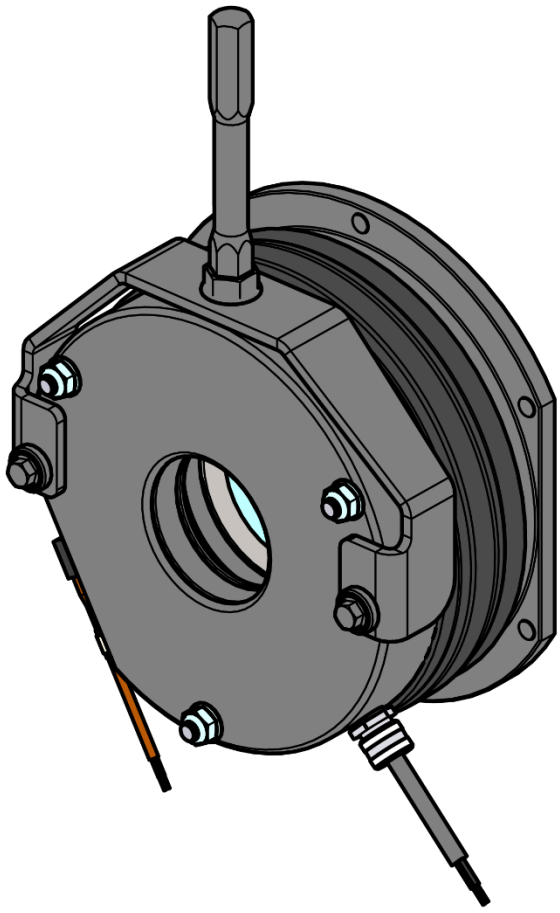


COMBISTOP **type 38**

Instruction Manual | Load Brake Size 9

Original Manual
Load Brake Size 9
Document 20139598 000 01
Material No. 0938TUM-K001

1 Preface

The hardware and software described in this document are products of KEB America, Inc. The information contained in this document is valid at the time of publishing. KEB reserves the right to update this document in response to misprints, mistakes or technical changes.

1.1 Warning Signs and Key Symbols

Certain procedures within this document can cause safety hazards during the installation or operation of the device. Refer to the safety warnings in this document when performing these procedures. Safety signs are also located on the device where applicable. A safety warning is marked by one of the following warning signs:

⚠ DANGER	➢ Dangerous situation which **will cause death or serious injury** if this safety warning is ignored.
⚠ WARNING	➢ Hazardous situation which **may cause death or serious injury** if this safety warning is ignored.
⚠ CAUTION	➢ Hazardous situation which **may cause minor or moderate injury** if this safety warning is ignored.
NOTICE	➢ Situation which **may cause property damage** if this safety warning is ignored.
RESTRICTION	➢ Used when the following statements depend on certain conditions or are only valid for certain ranges of values.
i	➢ Used for informational messages or recommended procedures.

1.2 More Symbols

1. Numbered lists begin action steps.
- Enumerations are marked with dots.

→ Thin arrows indicate cross references to another chapter or another page.

Further documentation can be found at https://www.kebamerica.com

Document search on www.kebamerica.com/em-documents/

1.3 Laws and Requirements

KEB Automation KG has certified the product against the US, Canadian and European standards. Additionally KEB Automation KG provides the EC declaration of conformity that the product complies with the essential safety requirements.

The UL, CSA and CE marks are located on the name plate when applicable. The EC declaration of conformity can be downloaded on demand via our website.

→ Further information is provided in Appendix 1: Certification.

1.4 Warranty

KEB Automation KG provides a limited warranty on all products. This warranty can be found in the terms and conditions at our website.

KEB America, Inc. Terms and Conditions

Terms and Conditions

Further agreements or specifications require written confirmation from KEB America, Inc.

1.5 Support and Liability

It is not possible to cover every potential application of our device in a single manual. If you require further information or if problems occur which are not covered in this document, you can request the necessary information via KEB America, Inc. or the local KEB Automation KG agency.

The use of our products in the target application is beyond our control and therefore exclusively the responsibility of the machine manufacturer, system integrator or customer.

The information contained in this document, as well as any user-specific advice in spoken or written form or generated through testing, is provided to best of our knowledge and is considered for informational purposes only. KEB America, Inc. bears no responsibility or liability for the accuracy of the information listed above, nor for any violation of industrial property rights committed by a third-party in relation to this information.

Selection of the most suitable product for any given application is the responsibility of the machine manufacturer, system integrator or customer.

Evaluation of the product can only be performed by the machine manufacturer in combination with the application. Any tests performed must be repeated every time any part of the hardware or software is modified, or any time the unit adjustment is changed.

1.6 Copyright

The customer may use the information contained within this document for internal purposes only. Copyright of this document is held by KEB America, Inc. and remains valid in its entirety.

Other wordmarks or/and logos are trademarks (™) or registered trademarks (®) of their respective owners and are listed in a footnote at the first occurrence.

Table of Contents

List of Figures

List of Tables

Glossary

AC	Alternating current.
Aggressive Fumes/Liquids	Gasses or liquids that are chemically reactive and may cause corrosion in exposed machine parts.
Air Gap	The gap between the armature and the magnet. This air gap must be precisely adjusted to a specific width, denoted as X. If the air gap is too wide, the brake may not release torque. If the air gap is too narrow, the brake may drag continuously.
Application	The machine/system in which the KEB device is to be used. For brakes the application is typically the motor to which the brake is attached.
Armature	The component of the brake connected to the magnet which moves across the air gap to engage or disengage the brake. When powered off the armature is pressed against the friction brake assembly by springs causing braking torque. When powered on the armature is pulled across the air gap by the magnet and the brake releases.
AWG / Wire Gauge	American Wire Gauge. A measure of the thickness of a wire using standardized sizes.
Branch Circuit Protection	Circuit protection for the portion of the electrical distribution system that extends beyond the final branch circuit protection device. A branch circuit is used to run motors or other appliances, and is what is commonly found inside a building.
CE	European safety standards for products in the European Economic Area. Manufacturers self-test products against these standards to maintain CE certification. The CE mark indicates a product meets EEA safety standards.
CEC	Canadian Electric Code. Safety standard for electrical installations used in Canada.
Control Device/Interface	The COMBISTOP brake is controlled electronically by a control device. This can be as simple as a switch, or as complex as a full suite of control software.
CSA	Canadian Standards Authority, also known as CSA Group. Organization that tests and certifies products according to Canadian safety standards. The CSA mark indicates a product meets Canadian safety standards.
Customer	The corporation or individual who purchased the COMBISTOP brake.
DC	Direct current.
Device / KEB Device	The COMBISTOP brake described in this manual.
Drive Shaft	A mechanical component for transmitting torque and rotation from a motor to other parts of a mechanical system.
Dry running	Operation in dry environments with no danger of dripping or splashing liquids.

EC Declaration of Conformity	Declaration that the device conforms to EU standards of safety.
Enclosure	A metal covering installed to protect the brake from airborn particles or moisture, and to prevent accidental contact with the brake that may result in injury.
Equipotential Bonding	A practice of intentionally electrically connecting all exposed metal items not designed to carry electricity in a room as protection from electric shock.
Flange	An external flat rim or ridge for attaching an external object to the device.
KEB Automation KG	Parent company of KEB America, Inc. Also referred to as KEB.
Machine Manufacturer	The manufacturer of the application in which the COMBISTOP brake is installed. Not KEB America, Inc.
Magnet	The component of the brake which contains the magnetic components.
Mounting Surface	A surface to which the COMBISTOP device is physically attached.
NEC	US National Electric Code. Safety standard for electrical installations used in the United States.
Product / KEB Product	See Device.
Recommended tightening torque	The torque required to fully screw a socket head screw into a mounting surface. The recommended tightening torque depends on the type of screw used as well as the material, thread depth and locking components (if any) used in the mounting surface. Refer to the machine manufacturer for details on recommended tightening torques for specific mounting surfaces.
Run-out	An inacuracy of rotating mechanical systems whereby the shaft does not rotate precisely in line with the main axis. Always present but must be minimized.
Specified Application	The specific application for which the COMBISTOP device was ordered, is usually (but not always) the same as the Application in which the device is being used.
System Integrator	The technician installing the COMBISTOP brake into the application.
UL	Independent Standardization Company that tests and certifies products according to defined and industry leading safety standards. The UL mark indicates a product meets UL safety standards.

Standards for COMBISTOP type 38 Load Brake

The COMBISTOP type 38 Load Brake installation must comply with all relevant safety standards. The following standards are relevant to the installation and operation of the Load Brake.

- **Directive 2006/42/EC (annex I)**
  - Region: EU
  - Essential health and safety requirements for the design and construction of machinery.
- **C22.1-18: Canadian Electric Code, Part 1 (CEC)**
  - Region: Canada
  - Electric safety code detailing safety standards for electric installations in Canada.
- **NFPA 70: National Electric Code (NEC)**
  - Region: US
  - Electric safety code detailing safety standards for electric installations in the United States.
- **NFPA 79: Electrical Standard for Industrial Machinery**
  - Region: US
  - Industrial safety code detailing safety standards for industrial machinery to protect against fire and electrical hazards.
- **OSHA 1910.137**
  - Region: US
  - Personal safety code detailing appropriate personal protective equipment for working on electrical installations.
- **OSHA 1910.269**
  - Region: US
  - Occupational safety code detailing safety standards for electrical power generation, transmission, and distribution.

