Agiletran* platforms for high speed/critical indexing, repetitive accuracy of dwell positioning, and for sensitive, heavy duty tooling needs.

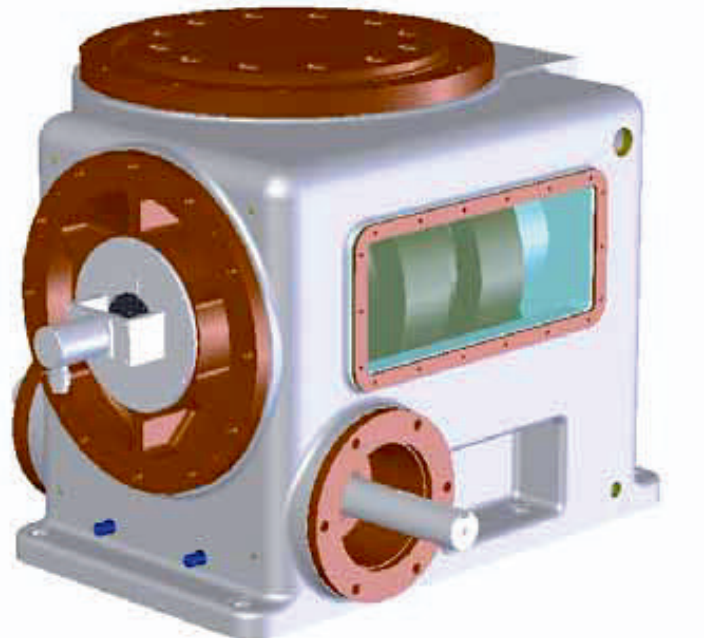
Two models are available: the L-2 *Agiledrive* and the L-3 *Agiledrive* with associated motor/clutch-brake mounting and the means to attach to the *Agiletran*.

Internal to the *Agiledrives* is the high-speed input worm shaft for powering synchronization between the indexing and the tooling through anti-backlash gearing. The hardened tool steel index cam transmits its rotary motion to intermittent motion through super precise Swanson cam followers to the combination bearing index plate.

The internal gear drive train powers a power take off (PTO) shaft on the center line of the machine, hereby eliminating all external reducers, gear boxes, shafts, couplings, etc. The PTO shaft is 3" in diameter for both the L-2 and the L-3 *Agiledrives*, insuring ample tooling cam torque capacity.

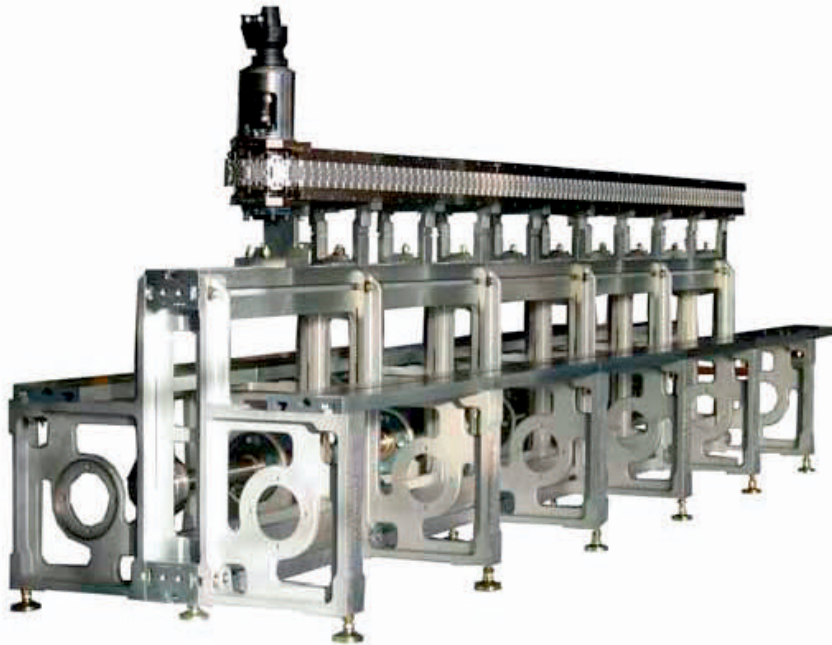


L-2 Cam Index Agiledrive



L-3 Cam Index Agile Drive

Small to Medium Precision Link Agile Chassis – the *Agileslim*® Platform



Agileslim platforms are available in carrousel, over and under, co-linear, parallel, perpendicular, and vertical configurations and in various combination.

