Ergonomic Material Handling Equipment

Product Catalog
**Servo Systems**

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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.

We are committed to **Total Customer Satisfaction** through QUALITY, RELIABILITY and EMPLOYEE INVOLVEMENT.
Servo Systems

Knight Global Servo Hoist Systems are Intelligent Assist Devices (IAD) that provide controlled transfers of workloads with speed, precision, quality and unmatched reliability. The Servos various programmability allows for imparting 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

- CE Compliant **
- Safety Rating of 125%
- Standard 24 VDC, 2.5 AMPS
- H5 Rated (Continuous Duty Cycle)
- 240 VAC, Single Phase 50/60 Hz
- Illuminated Run/Stop Button
- Programmable Overload Capability
- Fail Safe Braking
- Load Sensing, Pay Load and Handle Load
- Standard Float Mode
- Chain Driven

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

Intelligent Assist Devices (IADs) are computer controlled, servo driven tools that enable production workers to lift, move and position payloads quickly, accurately, and with ergonomic safety.

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

Ergonomic Safety Advantages

Knight Servo Systems are fully programmable allowing the application to be constantly monitored. Limits can be set to prevent the operator from accidentally dropping the load or from crashing the load into the nest when lowering to the set down position.

- Servo handles are load sensor based and do not require the pressing of buttons allowing for the operator to be 100% focused on moving or manipulating the part.
- Sensing will not allow for non-programmed loads to be raised or manipulated.
- Virtual limits can be programmed to prevent any crashes of loads moved into undesirable areas.
- Motion detection ability is available to stop if an operator moves into the path of a Servo Tractor.
- Programmable speeds and limits, to better assist the operator when manipulating a load.

Single Chain Single Motor

Knight Global’s KSH Series enables an operator to simply grasp the handle and move the load eliminating push buttons. Traditional hoists require the operator to push buttons in order to initiate motion.

The Standard hoist has a lifting capacity of up to 2000 lbs. [907kg] (Reeved Unit) and hoist speeds of up to 241 fpm [73.5mpm].

KSH 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 241 fpm</td>
</tr>
</tbody>
</table>

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

KSH Series

Max. Capacity(lbs/kg) | Max. Hoist Speed(fpm)
-----------------------|-----------------------|
up to 2,000 lbs. [907kg] | up to 241 fpm

* 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 Series

Max. Capacity(lbs/kg) | Max. Hoist Speed(fpm)
-----------------------|-----------------------|
up to 2,000 lbs. [907kg] | up to 196 fpm

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

Twin Chain Dual Motor

Knight Global’s Dual 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 Series

Max. Capacity(lbs/kg) | Max. Hoist Speed(fpm)
-----------------------|-----------------------|
up to 2,000 lbs. [907kg] | up to 123 fpm

* 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.

**KSHFA 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>

**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.

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**Features**

- CE Compliant **
- Safety Rating of 125% 
- Speeds: Up to 241 ft. per min. [73.5mpm].
- Overhead and Pedestal Mounted Configurations available.
- Maximum Lifting Capacity: Up to 1,500 lbs. [680kg] Reeved.
- Maximum Reach: Up To 48 in. [1,219mm].
  (Boom & End Effector length not included)
- Floor Mounted Pedestal Heights: 8 ft. [2.4m] - 10 ft. [3.0m].
- Chain Lengths: 12 ft. [365cm] - 20 ft. [609cm].
- Heavy Duty Roller Chain Available.
- Fall Safe Brake.
- Sealed Worm Style Gearbox.
- HS Rated (Continuous Duty Cycle).
- 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 Dampening.
- Standard Float Mode.
- Programmable Overload Capability.

**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 KSHAEB 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>
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<tbody>
<tr>
<td>up to 500 lbs. [226kg]</td>
<td>up to 241 fpm</td>
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* Listed capacities and speeds vary by configuration. For more detailed information, please contact a Knight representative.