2 Safety Instructions

The COMBISTOP type 38 Load Brake is designed and constructed with state-of-the-art technology in accordance with recognized safety rules and regulations. Improper use of this device may cause hazards to life and limb of the user or third-parties, or damage to the application and other material property.

The following safety instructions have been created by KEB America, Inc. for the Load Brake. These instructions can be supplemented by local, country- or application-specific safety instructions where relevant.

Violation of the safety instructions in this manual will result in the loss of any liability claims.

NOTICE

Stay Safe! Stay Informed!

- Read the instruction manual prior to operating the device!
- Follow all safety and warning instructions!
- If you are unsure of any part of these instructions, please contact KEB prior to operating the device!

2.1 Target Audience

This manual is intended exclusively for the use of qualified electrical/mechanical technicians. Qualified technicians for the purpose of this document must meet the following:

- Must have fully read and understood the safety instructions contained in this manual.
- Must be familiar with the installation and assembly of electrical products.
- Must be familiar with the installation and operation of the product as specified in this manual.

  → See the Installation and Operation chapters for details.
- Must fully understand the specified application of the product.

  → See the Specified Application section for details.
- Must be familiar with the hazards and risks of mechanical braking technology.
- Must be familiar with appropriate electrical and safety codes:
  - **US:** NFPA 70 National Electric Code (NEC)
  - **Canada:** Canadian Electric Code, C22 Part 1 (CEC)
- Must be familiar with national safety regulations (e.g. OSHA Title 29 CFR):

  → See the Standards for COMBISTOP type 38 Load Brake section for details.

2.2 Specified Application

The operational reliability of the brake is only guaranteed when the device is used for the specified application. In this context, specified application means the purpose for which the brake was ordered and configured.

Any use of the brake outside of this specified application is considered at the user's own risk. Such unintended uses may pose unforeseeable risks or hazards. KEB America, Inc. retains no liability for any damage or injury resulting from the use of a COMBISTOP brake outside of the specified application.

2.3 General Safety Guidelines

Carefully observe the following safety guidelines before installation or operation of the device.

- Only trained personnel should operate the brake.
- Immediately remove the brake from operation in case of a malfunction.
- Malfunctions should be corrected by trained personnel before returning the brake to operation.
- Never use the brake in potentially explosive environments.
- The brake may not be modified or altered in any way not intended by KEB America, Inc.

2.4 Electrical Safety Guidelines

⚠ DANGER

Rick of electrical shock!

- ➢ Turn off the power supply and secure it against switching on prior to any work on the device.
- ➢ Never bridge branch circuit protection devices.

Carefully observe the following safety guidelines during the electrical installation.

- Observe all relevant safety standards for the device.

  → See the Standards for COMBISTOP type 38 Load Brake section for details specific to the product.

- Use only wire gauges and fuses rated for the power requirements of the device.
- Ensure new or existing circuits meet NEC or applicable local requirements.
- The device must be appropriately grounded by a connector from the magnet and the fixed installation.
- When using components without isolated inputs/outputs, equipotential bonding must be used between the connected components to prevent damage to the device.
- Do not exceed specified electrical voltage and currant limits.

2.5 Installation and Operation Safety Guidelines

⚠ WARNING

Moving parts can crush and cut!

➢ Contact with rotating or moving parts may cause serious injury. Ensure adequate protection around the brake to prevent accidental contact!

⚠ CAUTION

Hot Surfaces!

➢ The heat generated during the operation of the brake may cause burns on contact with skin. Always wear appropriate protective equipment!

Do not start the device until you have confirmed that the installation complies with the following safety standards.

- Ensure there is sufficient protection against foreign particles entering the air gap. These particles may impede the motion of the armature.
- Ensure there is sufficient thermal protection such that the brake or clutch does not exceed or fall below the listed temperature limits for the device.
- Ensure there is protection against accidental contact with rotating or moving parts.
- Ensure there is sufficient protection from environmental factors such as moisture or aggressive gases that may compromise the integrity of the friction surface or armature.

2.6 Maintenance Safety Guidelines

⚠ DANGER

Risk of electrical shock!

➢ Turn off the power supply and secure it against switching on prior to any maintenance on the brake.

⚠ WARNING

Moving parts can crush and cut!

➢ Contact with rotation or moving parts may cause serious injury. Wait until the drive has come to a complete stop before performing any maintenance.
➢ Secure the drive against accidental movement prior to performing any maintenance.

⚠ CAUTION

Hot Surfaces!

➢ The heat generated during the operation of the brake may cause burns on contact with skin. Always wear appropriate protective equipment.

Carefully observe the following safety guidelines before performing maintenance on the brake.

- Ensure the device is powered off and has come to a complete stop before performing any maintenance.
- Secure the brake so it cannot be switched on accidentally during maintenance.
- Disconnect the brake from the load before maintenance to avoid uncontrolled movements.
- Ensure there is sufficient protection against foreign particles entering the air gap during maintenance.
- Ensure there is sufficient protection against moisture or aggressive gasses that may compromise the integrity of the friction surface or armature.

2.7 Personal Protective Equipment

When installing or performing maintenance on the brake or clutch, use the following personal protective equipment:

- Long-sleeved protective clothing
- Safety gloves
- Safety shoes
- Safety goggles

The personal protective equipment must be provided by the operating company and must comply with any applicable safety regulations.

3 Product Description

3.1 Scope of this Manual

This manual describes the installation and operation of the KEB size 09 COMBISTOP Type 38 Load Brake. The Load Brake is a specialized version of the COMBISTOP spring set brake designed for quiet running and heavy loads.

The size 09 Load Brake can be mounted eternally or internally.

Externally mounted brakes can be mounted directly to the bulkhead of the machine and are the simplest to install. Externally mounted brakes are referred to as **Design Style A**.

→ See section Design A Installation for details.

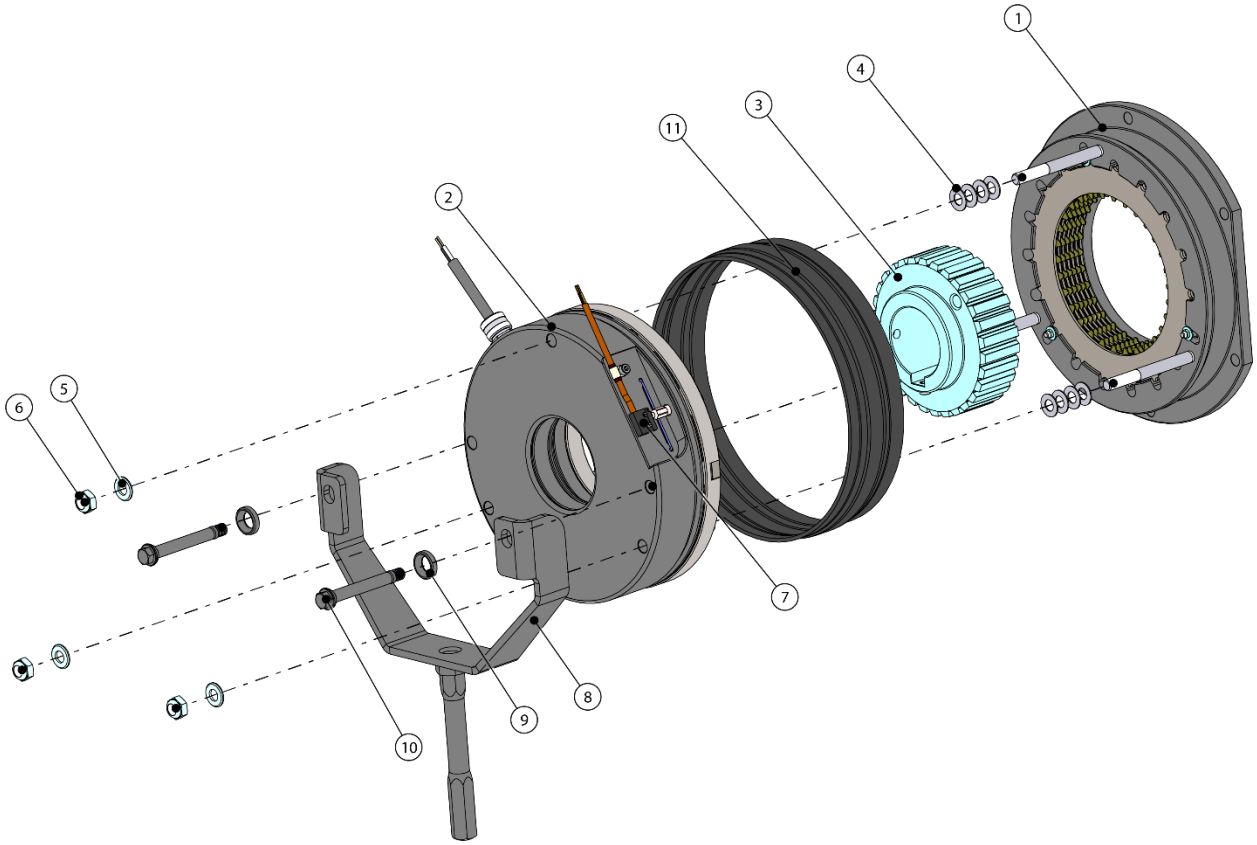
Internally mounted brakes are mounted to the output of a gearbox internal to the machine. Internally mounted brakes are referred to as **Design Style B**.

→ See section Design B Installation for details.

This manual also covers the installation of a microswitch and hand release lever for the brake, as well as explaining the different rectifiers available for the Load Brake.