Agileslims are offered in four widths, designated *Agileslim* 0, I, II, III. All can be cabinet base mounted; or, mounted on 36" (900 mm) *Agilesections* which form the "spine" of the machine platform. Side supports are available as *Agiledock* II and III which can be mounted in any of three attitudes.

Agileslim link sizes range from 1½" to 6" (38-150mm)

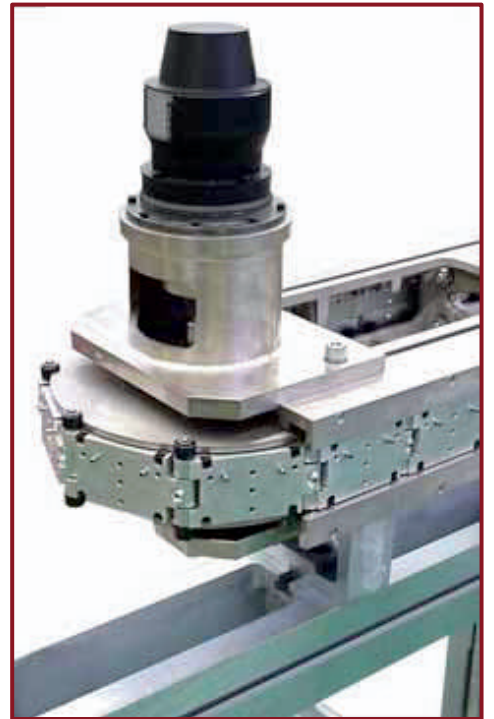
Agileslims are the perfect platform for both cam synchronized machines and for servo and robotic tooling applications, or combinations. *Agileslims* utilize either servo motor or cam means of work transfer (indexing); and are applicable to continuous transfer motion.

Agilesections can also make an excellent machine platform for non-synchronous conveyor/pallet arrangements. Their robustness and universal tool mounting means provide the best foundation for tooling support in combination with power and free work transfer systems.



There are several options for **Agileslim® drives** and their mountings

For mechanical cam indexing, the indexer normally mounts below the drive sprocket and is connected by a clutch-coupling. Cycle-on-demand units have the motor and reducer directly mounted to the indexer. Platforms incorporating cam actuated tooling have the reducer mounted to the camshaft, from which the indexer is directly driven. A choice of cam indexers is available.

