Ergonomic Material Handling Equipment

Product Catalog
Knight Global headquarters and facilities is located in Auburn Hills, Michigan. Our turn key ergonomic material handling solutions combine standard and proven product designs with custom development.

**Experience:** Designing and building ergonomic material handling equipment since 1984.

**Design:** FEA, Microstation, EPiAN. State-of-the Art 2D and 3D design software: Includes CATIA, Unigraphics, Solid Works and AutoCAD.

**Build:** Full CNC, Laser / Plasma / Waterjet Cutting, Robotic Welding Technologies, Paint and Powdercoating Booth.

**Controls:** Design and build electrical and pneumatic systems in-house for each application.

**Service:** Stand alone department. Fully trained field service technicians on call 24/7 nationally and internationally.

**Quality Assurance:** Duty cycle/destructive testing capabilities to conform with industry requirements. • Ford Q1, ISO9001:2008, ISO14001-2004, CE

**Customer Support:** National/ International Distributors

**Sales Team:** Internal and External Sales Force.

**Support Staff:** Project Management, I.T., Standards, Coordination, Documents/Manuals and Marketing.

---

**Servo Systems**
- Servo Host ........................................... 1
- Twin Chain Servo Hoists .......................... 2
- Articulating Servo Hoist Arms .................. 3
- Extension Servo Hoist Arms ..................... 4
- Vertical Servo Hoist Arms ....................... 5
- Servo Controls ...................................... 6
- Servo Accessories .................................. 7
- Servo Applications .................................. 8

**Tractors**
- Electric (VFD) Tractor ............................. 9
- Pneumatic Tractor .................................. 9
- Servo Tractor Systems ............................. 10

**Pneumatic Balancers**
- Single Cable/Chain .................................. 11
- Tandem ................................................ 12
- Reeved ............................................... 13
- Balancer Controls .................................. 13
- Balancer Accessories .............................. 14

**Lift Assists**
- Standard Arms ...................................... 15
- Lower Mass Arms .................................. 15
- Extension Arms .................................... 16
- Servo Arms ......................................... 16
- Vertical Arms ....................................... 17
- Torque Tubes ....................................... 17
- Quick Build Connectors ............................ 18
- Linear Rail Mounted Tooling Arm ............... 18
- Ergo Positioner ...................................... 18
- End Effectors ....................................... 18
- End Effector Applications ......................... 20

**Controls**
- Pneumatic Control Handles ....................... 21
- Electric Control Handles .......................... 21
- Electric/Pneumatic Control Handles .......... 21
- Pneumatic Control Handles w/ Triggers ...... 22
- Electric Control Handles w/ Triggers ......... 22
- Control Handles Collar Mounts ................. 22
- Valve Block Kits .................................... 22

**Workstation Cranes/ Rail Series**
- Enclosed Rail Series ............................... 23
- Backer Rail Series .................................. 23
- Curved Rail Series .................................. 24
- Tool Rail Series ..................................... 24
- Engineered Round Rail Series .................. 24
- Engineered Linear Rail Series .................. 24
- Rail Systems ......................................... 25
- Cantilevered Workstation ........................ 27
- Rail Accessories .................................... 27

**Jib Cranes**
- Jib Cranes ............................................ 28
- Jib Crane Accessories ............................. 28

**Tables, Shuttles and Carts**
- Lift Tables ........................................... 29
- Table Accessories .................................. 30
- Accumulators ....................................... 31
- Shuttles Systems ................................... 31
- Carts .................................................. 32
- Smart Carts ......................................... 32
- Cart Lifts ............................................ 32

---

We are committed to Total Customer Satisfaction through QUALITY, RELIABILITY and EMPLOYEE INVOLVEMENT.
Knight Global Servo Hoist Systems are Intelligent Assist Devices (IAD) that provide controlled transfers of workloads with speed, precision, quality and unmatched reliability. The Servo’s various programmability allows for importing precision into the applications process.

Knight Servo Hoists enable the operator to precisely locate and/or float a load in the “Z” direction using programmable limits.

**Features**
- **Standard Float Mode**
- **Load Sensing, Pay Load and Fail Safe Braking**
- **Programmable Overload Capability**
- **Illuminated Run/Stop Button**
- **240 VAC, Single Phase 50/60 Hz**
- **H5 Rated (Continuous Duty Cycle)**
- **Standard 24 VDC, 2.5 AMPS**
- **Safety Rating of 125%**
- **Worm Style Gearbox**
- **Programmable Diagnostic Communication Ports**
- **STO - Safe Torque Off.**
- **Enhanced User Interface (UI).**
- **Ethernet Connection.**
- **I/O Capabilities**
  - (4) Analog Inputs/ (4) Analog Outputs
  - (20) Inputs/ (12) Outputs
  - (12) Inputs/ (8) Outputs are free for interface controls.
  - LED Status Indicators
  - LED Fault Diagnostics
  - Virtual Travel Limits
  - Active Damping
  - Impact Limiting

**Advantages**
- **Impact Limiting**
- **Active Dampening**
- **Virtual Travel Limits**
- **LED Fault Diagnostics**
- **LED Status Indicators**
- **Enhanced User Interface (UI).**
- **Ethernet Connection.**
- **STO - Safe Torque Off.**

Knight Global Servo Hoist Systems are environmentally friendly by only consuming as much power as (2) 100watt light bulbs per day and operating on 240VAC.

**Servo Systems**

**Safety Chain Single Motor**

Knight Global’s KSHS Series includes the patent pending “Safety Drop Stop” “SDS” feature, which makes it the safest intelligent hoist in the world. It is equipped redundant chains, one carrying the load, and the second travels along for safety.

The Standard hoist has a lifting capacity of up to 1000 lbs. [453kg] and hoist speeds of up to 241 fpm [73.5mpm].

**KSH SDS Series**

<table>
<thead>
<tr>
<th>Max. Capacity(lbs/kg)</th>
<th>Max. Hoist Speed(fpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 1,000 lbs [453kg]</td>
<td>up to 241 fpm</td>
</tr>
</tbody>
</table>

* Listed capacities and speeds vary by configuration. For more detailed information, please contact a Knight representative.

**Twin Chain Single Motor**

Knight Global’s Twin Chain Servo Hoist incorporates all the features and benefits of a standard servo hoist into a Twin Chain hoist configuration. The Twin Chains help to control and balance unwieldy or long parts.

The two chains are mechanically linked together and can provide spans of up to 36 in. [914mm] in a single housing. The Twin Chain hoist has a maximum lifting capacity of up to 500 lbs. [226kg] and hoist speeds of up to 196 fpm [60rpm].

**KSHTC SDS Series**

<table>
<thead>
<tr>
<th>Max. Capacity(lbs/kg)</th>
<th>Max. Hoist Speed(fpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 500 lbs [226kg]</td>
<td>up to 196 fpm</td>
</tr>
</tbody>
</table>

* Listed capacities and speeds vary by configuration. For more detailed information, please contact a Knight representative.

**Twin Chain Dual Motor**

Knight Global’s Twin Motor Servo Hoists twin chains are electronically synced together and incorporate a Load Monitoring Module (LMM) with Operator Controlled Interface (OCI). The Twin Chain Dual Motor hoist has a maximum lifting capacity of up to 2,000 lbs. [907kg] and hoist speeds of up to 123 fpm [37.5mpm]. We can provide spans of up to 36 in. [914mm] in a single enclosure. Custom configurations are available.

**KSHTCDM SDS Series**

<table>
<thead>
<tr>
<th>Max. Capacity(lbs/kg)</th>
<th>Max. Hoist Speed(fpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 2,000 lbs [907kg]</td>
<td>up to 123 fpm</td>
</tr>
</tbody>
</table>

* Listed capacities and speeds vary by configuration. For more detailed information, please contact a Knight representative.
Articulating Servo Arms

As an extension of an operator’s natural movements, Knight Global’s Servo Arm technology greatly improves safety, productivity and quality. Servo Arms are available in various overhead and floor mounted configurations.

Knight’s KSHCA Overhead Carriage Mounted and KSHFA Floor Mounted Articulating Arm Series allows for an overhead varied reach within a work cell.

KSHCA Series

<table>
<thead>
<tr>
<th>Max. Capacity (lbs/kg)</th>
<th>Max. Hoist Speed (fpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 1,500 lbs. [680kg]</td>
<td>up to 98 fpm</td>
</tr>
</tbody>
</table>

* Listed capacities and speeds vary by configuration. For more detailed information, please contact a Knight representative.

Features

- CE Compliant **
- Safety Rating of 125%
- Speeds: Up to 241 ft. per min. [73.5mpm].
- Maximum Lifting Capacity: Up to 1,500 lbs. [680kg].
- Maximum Reach: Up To 48 in. [1,219mm].
- Industry Standard 24 VDC, 2 AMP power.
- Illuminated Run/Stop Button.
- Vertical Arms assist and enable an operator to reach underneath and overhead work areas with minimal effects of inertia with heavy loads in a confined work cell.
- Knight Global’s Overhead Carriage and Floor Mounted Vertical Arm Series creates a stable lifting platform, eliminating the yarding and swinging of chain or cable.