3.2 Description

3.2.1 Brake Components

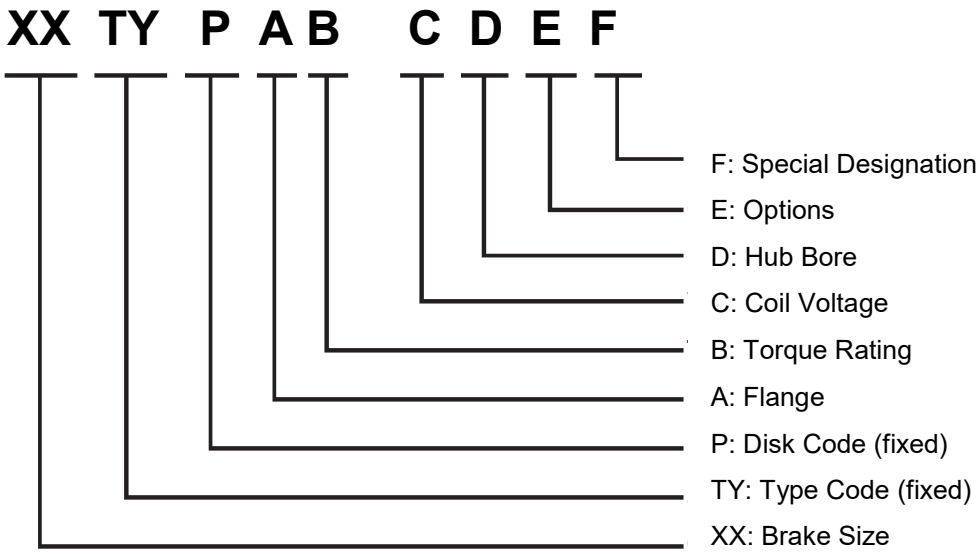


Brake Components		
Component	**Name**	**Number Included**
1	Brake basket assembly	1
2	Magnet assembly	1
3	Hub	1
4	M10 spring washers	12 (4 per stud)
5	M10 washers	3 (1 per stud)
6	M10 nylon lock-nuts	3 (1 per stud)
7	Hand release lever (optional)	1
8	Microswitch (optional)	1
9	Spherical Washer (included with Hand Release)	2
10	Spherical Bolts (included with Hand Release)	2
11	Dust protection ring	1

Figure 1 Brake Components

3.2.2 Brake Assembly Numbering Scheme

The part number for a COMBISTOP brake describes the device type as well as options specified for the device. It is important to order the correct brake for your specified application. Consult the following table for a description of Load Brake part numbers and their meanings.



Part Number Component Descriptions			
Number	**Name**	**Options**	**Description**
XX	Brake Size	09	The only size described in this manual (Fixed)
TY	Type Code	38	Spring Set Brake (Fixed)
P	Disc Code	M	Multi-Disk Brake (Fixed)
A	Flange Type	0	Generic Flange
		1	KEB F4/K4
		2	SEW 57/67 B
		3	Torque Arm
B	Torque Rating	1	250 Nm
		2	500 Nm
		3	750 Nm
		4	1000 Nm
		5	1250 Nm
		6	1500 Nm
C	Coil Voltage	0	24 VDC
		1	105 VDC
		2	170 VDC
		3	205 VDC

Part Number Component Descriptions			
Number	**Name**	**Options**	**Description**
		4	270 VDC
D	Hub Bore (Metric)	1	35 mm
		2	40 mm
		3	45 mm
		4	50 mm
		5	55 mm
		6	60 mm
		7	65 mm
	Hub Bore (Inches)	A	1.5“
		B	1.625“
		C	1.75“
		D	2.00“
		E	2.375“
		F	2.50“
E	Options	0	Bolt release, no microswitch
		1	Hand release, no microswitch
		2	Bolt release with microswitch
		3	Hand release with microswitch
F	Special Designation	0	Standard
		X	Special, number C, D and E are randomized

Table 1 Part Numbers

3.3 Brake Specifications

Coil Specifications	
Specification	**Value**
Voltage	Variable
Power	135W
Current	135W/Coil Voltage
Mounting	Can be mounted vertically or horizontally
Max Operating Speed	600 RPM

Table 2 Coil Specifications

Resistance Range	
Coil Voltage	**Resistance (Ω)**
24 VDC	3.9 – 4.5
105 VDC	76 – 87
170 VDC	199 – 229
205 VDC	275 – 317
270 VDC	502 – 578

Table 3 Resistance Ranges

4 Installation

NOTICE

Stay Safe! Stay Informed!

- Read and follow all safety instructions prior to installing the Load Brake.

The following sections detail the steps for unpacking and installing the size 09 COMBISTOP type 38 Load Brake (shown below). Read this chapter thoroughly before beginning the installation process.

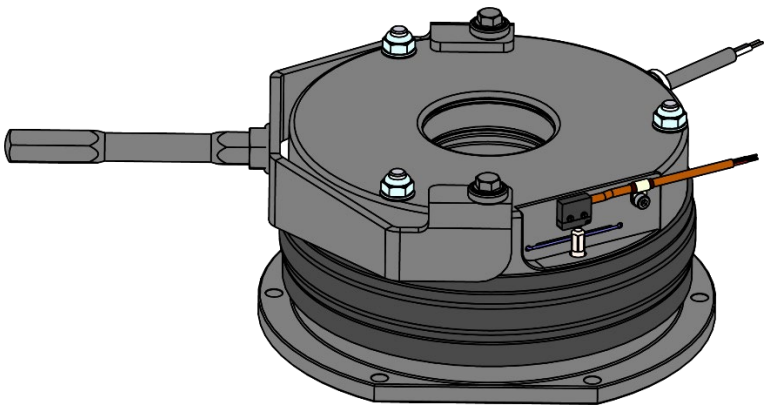


Figure 2 Load Brake with optional Hand Release Lever and Microswitch

4.1 Required Tools

You will need the following tools before you begin the Load Brake installation.

- Customer supplied hex head key (Design A)
- 6mm or 8mm hex head key (Design B)
- KEB Alignment Tool (Design B, Optional): Part number 0938007-007U
- 17mm wrench
- Feeler gauge

Brake with hand release:

- 13mm wrench

Brake with Microswitch:

- Small flathead screwdriver
- 4mm hex head key
- 8mm wrench
- Digital multimeter

4.2 Unpacking the Brake

⚠ CAUTION

Heavy Objects!

- Large sizes of the Load Brake can be too heavy to safely lift by hand. Use appropriate lifting equipment to transport the size 10 Load Brake.

1. Remove the packaging from the brake.
2. Inspect the complete brake assembly for damage or defect.

i

- Report any shipping damage to the device or packing to the shipping company and to KEB America, Inc.

3. Remove the rubber dust ring, if installed.
4. Remove cardboard packaging strips holding the hub in place.
5. Place the brake on a support such that the weight of the brake does not rest on the protruding internal mounting bolts (Design B).

4.3 Installing the Brake

4.3.1 Design A Installation

4.3.1.1 Install the Hub on the Shaft.

1. Mount the hub (2) on the shaft (3), positioning the hub 1mm from the mounting surface (3). Ensure the hub is oriented with set screws facing out.

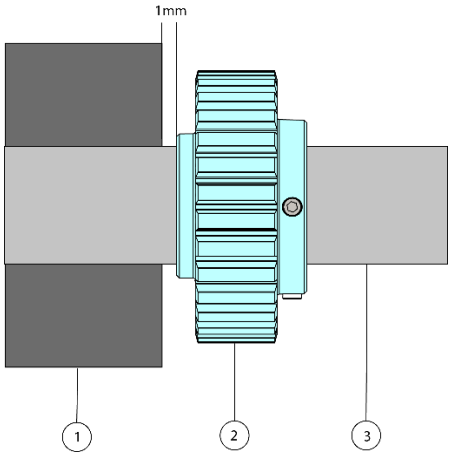


Figure 3 Hub Installation

2. Lock the hub in place axially with a shaft collar or snap rings. Set screws are included for additional security.
3. The hub should rotate with less than a 0.2mm runout on the hub outer diameter and the hub face.
   The hub should be centered in the brake mounting pattern to less than 0.2mm when measured from the hub to the six mounting holes.

4.3.1.2 Install the Brake on the Hub

1. Lift the brake assembly with the help of a second person or a lifting strap.
2. Slide the brake assembly (4) over the hub (2) and shaft (3); positioned such that the lead wire extends in the desired direction. The brake may have to be rotated slightly to engage the teeth of the friction disk.
3. Ensure the brake assembly (4) fits snugly against the mounting surface (1)

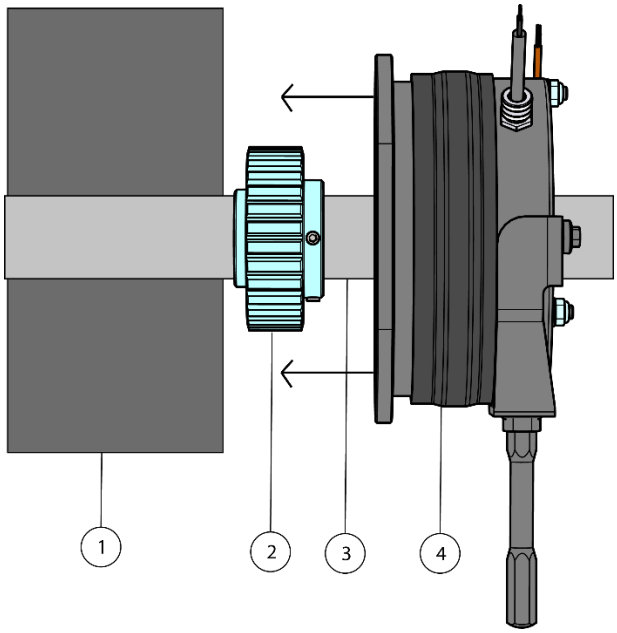


Figure 4 Brake Assembly Installation

⚠ CAUTION

➢ Do not force the brake assembly onto the hub! Doing so may damage the brake.