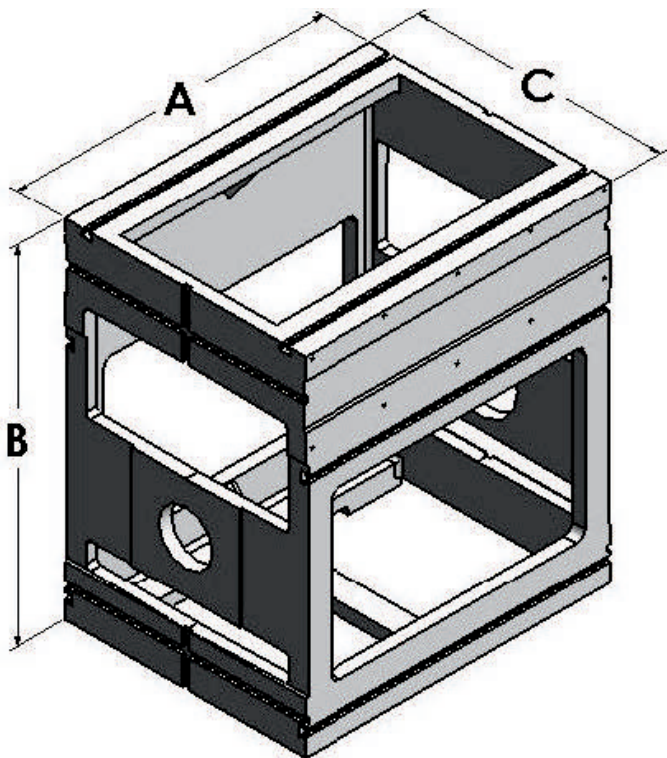


- Direct servo drive arrangements can have the motor mounted optionally on the underside or on top.
- Choice of location depends upon accessibility and clearance of structural members.
- Standard enclosures are used to mount the servo motor/reducer package and contain the coupling between the motor and sprocket shafts, providing safety and accessibility.

Support Structures – *Agile Supports*®

Agile support structures are a series of highly precise “building blocks”, 100% dimensionally interchangeable, interlocking components. Each support can be simply defined by the three critical dimensional i.e., length (18 inch (450 mm) and 36 inch (900 mm) all common within a series, height, and variable widths. With these components an entire machine platform can be constructed in a wide variety of sizes and configurations.

Cast ductile iron *Agile* support structures have ten times the vibration dampening of steel or aluminum. Their permanent integrity insures unlimited platform expansion/upgrade, reuse, redeployability, and reconfiguration. All components are joined together with T-keys, T-bolts, and nuts and washers (no tapped holes).



Agile Support structure	A (Length)		B (Height)		C (Width)	
		mm		mm		mm
Agile section	36	900	30	762	6	150
Agileslim cell 0	18	450	5	127	3.5	89
Agileslim cell I	18	450	5	127	6.2	160
Agileslim cell II	18	450	5	127	10	250
Agileslim III	18	450	6.5	165	12.5	318
AG 4 - cell	36	900	42	1070	20.25	515
AG 6 - cell	36	900	42	1070	28.30	720
AG 4 - half cell	18	450	42	1070	20.25	515
AG 6 - half cell	18	450	42	1070	28.3	720
Agilestation	18	450	32	810	20	508
Agileriser I	2.5	63	6.5	165	6.0	152
Agileriser II	2.5	63	6.5	165	13.0	330
Agiledock I	29.8	757	29.8	757	6	152
Agiledock II	29.8	757	29.8	757	4	102
Agiledock III	16	406	29.8	757	4	102
Agileapron	36	900	1.4	35	8	203
Shaft supports	3	76	12.5	318	20,28	500,711



Main building block components – *Agilecells*®, *Halfcells*, and *Agilestations*

For *Agiletran* platforms the main building block components are the cast ductile iron AG 4, AG 6 *Agilecells*, their companion “*Halfcells*” and *Agilestations*.

Agilestations are rigid sub-platforms which can stand on their own as sub-assembly modules or machine attachments. They are also used as a rigid idle end support on carousel configured *Agiletrans*.

18” (450 mm) long Agile “*halfcells*” offer increased camshaft coupling flexibility at the drive end and allow elongation of the platform in 18” (450 mm) increments.

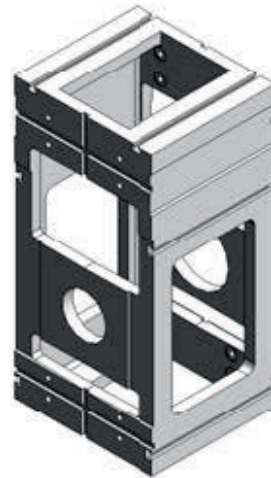
All are individually serialized and warranted 100% interchangeable in accordance with their dimensional specifications and totally redeployable. They incorporate 0.750” width precision T-keyways for fastening together and for tool mounting on the top and sides.