KSHEA Series

<table>
<thead>
<tr>
<th>Max. Capacity (lbs/kg)</th>
<th>Max. Hoist Speed (fpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 500 lbs. [226kg]</td>
<td>up to 241 fpm</td>
</tr>
</tbody>
</table>

* Listed capacities and speeds vary by configuration. For more detailed information, please contact a Knight representative.

Ergonomic Safety Advantages

Knight Servo Arms incorporate Servo Hoist Intelligent Assist Device (IAD) technology into various arm configurations to provide controlled transfers of workloads. The programmability features of the Servo Arm assist your natural movements, by combining safety and ergonomics; it makes heavy loads feel weightless.

Extension Servo Arms

Extension Arms enable an operator with a non-linear reach and the capabilities to reach outside the area directly below a rail system. Extension Arms may be mounted to a single bridge, overhead carriage or floor mounted pedestal.

Knight’s KSHEA Overhead Carriage Mounted and KSHEA Floor Mounted Extension Arm Series allows for an overhead extended non-linear reach within a specified work cell. Extension arms may also be mounted to a single bridge.

KSHEA Series

<table>
<thead>
<tr>
<th>Max. Capacity (lbs/kg)</th>
<th>Max. Hoist Speed (fpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 1,000 lbs. [453kg]</td>
<td>up to 241 fpm</td>
</tr>
</tbody>
</table>

* Listed capacities and speeds vary by configuration. For more detailed information, please contact a Knight representative.

Features

- CE compliant **
- Industry Standard 24 VDC, 2 AMP power.
- Illuminated Run/Stop Button.
- 240 VAC, Single Phase 50/60 Hz..
- Load Sensing.
- I/O Capabilities.
- LED Status Indicators, Green and Blue Lighted Push buttons.
- LED Fault Indicators, Illuminated Run/Stop Button.
- Programming and Diagnostic Communication Ports.
- Virtual Travel Limits.
- Speed Reduction Zones.
- Impact Limiting.
- Active Damping.
- Standard Float Mode.
- Programmable Overload Capability.

Extension Boom Servo Arms

Vertical Arms assist and enable an operator to reach underneath and overhead work areas with minimal effects of inertia with heavy loads in a confined work cell.

Knight Global’s Overhead Carriage and Floor Mounted Vertical Arm Series creates a stable lifting platform, eliminating the yarding and swinging of chain or cable.

KSHAEB Series

<table>
<thead>
<tr>
<th>Max. Capacity (lbs/kg)</th>
<th>Max. Hoist Speed (fpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 1,000 lbs. [453kg]</td>
<td>up to 241 fpm</td>
</tr>
</tbody>
</table>

* Listed capacities and speeds vary by configuration. For more detailed information, please contact a Knight representative.

Note: KSHEA overhead carriages are sold separately. Contact a Knight representative for more information.
Vertical Servo Arms

Vertical Arms assist and enable an operator to reach underneath and overhead work areas with minimal effects of inertia with heavy loads in a confined work cell.

Knight Global’s Overhead Carriage and Floor Mounted Vertical Arm Series creates a stable lifting platform, eliminating the yarning and swinging of chain or cable.

KSHVAAR Series
Max. Capacity(lbs/kg) Max. Hoist Speed(fpm)
up to 1,500 lbs. [680kg] up to 131 fpm

KSHVAR Series
Max. Capacity(lbs/kg) Max. Hoist Speed(fpm)
up to 1,500 lbs. [680kg] up to 131 fpm

KSHVAAR/ KSHVAR Series are sold separately. Contact a Knight representative for more information.

Vertical Servo Roller Arms

The roller chain series arm allows for more stroke of the arm, versus the standard chain because the servo is offset to the backside of the arm. The roller chain is a more robust option to the link chain and provides a smoother transition across the sprocket.

Knight Global’s Overhead Carriage and Floor Mounted Vertical Arm Series creates a stable lifting platform, eliminating the yarning and swinging of chain or cable.

KSHVAAR Series
Max. Capacity(lbs/kg) Max. Hoist Speed(fpm)
up to 1,000 lbs. [453kg] up to 241 fpm

KSHVAR Series
Max. Capacity(lbs/kg) Max. Hoist Speed(fpm)
up to 1,000 lbs. [453kg] up to 241 fpm

* Listed capacities and speeds vary by configuration. For more detailed information, please contact a Knight representative.

Note: Shown KSHVA/ KSHVAA overhead carriage and extension arm segments are sold separately. Contact a Knight representative for more information.

Servo Control Series

To view our full line of Servo Controls visit us at www.knight-ind.com

Inline Trigger
The latest in design that includes our patented load cell with integral amplifier. The actuation trigger prevents the system from unintentional movements and provides more response.
Model# EBA1304 (Shown)

Remote Two Speed w/ OCI
Equipped with the same features as the Inline handles. Available in single or two speed configurations with Operator Controlled Interface (OCI).
Model# EBA1063 (Shown)

Two Speed Pendant
Non-programmable, electrically powered pendant that allows for (2) speed operation by compressing thumb levels.
Model# EBA1063 (Shown)

Analog LMM / Pass-Through
Fully programmable Load Monitoring Module (LMM) with Pass Through is a fully programmable analog style load monitoring module.
Model# EBA1385 (Shown)

Two Speed Pendant w/ Trigger
Non-programmable, electrically powered pendant that allows for (2) speed operation by compressing thumb levels and additional trigger button.
Model# EBA1063 (Shown)

Analog LMM / OCI
Fully programmable Load Monitoring Module (LMM) with Operator Controlled Interface (OCI). Mounted inline, and is used when an inline control handle is not a practical solution.
Model# EBA1384 (Shown)

Fixture Mounted OCI
A fixture mounted operator controlled interface (OCI) with illuminated buttons and a run-stop button switch. Side and rear cable attachment models available.
Model# EBA1058 & EBA1226 (Shown)

Wireless Remote Control
The EBA1054 Wireless Remote by Enrange FLEX® is used to control Knight Servo Systems where wireless control is preferred.
Model# EBA1054 & EBA1233 (Shown)

Load Cell Fixture Handle
A fully programmable load sensing handle remotely mounted inline, and is used when an inline control handle is not a practical solution.
Model# EBA1141 (Shown)

To view our full line of Servo Controls visit us at www.knight-ind.com
**Servo Accessories**

**Shackle**
Shackle secures fixtures and loads in-line with the Servo System chain. Used primarily for in-line handle applications.

- Model# EBA1213 (Shown)

**Swivel Hook Shackle**
Shackle secures fixtures and loads in-line with the Servo System chain. Larger opening to accommodate for Knight’s Swivel Hook.

- Model# EBA1269 (Shown)

**Quick Connect/ Disconnect**
Allows for quick connections and disconnections of fixtures or end effectors. Easily disengages by the simple pull of the release pin.

- Model# EBA1183 (Shown)

**Replacement Chain**
Replacement chain kits are electro galvanized blue chromated 4mm Steel Grade (80), Heat Treated Carburized chain.

- Model# EBA1171 (Shown)

**Replacement Roller Chain**
Replacement roller series double strand ANSI 50-2 roller chain that creates a more ergonomic operation condition.

- Model# EBD1547 (Shown)

**Electrical Disconnect Enclosure Stand**
Enclosure Stand is for the mounting of the disconnect enclosures at a ergonomic positioned height. Heights are adjustable.

- Model# EBA1145 (Shown)

**Electric Coil Cable**
19-pin cable provides communication from the (OCI) operator control interface module on the floor level, to the servo controls up on the rail.

- Model# EBA1011 (Shown)

**Electrical Disconnect Enclosures (3 KVA)**
Converts 480VAC to 230VAC for powering the servo hoists. Enclosure provides a means to lock out the system.

- Model# EBA1003 (Shown)

**Electrical Disconnect Enclosures (Dual)**
Converts 480VAC to 230VAC for powering the servo hoists. Set up for a dual output for two servo systems.

- Model# EBA1086 (Shown)

**Large Truck Hood Install**
Vacuum operated front hood fixture mounted on a custom Knight KSH-ICA Series Servo Hoist Articulating Arm. Knight Servo Arm assists in the lift and installation of truck hood.

**Powertrain Lift Assist**
Automated Knight KSH XYZ Servo Hoist and Tractor System that lifts and transfers the entire powertrain assembly from one work cell to another.

**Large Roll Transfer**
Vacuum style end effector operated by a programmable PLC system that controls the Air Balancer and Electric VFD Tractor that automatically attaches and raises the hood to operating level.

**Large Tire Install**
Nesting style fixture mounted from a Knight Servo Arm. Pneumatic rollers allow for the operator to power rotate tire to the lugs on vehicle.

