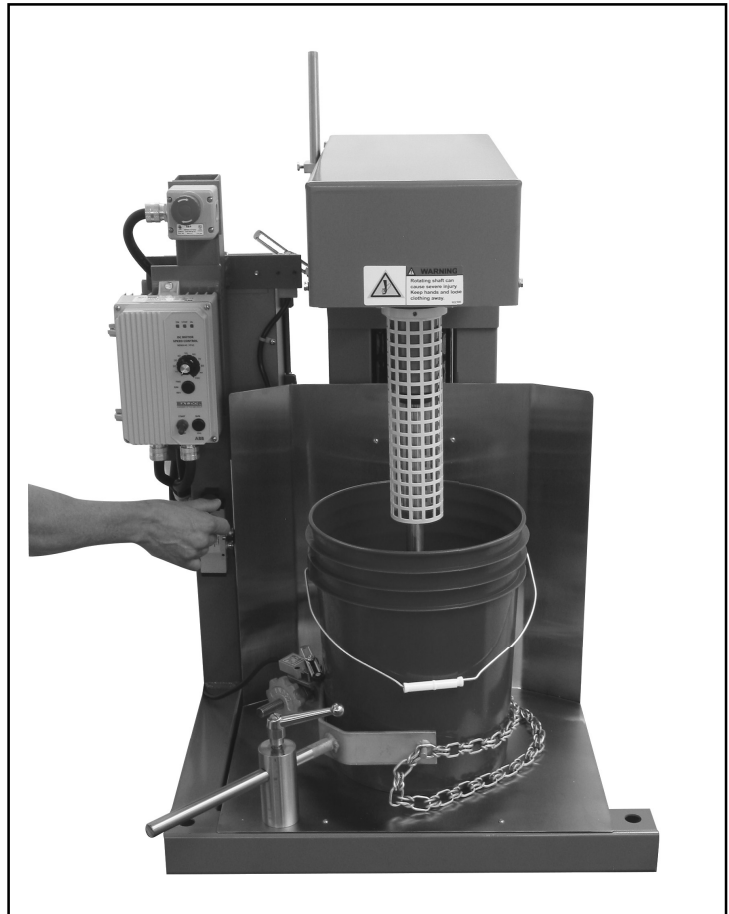


# HSM-03V

## OWNERS MANUAL

### Warranty

Our products are guaranteed against defective materials and workmanship. We will repair or replace such items as may prove defective at our option. Warranty period is one year on items manufactured by INDCO. On items not manufactured by INDCO, the manufacturer's warranty applies. All component parts of our products are covered by this warranty, except for normal wear items such as belts or impellers. We cannot be responsible for damage or abuse to equipment caused by improper installation or operation. Warranties can also be voided by unauthorized disassembly of equipment. For warranty repairs, equipment is returned to INDCO at the customer's expense; we will repair and return to customer at our expense. Under no circumstances will we allow labor charges or other expense to repair defective merchandise. This warranty is exclusive and is in lieu of all other warranties, whether express or implied. INDCO shall not be liable for any other damages, whether consequential, indirect, or incidental, arising from the sale or use of its products.



## HSM-03V Mixer

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## General:

Congratulations on the purchase of the HSM-03V mixer, INDCO's most versatile benchtop laboratory and small batch production mixer. This unique design offers the speed and torque characteristics to handle challenging mixing and dispersion applications normally requiring separate mixers. The constant torque of the 3-hp DC motor, two-pulley belt-driven power transmission and electronic control with speed-priority and torque-priority settings enables the mixer to perform low-speed, high-torque mixing of highly viscous materials, general agitation of lower viscosities and high-speed dispersions.

The HSM-03V is designed for batch sizes to five gallons and is equipped with an adjustable container restraint system and standard safety features including shaft rotation and container position limit switches, front-facing E-stop button and user adjustable shaft guard. The heavy-duty welded carbon steel frame is designed for rigorous mixing loads with minimal deflection. Mixing is achieved using the standard bowtie impeller (included) or optional marine style, hydrofoil, and axial turbine impellers or one of multiple available dispersion blade designs.

## Safety:



Please follow the below safety precautions. If there are any questions, please call INDCO at 800-942-4383. Please read this manual completely before trying to operate your mixer. Failure to follow these instructions could result in serious bodily injury or death.