AG 4 Agilecell

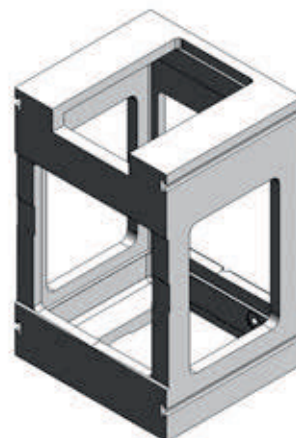


AG 6 Agilecell



AG 4 Agile Halfcell

Agilestation



Aux. Support Structures – **Agile Docks®** and **Agile Wings®**

Agile Docks are especially suited for *Agiletran* and *Agileslim* use. They permit off-line assembly and debug of critical stations with easy “docking” using heavy duty T-keys and T-bolts at any location around the machine.

Agile Wings and *Agile Dock III*'s are often used for side mounted cam shafts.

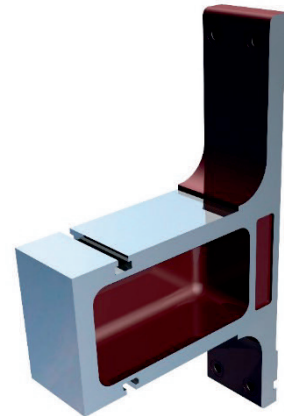
Agile Docks I, II, III can be “docked” to the *Agilecells* and *Agileslim* sections in any of three attitudes, offering a selection of heights relative to the fixture location. *Agilewings* have two optional height locations. All docks and wings have machined all-over outside surfaces for mounting individual tooling stations or common *Agileaprons*. 0.750” T-keyways are cut in the tool mounting surfaces, allowing for ease of tooling mounting and accuracy of location. *Agiledocks* also add stability to the entire *Agile* platform. Being of cast ductile iron they contribute substantially to vibration dampening.

Agile Docks®

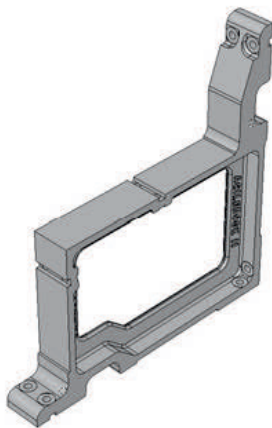
Agile Wings®



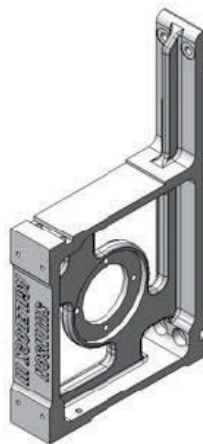
Agiledock I



Agile Wing



Agiledock II



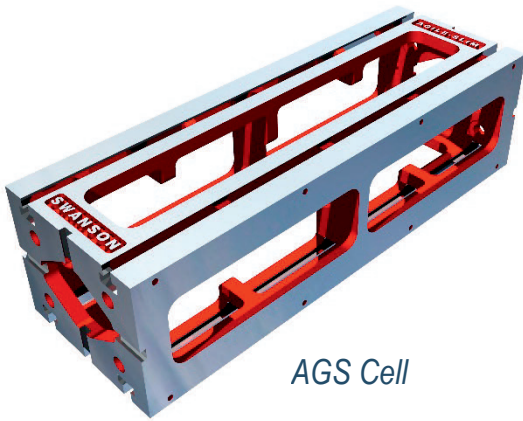
Agiledock III



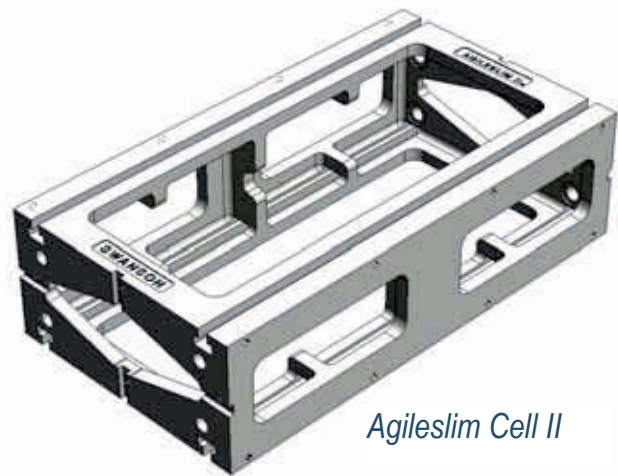
Base Support Structures – *Agileslim*® Cells

Agileslim Cells are available permit a wide range of link and fixture mounting platforms and tool mounting flexibility. (Link to cell combinations are defined on the link specification sheet).