**Front Hood Open**
Servo Actuator, clamp style end effector mounted on a vertical KSHVAR Roller Servo Arm that assists the operator in installing the IP unit into the vehicle.

**Large Pin Install Assist**
Vertical KSHVAR XYZ Roller Servo Hoist Arm using a hydraulic clamp style end effector that clamps, lifts and transfers into 300 degree hardening ovens.

**Large Tire Install**
Nesting style fixture mounted from a Knight Servo Arm. Pneumatic rollers allow for the operator to power rotate tire to the lugs on vehicle.

To view more Servo System Applications visit us at www.knight-ind.com

For more detailed information, visit www.knight-ind.com
Tractors are devices designed primarily to push, pull, lift and position a load that is suspended from a trolley on an overhead rail system. Tractors significantly overcome ergonomically unfavorable push/pull forces.

**Electric Tractors**

VFD (Variable Frequency Drive) Tractors provide the operator with complete control via the ability to program acceleration and deceleration speeds. The VFD Electric Tractor can also be configured to run on different Knight rail as well as different manufactures rail systems.

The Knight VFD Electric Tractor has a modular assembly design that allows easy installation and set-up. They are equipped with Knight’s proven pneumatic tractor mechanics using a worm gear reducer that is reliable and maintenance free.

**Features**

- Dual speed pendant.
- 1/2 HP, 240/480 VAC, Single Phase Inverter Motor.
- Hand clamp to engage/lock tractor into position with tension adjustments.
- Integral trolley.
- Dual rubber drive wheels that ride on bottom of rail.
- Direct drive with programmable acceleration and deceleration speeds.
- Capability of disengaging wheels to allow for free wheeling. (Pneumatic Model)

**Options**

- Complete fixture integration.
- 24 VDC, Drive Clutch.
- Mid-rail and end of rail shock absorbers.
- Programmable return to home position function.
- Over travel limits.
- Power Rail configuration.
- Return to home.
- Pneumatic engage cylinder for disengaging tractor from the rail.
- Wireless control.

**Pneumatic Tractors**

Knight’s Pneumatic Tractors provide mobility by towing bridges, fixtures and heavier loads. They typically are used to assist an operator to push, pull, or position loads. Pneumatic Tractors can be integrated with a pneumatic fixture allowing for multiple loads. They typically are used to assist an operator to push, pull, or position loads.

**Features**

- Impact Limiting
- Virtual Travel Limits
- LED Fault Diagnostics
- LED Status Indicators
- I/O Capabilities (16 In / 8 Out)
- Programming/ Diagnostic
- Planetary Gearbox
- H5 Rated (Continuous Duty Cycle)
- Fail Safe Braking
- Illuminated Run/Stop Button
- Standard 24 VDC
- Safety Rating of 125%
- Standard Float Mode

**KET Series**

<table>
<thead>
<tr>
<th>Max. Tow Capacity(lbs/kg)</th>
<th>Max. Tow Speed(fpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 3,000 lbs. [1,360kg]</td>
<td>up to 180 fpm</td>
</tr>
</tbody>
</table>

*K Listed capacities and speeds vary by configuration. For more detailed information, please contact a Knight representative.

**KSSHXYZ Series**

<table>
<thead>
<tr>
<th>Model</th>
<th>Max Tractor Capacity(lbs)</th>
<th>Max Tractor Hoist Capacity(lbs)</th>
<th>Max Tractor Speed(fpm)</th>
<th>Max Hoist Lift Capacity(fpm)</th>
<th>Axis(X/Z/Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KSSHXYZ250</td>
<td>4,000 lbs.</td>
<td>250 lbs.</td>
<td>174.53 fpm</td>
<td>196.85 fpm</td>
<td>X / Y / Z</td>
</tr>
<tr>
<td>KSSHXYZ350</td>
<td>4,000 lbs.</td>
<td>350 lbs.</td>
<td>174.53 fpm</td>
<td>241.00 fpm</td>
<td>X / Y / Z</td>
</tr>
<tr>
<td>KSSHXYZ450</td>
<td>4,000 lbs.</td>
<td>450 lbs.</td>
<td>174.53 fpm</td>
<td>260.30 fpm</td>
<td>X / Y / Z</td>
</tr>
</tbody>
</table>

* Listed capacities and speeds vary by configuration. For more detailed information, please contact a Knight representative.

Our Knight Global Servo design team will analyze your system requirements in detail and custom design a servo tractor system that fits your specific application needs.

For more detailed information on Knight Global Servo Tractor System features and options, please visit www.knight-ind.com.
Balancers

Knight Pneumatic Balancers are designed to assist in transferring loads ergonomically using a variety of Up/Down pendants or Balance “Float” Control options. Pneumatic Balancers provide superior control over standard air hoists when it comes to locating and positioning loads.

Cable/Chain Balancers

Cable Pneumatic Balancers are commonly used when lower weight parts are required to be floated into position. Chain Pneumatic Balancers are recommended when balancing weights in excess of 350 lbs. (159kg) and travels of up to 110 in. (2794mm).

Features

- Multiple configurations.
- Requires Non-Lubricated Clean/Dry Air.
- Internal Centrifugal Retract Control.
- Standard “Float” Mode
- Hands-Free Operation
- CE Compliant **

** CE compliance is not a standard feature on Knight Global Pneumatic Balancers. Please contact us for more details.

Options

- Optional External Retract Controls.
- Optional High Relieving and Feathertouch Controls.
- Optional Up/Down Controls.
- Multiple Suspension Kits available.

KBC Chain Series

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. Balance Capacity(lbs/kg)</th>
<th>Max Travel(in./mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KBC150-070</td>
<td>150 lbs. [68kg]</td>
<td>70 in. [1778mm]</td>
</tr>
<tr>
<td>KBC200-110</td>
<td>200 lbs. [91kg]</td>
<td>70 in. [1778mm]</td>
</tr>
<tr>
<td>KBC225-077</td>
<td>225 lbs. [102kg]</td>
<td>70 in. [1778mm]</td>
</tr>
<tr>
<td>KBC350-073</td>
<td>350 lbs. [159kg]</td>
<td>73 in. [1854mm]</td>
</tr>
</tbody>
</table>

KBA Cable Series

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. Balance Capacity(lbs/kg)</th>
<th>Max Travel(in./mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KBA100-028</td>
<td>100 lbs. [45kg]</td>
<td>28 in. [711mm]</td>
</tr>
<tr>
<td>KBA150-076</td>
<td>150 lbs. [68kg]</td>
<td>76 in. [1930mm]</td>
</tr>
<tr>
<td>KBA225-073</td>
<td>225 lbs. [102kg]</td>
<td>73 in. [1854mm]</td>
</tr>
<tr>
<td>KBA350-073</td>
<td>350 lbs. [159kg]</td>
<td>73 in. [1854mm]</td>
</tr>
<tr>
<td>KBA450-080</td>
<td>500 lbs. [227kg]</td>
<td>80 in. [2032mm]</td>
</tr>
<tr>
<td>KBA700-054</td>
<td>700 lbs. [318kg]</td>
<td>54 in. [1371mm]</td>
</tr>
</tbody>
</table>

TKBC Chain Series

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. Balance Capacity(lbs/kg)</th>
<th>Max Travel(in./mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TKBC700-054</td>
<td>700 lbs. [318kg]</td>
<td>54 in. [1371mm]</td>
</tr>
<tr>
<td>TKBC1000-080</td>
<td>1000 lbs. [453kg]</td>
<td>80 in. [2032mm]</td>
</tr>
<tr>
<td>TKBC1400-054</td>
<td>1400 lbs. [635kg]</td>
<td>52 in. [1320mm]</td>
</tr>
</tbody>
</table>

TKBA Cable Series

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. Balance Capacity(lbs/kg)</th>
<th>Max Travel(in./mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TKBA700-073</td>
<td>700 lbs. [318kg]</td>
<td>73 in. [1854mm]</td>
</tr>
<tr>
<td>TKBA1000-080</td>
<td>1000 lbs. [453kg]</td>
<td>80 in. [2032mm]</td>
</tr>
<tr>
<td>TKBA1400-054</td>
<td>1400 lbs. [635kg]</td>
<td>52 in. [1320mm]</td>
</tr>
</tbody>
</table>

NOTE: For better performance, Knight Global offers the KSH Series Servo Hoists. These electrically operated servo motor hoists impart precision and control into your process. (See page 1)

Cable Swivel Hook

Knight KBC Cable Series Balancers come equipped with a 1 ton capacity Crosby/Bullard® Golden Gate size 2 Pin-Lok Hook with self closing gate and 360° rotational capabilities.

Chain Shackle

Knight KBC Chain Series Balancers come equipped with a Knight 2 ton capacity Shackle.

Options

- Multiple Suspension Kits
- Optional High Relieving and Feathertouch Controls.
- Optional External Retract Controls.