**KSHEB 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>
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</tbody>
</table>

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

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**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>
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**KSHAEB Series**

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

**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 yarding and swinging of chain or cable.

**KSHVAA Series**

<table>
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<th>Max. Capacity (lbs/kg)</th>
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<td>up to 1,000 lbs. [453kg]</td>
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**KSHVA Series**

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<th>Max. Capacity (lbs/kg)</th>
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<td>up to 241 fpm</td>
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</table>

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

Note: Shown KSHVAA/KSHVAA overhead carriage and extension arm segments 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 servon 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 yarding and swinging of chain or cable.

**KSHVAAAR Series**

<table>
<thead>
<tr>
<th>Max. Capacity (lbs/kg)</th>
<th>Max. Hoist Speed (fpm)</th>
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<tbody>
<tr>
<td>up to 1,500 lbs. [680kg]</td>
<td>up to 131 fpm</td>
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**KSHVAR Series**

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<thead>
<tr>
<th>Max. Capacity (lbs/kg)</th>
<th>Max. Hoist Speed (fpm)</th>
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<tbody>
<tr>
<td>up to 1,500 lbs. [680kg]</td>
<td>up to 131 fpm</td>
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* Listed capacities and speeds vary by configuration. For more detailed information, please contact a Knight representative.

Note: Shown KSHVAR/KSHVARA 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 cells 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# EPDA9600 (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# EPOTA9600 (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)

**Analog LMM / Pass-Through**

Fully programmable analog style load monitoring module.

Model# EBA1385 (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# EBA1056 & 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)

**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# EBA1056 & EBA1226 (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)
**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 S0-2 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 an ergonomic positioned height. Heights are adjustable.
  - Model# EBA1145 (Shown)

- **Electric Coil Cable**
  - 10-pin cable provides communication from the (OCC) operator control interface module on the floor level, to the servo controls up on the rail.
  - Model# EBA1011 (Shown)

- **Servo System Applications**

  - **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 Pin Install Assist**
    - Vertical KSHVAR XYZ Roller Servo Hoist Arm using a hydraulic clamp style end effector that clamps, lifts 500 lbs. machinery pins and transfers into 300 degree hardening ovens.

  - **Engine Transfer**
    - Hook style end effector operated by a XYZ Servo Hoist and Tractor system. System assists operator in moving the large engine from the line conveyor to the dunnage.

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

To view more Servo System Applications visit us at www.knight-ind.com
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 mechanisms 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.
- Midrail 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 control configurations such as: automatic return home, conveying of a load to the next operator; which controls the movement of the Servo Tractor in the X (runway), Y (bridge) or Z (vertical) axis. Input sensors also coordinate the motion on the system by the movement of the hoist chain.

Features
- Safety Rating of 125%
- Standard 24 VDC
- H5 Rated (Continuous Duty Cycle)
- 480 VAC, Three Phase 50/60 Hz
- Illuminated Run/Stop Button
- X/Y/Z Braking
- Programmable Overload Capability
- Fail Safe Braking
- Load Sensing, Pay Load and Handle Load
- Standard Foot Mode
- Planetary Gearbox
- Programming/ Diagnostic Communication Ports
- I/O Capabilities (16 In / 8 Out)
- LED Status Indicators
- LED Fault Diagnostics
- Virtual Travel Limits
- Speed Reduction Zones
- Active Damping
- Impact Limiting

Servo Tractor Systems

The Servo Tractor Hoist Series accurately locates, transfers and lifts loads in the X, Y and Z directions. Servo Tractors have Knight Global’s Intelligent Assist Device (IAD) Servo Technology incorporated into their design allowing them to provide controlled transfers of workloads with speed and precision.