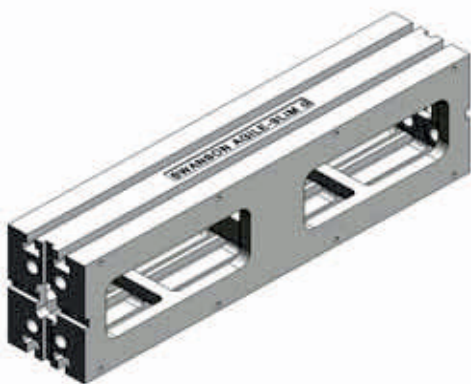
All *Agileslim* Cells are made of cast ductile iron in 18" (450 mm) lengths. All contain dual 0.375" T-Keys top and bottom. Precision tolerancing of external dimensions allows infinite length extensions and 100% warranted dimensional interchangeability.



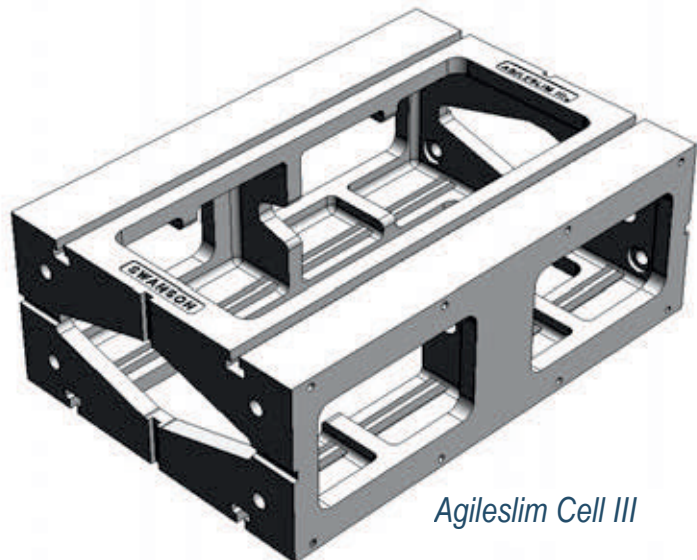
AGS Cell



Agileslim Cell II



Agileslim Cell 0



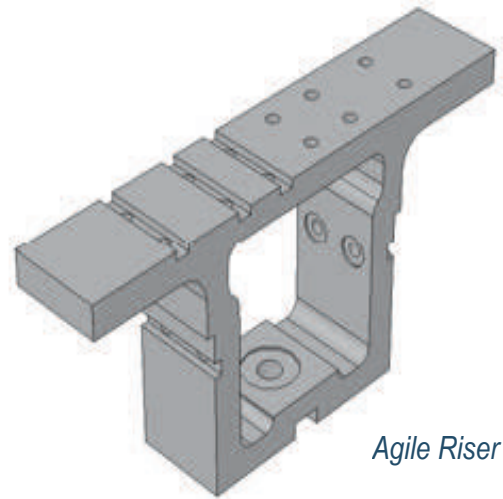
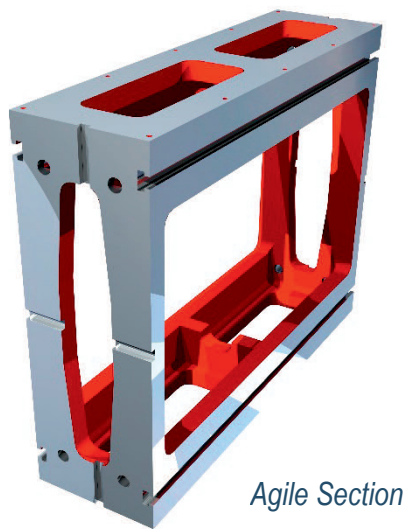
Agileslim Cell III