4. Apply LOCTITE® to the threads of the six external socket head mounting bolts (customer supplied). Start the bolts using the appropriate hex head key.
5. Tighten the bolts equally in two stages until the brake assembly is securely fastened to the mounting surface. KEB recommends a tightening torque of 60 – 80 Nm.

Proceed to Checking the Air Gap.

4.3.2 Design B Installation

4.3.2.1 Disassemble the Brake

The Design B brake comes fully assembled, but must be disassembled prior to installation.

1. Loosen and remove the three M10 lock-nuts (1) holding the magnet housing on the brake assembly using a 17mm wrench.

> ➢ Do not loosen or remove the two black manual release bolts (if included) as they hold the magnet together.

2. Lift the magnet assembly (2) off the mounting studs (3) and set it aside.

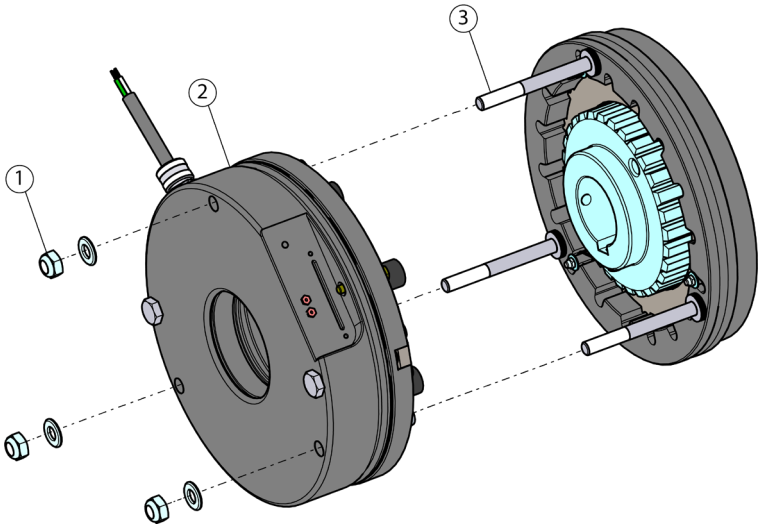


Figure 5 Magnet Removal

3. Remove the hub (4) from the brake assembly (5) and set it aside.

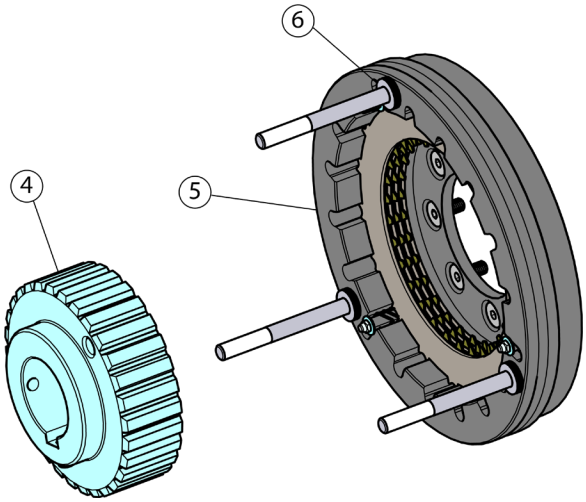


Figure 6 Hub Removal

4. Note the orientation of the spring washer stacks (6) on each stud. Ensure the washers do not fall off during the installation process.
   - If the washers do fall off the mounting studs, replace them with the first washer cone up and then alternating directions (<><>).

> ➢ A piece of tape or similar measure may be used to secure washers to the mounting studs if the brake must be moved before reassembly.

4.3.2.2 Mount the Brake Assembly

1. Apply LOCTITE® to the threads on the internal flat head mounting bolts (2).
2. Mount the brake assembly (3) over the shaft (4) and align with the motor (1).

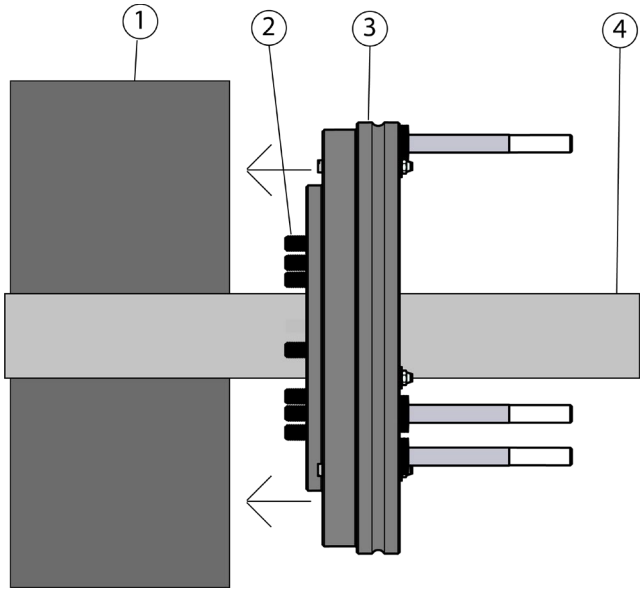


Figure 7 Brake Assembly Installation

3. Fasten the brake assembly to the gear motor using the mounting bolts (2).
4. Tighten the bolts equally in two stages until the brake assembly is securely fixed to the motor. KEB recommends a tightening torque of 60 – 80 Nm.

4.3.2.3 Mount the Hub

1. The Load Brake contains several friction disks which can freely rotate when the brake is disengaged or disassembled. Ensure the teeth of each friction disk are all aligned in the same orientation.
   - For ease of assembly an optional alignment tool (6) can be used to hold the friction disks in place while mounting the hub.

   → See section Required Tools for details on the alignment tool.
2. Mount the hub (5) onto the shaft (4) ensuring the hub is oriented with set screws facing out.

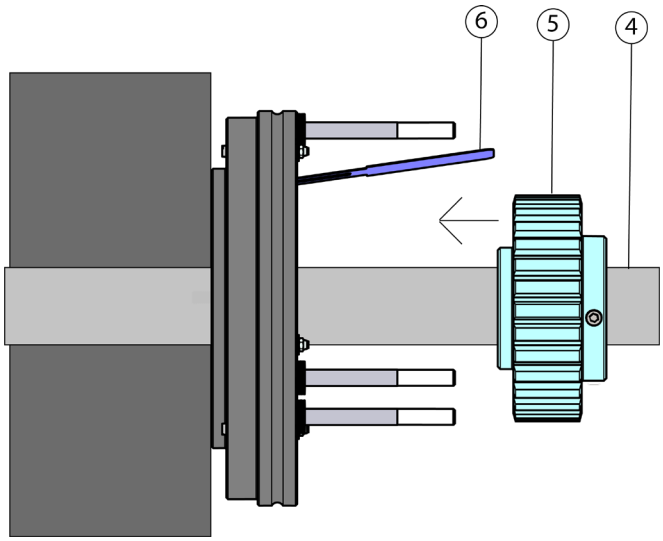


Figure 8 Hub Installation

3. Align the hub (5) onto the teeth of the friction disks (7) using the alignment tool (6) to hold the friction disks steady (if used). Some rotation of the hub may be necessary to align all of the friction disks if the optional alignment tool is not used.

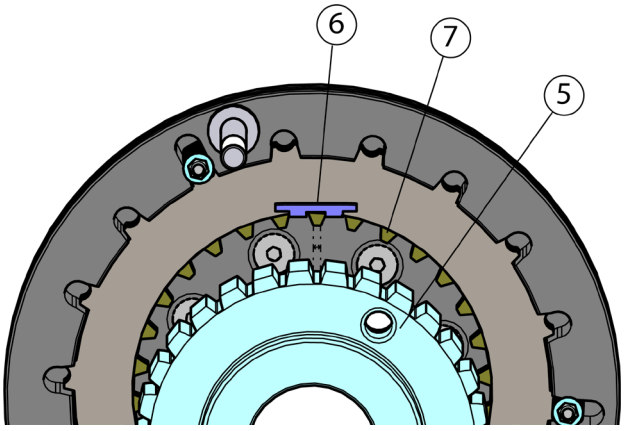


Figure 9 Hub Alignment

4. Align the hub axially on the shaft per the brake specifications.
5. Tighten set screws, clamping color or snap rings to secure the hub in place.

4.3.2.4 Mount the Magnet

1. Orient the magnet such that the lead wire exits in the desired position.
2. Slide the magnet (9) onto the M10 mounting studs (8).

