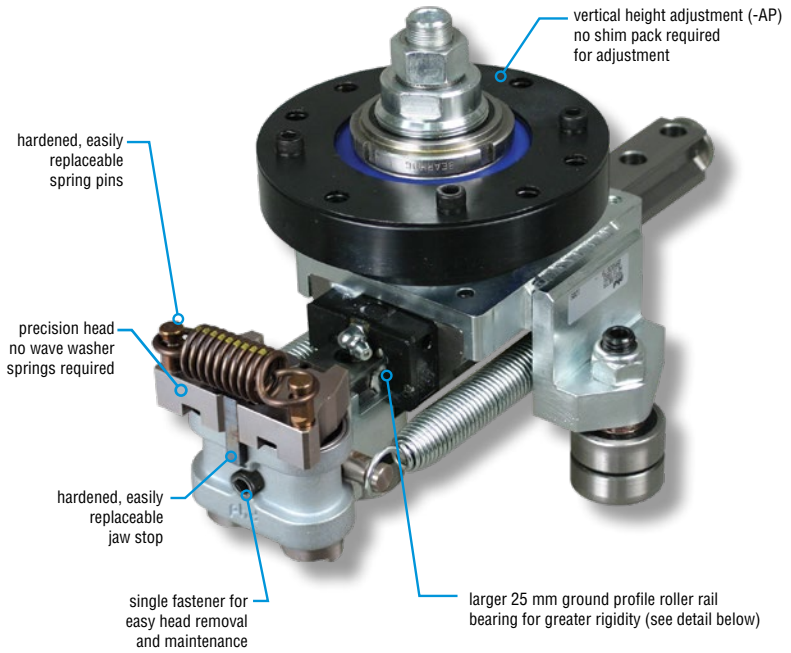
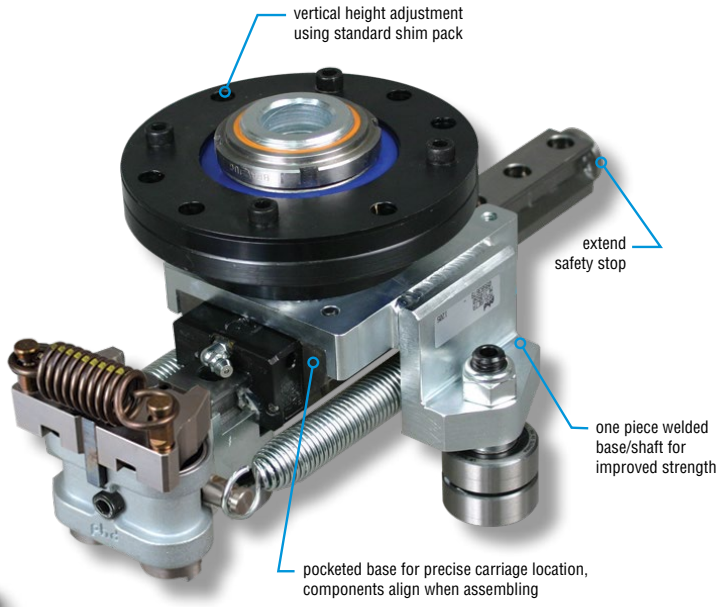
BST2

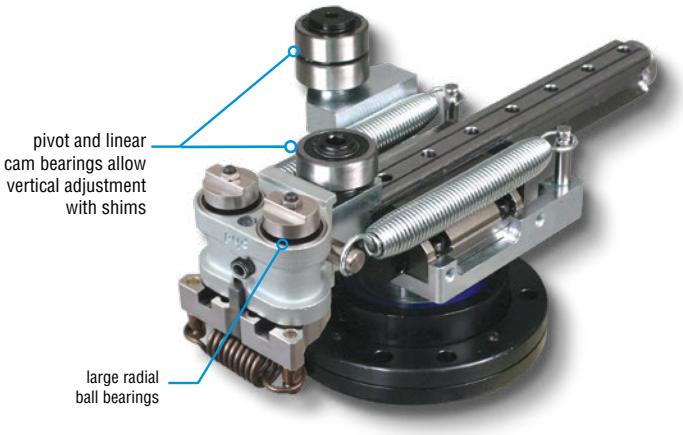
TRANSFER ARM

Major Benefits

- Threaded vertical height adjustment eliminates need for shim pack, which greatly reduces setup adjustment time (-AP option).
- Linear rail and carriage bearing has increased in size and upgraded to roller bearing style assembly.
- Base, shaft, and pivot incorporated into one piece weldment.
- Head is designed with large radial bearings for increased rigidity and long life.
- Hardened replaceable jaw stop for ease of repair and cost considerations.
- Jaw and retract springs manufactured especially for PHD, providing greater life.
- All spring return pins hardened and replaceable for ease of repair and cost considerations.
- Unit is designed to operate over 20 million cycles.