- Do not touch moving parts while mixer is operating. Do not wear loose-fitting clothes or jewelry around an operating mixer. Keep all hands, feet, clothes, neckties, necklaces and other objects clear of moving parts.
- Never move the unit without a suitable lifting device.
- Have a qualified individual bring power to your unit.
- Always ground the unit. Never use an extension cord.
- Never run the unit in open air.
- Never adjust the speed without the unit running.
- Always lockout the power when working on the unit.

### SAFETY FEATURES:

- Vertical Lift Limit Switch: prevents the shaft from rotating when the mixer is in the raised position.
- Container Position Limit Switch: Halts the shaft rotation in the event the container moves from its secure position.
- Emergency Stop Button: Front-facing plunger style E-stop button immediately stops machine operation when engaged.
- Shaft Guard: Reduces exposure to the rotating shaft.

### ELECTRIC MOTOR SAFETY:

Motors should be installed, protected and fused in accordance with the latest issue of the National Electrical Code, NEMA Standard Publication No. MG 2 and local codes. Frames and accessories of motors should be grounded in accordance with National Electrical Code (NEC) Article 430. For general information on grounding refer to NEC Article 250. Not all rotating parts are guarded. Keep hands and clothing away from moving parts. Trained, qualified personnel should make electrical repairs and non-standard connections. If environment has hazardous combustible fumes present, use only explosion-proof electric motors.

## Receiving and Inspection:



All INDCO equipment is inspected prior to shipment. Before removing any packing material, visually inspect the exterior of the crating for any signs of damage. Report any damage to both the delivering carrier and INDCO. If you should choose to accept the damaged package, always note the damage on the Bill of Lading or receiving document before signing the receipt. Open packages promptly to inspect the condition of the merchandise. You must place a claim with the carrier immediately for any damages. The window for carrier notification of concealed damage is commonly 24 hours. Retain all packaging material in the event the carrier requests to inspect the package. Photos are always a good idea to capture for the claims process. INDCO will not be held responsible for any damaged freight that is not signed as damaged.

## Setup & Initial Startup:

### MOUNTING

Securely bolt the mixer to a level work surface using the four mounting holes (see figure 1).

Note: Mounting bolts are not included. Position the unit to maintain adequate space for cleaning and maintenance.

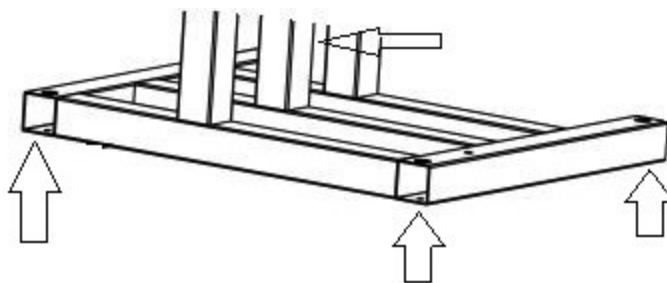


Figure 1. Mounting bolt locations

### POWER REQUIREMENTS

Electrical requirements and specifications for the HSM-03V mixer are shown in Table 1 below:

Model Number	Line Voltage (VAC-50/60HZ)	Max Line Current (ADC)	Output Voltage (VDC)	Max Output Current (ADC)	Max Field Current (ADC)	Max Horsepower HP, (kW)
BC160	115	22	0-90	15	1.5	1.5, (1.12)
	230	22	0-180	15	1.5	3.0, (2.25)

Table 1: Electrical Specifications

### AIR CYLINDER REQUIREMENTS, INITIAL START-UP, AND OPERATION

The air cylinder is rated for 100 PSI maximum pressure. Before connecting to a compressed air supply, verify the lift control valve is in the center (off) position. Note: the pneumatic valve returns to the center (off) position when not manually moved to up or down. Connect the air supply to the quick connector at the 4-way air valve inlet. Note: Air pressure is used to both raise and lower the air cylinder.

**IMPORTANT!:** After air pressure is connected to the 4-way valve and before operating the cylinder for the first time, move the lift control valve to the downward position. This action will charge the air cylinder and prevent rapid movements when the lift control valve is moved to the upward position.

#### Raising the Mixer:

1. Move the lift control valve upward from the center position. To stop the upward movement, move the valve back to the center (off) position.

#### Holding Vertical Position:

2. To hold the impeller at any height, move the lift control valve to the center (off) position.

#### Lowering the Mixer:

3. Move the lift control valve downward. To stop downward movement, move the control valve back to the center (off) position.

(Figure 2.)