Features
- Safety Rating of 125%
- Standard 24 VDC
- H5 Rated (Continuous Duty Cycle)
- 480 VAC, Three Phase 50/60 Hz
- Illuminated Run/Stop Button
- Power and Free Drive Wheel
- Programmable Overload Capability
- Fail Safe Braking
- Load Sensing, Pay Load and Handle Load
- Standard Foot Mode
- Planetary Gearbox
- Programming/ Diagnostic Communication Ports
- I/O Capabilities (16 In / 8 Out)
- LED Status Indicators
- LED Fault Diagnostics
- Virtual Travel Limits
- Speed Reduction Zones
- Active Damping
- Impact Limiting

For more detailed information, please contact a Knight representative.

For more detailed information, 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. *(See note below)* or when high cycle times are required. Knight balancers have a maximum balancing capacity of up to 700 lbs. [318kg] and travels of up to 110 in. [2794mm].

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

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

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

**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>37 in. [940mm]</td>
</tr>
<tr>
<td>KBA225-073</td>
<td>225 lbs. [102kg]</td>
<td>73 in. [1854mm]</td>
</tr>
<tr>
<td>KBA225-110</td>
<td>225 lbs. [102kg]</td>
<td>110 in. [2794mm]</td>
</tr>
<tr>
<td>KBA350-073</td>
<td>350 lbs. [159kg]</td>
<td>73 in. [1854mm]</td>
</tr>
<tr>
<td>KBA500-080</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>

**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>110 in. [2794mm]</td>
</tr>
<tr>
<td>KBC225-067</td>
<td>225 lbs. [102kg]</td>
<td>67 in. [1701mm]</td>
</tr>
<tr>
<td>KBC350-067</td>
<td>350 lbs. [159kg]</td>
<td>67 in. [1701mm]</td>
</tr>
<tr>
<td>KBC500-080</td>
<td>500 lbs. [227kg]</td>
<td>80 in. [2032mm]</td>
</tr>
<tr>
<td>KBC700-062</td>
<td>700 lbs. [318kg]</td>
<td>52 in. [1320mm]</td>
</tr>
</tbody>
</table>

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

**Chain Shackle**

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

**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.

**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 a pneumatic balancer doubles the balancing capacity.

**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. Tandem Cable and Chain Pneumatic Balancers double the load capacity of a single balancer without sacrificing vertical travel.

**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>RKBA400-036</td>
<td>400 lbs. [181kg]</td>
<td>56 in. [1422mm]</td>
</tr>
<tr>
<td>RKBA500-065</td>
<td>500 lbs. [227kg]</td>
<td>56 in. [1422mm]</td>
</tr>
<tr>
<td>RKBA700-036</td>
<td>700 lbs. [318kg]</td>
<td>36 in. [914mm]</td>
</tr>
<tr>
<td>RKBA1000-040</td>
<td>1,000 lbs. [453kg]</td>
<td>40 in. [1016mm]</td>
</tr>
<tr>
<td>RKBA1400-067</td>
<td>1,400 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>
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</tr>
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<tbody>
<tr>
<td>RKBC400-055</td>
<td>400 lbs. [181kg]</td>
<td>56 in. [1422mm]</td>
</tr>
<tr>
<td>RKBC500-033</td>
<td>500 lbs. [227kg]</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>1,000 lbs. [453kg]</td>
<td>40 in. [1016mm]</td>
</tr>
<tr>
<td>RKBC1400-052</td>
<td>1,400 lbs. [635kg]</td>
<td>27 in. [685mm]</td>
</tr>
</tbody>
</table>

* 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>
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</table>

**RKBC Cable Series**

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<th>Max. Balance Capacity(lbs/kg)</th>
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<td>RKBC1000-040</td>
<td>1,000 lbs. [453kg]</td>
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<td>RKBC1400-052</td>
<td>1,400 lbs. [635kg]</td>
<td>27 in. [685mm]</td>
</tr>
</tbody>
</table>

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

*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.