ORDERING & ENGINEERING DATA: SERIES BST2 TRANSFER ARM

TO ORDER SPECIFY:
Product Line, Series, Type, Machine No., Process, Cam Bearing, Design No., Head Design, Jaw Opening, and Options if required.

PRODUCT LINE
B - Blow Mold

TYPE
T - Transfer Arm

PROCESS
S - CSD
D - HR

DESIGN NO.
5 - Metric

JAW OPENING
90 - Non-Locking (90°)

B S T 2 S 3 - 5 - 1 x 90 - AP

SERIES
S - Slide

CAM BEARING
2 - Single Pivot Bearing
3 - Double Pivot Bearing

HEAD DESIGN
1 - Removable

MACHINE NO.
2 - Series2

OPTIONS
AP - Threaded Vertical Height Adjustment
KS - Shim Height Adjustment Installed
H110 - Head Assembly with Spring Installed, No Clamp (Requires Full Unit Description)
H115 - Head Assembly with Spring and Clamp Installed (Requires Full Unit Description)
H116 - Head Assembly Only, No Spring, No Clamp (Requires Full Unit Description)
H117 - Head Assembly with Clamp Installed, No Spring (Requires Full Unit Description)
H800 - Slide Assembly Only (Requires Full Unit Description)

NOTE: Standard BST2 Transfer Arms are not designed for 'S' style SBO4-SBO8 or SBO28 machines. See "Component Reference Chart" on page 4 or contact PHD for specific machines.

RECOMMENDATIONS

Care must be taken with the newer style preforms to ensure that the fingers match the profile of the finish being processed.

SPECIFICATIONS	IMPERIAL	METRIC
SERIES	'S' Style Series2 Replacement	
OPERATION	Cam Operated, Spring Return	
LINEAR BEARING SYSTEM	Steel Ground Profile Rail with Recirculating Roller Bearings	
LUBRICATION	FDA Regulation 21CFR 178.3570	
AMBIENT TEMPERATURE	-20° to +180°F	-29° to +82°C
GRIP FORCE AT TOOLING*	3.4 to 9.4 lb	15.1 to 41.8 N
EXTENSION SPRING FORCE		
FULL RETRACT	14 lb	62.3 N
FULL EXTEND	45 lb	200.2 N
WEIGHT - STANDARD UNIT	13.1 lb	4.9 kg
WEIGHT - AP ADJUSTABLE UNIT	13.8 lb	5.2 kg
STROKE	3.543 +0.472/-0.551 in	90 +12/-14 mm

*See page 73 for alternate grip force springs.

LIFE EXPECTANCY

Series BST Transfer Arms are designed for over 20 million trouble-free cycles with proper maintenance.

MAINTENANCE

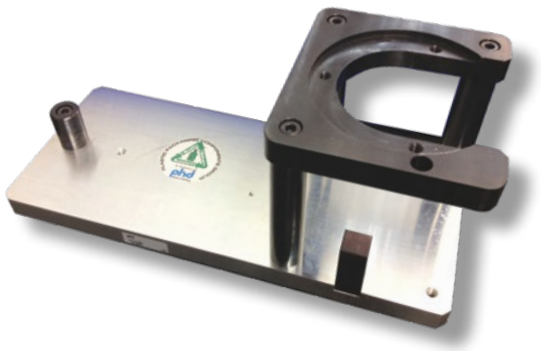
As with most PHD products, these transfer arms are field repairable. Repair kits and main structural components are available as needed for extended service.