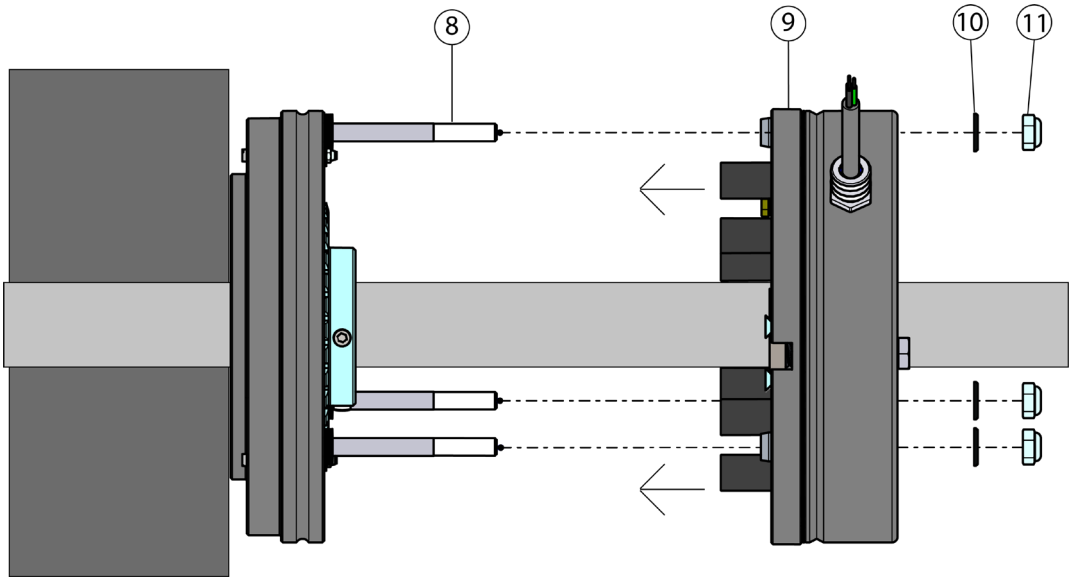


Figure 10 Magnet Installation

3. Slide the washers (10) onto the M10 mounting studs (8) and fasten a nylon lock-nut (11) to each stud.
4. Tighten the lock-nuts equally in stages to compress the pressure springs and reduce the air gap between the magnet and armature.

Proceed to Checking the Air Gap

4.4 Checking the Air Gap

The air gap (X) between magnet and armature should be between 0.9 and 1.0 mm. Using a feeler gauge between the armature and magnet, verify the air gap is within the acceptable values.

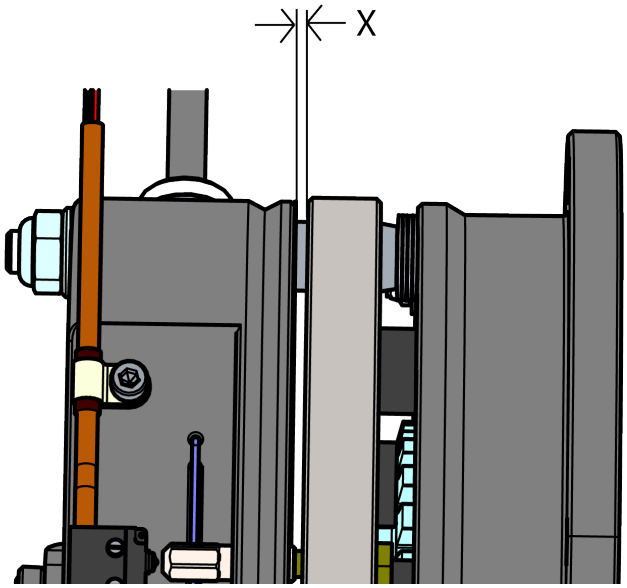


Figure 11 Air Gap

Take measurements at various points around the brake's circumference to ensure the air gap is equal throughout the entire brake circumference.

If the air gap is not within tolerance, tighten or loosen the lock-nuts or bolts to expand or contract the air gap as appropriate.

Ensure the air gap is equal throughout the entire brake circumference after adjusting the air gap.

After checking the air gap, re-install the dust protection ring (1) over the lead wire cable, ensuring the ring fits into the groves in the brake to ensure a tight seal.

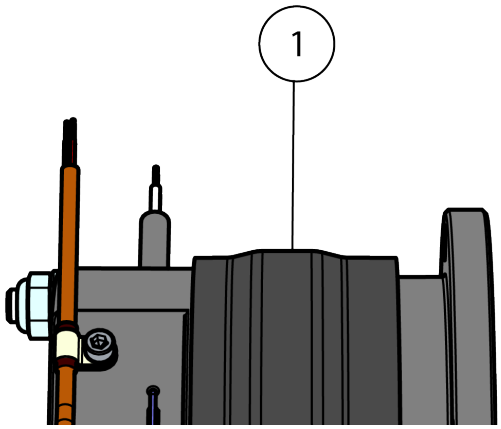


Figure 12 Dust Protection Ring

4.5 Testing the Brake Function

After installing the Load Brake, it is recommended to test the brake function to sure the installation was performed successfully.

1. Power on the brake with nominal voltage and verify the armature disengages.
2. Check for free rotation of the shaft while the brake is powered on.
3. Power off the brake and verify the armature engages.
4. Check for free rotation of the shaft while the brake is powered off. The shaft should not rotate with the brake engaged.

⚠ WARNING

- After performing an emergency stop inspect the brake components and test the brake performance before continued use.

5 Optional Components and Accessories

The Size 09 COMBISTOP Load Brake has several optional components and accessories that can be ordered with the brake or separately as an upgrade kit. The following sections contain instructions on installing these optional components.

Optional Components and Accessories	
Component	**Part Number**
Hand Release Lever	0938520-M01U
Microswitch	0938270-M01U

Table 4 Optional Accessories

5.1 Hand Release Lever

Part Number: **0938520-M01U**

Kit Components	
Component	**Number Included**
Handle	1
Yoke	1
Spherical Bolt	2
Spherical Washer	2

Table 5 Hand Release Components

The optional Hand Release Lever provides a manual backup to the standard electronic brake release for releasing the brake in power failure situations.

To use the Hand Release Lever, pull directly away from the mounting surface with at least 70lbs of force.

The handle of the Hand Release Lever can optionally be replaced by a lifting eyebolt as needed for the specific application.

5.1.1 Installation

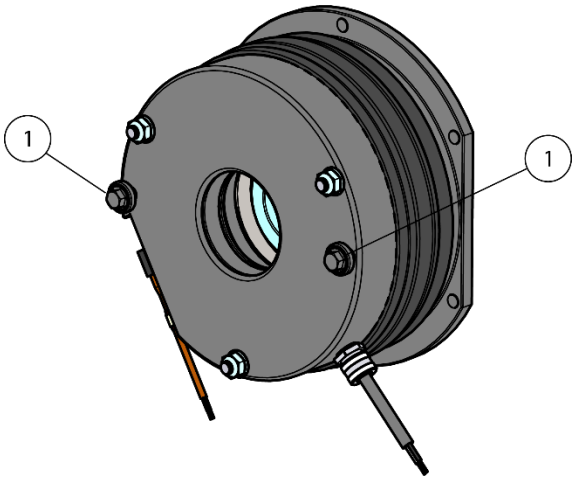


Figure 13 Bolt Removal

1. Using a 17mm wrench/socket, remove the two standard bolts (1) from the magnet assembly as shown above.
2. Mount the hand release yoke (2) to the magnet using the spherical bolts and washers included with the kit as shown below.

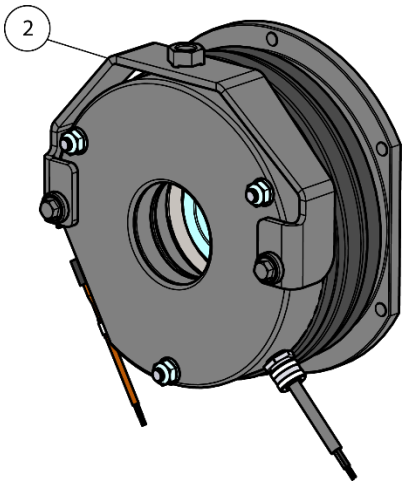


Figure 14 Hand Release Yoke Attachment

3. Tighten the bolts to 60Nm with a 13mm wrench/socket.
4. Screw the hand release handle (3) to the yoke, ensuring a tight fit.

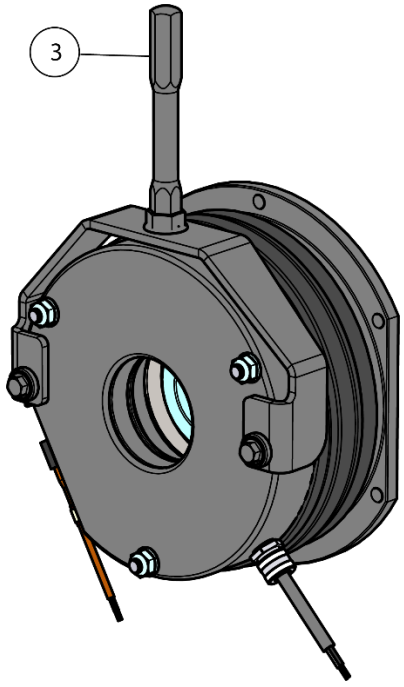


Figure 15 Hand Release Lever Attachment

5. Test the Hand Release Lever before returning the brake to operation.

> ➢ A pull force of 70lbs is required to release the Load Brake via the hand release lever.

5.2 Microswitch

Part Number: **0938270-M01U**

Kit Components	
Component	**Number Included**
Precision Microswitch	1
Anti-rotation wire	1
Plunger	1
Pipeclip and hardware	1

Table 6 Microswitch Components

Typically a Microswitch is used to detect when the powered-on brake disengages. This can be used to signal the system that the shaft is free to rotate, or that the motor is free to engage.

5.2.1 Installation

1. Install the anti-rotation wire (1) onto the magnet, fitting both ends of the wire into the guide holes (2). This wire keeps the plunger from rotating out of alignment.