**Tandem Pneumatic Balancer**

<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>1,000 lbs. [453kg]</td>
<td>80 in. [2032mm]</td>
</tr>
<tr>
<td>TKBA1400-054</td>
<td>1,400 lbs. [635kg]</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>TKBC700-067</td>
<td>700 lbs. [318kg]</td>
<td>67 in. [1701mm]</td>
</tr>
<tr>
<td>TKBC1000-080</td>
<td>1,000 lbs. [453kg]</td>
<td>80 in. [2032mm]</td>
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<td>TKBC1400-052</td>
<td>1,400 lbs. [635kg]</td>
<td>52 in. [1320mm]</td>
</tr>
</tbody>
</table>

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

Reeved Cable Balancer Pulley
Doubles the overall balancing capacity of a Reeved Cable Air Balancer.
Model# BPA2065 (Shown)

Reeved Chain Balancer Pulley
Doubles the overall balancing capacity of a Reeved Chain Air Balancer.
Model# BPA2066 (Shown)

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

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

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.
Model# RWA4133 (Shown)

Air Connection with Balancer Manifold
Air Manifold and Manifold to balancer air connection hose fittings are included with every controls handle purchase.
Model# CAMIRWA4133 (Shown)

Balancer Safety Cable Kit
Safety Cable Kits prevent Air Balancers or fixtures from separating or falling from overhead structures or rail.
Model# FDA4133 (Shown)

Nyco-Press Safety Cable Kit
Nyco-Press Safety Cable Kits prevent Air Balancers or fixtures from separating or falling from overhead structures or rail.
Model# CAMIRWA4133 (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

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. Lifting Capacity(lbs/kg)</th>
<th>Max. Travel(in./mm)</th>
<th>Max. Reach(in./mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOA7000</td>
<td>up to 470 lbs. [213kg]</td>
<td>up to 48 in. [1,219mm]</td>
<td>up to 48 in. [1,219mm]</td>
</tr>
<tr>
<td>AAA6000</td>
<td>up to 1,000 lbs. [453kg]</td>
<td>up to 110 in. [2,794mm]</td>
<td>up to 48 in. [1,219mm]</td>
</tr>
</tbody>
</table>

* 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

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. Lifting Capacity(lbs/kg)</th>
<th>Max. Travel(in./mm)</th>
<th>Max. Reach(in./mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA1000</td>
<td>up to 350 lbs. [158kg]</td>
<td>up to 110 in.</td>
<td>up to 48 in. [1,219mm]</td>
</tr>
</tbody>
</table>

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

Servo Arms

Expands 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 Series

<table>
<thead>
<tr>
<th>Model</th>
<th>Max Capacity(lbs/kg)</th>
<th>Max Hoist Speed(fpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KSHVA Series</td>
<td>up to 1,500 lbs. [680kg]</td>
<td>up to 98 fpm</td>
</tr>
<tr>
<td>(Floor Mounted Articulating)</td>
<td>up to 1,500 lbs. [680kg]</td>
<td>up to 98 fpm</td>
</tr>
<tr>
<td>(Overhead Mounted Articulating)</td>
<td>up to 1,500 lbs. [680kg]</td>
<td>up to 98 fpm</td>
</tr>
<tr>
<td>KSHVAE Series</td>
<td>up to 1,000 lbs. [453kg]</td>
<td>up to 241 fpm</td>
</tr>
<tr>
<td>(Floor Mounted Extension)</td>
<td>up to 1,000 lbs. [453kg]</td>
<td>up to 241 fpm</td>
</tr>
<tr>
<td>(Overhead Mounted Extension)</td>
<td>up to 1,000 lbs. [453kg]</td>
<td>up to 241 fpm</td>
</tr>
</tbody>
</table>

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

For more detailed information on Knight Global Servo Arms, please see (Page 3) 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

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. Balance Capacity(lbs/kg)</th>
<th>Max. Travel(in./mm)</th>
<th>Max. Reach(in./mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KEAA1000</td>
<td>up to 700 lbs. [317kg]</td>
<td>up to 110 in.</td>
<td>up to 45 in. [1,143mm]</td>
</tr>
<tr>
<td>KEAA1500</td>
<td>up to 1,500 lbs. [680kg]</td>
<td>up to 241 fpm</td>
<td>up to 98 fpm</td>
</tr>
</tbody>
</table>

* 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.
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.