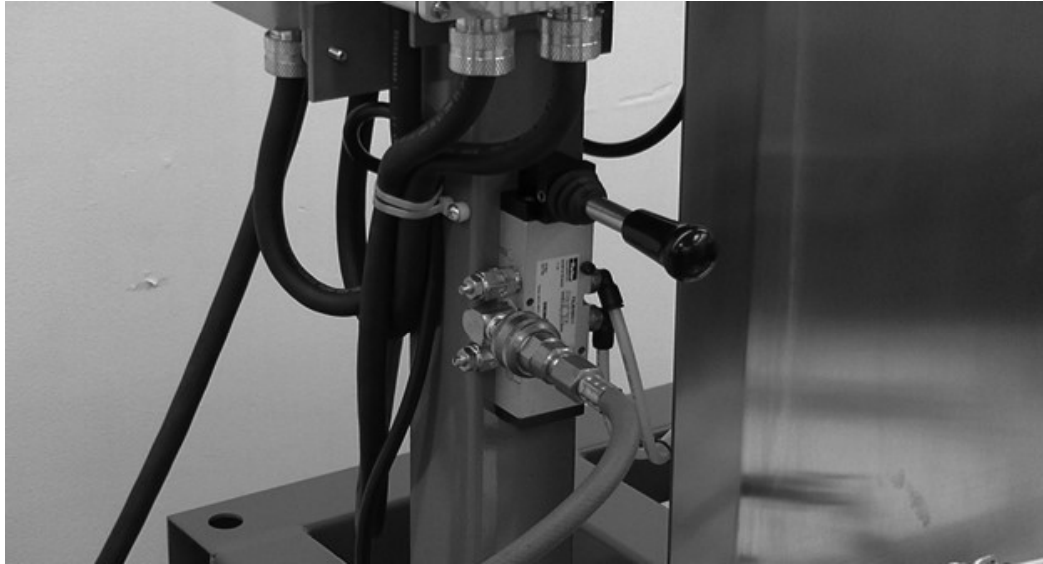


Figure 2. Air valve is in the center, off position

#### IMPELLER ASSEMBLY AND POSITION

Impellers assemble to the mixer shaft using one of two methods: threaded insertion into the 1/2"-13 hole in the bottom of the shaft or via hub with set screws. INDCO's recommended impeller position for set screwed impellers is with the bottom of the hub flush with the bottom of the shaft.

- 1) If your impeller has the threaded mounting option, attach the impeller to the shaft by screwing the impeller into the opening on the bottom of the shaft.
- 2) If your impeller is constructed with a bored hub, attach the impeller onto the shaft by sliding the hub onto the bottom of the mixer shaft. Tighten the set screws on the side of the impeller hub to secure to the shaft.

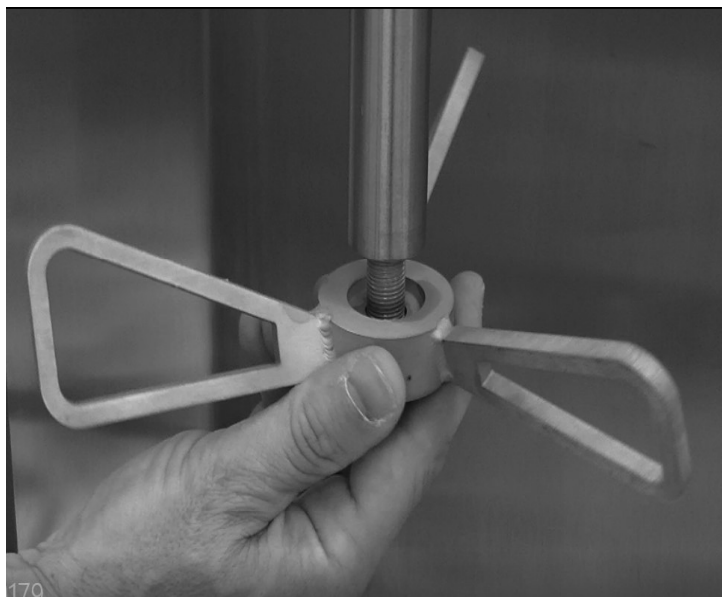


Figure 3. Threaded impeller assembly

## SETTING CONTAINER LIMIT SWITCH / CONTAINER PLACEMENT

When setting the container holder limit switch, it is important to keep in mind that it is an open switch in its normal, static position. To set the container holder and the container limit switch for the mixer observe the following steps:

- 1) Place the mixing container onto the work surface and lower the mixer shaft into the center of the container.
- 2) Slide the container holder against the side of the container and tighten down the container holder lever to lock the holder in place.
- 3) Secure the container onto the holder by wrapping the chain around the container and tightening the chain using the turn-knob on the threaded rod.
- 4) Ensure the limit switch was moved into the closed position when the container was locked into place.