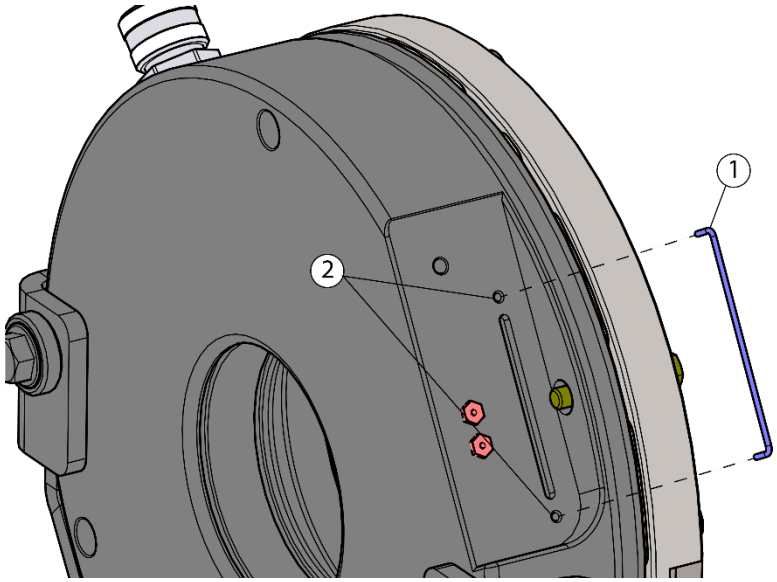


Figure 16 Anti-rotation Wire Attachment

2. Insert the plunger (3) onto the M6 screw (4).

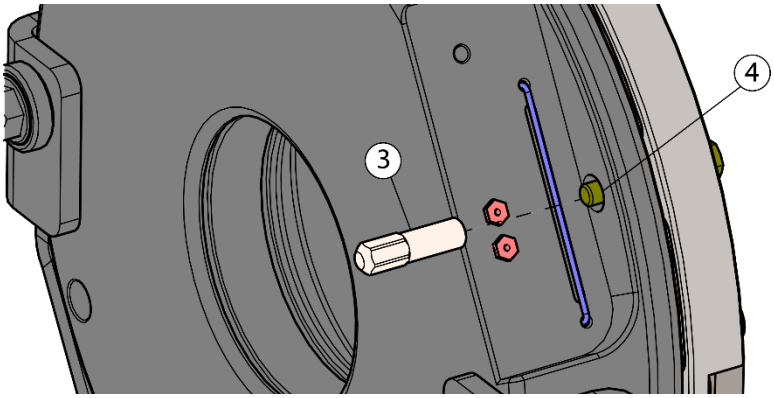


Figure 17 Plunger Attachment

3. Tighten the plunger with an 8mm wrench until there is at least a one inch gap from the plunger tip to the top of the magnet.

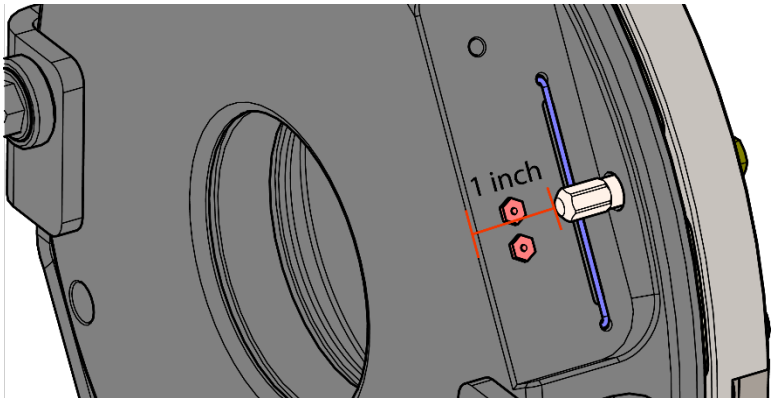


Figure 18 Plunger Position

4. Fasten the microswitch wire to the magnet housing via the pipe clip (5). Tighten the bolt with a 4mm hex head key.

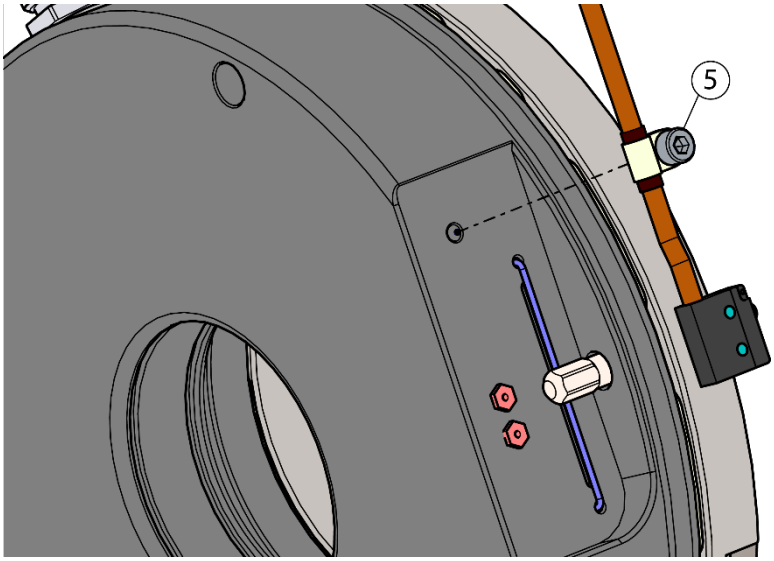


Figure 19 Microswitch Wire Attachment

5. Apply purple LOCTITE to the threads of the two M2 screws (6). Fasten the microswitch to the magnet housing with the M2 screws and a small flathead screwdriver.

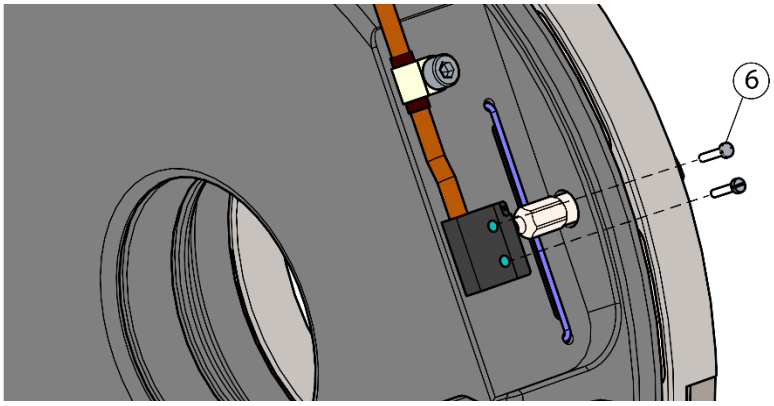


Figure 20 Microswitch Attachment

6. Connect the microswitch leads to a digital multimeter (microswitch black to red = normally open) and set the meter to diode test settings.
   The multimeter should read OL indicating there the microswitch is open.
7. Attach the brake power leads to the power supply and power the brake on.
8. Using an 8mm wrench, rotate the plunger upward until it contacts the microswitch and the multimeter shows the switch is closed.

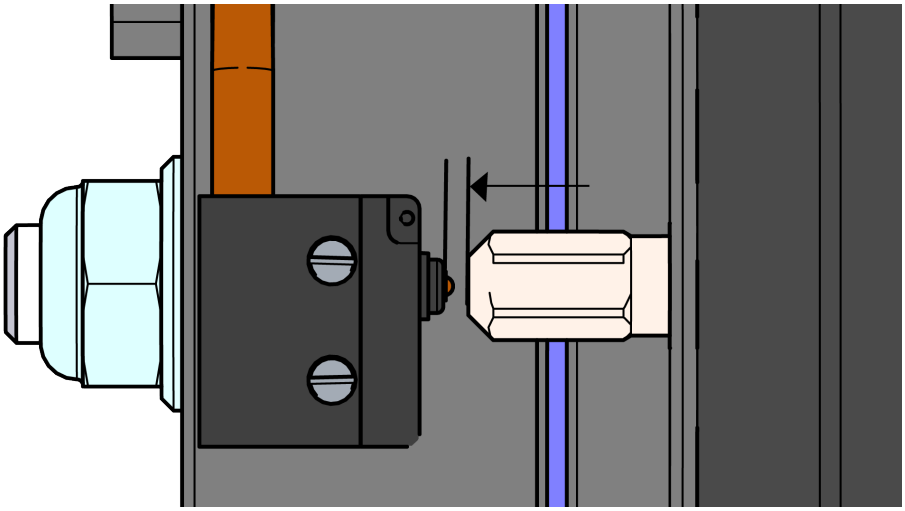


Figure 21 Plunger Adjustment

9. Rotate the plunger outward 1/6 turn further.
   The microswitch is now set.
10. Test the microswitch functionality by power cycling the brake several times to verify the microswitch triggers when the brake is powered on.

6 Operation

6.1 Normal Operation

The COMBISTOP type 38 Load Brake is an electrically activated spring set brake. The brake is normally engaged with power off preventing rotation of the shaft.

When a nominal voltage is applied to the brake, the electromagnet disengages the brake allowing free rotation of the shaft.

Operation of the brake is typically performed automatically through a customer supplied control system. There is no manual operation of the Load Brake unless the optional Hand Release Lever is installed.

6.2 Manual Operation

With the optional Hand Release Lever, the brake may be disengaged manually by pulling the lever directly away from the mounting surface to which the brake is attached. When the lever is released, the brake engages once more preventing rotation of the shaft.

The Hand Release Lever is intended for emergency release of the brake in power failure situations, and should not be used as the standard method of operation of the Load Brake.

7 Rectifiers

Several rectifiers are available for the COMBISTOP Load Brake. Size 04 KEB rectifiers can be used on the AC side or for simultaneous AC and DC side switching. An over-excitation or OEX switch is also available for simultaneous AC and DC side switching.