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/cantilevered loads.

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.

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 60 lbs. (27kg)</td>
<td>up to 74 ft. lbs.</td>
</tr>
<tr>
<td>ATA1500-15</td>
<td>up to 15 lbs. (7kg)</td>
<td>up to 74 ft. lbs.</td>
</tr>
<tr>
<td>ATA1500-25</td>
<td>up to 25 lbs. (11kg)</td>
<td>up to 74 ft. lbs.</td>
</tr>
<tr>
<td>ATA2600</td>
<td>up to 35 lbs. (16kg)</td>
<td>up to 150 ft. lbs.</td>
</tr>
<tr>
<td>ATA2700</td>
<td>up to 35 lbs. (16kg)</td>
<td>up to 150 ft. lbs.</td>
</tr>
<tr>
<td>ATA4500</td>
<td>up to 500 lbs. (226kg)</td>
<td>up to 853 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.

Quick Build Series

<table>
<thead>
<tr>
<th>Type</th>
<th>Aluminum</th>
<th>Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight Connector</td>
<td>DSAAL1136</td>
<td>DSA1136</td>
</tr>
<tr>
<td>L-Connector (1.0&quot;)</td>
<td>DSAAL1137</td>
<td>DSA1137</td>
</tr>
<tr>
<td>L-Connector (1.5&quot;)</td>
<td>DSAAL1147</td>
<td>DSA1147</td>
</tr>
<tr>
<td>L-Connector (2.0&quot;)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Spline Tubing (1.0&quot;)</td>
<td>DSD1109</td>
<td>N/A</td>
</tr>
<tr>
<td>Spline Tubing (1.5&quot;)</td>
<td>DSD1109</td>
<td>N/A</td>
</tr>
<tr>
<td>Spline Tubing (2.0&quot;)</td>
<td>DSD1108</td>
<td>N/A</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.

Ergo Positioner

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 large or unwieldy parts using the pneumatic foot control to lock and release the part in multiple positions. Its ability for unlimited 3-axis movement reduces operator strain and improves productivity.

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 450 lbs. [204kg]</td>
<td>up to 15 in. [381mm]</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.
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.

**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.

**End Effector Styles**

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

- **Scissor Hook Fixture**
  Scissor hook style fixture that is suspended by a Knight Pneumatic Balancer. Transfers large core pipe from mold machine to transfer cart.

- **Magnetic Fixture**
  Magnetic style fixture operated by a Knight Servo System. Transfers engine from assembly line 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.

- **I.D. Clamp Fixture**
  Inside diameter clamp 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.

- **I.D. Core Fixture**
  Inside diameter core style fixture operated by a Knight Servo System. Transfers roll material from dunnage to the unwind wheel station.

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

- **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.

- **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.

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

- **Wheel Assembly Install**
  Nesting and manual clamp end effector mounted on an ATA4000 vertical mast arm. Fixture assists operator in picking up wheel assembly and rotates tire for install.

End Effector Applications

To view all the End Effector Styles visit us at www.knight-ind.com

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

Knight Global offer’s 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 needs.

Levers 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**

To view all the Control Handle styles visit us at [www.knight-ind.com](http://www.knight-ind.com)

**Electric Control Handles**

**Electric/Pneumatic Control Handles**

**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 FHPH 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 2-Way valves used for only a single acting air balancer or lift assist used for UP/DOWN movement.

- Each BPA9001 Valve Block replacement kit includes:
  - (2) Plunger Assembly #CS-2993, (1) 6mm x 10mm FHPH 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 2-Way valves used for sending common pilot signals.