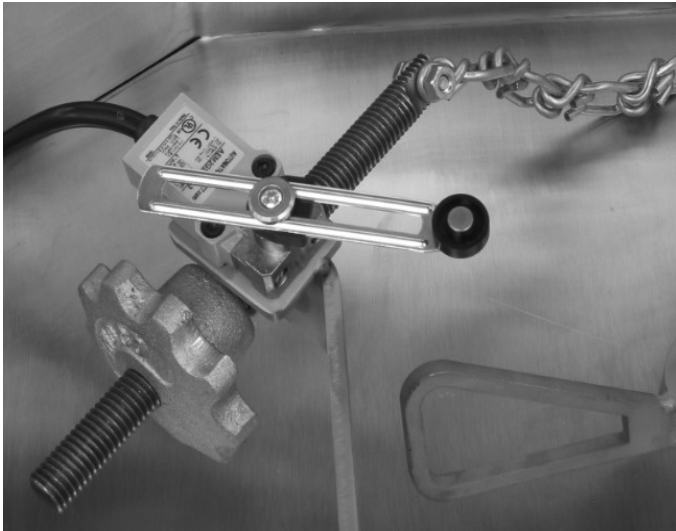


Figure 4. Container Limit Switch in the open position



Figure 5. Container Limit Switch in the closed position

## SETTING VERTICAL LIMIT SWITCH

The limit switch is projected in the 3 o'clock position when open (Figure 6). Please complete the previous steps for setting the container limit switch before setting the vertical limit switch. To set the vertical limit switch, observe the following steps:

- 1) Position the mixer to the highest desired point at which the mixer shaft is to rotate.
- 2) Lower the mixer approximately 2"-3".
- 3) Adjust the limit switch rod by loosening the bolt holding the limit switch rod in place.
- 4) Lower the limit switch rod to a position that will close the limit switch (4-5 o'clock) (Figure 7). At this point, the mixer approaches its highest point of mixing while running. The mixer will shut off as it exceeds the desired highest point.