Simultaneous AC and DC side switching guarantees short disconnecting times and reduces contact erosion. For simultaneous switching it is recommended to also use a MOV on the DC side.

AC side switching will yield slower switching times but requires no protective measures for the coil and switching contacts.

7.1 Example Wiring Diagrams

7.1.1 AC Side Switching

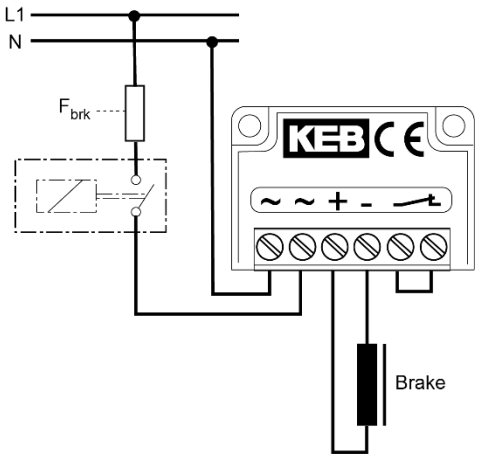
AC Side – Relay Switching – Phase to Neutral		
		
Switching: AC Side	**Rectifier: Full-wave**	**Model Number: 0291020-CE07**
Line Voltage: 120VAC	Input Voltage: 120VAC	Coil Voltage: 105VDC
F_{brk} = Class CC fuse max. 5A	Relay Contact: 120VAC 5A	

Figure 22 Rectifier Wiring AC Side Switching - Relay Switching - Phase to Neutral

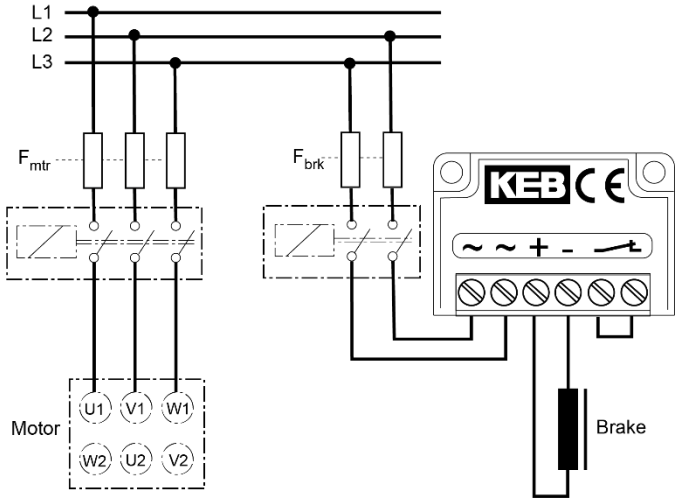
AC Side – Independent Contactor Switching – Phase to Phase		
		
Switching: AC Side	**Rectifier: Full-wave**	**Model Number: 0491020-CE07**
Line Voltage: 208VAC	Input Voltage: 208VAC	Coil Voltage: 170VDC
Line Voltage: 230VAC	Input Voltage: 230VAC	Coil Voltage: 205VDC
F_{brk} = Class CC fuse max. 5A	Independent Contactor rated 300VAC, min 5A AC1	

Figure 23 Rectifier Wiring AC Side Switching - Independent Contactor Switching - Phase to Phase

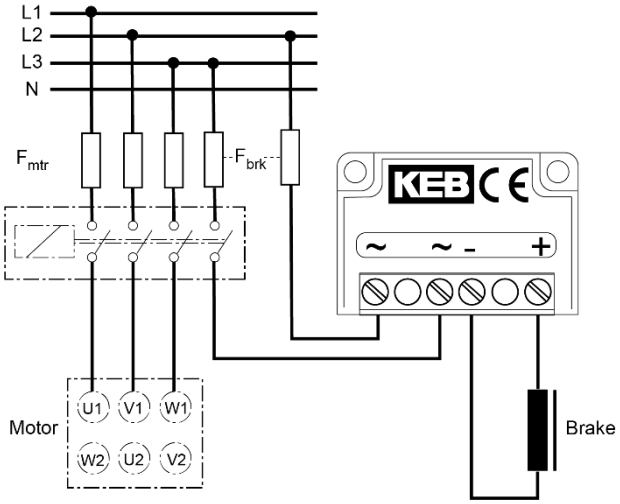
AC Side – Motor Contactor Switching – Phase to Phase		
		
Switching: AC Side	**Rectifier: Half-wave**	**Model Number: 0691020-CE07**
Line Voltage: 400VAC	Input Voltage: 400VAC	Coil Voltage: 170VDC
Line Voltage: 480VAC	Input Voltage: 480VAC	Coil Voltage: 205VDC
F_{brk} = Class CC fuse max. 5A	Motor Contactor sized for motor, min 5A	

Figure 4.2.5

Figure 24 Rectifier Wiring AC Side Switching - Motor Contactor Switching - Phase to Phase

7.1.2 DC Side Switching

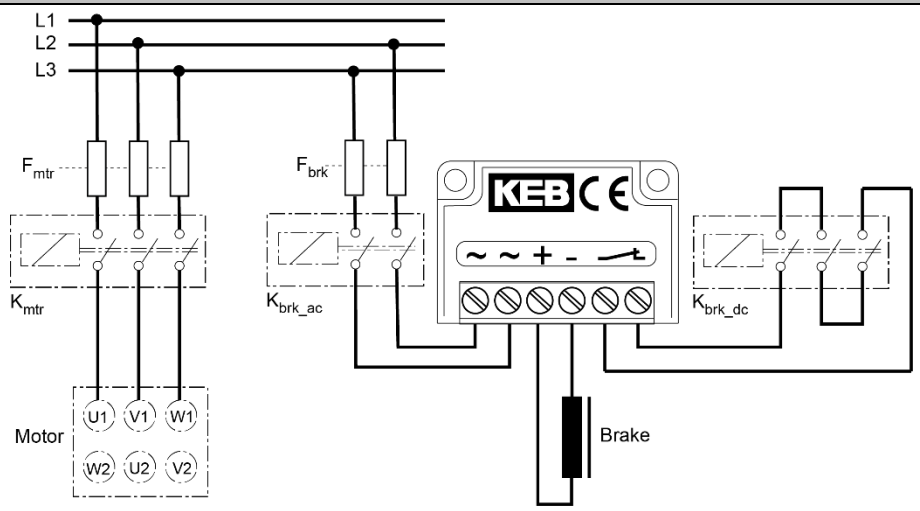
DC Side – Independent Contactor Switching – Phase to Phase		
		
Switching: DC Side	**Rectifier: Half-wave**	**Model Number: 0491010-CE07**
Line Voltage: 208VAC	Input Voltage: 208VAC	Coil Voltage: 95VDC
Line Voltage: 230VAC	Input Voltage: 230VAC	Coil Voltage: 105VDC
	Rectifier: Full-wave	**Model Number: 0491020-CE07**
Line Voltage: 208VAC	Input Voltage: 208VAC	Coil Voltage: 170VDC
Line Voltage: 230VAC	Input Voltage: 230VAC	Coil Voltage: 205VDC
F_{brk} = Class CC fuse max. 5A	K_{brk_dc} = min 300VDC 9A AC3	
Optional redundant contactor for safety	K_{brk_ac} = min 300VAC 5A AC1	

Figure 25 Rectifier Wiring DC Side Switching - Independent Contactor Switching - Phase to Phase

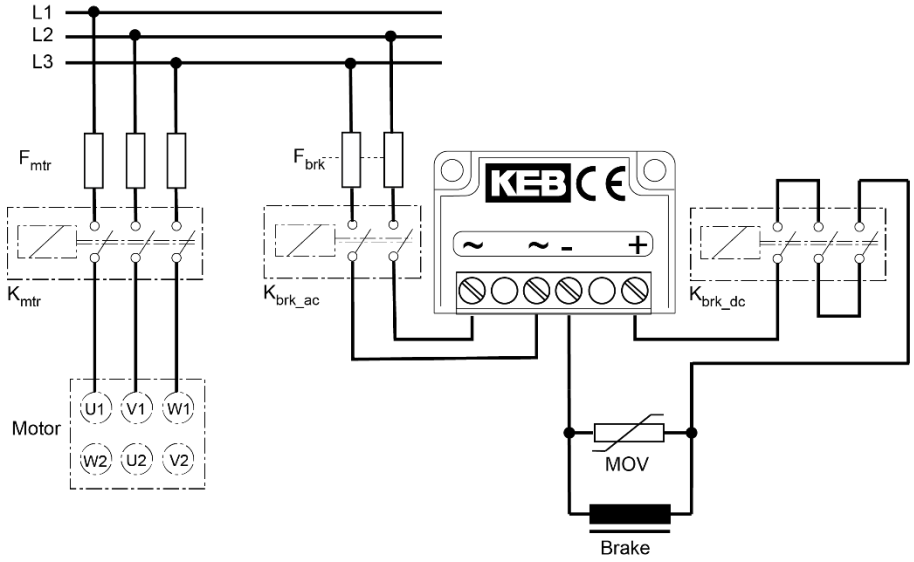
DC Side – Independent Contactor Switching with external MOV – Phase to Phase		
		
Switching: DC Side	**Rectifier: Half-wave**	**Model Number: 0691010-001U**
Line Voltage: 400VAC	Input Voltage: 400VAC	Coil Voltage: 170VDC
Line Voltage: 480VAC	Input Voltage: 480VAC	Coil Voltage: 205VDC
F_{brk} = Class CC fuse max. 5A	K_{brk_dc} = min 600VDC 9A AC3	MOV: 625Vrms / 1000Vpk / 500J *Installed at the brake*
Optional redundant contactor for safety	K_{brk_ac} = min 600VAC 5A AC1	

Figure 26 Rectifier Wiring DC Side Switching - Independent Contactor Switching with External MOV - Phase to Phase

7.1.3 OEX Switch Wiring Diagrams

The OEX Rectifier excites the brake magnet with the nominal voltage and then reduces the voltage by 50% for holding. This reduced holding voltage significantly reduces the power consumption and speeds up the engagement of the brake when the voltage is switched off.