Tandem Pneumatic Balancer

Tandem Cable or Chain Pneumatic Balancers were designed to provide the weight capacities of a reeved pneumatic balancer application yet incorporate the extended travels of a single cable or chain pneumatic balancer.

TKBA Cable Series

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. Balance Capacity(lbs/kg)</th>
<th>Max Travel(in./mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TKBA700-054</td>
<td>700 lbs. [318kg]</td>
<td>54 in. [1371mm]</td>
</tr>
<tr>
<td>TKBA1000-080</td>
<td>1000 lbs. [453kg]</td>
<td>80 in. [2032mm]</td>
</tr>
<tr>
<td>TKBA1400-054</td>
<td>1400 lbs. [635kg]</td>
<td>52 in. [1320mm]</td>
</tr>
</tbody>
</table>

NOTE: Listed balance capacities and travels vary by configuration. For more detailed information, please contact a Knight representative.

RKBA Cable Series

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. Balance Capacity(lbs/kg)</th>
<th>Max Travel(in./mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RKBA450-036</td>
<td>450 lbs. [204kg]</td>
<td>56 in. [1422mm]</td>
</tr>
<tr>
<td>RKBA700-036</td>
<td>700 lbs. [318kg]</td>
<td>56 in. [1422mm]</td>
</tr>
<tr>
<td>RKBA1000-040</td>
<td>1000 lbs. [453kg]</td>
<td>40 in. [1016mm]</td>
</tr>
<tr>
<td>RKBA1400-027</td>
<td>1400 lbs. [635kg]</td>
<td>27 in. [685mm]</td>
</tr>
</tbody>
</table>

RKBC Chain Series

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. Balance Capacity(lbs/kg)</th>
<th>Max Travel(in./mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RKBC450-033</td>
<td>450 lbs. [204kg]</td>
<td>33 in. [838mm]</td>
</tr>
<tr>
<td>RKBC700-033</td>
<td>700 lbs. [318kg]</td>
<td>33 in. [838mm]</td>
</tr>
<tr>
<td>RKBC1000-040</td>
<td>1000 lbs. [453kg]</td>
<td>40 in. [1016mm]</td>
</tr>
<tr>
<td>RKBC1400-025</td>
<td>1400 lbs. [635kg]</td>
<td>27 in. [685mm]</td>
</tr>
</tbody>
</table>

NOTE: Listed balance capacities and travels vary by configuration. For more detailed information, please contact a Knight representative.

RKBA Chain Series

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. Balance Capacity(lbs/kg)</th>
<th>Max Travel(in./mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RKBA450-036</td>
<td>450 lbs. [204kg]</td>
<td>56 in. [1422mm]</td>
</tr>
<tr>
<td>RKBA700-036</td>
<td>700 lbs. [318kg]</td>
<td>56 in. [1422mm]</td>
</tr>
<tr>
<td>RKBA1000-040</td>
<td>1000 lbs. [453kg]</td>
<td>40 in. [1016mm]</td>
</tr>
<tr>
<td>RKBA1400-027</td>
<td>1400 lbs. [635kg]</td>
<td>27 in. [685mm]</td>
</tr>
</tbody>
</table>

*Note: Knight recommends the use of chain instead of cable (Except in Reeved Applications) when balancing weights in excess of 350 lbs. [159kg] and / or high cycle times are encountered. The use of cable under these conditions has a greater tendency to fray or “birdcage” requiring a more specific PM program. Knight Pneumatic Balancers do not require the use of lubricated air.

Reeved Pneumatic Balancer

A Reeved Pneumatic Balancer increases the mechanical advantage of balancing a product. The pneumatic balancer reeve and pulley offers a second suspension point which gives greater stability to the load. Reeving an pneumatic balancer doubles the balancing capacity.

RKBA Chain Series

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. Balance Capacity(lbs/kg)</th>
<th>Max Travel(in./mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RKBA450-036</td>
<td>450 lbs. [204kg]</td>
<td>56 in. [1422mm]</td>
</tr>
<tr>
<td>RKBA700-036</td>
<td>700 lbs. [318kg]</td>
<td>56 in. [1422mm]</td>
</tr>
<tr>
<td>RKBA1000-040</td>
<td>1000 lbs. [453kg]</td>
<td>40 in. [1016mm]</td>
</tr>
<tr>
<td>RKBA1400-027</td>
<td>1400 lbs. [635kg]</td>
<td>27 in. [685mm]</td>
</tr>
</tbody>
</table>
**Balancer Controls**

- **Up/Down Pendant**
  Variable speed control for loading and unloading varying weights. The most common used control for balancers. Available in straight or coiled hose.
  Model# BCS3017 (Shown)

- **Tandem Up/Down Pendant**
  Variable speed control used on Tandem Balancers for loading and unloading varying weights. Available in straight or coiled hose.
  Model# BCS3330 (Shown)

- **High Relieving Single Balancer**
  Supports a constant weight at zero gravity. Used for near capacity or applications greater than 150 lbs. Available in straight or coiled hose.
  Model# BCS2090 (Shown)

- **Balancer Limit Switch**
  Provides the ability to set upper and lower limits. Eliminates unnecessary movements.
  Model# BPA2224 (Shown)

- **External Retract Control**
  Hydraulic shocks provide continuous resistance to spool travel. Prevents spool from accelerating if a load is lost.
  Model# BPA2089 (Shown)

- **Balancer Trolleys**
  Load Trolleys attach the air balancer to various types of aluminum rail systems.
  Model# MRTA7706 (Shown)

- **Feather Touch Balance**
  Used for light weight applications. Control is activated by an up/down movement of the control handle. Available in straight or coiled hose.
  Model# BCS2214 (Shown)

- **Single Balance**
  Supports a constant weight at zero gravity. Recommended for applications less than 150 lbs. (68kg).
  Model# BCS2018 (Shown)

- **Dual Balance**
  Supports two different weights at zero gravity. Used in applications where the part weight does not change. Available in straight or coiled hose.
  Model# BCS2215 (Shown)

- **Balancer Trolleys (W-Beam/S-Beam)**
  Load Trolleys attach the air balancer to various types of I-beam rail systems.
  Model# RTA2014 (Shown)

- **Balancer Safety Cable Kit**
  Safety Cable Kits prevent Air Balancers or fixtures from separating or falling from overhead structures or rail.
  Model# RWA4133 (Shown)

- **Balancer Limit Switch**
  Provides the ability to set upper and lower limits. Eliminates unnecessary movements.
  Model# BPA2224 (Shown)

- **Balancer Trolleys**
  Load Trolleys attach the air balancer to various types of aluminum rail systems.
  Model# MRTA7706 (Shown)

- **Air Connection with Balancer Logic Box**
  Air logic box, bracket and logic box to balancer air bracket connection hose fittings. Balancer air connection bracket is included with every balancer purchase.

- **Air Connection with Balancer Manifold**
  Air Manifold and Manifold to balancer air connection hose fittings are included with every controls handle purchase.

- **Balancer Safety Cable Kit**
  Safety Cable Kits prevent Air Balancers or fixtures from separating or falling from overhead structures or rail.
  Model# RWA4133 (Shown)

- **Balancer Trolleys**
  Load Trolleys attach the air balancer to various types of aluminum rail systems.
  Model# MRTA7706 (Shown)

- **Eye Bolt Safety Cable Kit**
  Eye-Bolt Safety Cable Kits prevent Air Balancers or fixtures from separating or falling from overhead structures or rail.
  Model# FDA4133 (Shown)
Lift Assists

Knight Global designs tools in accordance with our manufacturing partners. Our engineers work in unison with our customers, creating system layouts which conform to the specifications of each individual facility. We create tools and adjust existing technology to fit the needs of our manufacturing clients. We specialize in custom lift assists and lifting devices for all of your ergonomic situations.

Standard Arms

Knight Pneumatic arms use a parallelogram structure that articulates at the vertical planes. This design allows vertical positioning of a fixture or end effector. Knight Global offers a wide range of arm types, capacities and configurations to handle many types of end tooling.

Pneumatic arms are used to lift, rotate, balance, move and transfer product to and from conveyors, dunnage, assembly lines and more.

Pneumatic Series

Max. Lifting Capacity(lbs/kg)  Max. Travel(in./mm)  Max. Reach(in./mm)

* Listed capacities, travels and reaches vary by configuration. Listed specifications rated at 100 psi.

For more detailed information, please contact a Knight representative or visit www.knight-ind.com.

Lower Mass Arms

By eliminating the arm bearing and mounting plate, we help to reduce the weight of the overall system. The Lower Mass Arms provide an overall range of motion less than 84° degrees.

The Lower Mass Arms can use a tie-bar and optional locking and latching end pivot mechanisms to improve precision for pick-up and set-down.

Knight Lower Mass Arms have a maximum capacity of up to 350 lbs. [158kg], a maximum travel distance of up to 24 in. [609mm] with a maximum reach that varies upon the application.