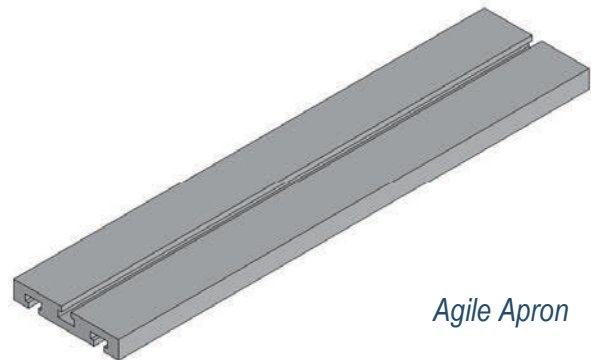
Agileslim® Sections, Risers, and Aprons

AGILE SECTIONS – These 36” (900 mm) cast ductile iron *Agile* Component members provide an expandable, totally redeployable “spine” or back bone for *Agileslim* platforms. *Agile Sections* contain two full length .750” T-key slots on both sides for anchoring *Agiledocks* and externally mounted tooling. Cored through holes allow for the passage of pneumatic and electrical service ways the full length of the machine. The open center area permits access to mechanical tooling linkages and pneumatic/electrical services.

AGILE RISERS – Act as the interface between the *Agile Section* machine backbone, and the incremental *Agileslim* cells. The risers can support over and under or carrousel configurations.



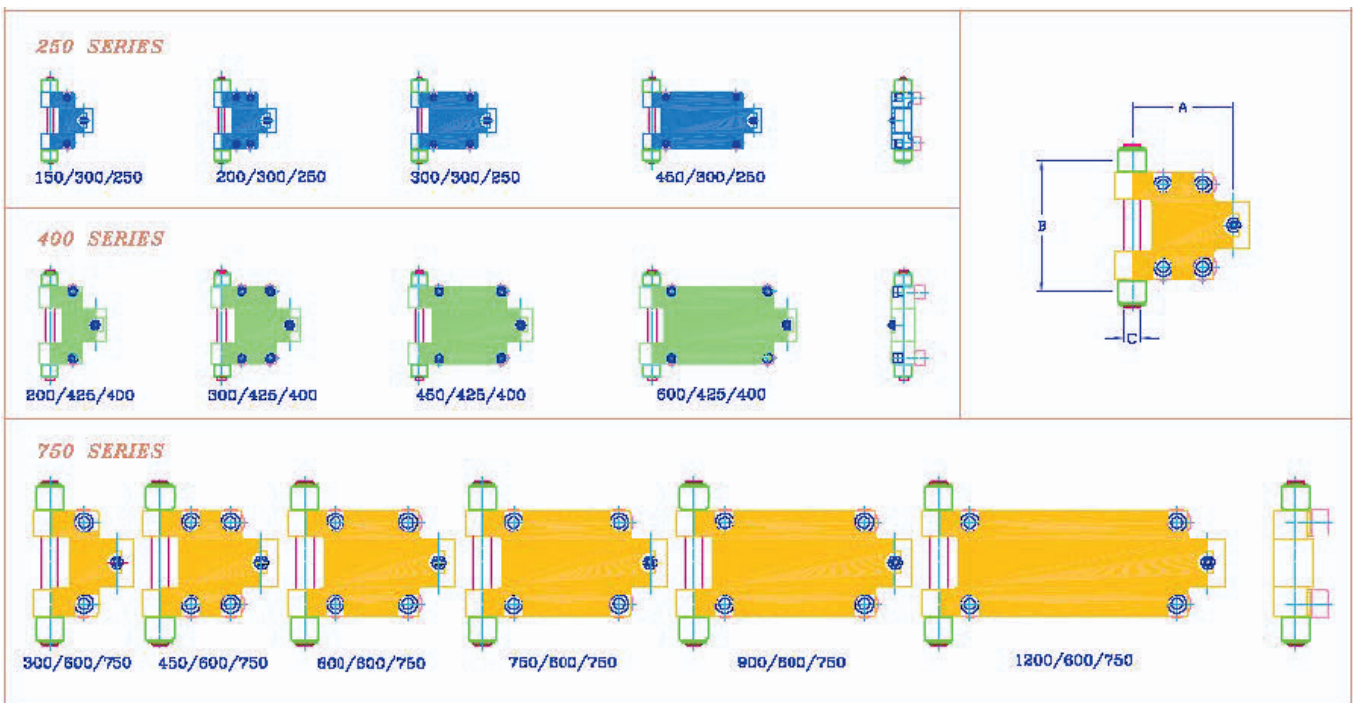
AGILE APRONS – Allow for tabletop mounting of externally located tooling, with T-keyways on the top for station mounting, and on the underside for both tool hanging and pivot shaft mounting.