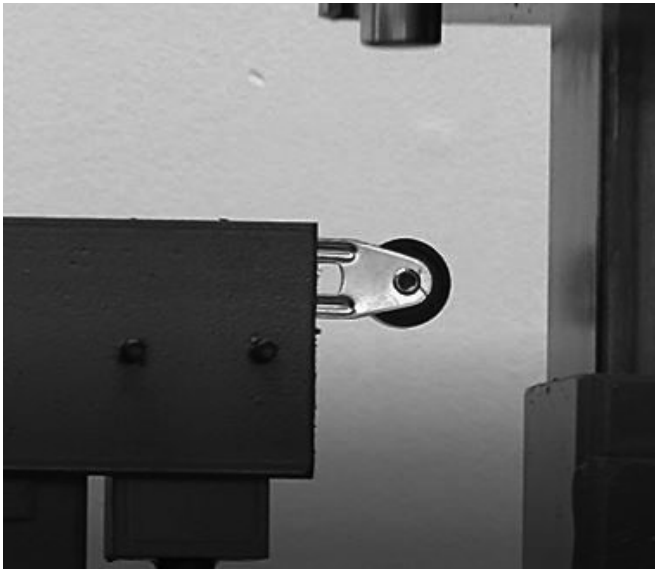


Figure 6. Vertical limit switch in the open position

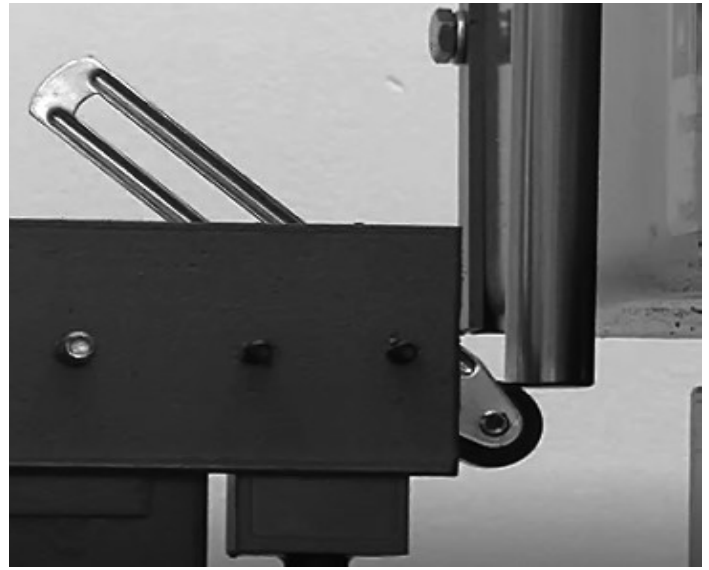


Figure 7. Vertical limit switch in the closed position

## SPEED AND TORQUE RANGE

BC160 NEMA 4X / IP65 Adjustable Speed DC Control:  
INDCO Default Settings

The HSM-03V mixer control is factory set in speed control mode. The current limit is set to 14 Amps. At these settings, the user is able to mix both low viscosity and high viscosity liquids. The turn-knob controls the shaft speed provided the current limit for the maximum torque is not exceeded. If the maximum allowable torque is reached, the overload LED will illuminate and the shaft will maintain the speed corresponding to the torque limit. When mixing high viscosity materials that thin due to shear or increased temperature, the shaft speed increases to the selected speed setting as the torque decreases from the reduced viscosity of the liquid.

The Baldor BC160 adjustable speed DC control allows the user to set the controller in either speed or torque priority mode. Speed control mode is suitable for the vast majority of mixing and dispersion applications. Torque control mode may be selected when direct control of torque applied by the mixer is desirable.

### Speed Control Mode

This mode should be used when maintaining shaft speed is of the utmost importance for your mixing application. For example, in high-shear mixing/dispersing applications, maintaining constant tip speed can be critical.

When Jumper J1 is in the SPD position, the drive controls motor speed as a linear function of the main speed potentiometer setting or analog voltage input. The range of output speeds can be adjusted with the MIN and MAX trimpots.

### Torque Control Mode

This mode can be used when maintaining constant torque is a high priority. For example, constant torque mixing could be desired when mixing materials that are highly sensitive to shear.

When Jumper J1 is in the TRQ position, the drive controls motor torque as a linear function of turn-knob rotation.

\*For further details regarding the BC160 Adjustable Speed DC control, please refer to the Baldor BC160 NEMA 4X / IP65 Adjustable Speed DC Control manual included in the HSM-03V packaging and also on our website at [www.Indco.com/resources-information/product-manuals](http://www.Indco.com/resources-information/product-manuals). If further assistance is needed please call INDCO customer service at (800) 942-4383.

## CHANGING SPEED RANGE:

The HSM-03V has a two-pulley configuration that allows for mechanically setting the mixer to run in two different speed ranges. With the smaller pulley directly above the motor, the mixer is in the high-torque, low-speed (60-1200 RPM) setting. Conversely, when the large pulley is directly above the motor, the mixer is in the low-torque, high-speed (135-2800 RPM) setting.

When changing the positioning of the pulleys, follow the directions below. (Part numbers can be found on pages 8-9 with the parts list and exploded views):

- 1) Remove the top and back covers (4&5) by removing the bolts on the top cover and place both covers along with the screws aside.
- 2) Release the belt tension by loosening (4) bolts in the channel below the motor pulley.
- 3) Remove the belt (18) from the pulleys (20&23) and place the belt aside.
- 4) Unscrew the bushing cap screws from the split taper bushing taper bushings (19&22)
- 5) Screw the bushing cap screws into the threaded holes on the bushings to loosen the split taper bushings (19&22) from the motor output shaft (21) and the mixing shaft (26).
- 6) Place the desired pulley around the the motor output shaft and attach the split taper bushing (19) by screwing the bushing cap screws into the pulley through the non-threaded holes.  
IMPORTANT: Position the top of the motor output shaft flush with the top of the split taper bushing (19).
- 7) Align the opposite pulley onto the mixing shaft (26) so that the pulley on the motor output shaft (21) is level with the pulley on the mixing shaft (26). Secure the pulley in place by attaching the split taper bushing (22) to the pulley by tightening the bushing cap screws into the pulley through the non-threaded holes in the bushing.
- 8) Re-tension the belt by tightening the bolts in the channel below the motor pulley.
- 9) Replace the top and back covers and secure with the top cover bolts.