Lower Mass Arm Series

Max. Lifting Capacity(lbs/kg)  Max. Travel(in./mm)  Max. Reach(in./mm)

* Listed capacities, travels and reaches vary by configuration. For more detailed information, please contact a Knight representative or visit www.knight-ind.com.

Extension Arms

Knight Extension Arms enable the operator to extend beyond the working limits of an overhead rail system within a workstation. A Knight Pneumatic Balancer mounts to the extension arm allowing for a controlled lifting and lowering of loads. KEAA Series Single or Dual Bridge Extension Arms expand the working area of a typical pneumatic hoist. They allow for a 360° rotation of the extension arm and have a (4) four position adjustable reach in 10° UP/DOWN increment adjustments to avoid clearance issues.

Extension Series

Max. Balance Capacity(lbs/kg)  Max. Travel(in./mm)  Max. Reach(in./mm)

* Listed capacities, travels and reaches vary by configuration. Listed specifications rated at 100 psi.

For more detailed information, please contact a Knight representative or visit www.knight-ind.com.

Servo Arms

Servo Arms expand the extension of an operator’s natural movements, Knight Global Servo Arm technology greatly improves the precision of an arm type application. Servo Arms are available in various Articulating, Extension and Vertical configurations. Servo arms are available in an Overhead Carriage Mounted or Floor Mounted configurations that allows for an overhead varied reach within a work cell.

Servo Series

Model  Max Capacity(lbs/kg)  Max Hoist Speed(fpm)

* Listed capacities, travels and reaches vary by configuration. For more detailed information, please contact a Knight representative or visit www.knight-ind.com.

Service

Intelligent Assist Devices

For more detailed information on Knight Global Servo Arms, please see (Page 3) or visit www.knight-ind.com.
**Vertical Mast Arms**

Vertical Mast Arms are typically used in applications that require extensive up/down travel. Vertical Arms improve ergonomics by eliminating the need for an operator to bend or reach for the control handles when positioning the part in a specified location. Allows for end tooling to be mounted to a rigid vertical mast. Vertical travel is achieved with a Knight Pneumatic Balancer or a chain hoist. Vertical Mast Arm handles are in a fixed ergonomic position on the mast. Available with a round mast for direct loads only or a square THK mast for offset/canted/levered loads.

**Torque Tubes**

Torque Tubes are designed to absorb torque reaction from fastening devices and balance the tool. Custom travel distances, heights and tool holders are available. They are available in light, medium and heavy duty pneumatic and spring balancer configurations. Each Torque Tube includes a standard fixed tool holder.

**Linear Rail Tooling Arm**

Linear Rail Mounted Tooling Arms allow for tooling to be mounted on a wall, in a pit or run on the floor. Tooling arm travels on Knight’s RAD6500 and LRD6500 Series engineered aluminum rail. Compared to traditional products, Knight’s Linear Tool Arms are easier to install, are more ergonomically friendly and have greater side loading capabilities.

**Quick Build Connectors**

Modular system of steel or aluminum connectors and tubing used to create custom carts, workstations and end effectors. You can design and build a workstation or fixture to your specific application in no time at all. The Quick Build Connectors modular design allows for quick and easy assembly without welding. Steel or aluminum connectors and tubing make them a lightweight and strong alternative for designing do it yourself applications.

**Ergo Positioner**

To be adjusted to lock and release the part in multiple positions. The part, then position shape or unidirectional parts using the pneumatic foot control. Pneumatic operated pivot locking workstation that allows a part to be adjusted to the operator’s comfort level. The operator can manually adjust the height of the part, then position shape or unidirectional parts using the pneumatic foot control to lock and release the part in multiple positions.

**Torque Tube Series**

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. Capacity(lbs/kg)</th>
<th>Max. Torque(ft. lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATA1500</td>
<td>up to 65 lbs. [29kg]</td>
<td>up to 50 ft. lbs.</td>
</tr>
<tr>
<td>ATA1500-15</td>
<td>up to 65 lbs. [29kg]</td>
<td>up to 50 ft. lbs.</td>
</tr>
<tr>
<td>ATA1500-25</td>
<td>up to 65 lbs. [29kg]</td>
<td>up to 50 ft. lbs.</td>
</tr>
<tr>
<td>ATA2640</td>
<td>up to 35 lbs. [16kg]</td>
<td>up to 50 ft. lbs.</td>
</tr>
<tr>
<td>ATA2640</td>
<td>up to 35 lbs. [16kg]</td>
<td>up to 50 ft. lbs.</td>
</tr>
<tr>
<td>ATA2700</td>
<td>up to 45 lbs. [20kg]</td>
<td>up to 50 ft. lbs.</td>
</tr>
<tr>
<td>ATA4500</td>
<td>up to 65 lbs. [29kg]</td>
<td>up to 50 ft. lbs.</td>
</tr>
</tbody>
</table>

* Listed capacities, torques and travels vary by configuration. Listed specifications rated at 100 psi. For more detailed information, please contact a Knight representative or visit [www.knight-ind.com](http://www.knight-ind.com).

**Ergo Positioner Series**

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. Capacity(lbs/kg)</th>
<th>Max. Vertical Travel(in./mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSA1106</td>
<td>up to 65 lbs. [29kg]</td>
<td>up to 25 in. [635mm]</td>
</tr>
</tbody>
</table>

* For more detailed application usage and specification information, please contact your local Knight Global representative or visit [www.knight-ind.com](http://www.knight-ind.com).
End effectors

Knight designs and manufactures an assortment of custom End Effectors. We specialize in custom lift assists and lifting devices for all of your ergonomic situations. We'll assist you on choosing the correct lift assist system which is best suited for your application by using our detailed analysis of your material handling needs.

End Effectors are classified into five category styles: Clamp, Hook, Magnet, Nest and Vacuum. Our designers will analyze your material handling needs and determine which end effector style will be best suited for your application.

Every End Effector is unique and custom designed to fit your specific application needs.

**Bite Line Clamp Fixture**
Bite line clamp style fixture with 45° rotating feature. Transfers seat to the assembly station.

**End Effector Styles**

- **O.D. Clamp Fixture**
  Outside diameter clamp style fixture with rotating feature. Transfers roll from rewind table to dunnage.

- **I.D. Clamp Fixture**
  Inside diameter clamp style fixture suspended by a Knight Pneumatic Balancer. Transfers large core pipe from mold machine to transfer cart.

- **Dual J-Hook Fixture**
  Dual J-hook style fixture operated by a Knight Servo System. Transfers the hood from dunnage to the unwind wheel station.

- **Nesting Clamp Fixture**
  Nesting clamp style fixture suspended by a Knight Servo System. Transfers material from dunnage to the unwind wheel station.

- **I.D. Core Fixture**
  Inside diameter core style fixture suspended by a Knight Pneumatic Balancer. Transfers the windshield from dunnage to the vehicle.

- **Multiple Vacuum Fixture**
  Multiple vacuum cup style end effector suspended by a Knight Pneumatic Balancer. Transfers the windshield from dunnage to the vehicle.

- **Magnetic Fixture**
  Magnetic style fixture operated by a Knight Servo System. Transfers large oil pipe from the dunnage to oil pipe testing area.

- **Scissor Hook Fixture**
  Scissor hook style fixture suspended by a Knight Pneumatic Balancer. Transfers engine block from assembly line to the inspection workstation.

- **Nesting Clamp Fixture**
  Nesting clamp style fixture suspended by a Knight Pneumatic Balancer. Transfers the hood from dunnage to the vehicle for installation.

- **Multiple Vacuum Fixture**
  Multiple vacuum cup style end effector suspended by a Knight Pneumatic Balancer. Transfers the windshield from dunnage to the vehicle.

- **Magnetic Fixture**
  Magnetic style fixture operated by a Knight Servo System. Transfers large oil pipe from the dunnage to oil pipe testing area.

- **I.D. Core Fixture**
  Inside diameter core style fixture operated by a Knight Pneumatic Balancer. Transfers the windshield from dunnage to the vehicle for installation.

- **Foundry Mold Transfer**
  Rotating clamping end effector suspended from a Knight ATA4500 Heavy Duty Vertical Torque Arm. Transfers mold from furnace oven and transfers it to the dunnage rack for cooling.

- **Canister Lift Assist**
  3-Cup vacuum end effector suspended from a Knight KBA Series Pneumatic Balancer. Transfers canister from dunnage to the unloading area.

- **Wheel Assembly Install**
  Nesting and manual clamp end effector mounted on an ATA4000 vertical mast arm. Transfers the wheel assembly to the installation area.

End Effector Applications

**Trans Case Lift Assist**
Clamp style end effector mounted on a custom vertical mast. End effector lifts and rotates trans case for a different set-down position on the line.

**Doors-On Install**
Doors-on lift assist using a custom clamping fixture mounted to a Knight AAA6000 Articulating Pneumatic Arm. Arms assist in the installation of the front door.