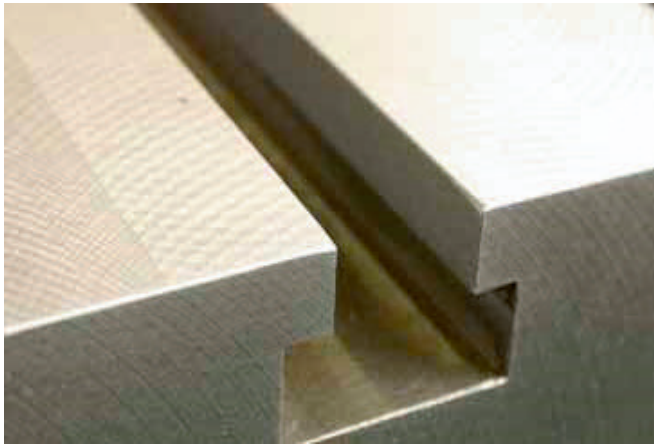
Precision Links – Basic design features

Swanson Precision Links are renowned for accuracy and durability under sustained production conditions. They are offered for in three series: 250, 400, 750; each with a variety of lengths and materials which include aluminum, iron, steel, stainless steel, and non-metallic materials.

Useable Platforms						Series	Link Designation	Dimensions (")		
Agileslim			Agiletran					A	B	C
0	I	II	III	AG 4	AG 6					
						250	150 x 300 x 250	1.5	3	.250
							200 x 300 x 250	2	3	.250
							300 x 350 x 250	3	3	.250
							450 x 300 x 250	4.5	3	.250
						400	200 x 425 x 400	2	4.25	.400
							300 x 425 x 400	3	4.25	.400
							450 x 425 x 400	4.5	4.25	.400
							600 x 425 x 400	6	4.25	.400
						750	300 x 600 x 750	3	6	.750
							450 x 600 x 750	4.5	6	.750
							600 x 600 x 750	6	6	.750
							750 x 600 x 750	7.5	6	.750
							900 x 600 x 750	9	6	.750
							1200 x 600 x 750	12	6	.750



Swanson T-Keys – New design feature



The fundamental fastening means inherent in Precision Link Agile Chassis components is the precise T-key arrangement. This patented feature utilizes an accurately machined key with a close tolerance keyway in combination with a “T” slot. Running full length in all Precision Link Agile Chassis platforms, the T-key slot permits unrestricted mounting and locating of tooling anywhere along the length of the machine, thus eliminating critically located tapped and dowel holes: a great savings in machine design, time to release drawings, and reduced assembly/development.

T-key design permits simple assembly, disassembly, and changes of tooling positions: all with the tightening or loosening of a single nut.

Precision Link Agile Chassis platform components are “fastened” together with T-keys and bolts, thus enabling virtually any configuration, length, or combination. The absence of tapped holes and screw fasteners encourages expansion/contraction/redeployment; and preserves the integrity of all *Agile* components.