- Each BPA9050 Valve Block replacement kit includes:
  - (1) Plunger Assembly #CS-2993, (1) 6mm x 10mm FHPH and (1) tube of lubricant, (1) 6mm x 10mm B.H.C.S, (1) 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.

**Model Inner Diameter (I.D.)**

- BPD1119: 0.88 in. [22.2mm] I.D.
- BPD1120: 1.00 in. [25.4mm] I.D.
- BPD1121: 1.25 in. [31.7mm] I.D.
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

Knight’s 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. [495kg]</td>
<td>1:350 *</td>
</tr>
<tr>
<td>TR2000</td>
<td>2 in. [51mm]</td>
<td>500 lbs. [226kg]</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, roller, etc.) isationally 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. [495kg]</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>HAD3500 (Half)</td>
<td>2 in. [51mm]</td>
<td>Application Specific</td>
<td>1:350 *</td>
</tr>
<tr>
<td>HAD3000 (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>550 lbs. [249kg]</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>
</tr>
</thead>
<tbody>
<tr>
<td>RAD6500</td>
<td>6 in. [152mm]</td>
<td>Application Specific</td>
</tr>
<tr>
<td>RAD4700</td>
<td>4 in. [101mm]</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.

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.
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

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 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.

<table>
<thead>
<tr>
<th>Model</th>
<th>Max Capacity(lbs)</th>
<th>Bridge Type</th>
<th>Rail Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>FMRS1400</td>
<td>Application Specific</td>
<td>Single/ Dual</td>
<td>RAD4110</td>
</tr>
<tr>
<td>FMRS1700</td>
<td>Application Specific</td>
<td>Single/ Dual</td>
<td>RAD7910</td>
</tr>
<tr>
<td>FMRS2790</td>
<td>Application Specific</td>
<td>Single/ Dual</td>
<td>RAD7910</td>
</tr>
</tbody>
</table>

* 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.

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.

<table>
<thead>
<tr>
<th>Model</th>
<th>Max Capacity(lbs)</th>
<th>Bridge Type</th>
<th>Rail Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFMRS1000</td>
<td>Application Specific</td>
<td>Single/ Dual</td>
<td>RAD7910</td>
</tr>
</tbody>
</table>

* 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.

Additional columns and runway backers can be added to the two post system to achieve greater load capacities and minimize system deflection.

<table>
<thead>
<tr>
<th>Model</th>
<th>Max Capacity(lbs)</th>
<th>Bridge Type</th>
<th>Rail Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMRS1000</td>
<td>Application Specific</td>
<td>Single/ Dual</td>
<td>RAD7910</td>
</tr>
</tbody>
</table>

* 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.

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 Trolley

Load trolleys transfer loads along the horizontal axis and suspends 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.

Overhead or Floor Mounted Rail Systems

CMRS1000

CMRS1700

CMRS2790

Floor Mounted Post System

CMRS1000

CMRS1700

CMRS2790

Overhead or Floor Mounted Rail Systems

Structural Hangers

I-Beam Infrastructure & Elevations

Runway System

End Trucks

Bridge Brace

Load Trolley

Cantilevered Rail System

Two/Three Post Cantilevered System

Dual Cantilevered System

Bridge Brace

Hose Management Kits

Splice Kits
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 in 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.

Cantilevered Workstation

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

Rail Accessories

Model Max Capacity/lbs Max. Under Rail Heights/ft/m Max. Boom Lengths/ft/m
WSA1000 Application Specific up to 16 ft. [4.87m] up to 16 ft. [4.87m]

* 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.