**Wire Harness Load**
Clamp style fixture mounted on a vertical mast arm that loads, opens and spreads out the wire harness bag inside the vehicle cab.

**Hybrid Battery Install**
KSH Servo Hoist and pneumatically clamping hybrid battery end effector. Knight End effector positions large tray for hybrid battery cell pack installation.

**Front Cab Lift Assist**
Custom Knight Front Cab End Effector that securely assists in the lifting of the front cab assembly.

**Transformer Lift Assist**
Clamp style end effector mounted on a vertical mast arm. End effector clamps the transformer unit and assists in moving it from one conveyor to another work cell.

**Wheel Assembly Install**
Nesting and manual clamp end effector mounted on an ATA4000 vertical mast arm. Transfers the wheel assembly and rotates tire for install.

**Foundry Mold Transfer**
Rotating clamping end effector suspended from a Knight ATA4500 Heavy Duty Vertical Torque Arm. Transfers mold from furnace oven and transfers it to the dunnage rack for cooling.

**Canister Lift Assist**
3-Cup vacuum end effector suspended from a Knight KBA Series Pneumatic Balancer. Transfers canister from dunnage to the unloading area.

**Wheel Assembly Install**
Nesting and manual clamp end effector mounted on an ATA4000 vertical mast arm. Transfers the wheel assembly and rotates tire for install.

To view more End Effector Applications visit us at www.knight-ind.com

For more detailed information, visit www.knight-ind.com
**Control Handles**

Knight Global offers seven types of control handles with various configurations. The control handle series are designed to ensure an ergonomically correct hand position for the operator. Control handle levers are marked according to customer specifications and can be customized to fit each application need.

Lever can be customized with stamped callouts for identification and ease of use. Callouts are available in different languages, Angled levers are used for optimum ergonomics. Up (Green) and Down (Red) levers are standard colors. Custom colors can be applied according to customer specification. Control Handle Trigger levers can be mounted on the back of the handle for optimum ergonomics or as an additional button.

**Pneumatic Control Handles**

- One (1) Button
  - Model# BPA9400 (Shown)
- Two (2) Button
  - Model# BPA9100 (Shown)
- Three (3) Button
  - Model# BPA9430 (Shown)
- Four (4) Button
  - Model# BPA9310 (Shown)

**Electric Control Handles**

- One (1) Button
  - Model# EPA9500 (Shown)
- Two (2) Button
  - Model# EPA9600 (Shown)
- Three (3) Button
  - Model# EPA9650 (Shown)
- Four (4) Button
  - Model# EPA9660 (Shown)

**Electric/ Pneumatic Control Handles**

- Two (2) Button
  - Model# EPPA9450 (Shown)
- Three (3) Button
  - Model# EPPA9460 (Shown)
- Four (4) Button
  - Model# EPPA9464 (Shown)

**Pneumatic Control Handles with Trigger Levers**

- One (1) Button
  - Model# BPTA9400 (Shown)
- Two (2) Button
  - Model# BPTA9100 (Shown)
- Three (3) Button
  - Model# BPTA9410 (Shown)
- Four (4) Button
  - Model# BPTA9414 (Shown)

**Electric Control Handles with Trigger Levers**

- One (1) Button
  - Model# EPTA9500 (Shown)
- Two (2) Button
  - Model# EPTA9600 (Shown)
- Three (3) Button
  - Model# EPTA9560 (Shown)
- Four (4) Button
  - Model# EPTA9660 (Shown)

**Pneumatic Control Handles with Trigger Levers**

- One (1) Button
  - Model# BPTA9400 (Shown)
- Two (2) Button
  - Model# BPTA9100 (Shown)
- Three (3) Button
  - Model# BPTA9410 (Shown)
- Four (4) Button
  - Model# BPTA9414 (Shown)

**Electric Control Handles with Trigger Levers**

- One (1) Button
  - Model# EPTA9500 (Shown)
- Two (2) Button
  - Model# EPTA9600 (Shown)
- Three (3) Button
  - Model# EPTA9560 (Shown)
- Four (4) Button
  - Model# EPTA9660 (Shown)

**Valve Block Replacement Kits**

- **BPA9111 Valve Block Assembly**
  - Knight’s BPA9111 Pneumatic Valve Block Assembly has 3-Way valves used for sending common pilot signals.
  - Each BPA9111 Valve Block replacement kit includes:
    - (1) Plunger Assembly #CS-2993, (1) 6mm x 10mm FPH and (1) tube of lubricant, (1) 6mm x 10mm B.H.C.S, (1) Nylon Ball.
  - Replacement Kit# BPA2139

- **BPA9001 Valve Block Assembly**
  - Knight’s BPA9001 Pneumatic Valve Block Assembly has 3-Way valves used for sending common pilot signals.
  - Each BPA9001 Valve Block replacement kit includes:
    - (2) Plunger Assembly #CS-2993, (1) 6mm x 10mm FPH and (1) tube of lubricant, (2) 6mm x 10mm B.H.C.S, (2) Nylon Ball.
  - Replacement Kit# BPA2141

- **BPA9050 Valve Block Assembly**
  - Knight’s BPA9050 Pneumatic Valve Block Assembly has 3-Way valves used for sending common pilot signals.
  - Each BPA9050 Valve Block replacement kit includes:
    - (2) Plunger Assembly #CS-2993, (1) 6mm x 10mm FPH and (1) tube of lubricant, (2) 6mm x 10mm B.H.C.S, (2) Nylon Ball.
  - Replacement Kit# BPA2140

**Standard Collar Mounts**

Standard Collar Mounts allow Control Handles to be mounted in a fixed rotational position and are equipped with hole patterns that allow for the 360° rotation of the control handle around a vertical axis.

<table>
<thead>
<tr>
<th>Model</th>
<th>Inner Diameter(ID.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPD1119</td>
<td>0.88 in. [22.92 mm]</td>
</tr>
<tr>
<td>BPD1120</td>
<td>1.00 in. [25.44 mm]</td>
</tr>
<tr>
<td>BPD1213</td>
<td>1.25 in. [31.75 mm]</td>
</tr>
</tbody>
</table>

- **BPD1119**
  - Model Inner Diameter(ID.)
  - 0.88 in. [22.92 mm]
- **BPD1120**
  - Model Inner Diameter(ID.)
  - 1.00 in. [25.44 mm]
- **BPD1213**
  - Model Inner Diameter(ID.)
  - 1.25 in. [31.75 mm]
**Workstation Cranes/ Rails**

Knight Global Rail Systems form the foundation of your material handling system. Whether you choose our Lightweight, High Performance Aluminum Rail or Power Rail, you can be confident you have the highest quality and safest product available. Knight’s enclosed track design reduces dirt and grime buildup on the running surface which improves long term performance.

### Aluminum Rail

Knights’ lightweight aluminum enclosed track rail is the ideal solution; whether your load is located directly under the system or cantilevered off to the side. Knight offers (14) fourteen series of aluminum rail that is available in multiple configurations. The lightweight rail eases installation and reduces overhead loads. Each aluminum rail series load capacity varies by size and length of the hanger spans.

### Aluminum Enclosed Track Rail Series

The enclosed track rail series is extruded from high strength aluminum alloy that allows for the trolley to travel inside the rail. The enclosed track series is offered in four (4) sizes:

<table>
<thead>
<tr>
<th>Model</th>
<th>Size(in./mm)</th>
<th>Max Capacity(lbs/kg)</th>
<th>Deflection Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAD7510</td>
<td>8 in. [203mm]</td>
<td>3,000 lbs. [1,360kg]</td>
<td>1:350 *</td>
</tr>
<tr>
<td>RAD6110</td>
<td>6 in. [152mm]</td>
<td>1,600 lbs. [725kg]</td>
<td>1:350 *</td>
</tr>
<tr>
<td>RAD4110</td>
<td>4 in. [101mm]</td>
<td>1,100 lbs. [499kg]</td>
<td>1:350 *</td>
</tr>
<tr>
<td>TR2000</td>
<td>2 in. [51mm]</td>
<td>500 lbs. [227kg]</td>
<td>1:350 *</td>
</tr>
</tbody>
</table>

* Knight Global rail deflection ratios are predetermined. For more detailed information on size, capacities and lengths, contact your local Knight Global representative or visit www.knight-ind.com.

### Backer Rail Series

The backer rail series is an enclosed track design that is extruded from a lightweight high strength aluminum alloy with an extruded aluminum backer to reduce rail deflection under heavy loads. The rigid rail series is available with an 8” or 6” aluminum backer.