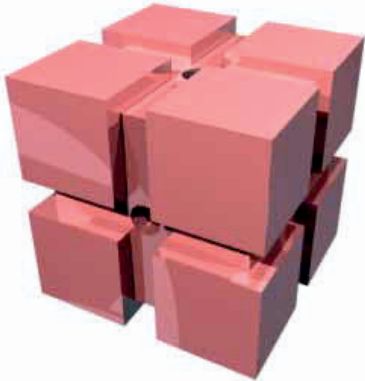
Swanson T-keys come in two standard sizes: 0.750” and 0.375” with corresponding T-bolts. The fastening force of one, occasionally two, T-keys far exceeds that of four screws and two dowels.

In instances where it is needed to regain position after temporary removal, a simple external “dummy” T-key, can be added.

More Agile® Accessories

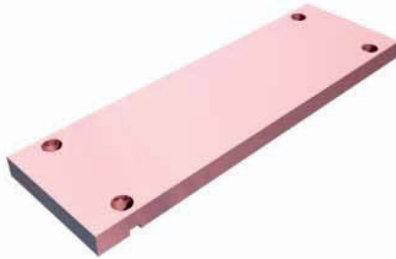
AGILEBRICKS

5" (125 mm) precision cubes with 0.750" keyways on five sides, open on the sixth side for access to mounting holes. Ideal for prototyping and development work, for set up, tear down, reuse. Totally redeployable. Save designing and building one-of-a-kind brackets and supports. Available in cast iron, aluminum, and non-ferrous materials.



AGILEPADS

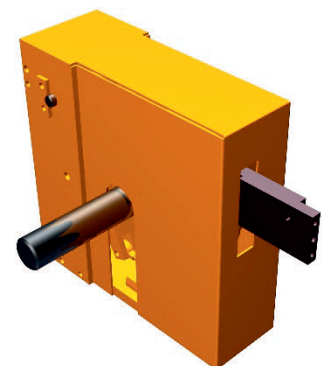
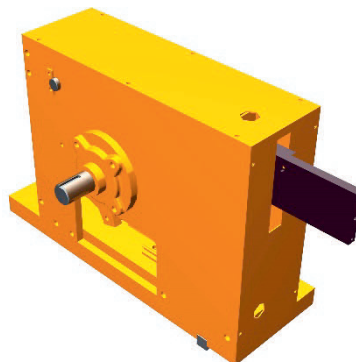
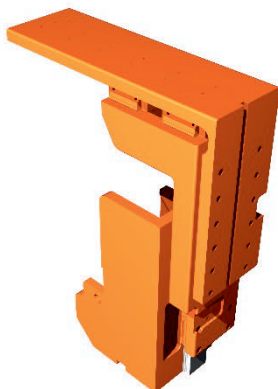
The highly functional interface between specialized tooling and the *Agile* platform. These expendable pads are intended to be drilled and tapped to receive commercially available tooling components. *Agilepads* eliminate any need to machine the Precision Link Agile platform, thus insuring its long term dimensional integratory.



AGILE PARTS PLACERS

A wide variety of parts placers are available for marriage with the Precision Link Agile Chassis. These include:

- Integral belt driven in four different sizes, strokes, shaft, and cam diameters.
- Direct camshaft actuated, with a variety of stroke and load-carrying specifications.
- Cam actuated common overhead tool plate.
- Overhead tool plate, with mechanically derived vertical motion and either pneumatic or servo-motion horizontal: hybrid style.





RENT FOR DEVELOPMENT...

Precision Link Agile Chassis components are available for short term rent and longer-term leasing with “buyout” options.

Renting the lighter duty machine includes automatic work transfer (indexing). It can incorporate lower and upper camshafts for the tryout of mechanically actuated tooling at various cyclical rates up to your design objective. The lessee is obligated to maintain the equipment in condition suitable for return and redeployment, although many builders and users find great advantage in ultimately owning the units for on-going development work.

Renting a small chassis or a section, permits demonstration and verification of critical fixturing and tooling before high capital expenditures are incurred, sometimes in advance of their proof-of-principle. There is savings in time and cost.