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 20 ft. [6m] 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. [3m]</td>
</tr>
<tr>
<td>MJBA2100</td>
<td>up to 149 lbs [68kg]</td>
<td>up to 15 ft. [4.5m]</td>
<td>up to 20 ft. [6.1m]</td>
</tr>
<tr>
<td>MJBA2200</td>
<td>up to 800 lbs [363kg]</td>
<td>up to 15 ft. [4.5m]</td>
<td>up to 20 ft. [6.1m]</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 20 ft. [6.1m]</td>
</tr>
<tr>
<td>MJBA2600</td>
<td>up to 1,150 lbs [522kg]</td>
<td>up to 15 ft. [4.5m]</td>
<td>up to 20 ft. [6.1m]</td>
</tr>
<tr>
<td>MJBA3000</td>
<td>up to 1,150 lbs [522kg]</td>
<td>up to 15 ft. [4.5m]</td>
<td>up to 20 ft. [6.1m]</td>
</tr>
<tr>
<td>MJBA4000</td>
<td>up to 2,000 lbs [907kg]</td>
<td>up to 15 ft. [4.5m]</td>
<td>up to 20 ft. [6.1m]</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 cable. Available for coiled and straight hose systems. Hose sold separately.

Model: JSA9135 (shown)

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

Model: JSA9137 (shown)

MJBA3000 Rail Mount Kit Attaches underneath the 1 or 5-S-Beam of a Knight Jib Crane. Allows for a Knight low friction load trolley to move the load on the rail.

Model: MRHS40821 (shown)
Tables, Shuttles and Carts

Knight Lift Tables incorporate the use of pneumatic control technologies, which makes table operation cleaner, simplifies spare parts inventories and reduces general maintenance. Our exclusive Knight Global air bag design offers high durability and resistance to wear.

Lift Tables are available in a variety of configurations to accommodate every applications needs. All lift tables come equipped with hydraulic steel fittings and a Continental “Flexagrip” hose/fitting system. Stainless steel braided hydraulic hoses for increased durability is optional. Polished chrome shafts are used at all slide and pivot points to minimize the wear and prolong component life.

Maintenance Lock-Out Bar design that physically locks out the lift table are standard on all Knight Global Lift Tables. All tables are inspected and tested before they leave our facility.

Lift Table Series

Standard Lift
Lift table raises loads to the proper ergonomic height for the operator. Lifting capacity up to 8,000 lbs. [3,629kg].

Lift and Rotate
Rotate table raises loads to the proper ergonomic height and provides up to 360° of rotation. Lifting capacity up to 8,000 lbs. [3,629kg].

Low Profile
Lift and Rotate
The low profile design lowers the table top to 8.5 in. [215mm] off the floor. Lifting capacity up to 6,000 lbs. [2,722kg].

Slide and Tilt
Cart Lift
Cart lift systems position the cart and content in an ideal ergonomic position so workers are more productive. They are equipped with cart to table interlock systems.

Cart Lift
Fork-free lift that raises smaller carts to operator working level. Rear wheels allow operator to easily transfer the cart lift to multiple locations.

Stationary/ Portable Cart Lift

Lift and Tilt
Lift and Tilt table will raise loads to ergonomic heights and provides a tilting table top. Lifting capacity up to 6,000 lbs. [2,722kg].

Standard Tilt
By tilting container forward, the table positions dunnage for easy loading or unloading. Lifting capacity up to 8,000 lbs. [3,629kg].

Lift Table Series (Cont.)

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. Skirting 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.

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

Zero Loader
Designed for ground level loading, lifting and tilting with a pallet jack when fork truck access is limited. Capacity up to 4,000 lbs. [1,814kg].

Zero Lift/ Tilt Loaders
Combines the convenience of ground level loading with the footprint of a standard lift table. Capacity up to 4,000 lbs. [1,814kg].

Platform Lift
Platform lifts the position of the operator in an ergonomic manner within a workstation. Pneumatic or hydraulic lifts available. 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.

Air/ Hydraulic/ Electric
Lift and Rotate
Air or electric operated for the applications that need the rigid actuation that hydraulic provides.

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].

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 skirts, 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 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, Shutters 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].

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

To view our full line of Shuttles and Accumulators visit us at www.knight-ind.com

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