## Operation

### SAFETY FEATURES

- Verify all safety limit switches have been set and shaft guard is securely in place.
- Vertical Lift Limit Switch: prevents the shaft from rotating when the mixer is in the raised position.
- Container Position Limit Switch: Halts the shaft rotation in the event the container moves from secure position.
- Emergency Stop Button: Front-facing plunger style E-stop button immediately stops machine operation when engaged.
- Shaft Guard: reduces exposure to the rotating shaft.

### CONTAINER PLACEMENT

INDCO's recommended container placement on the work surface is with the mixing shaft and impeller in the direct center of the mixing container. See page 5 for securing the container into place using the container holder with locking lever and chain.

### IMPELLER POSITION

The impeller should be positioned in the mixing container 1 - 2 impeller diameters from the the bottom of the mixing container, for general mixing applications. This may be reduced to 1/2 the impeller diameter for the maximum suspension of settled solids.

### STARTING & STOPPING THE MIXER

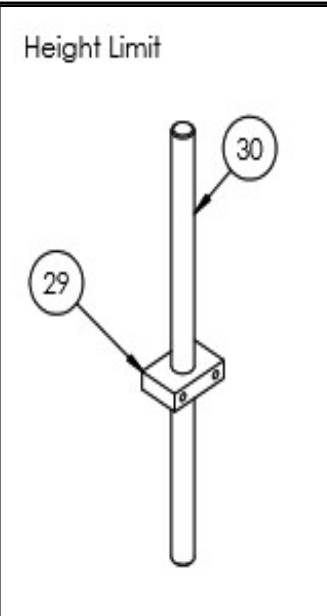
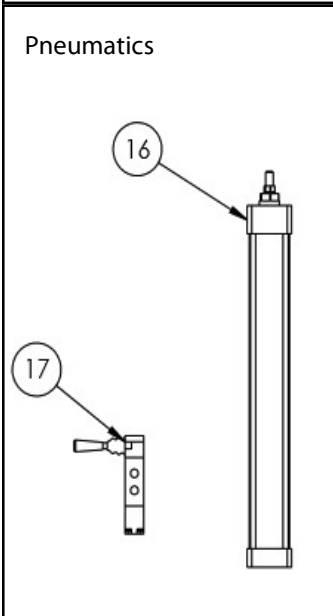
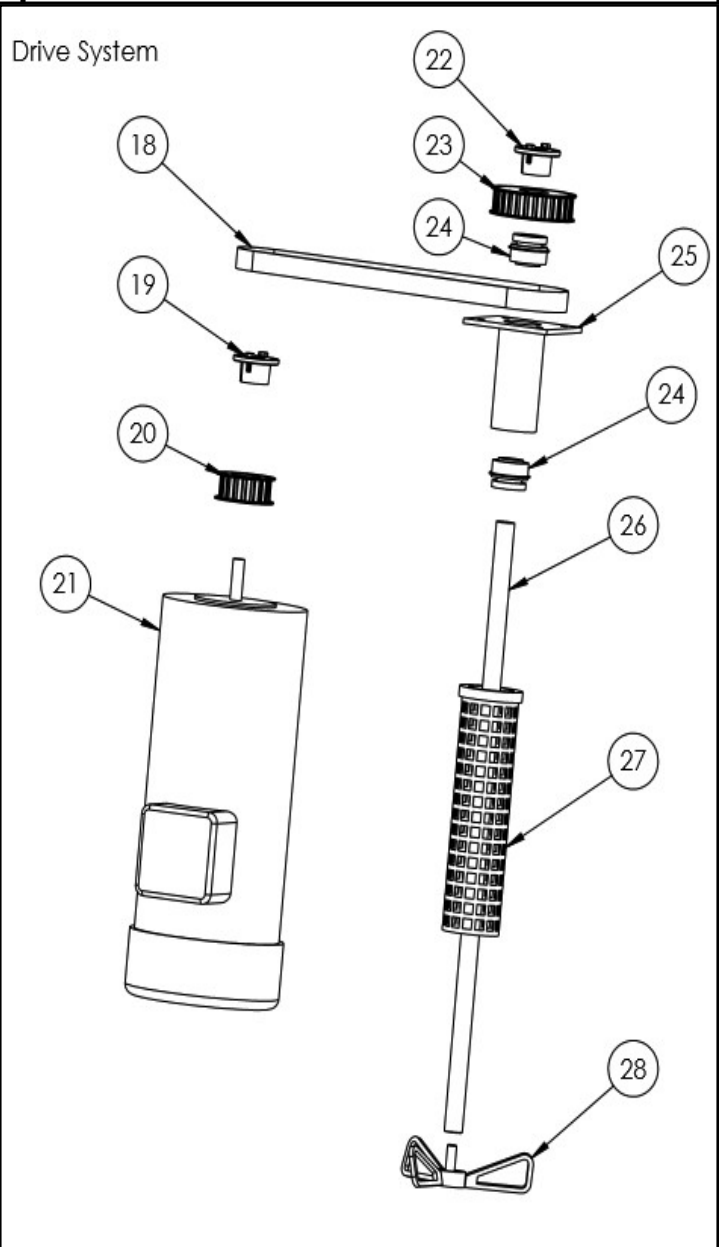
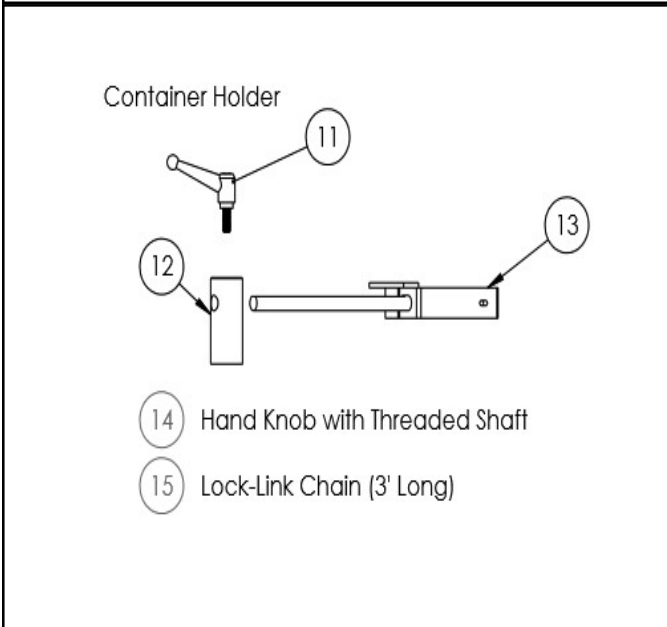
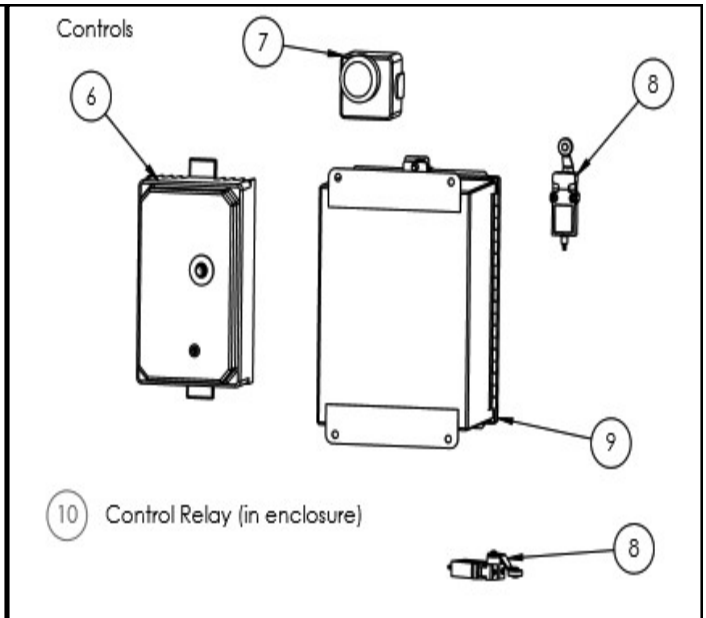
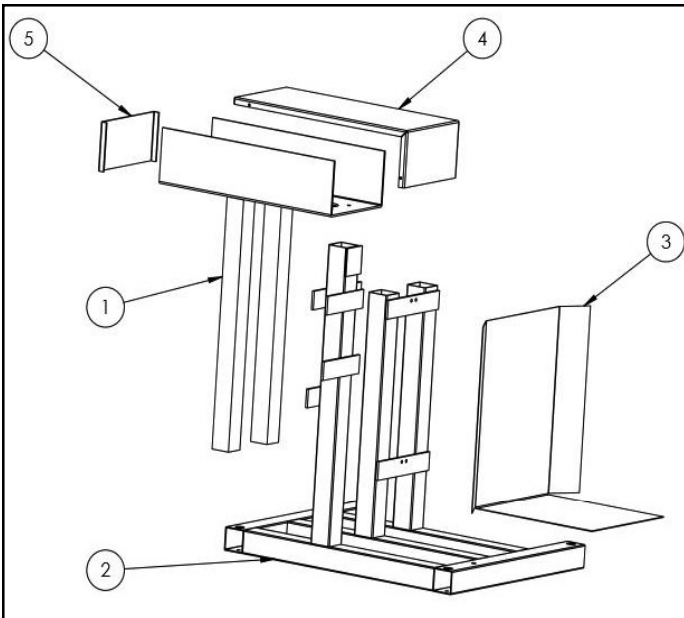
To start the mixer, ensure the electric source is properly connected to the electric cabinet. With the electrical connection secured, start the mixer by moving the switch on the control to the start position. Conversely, to stop the mixer, move the switch on the control to the stop position.