AC Side – Independent Contactor Switching – Phase to Phase

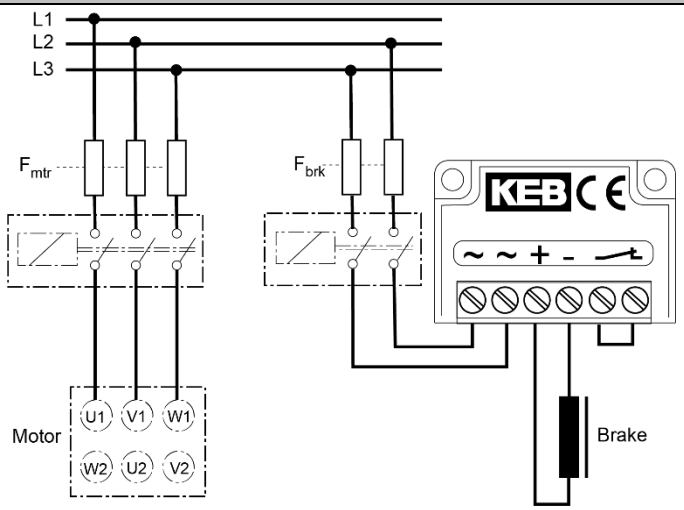


Figure 4.2.4

Switching: AC Side	Rectifier: OEX Switch	Model Number: 9098200-CE09
Line Voltage: 208VAC	Input Voltage: 208VAC	Coil Voltage: 170VDC
Line Voltage: 230VAC	Input Voltage: 230VAC	Coil Voltage: 205VDC
F_{brk} = Class CC fuse max. 5A	Independent Contactor rated 300VAC, min 5A AC1	

Figure 27 OEX Wiring AC Side Switching - Independent Contactor Switching - Phase to Phase

DC Side – Independent Contactor Switching – Phase to Phase		

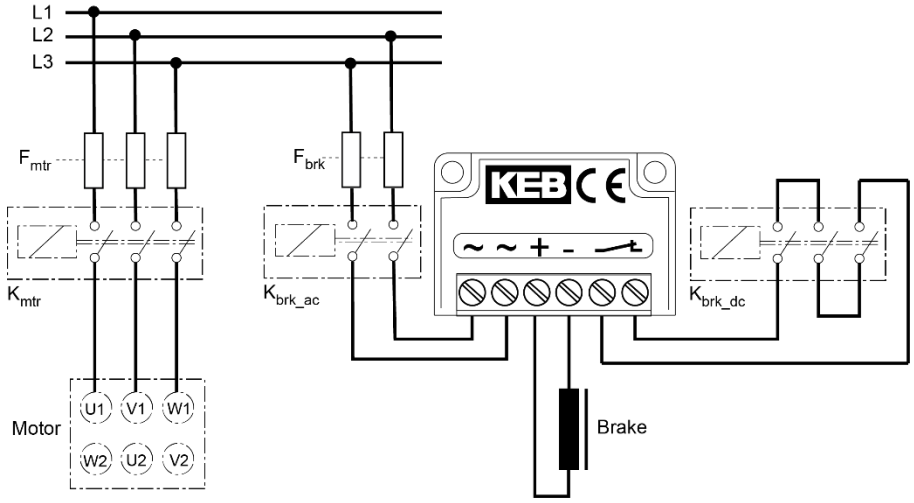



Figure 4.2.6		
Switching DC Side	**Rectifier: OEX Switch**	**Model Number: 9098200-CE09**
Line Voltage: 208VAC	Input Voltage: 208VAC	Coil Voltage: 170VDC
Line Voltage: 230VAC	Input Voltage: 230VAC	Coil Voltage: 205VDC
F_{brk} = Class CC fuse max. 5A	K_{brk_dc} = min 300VDC 9A AC3	
Optional redundant contactor for safety	K_{brk_ac} = min 300VAC 5A AC1	

Figure 28 OEX Wiring DC Side Switching - Independent Contactor Switching - Phase to Phase

8 Appendix

8.1 Appendix 1: Certification

Document No. / month.year: ce_mt_rns-mt-usa-a_en / 01.2019

Manufacturer:	KEB AMERICA, INC 5100 Valley Industrial Blvd.South USA – Shakopee, MN 55379 United States	
Product type:	spring applied fail safe brake electromagnet - clutch or brake clutch - brake - combinations in one housing Size Voltage category	COMBISTOP COMBINORM COMBIBOX 01 up to 14 75...440Vdc (50…690Vac)

The above given product is in accordance with the following directives of the European Union

Number:	**Low voltage : 2014 / 35 / EU**
Text:	Directive on the approximation of the laws of the Member States relating to all electrical equipment that has a voltage rating between 50V and 1000V AC or 75V and 1500V DC.
Number:	**Hazardous Substances: 2011 / 65 / EU incl. changes 2015 / 863 / EU**
Text:	Directive on the approximation of the laws of the Member States relating on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

9 Revision History

Chapter	Change	Date
Instruction Manual	Initial Publication	07/2021

Austria | KEB Antriebstechnik Austria GmbH
Ritzstraße 8 4614 Marchtrenk Austria
Tel: +43 7243 53586-0 Fax: +43 7243 53586-21
E-Mail: info@keb.at Internet: www.keb.at

Belgium | KEB America, Inc.
Herenveld 2 9500 Geraardsbergen Belgium
Tel: +32 544 37860 Fax: +32 544 37898
E-Mail: vb.belgien@keb.de Internet: www.keb.de

Brazil | KEB SOUTH AMERICA - Regional Manager
Rua Dr. Omar Pacheco Souza Riberio, 70
CEP 13569-430 Portal do Sol, São Carlos Brazil
Tel: +55 16 31161294 E-Mail: roberto.arias@keb.de

France | Société Française KEB SASU
Z.I. de la Croix St. Nicolas 14, rue Gustave Eiffel
94510 La Queue en Brie France
Tel: +33 149620101 Fax: +33 145767495
E-Mail: info@keb.fr Internet: www.keb.fr

Germany | **Headquarters**
KEB Automation KG
Südstraße 38 32683 Barntrup Germany
Telefon +49 5263 401-0 Telefax +49 5263 401-116
E-Mail: info@keb.de Internet: www.keb.de

Germany | **Geared Motors**
KEB Antriebstechnik GmbH
Wildbacher Straße 5 08289 Schneeberg Germany
Telefon +49 3772 67-0 Telefax +49 3772 67-281
Internet: www.keb-drive.de E-Mail: info@keb-drive.de

Italia | KEB Italia S.r.l. Unipersonale
Via Newton, 2 20019 Settimo Milanese (Milano) Italia
Tel: +39 02 3353531 Fax: +39 02 33500790
E-Mail: info@keb.it Internet: www.keb.it

Japan | KEB Japan Ltd.
15 - 16, 2 - Chome, Takanawa Minato-ku
Tokyo 108 - 0074 Japan
Tel: +81 33 445-8515 Fax: +81 33 445-8215
E-Mail: info@keb.jp Internet: www.keb.jp

P.R. China | KEB Power Transmission Technology (Shanghai) Co. Ltd. No. 435 QianPu Road Chedun Town Songjiang District
201611 Shanghai P.R. China
Tel: +86 21 37746688 Fax: +86 21 37746600
E-Mail: info@keb.cn Internet: www.keb.cn

Republic of Korea | KEB America, Inc.
Room 1709, 415 Missy 2000 725 Su Seo Dong
Gangnam Gu 135- 757 Seoul Republic Korea
Tel: +82 2 6253 6771 Fax: +82 2 6253 6770
E-Mail: vb.korea@keb.de

Russian Federation | KEB RUS Ltd.
Lesnaya str, house 30 Dzerzhinsky MO
140091 Moscow region Russian Federation
Tel: +7 495 6320217 Fax: +7 495 6320217
E-Mail: info@keb.ru Internet: www.keb.ru

Spain | KEB America, Inc.
c / Mitjer, Nave 8 - Pol. Ind. LA MASIA
08798 Sant Cugat Sesgarrigues (Barcelona) Spain
Tel: +34 93 8970268 Fax: +34 93 8992035
E-Mail: vb.espana@keb.de

United Kingdom | KEB (UK) Ltd.
5 Morris Close Park Farm Industrial Estate
Wellingborough, Northants, NN8 6 XF United Kingdom
Tel: +44 1933 402220 Fax: +44 1933 400724
E-Mail: info@keb.co.uk Internet: www.keb.co.uk

United States | KEB America, Inc.
5100 Valley Industrial Blvd. South
Shakopee, MN 55379 United States
Tel: +1 952 2241400 Fax: +1 952 2241499
E-Mail: info@kebamerica.com Internet: www.kebamerica.com

Automation **with Drive** **www.kebamerica.com**

MORE KEB PARTNERS WORLDWIDE:

www.keb.de/company/representatives-agencies