<table>
<thead>
<tr>
<th>Model</th>
<th>Backer(in./mm)</th>
<th>Max Capacity(+ %)</th>
<th>Deflection Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAA4439</td>
<td>8 in. [203mm]</td>
<td>60%</td>
<td>1:350 *</td>
</tr>
<tr>
<td>RAA4438</td>
<td>6 in. [152mm]</td>
<td>50%</td>
<td>1:350 *</td>
</tr>
</tbody>
</table>

* Knight Global follows material handling industry standards in determining the capacity and safety factor ratings for enclosed track overhead workstation crane systems. Every rail component (e.g. rail, hangers, railcloth, etc.) is individually tested to establish its ultimate failure point. From this number, a safe working load is then assigned to the component. Each rail span length is then tested to determine the maximum single point load required to achieve a predetermined deflection based on a 1:350 ratio (1” of deflection for each 350” of length) or a 1:450 ratio (1” of deflection for each 450” of length). Each rail or rail system is then assigned its capacity and safety factor rating. For more information on the recommended rail capacities, please contact your local Knight Global representative or visit www.knight-ind.com.

### Curved Rail Series

The curved rail series has a curved radius enclosed track design that is extruded from a lightweight high strength aluminum alloy. Its curved design allows loads to travel around corners and stationary objects. Curved rail is available in overhead mounted configurations.

<table>
<thead>
<tr>
<th>Size(in./mm)</th>
<th>Max Capacity(lbs/kg)</th>
<th>Min/Max Radius(ft)</th>
<th>Deflection Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 in. [203mm]</td>
<td>3,000 lbs. [1,360kg]</td>
<td>5 ft. - 8 ft.</td>
<td>1:350 *</td>
</tr>
<tr>
<td>6 in. [152mm]</td>
<td>1,600 lbs. [725kg]</td>
<td>4 ft. - 8 ft.</td>
<td>1:350 *</td>
</tr>
<tr>
<td>4 in. [101mm]</td>
<td>1,100 lbs. [499kg]</td>
<td>3 ft. - 8 ft.</td>
<td>1:350 *</td>
</tr>
</tbody>
</table>

* Knight Global rail deflection ratios are predetermined. For more detailed information on size, capacities and lengths, contact your local Knight Global representative or visit www.knight-ind.com.

### Tool Rail Series

HAD rail series is easily installed on C-Channel or angle iron structures. The HAD3000 series chambered rail can be used as a fluid power distribution system for water, air, oil and other non-caustic fluids. The TR2000 series offers the greatest weight capacity and can mount to anything; even on the side of larger rail. It allows for festooning trolleys and utilities to be attached.

<table>
<thead>
<tr>
<th>Model</th>
<th>Size(in./mm)</th>
<th>Max Capacity(lbs/kg)</th>
<th>Deflection Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAD3900 (Half)</td>
<td>2 in. [51mm]</td>
<td>Application Specific</td>
<td>1:350 *</td>
</tr>
<tr>
<td>HAD3900 (Round)</td>
<td>2 in. [51mm]</td>
<td>Application Specific</td>
<td>1:350 *</td>
</tr>
<tr>
<td>TR2000 (Square)</td>
<td>2 in. [51mm]</td>
<td>500 lbs. [227kg]</td>
<td>1:350 *</td>
</tr>
</tbody>
</table>

* Knight Global rail deflection ratios are predetermined. For more detailed information on size, capacities and lengths, contact your local Knight Global representative or visit www.knight-ind.com.

### Engineered Round Rail Series

Engineered round rail series is for low friction vertical or horizontal linear movements. It is capable of handling direct or offset loads as well as high torque applications. Round rail is designed to be more ergonomically friendly when compared to traditional linear motion products.

<table>
<thead>
<tr>
<th>Model</th>
<th>Size(in./mm)</th>
<th>Max Capacity(lbs/kg)</th>
<th>Deflection Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAD6500</td>
<td>6 in. [152mm]</td>
<td>Application Specific</td>
<td>1:350 *</td>
</tr>
<tr>
<td>RAD4700</td>
<td>4 in. [101mm]</td>
<td>Application Specific</td>
<td>1:350 *</td>
</tr>
</tbody>
</table>

* Knight Global rail deflection ratios are predetermined. For more detailed information on size, capacities and lengths, contact your local Knight Global representative or visit www.knight-ind.com.

### Engineered Linear Rail Series

LRD Series Engineered linear rail is for floor mounted or wall mounted low friction horizontal movements. Capable of handling direct or offset loads. Linear rail is a lower maintenance alternative to hardened ground rail and bearing blocks. The LRD Series binding is significantly reduced due to its flexible tolerances. The linear rail is mounted in horizontal configurations.

<table>
<thead>
<tr>
<th>Model</th>
<th>Size(in./mm)</th>
<th>Max Capacity(lbs/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LRD0650</td>
<td>9 in. [228mm]</td>
<td>Application Specific</td>
</tr>
</tbody>
</table>

* Knight Global rail deflection ratios are predetermined. For more detailed information on size, capacities and lengths, contact your local Knight Global representative or visit www.knight-ind.com.

For more detailed information, visit www.knight-ind.com.
Rail Systems

Knight suspension rail systems include an enclosed trolley track that resists dirt build-up for a smoother, quieter operation. A Knight representative will assist you in selecting, developing and designing your rail system. Overhead and Floor Mounted Rail Suspension Systems are available in single or dual bridge configurations.

Overhead or Floor Mounted Rail Systems

- I-Beam Infrastructure & Elevations
- Runway System
- End Trucks
- Load Trolley
- Bridge Brace
- Coiled or Straight Hose Management Kits
- Redundant Endcaps/Steps
- Single or Dual Bridge Configuration

Rail Systems are designed to provide a safe, efficient solution to your ergonomic challenges. A wide range of options are available to meet all your specific engineering and application requirements.

Structural Hangers

Structural hangers are used to suspend Knight’s rail series from overhead steel I-beam infrastructures and elevations.

End Trucks

End Trucks carry the bridge along the runways of a rail system. Available in a variety of different configurations.

Load Trolleys

Load trolleys transfer loads along the horizontal axis and suspend Knight air balancers and fixtures.

Redundant End Caps

Combination of an end cap and a mid-rail stop that prevents load trolleys or end trucks from exiting the rail.

Bridge Braces

Adjustable bridge braces are used to secure parallel rails at specific distances.

Hose Management Kits

Hose management kits supply air to pneumatic balancers, tractors, tooling or fixtures.

Splice Kits

Splice kits join runways or monorails together.

Coated or Straight Hose Management Kits

Aluminum Floor Mounted Post System

Knight’s Aluminum Floor Mounted Post System is an easy to assemble lightweight alternative to the traditional steel four post system. The channels in the extruded aluminum posts can be used to mount torque monitors, tool holders, keyboards, television screens, tables and more.

Model | Max Capacity (lbs) | Bridge Type | Rail Type
--- | --- | --- | ---
AFMRS1000 | Application Specific | Single/Dual | RAD7510

* For more detailed information on rail systems, capacities, bridge types and rail types, contact your local Knight Global representative or visit www.knight-ind.com.

Cantilevered Rail System

Knight’s Cantilevered Rail Systems are designed to eliminate the need for a four post floor structure system. It provides an alternative to workstations with minimal floor space. A wide range of options are available with each system to meet all your specific engineering and application requirements. A Knight Representative will assist you in selecting and developing alternatives when designing your rail system.

Model | Max Capacity (lbs) | Bridge Type | Rail Type
--- | --- | --- | ---
CMRS1000 | Application Specific | Single/Dual | RAD7510

* For more detailed information on rail systems, capacities, bridge types and rail types, contact your local Knight Global representative or visit www.knight-ind.com.
Cantilevered Workstation

Knight’s Cantilevered Workstation is the perfect light weight aluminum solution for work spaces and assembly stations. The WSA1000 rail design allows for custom designed accessory mounts to be attached and positioned into various locations.

Knight’s WSA1000 is custom designed to your application. The WSA1000 is available in various configurations.

The Cantilevered Workstation can be installed on the back side of a conveyor and allow secure tools to be within operators reach to fasten bolts/nuts.

It can also be used to mount torque monitors, keyboards, television screens, tables or whatever the customer deems necessary.

End Caps with Shock
Combination of an end cap and mid-rail stop that prevents load trolley or end trucks from exiting the rail.

End Trucks
End Trucks carry the bridge along the runways of a rail system. Available in a variety of different configurations.

Inspection Gate
Same Plane End Truck
Designed to elevate bridge to the same height as the runway. System stack-up heights can be reduced by as much as 11.5 inches.

Single or Dual Bridge Rigid End Truck
Eliminates bridge skew for applications that will require added stability.

Cantilevered Workstation

<table>
<thead>
<tr>
<th>Model</th>
<th>Max Capacity (lbs)</th>
<th>Max. Under Rail Heights (ft/m)</th>
<th>Max. Boom Lengths (ft/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSA1000 Application Specific</td>
<td>up to 16 ft. [4.87m]</td>
<td>up to 16 ft. [4.87m]</td>
<td></td>
</tr>
</tbody>
</table>

* For more detailed information on the cantilevered workstation capacities, accessories and custom options, contact your local Knight Global representative or visit www.knight-ind.com.

Rail Accessories

Redundant End Caps
Combination of an end cap and a mid-rail stop that prevents load trolley or end trucks from exiting the rail.