### SPEED ADJUSTMENT

To adjust the speed of the mixer, adjust the turn-knob on the control to the desired speed. For a more in-depth review of speed adjustment and the different speed ranges the HSM-03V is capable of, please see the Speed and Torque Range section of the manual on pages 6 & 7.

\*For further details regarding the operation of the HSM-03V mixer, please call INDSCO customer service at (800) 942-4383. Our technical support team is happy to assist you.

# Exploded Views





# HSM-03V Parts List

ITEM	DESCRIPTION	PART NUMBER	QTY
1	Upper Weldment	N/A	1
2	Base Weldment	N/A	1
3	Splash Shield	13H6273	1
4	Top Cover	13H6216	1
5	Back Cover	13H6272	1
6	Motor Controller	12H2050	1
7	E-Stop Station	12H1345	1
8	Limit Switch	12H1347	2
9	Electrical Enclosure	13H0020	1
10	Control Relay (240V coil)	12H2051	1
11	Handle	13H6188	1
12	Container Holder Mount	14H1010	1
13	Container Holder Assembly	14G1009	1
14	Hand Knob with Rod	15G1013 & 14G1011	1
15	Container Holder Chain	13H6180	1
16	15" Air Cylinder	13H6244	1
17	Air Valve	13H6117	1
18	Belt	13H6079	1
19	Split Taper Bushing 7/8" I.D.	13H6262	1
20	Timing Pulley 18T	13H6251	1
21	Motor 3Hp 180VDC	13H2072	1
22	Split Taper Bushing 1" I.D.	13H6261	1
23	Timing Pulley 28T	13H6257	1
24	Bearing	13H6125	2
25	Bearing Housing (comes with bearings)	13F1044	1
26	Shaft	15M1414	1
27	Shaft Guard	24G1020	1
28	Impeller	21P1000	1
29	Height Limit Mount	15M4074	1
30	Height Limit Rod 12" long	15M1251	1

## Troubleshooting Guide

Symptom	Possible Cause	Suggested Corrective Action
Motor is not running and Pilot Light not illuminated.	On/Off AC Line Switch in Off Position.	Set On/Off Switch to On Position.
	Blown Line fuse.	Replace Line Fuse.
	Defective On/Off AC Line Switch,	Replace On/Off AC Line Switch.
Motor does not run and Pilot Light is illuminated.	Main Speed Potentiometer set fully counterclockwise.	Rotate Main Speed potentiometer clockwise.
	Defective motor.	Check for defective motor, worn brushes, etc. Replace motor, if necessary.
	Blown Armature Fuse.	Replace Armature Fuse.
	CL Trimpot set fully counterclockwise.	Set CL Trimpot
Motor hums, runs at very low speed, or slows down substantially when loaded.	Low AC line input voltage.	Check AC line input voltage.
Motor continues to run with Main Speed Potentiometer set fully counterclockwise.	MIN speed trimpot set higher than 0% of base speed.	Readjust the MIN Trimpot.
	IR Comp trimpot set too high.	Readjust the IR Trimpot.
Motor runs in wrong direction.	Motor armature leads are reversed.	Reconnect motor armature leads.
Erratic motor performance.	Overload condition.	Remove overload.
	CL and/or IR Trimpots may be set incorrectly.	Readjust the CL and/or IR Trimpots
	Defective speed control module.	Replace speed control.
	Voltage Select Switch set to wrong position.	Recheck line voltage and the correct setting of the Voltage Select Switch.
	Defective motor, worn brushes, etc.	Repair or replace motor.