End Caps with Shock
Non-adjustable hanger used for cantilevered or direct loads.

End Trucks
End Trucks for direct loads such as hoists or balancers. Fits 1-beam flange widths 2-11 inches. Recommended for light duty use only.

Same Plane End Truck
Designed to elevate bridge to the same height as the runway. System stack-up heights can be reduced by as much as 11.5 inches.

Single or Dual Bridge Rigid End Truck
Eliminates bridge skew for applications that will require added stability.

Jib Cranes

Jib Cranes offer a large tool coverage area with a single rotating rail on a floor mounted pedestal. Knight cranes are ideal for short transfer applications and are designed to move effortlessly while still carrying large loads. Jib cranes allow for maximum hoist height on low head room applications or when the overhead working space cannot accommodate a rail system. Jib Cranes’ two component design makes installation and set-up simple.

Jib Cranes have Timken® Tapered Roller bearings that provide a smooth 360° rotation. Max. boom lengths are available up to 15 ft. [4.5m] with max. under rail clearance heights of up to 15 ft. [4.5m]. Jib Crane booms can be extended by adding a telescoping rail.

Jib Crane Series

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. Capacity (lbs/kg)</th>
<th>Max. Under Rail Heights (ft/m)</th>
<th>Max. Boom Lengths (ft/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MJBA2000</td>
<td>up to 30 lbs. [13kg]</td>
<td>up to 6 ft. [1.8m]</td>
<td>up to 5 ft. [1.5m]</td>
</tr>
<tr>
<td>MJBA2050</td>
<td>up to 50 lbs. [23kg]</td>
<td>up to 12 ft. [3.7m]</td>
<td>up to 10 ft. [3.0m]</td>
</tr>
<tr>
<td>MJBA2100</td>
<td>up to 149 lbs. [68kg]</td>
<td>up to 15 ft. [4.5m]</td>
<td>up to 15 ft. [4.5m]</td>
</tr>
<tr>
<td>MJBA2200</td>
<td>up to 800 lbs. [363kg]</td>
<td>up to 15 ft. [4.5m]</td>
<td>up to 15 ft. [4.5m]</td>
</tr>
<tr>
<td>MJBA2300</td>
<td>up to 1,150 lbs. [522kg]</td>
<td>up to 15 ft. [4.5m]</td>
<td>up to 15 ft. [4.5m]</td>
</tr>
<tr>
<td>MJBA2600</td>
<td>up to 1,500 lbs. [682kg]</td>
<td>up to 15 ft. [4.5m]</td>
<td>up to 15 ft. [4.5m]</td>
</tr>
<tr>
<td>MJBA3000</td>
<td>up to 2,000 lbs. [907kg]</td>
<td>up to 15 ft. [4.5m]</td>
<td>up to 15 ft. [4.5m]</td>
</tr>
<tr>
<td>MJBA4000</td>
<td>up to 1,000 lbs. [453kg]</td>
<td>up to 15 ft. [4.5m]</td>
<td>up to 15 ft. [4.5m]</td>
</tr>
</tbody>
</table>

* For more detailed information on jib crane capacities, heights and lengths, contact your local Knight Global representative or visit www.knight-ind.com.

Jib Crane Accessories

To view our full line of Jib Crane Accessories visit us at www.knight-ind.com

Hose Management
Supplies air to the tooling. Includes the brackets, fittings, regulator, air lock-out and messenger cables. Available for coiled and straight hose systems (hose sold separately).

360° Rotate Air Fitting Assembly
Allows for the 360° continuous rotation of the air supply line.

360° Rotate Air Fitting (shown)

Hose Management (shown)
Lift Table Series (Cont.)

Double Scissor Lift
When extra lift is needed to raise loads to a higher and safe ergonomic height. Capacity up to 2,000 lbs. [907kg].

Turntables
Supplies loads continuously to an assembly station with one, two or four position configurations. Capacity up to 8,000 lbs. [3,629kg].

Portable Lift Table
Custom portable lift table is mounted to a cart for mobile use. Deck size and lift height will be customized to your application. Capacities vary by application.

Load Sensor Lift
Maintains loads at a safe ergonomic working height during varying weight load exchanges. Capacity up to 4,500 lbs. [2,041kg].

Table Accessories

Hand and Foot Controls
Table controls are available in a pedestal mounted or floor mounted configuration.

Bellows Skirting
Protective covering that serves as a barrier for the operator. Skirt keeps debris from entering the table.

Motion Stabilizer
Stabilizes loads traveling upward downward in a smooth, consistent manner. Typically used for loads that are greater than 4,000 lbs. [1,814kg].

Steel Riser
The steel reinforced construction ensures a safe, sturdy mounting base. Standard and custom risers are available.

Note: Table, Shuttles and Carts are available with a variety of accessories, safety features and equipment. Optional Safety Equipment including but not limited to: perimeter fence guarding, bellows skirting, safety mats, audible signals, light signals, toe guards, special control guarding, etc. are not included unless otherwise stated in the product descriptions. Please check with your state, local or plant safety for requirements. Please contact your local Knight Global representative or visit www.knight-ind.com (Tables, Shuttles and Carts) for more detailed information. Knight Global will be happy to quote any and all safety equipment needed to meet your requirements.
Accumulators/ Shuttles/ Conveyors/ Custom

Accumulators, Shuttles and Conveyors present customer product and allow the operator to continuously work without the need to stop for customer product reload. Knight shuttles and accumulators are custom designed to your specific application.

Knight Accumulators, Shuttles and Conveyors are available with Lift, Tilt, Lift and Rotate or Lift and Tilt features. They have a adjustable gravity feed with manual actuations to completely automate systems. Available in Pneumatic only, Pneumatic and Electric or an Electric only operated system. Optional docking system for fork-free incentive tugger carts.

**Powered Accumulators**
Powered Accumulators transfer parts between two workstations and offer an accumulation of parts. They are designed to your specific application needs. Loading capacity up to 50 lbs. per ft. [22kg].

**Custom Built Shuttles**
Custom shuttles are designed to your applications need and with a variety of design options available; the shuttle system is ideal for the transferring of products to and from workstations.

**Powered Conveyors**
Powered or Gravity Conveyors transfer parts between two workstations. They can be used in many types of material handling applications. They are designed to your specific needs.

**Gravity Over Under**
The Gravity Over-Under is an efficient way to transfer parts between areas for assembly applications. No power source is required making it a very cost effective and maintenance free system.

**Workstation Tables**
Workstation tables are designed to your applications need and with a variety of design options available. They can be incorporated with your existing tooling application.

**Lid Stack-n-Store**
The Lid Stack-n-Store, will store large, heavy and cumbersome container lids at a common location without manual handling. It is an efficient way to save space and organize a workstation at the same time.

**Dunnage Rack Carts**
Dunnage Racks are custom designed to store and transfer parts. Every rack is custom designed to your application. Multiple options and sizes are available.

**Controlled Drain Carts**
Controlled drain cart and nestings are used in the assembly or disassembly of transmissions and other components. Carts are designed to your application with or without a wet cart self contained oil drainage storage system.

**Smart Carts**
The Smart Cart is ideal when portable powered manipulation is required for an application. Options include various end effectors such as I.D. roll grippers, clamps, suction cups, etc. Capacity up to 400 lbs. [181kg].

To view our full line of Shuttles and Accumulators visit us at [www.knight-ind.com](http://www.knight-ind.com)

---

Carts/ Smart Carts

Knight Global Carts are designed to be customized to handle a wide variety of material handling needs. Each cart is tailored to the customer’s specific application. Knight Carts are also designed to be integratable with Knight Lift Tables.

Carts are the ideal choice for transporting, lifting and/or rotating products to an ergonomically correct position when portability is required. Knight Global Cart Systems are available in manual and electric (Smart Cart) operated configurations.

Smart Carts are custom designed to the customer’s specific application. The Smart Cart is ideal when an off the shelf cart will not work with your application. We can also design and build a custom end effector for your Smart Cart application.

**Carts/ Smart Cart Series**

**Custom Carts**
Designed per application. Open or fully enclosed with vinyl covers or solid doors. Available in a variety of configurations such as: Static Carts, Rotational Carts, Tilt Carts, Transfer Carts, Corral Carts and more.

**Forkless Tugger Carts**
Forkless cart systems allow you to link the carts together and tow several carts at once. The carts brake automatically disengages when the tongue comes down. Manually operated foot brake also included with cart.

**Push Carts**
Forkless carts are available in either push or tugger configurations. Can be configured with a rotolinal or static top. Capacity up to 1,500 lbs. [680kg].

**Smart Carts**
The Smart Cart is ideal when portable powered manipulation is required for an application. Options include various end effectors such as I.D. roll grippers, clamps, suction cups, etc. Capacity up to 400 lbs. [181kg].

To view our full line of Carts visit us at [www.knight-ind.com](http://www.knight-ind.com)