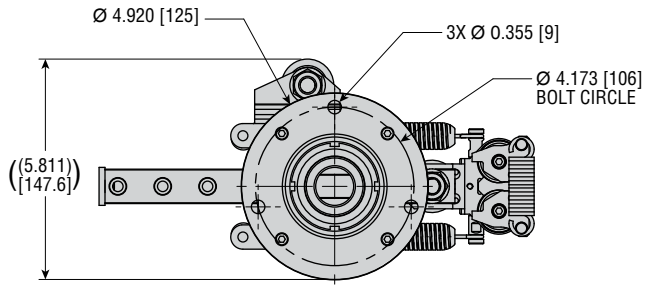
LUBRICATION

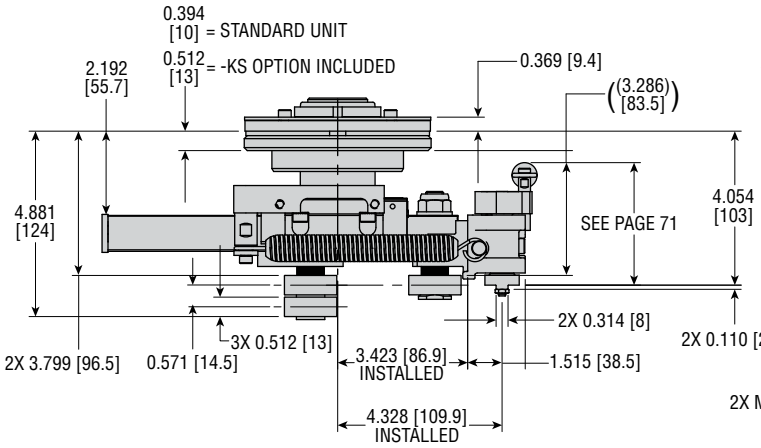
The Series BST Transfer Arm bearing systems are factory lubricated and designed to use lubrication per FDA Regulation 21CFR 178.3570 and may not need further lubrication for the life of the unit depending on the duty cycle of the machine. However, lubrication of the bearing system every six months is recommended. Also the application of anti-seize to the Weldment Base Assembly (-AP option only) every 4-6 months will provide extended life and keep adjustment components working properly.

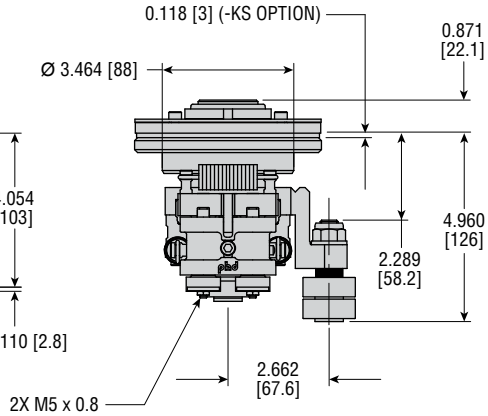
JIG FOR SERIES BST2 - ML312709

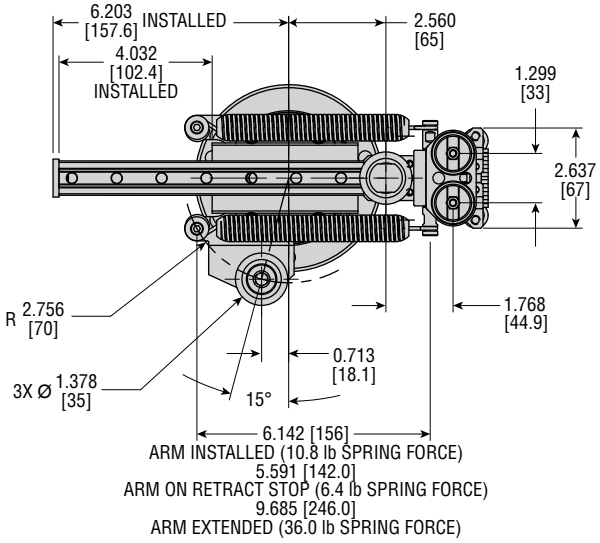
This jig is designed to verify and assist in rebuilding transfer arms as needed in the field. This jig is designed to fit in a standard 6 inch vise.

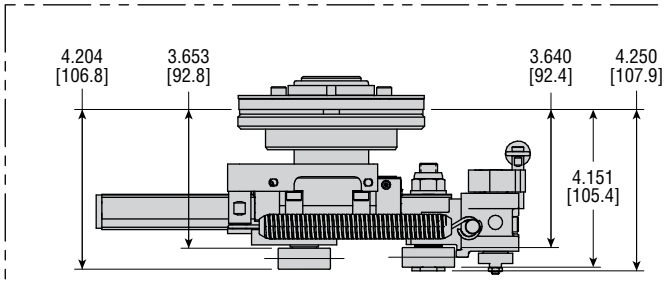










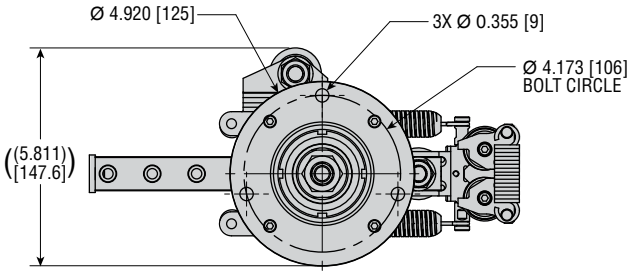


FOR BST2x2-5 UNITS

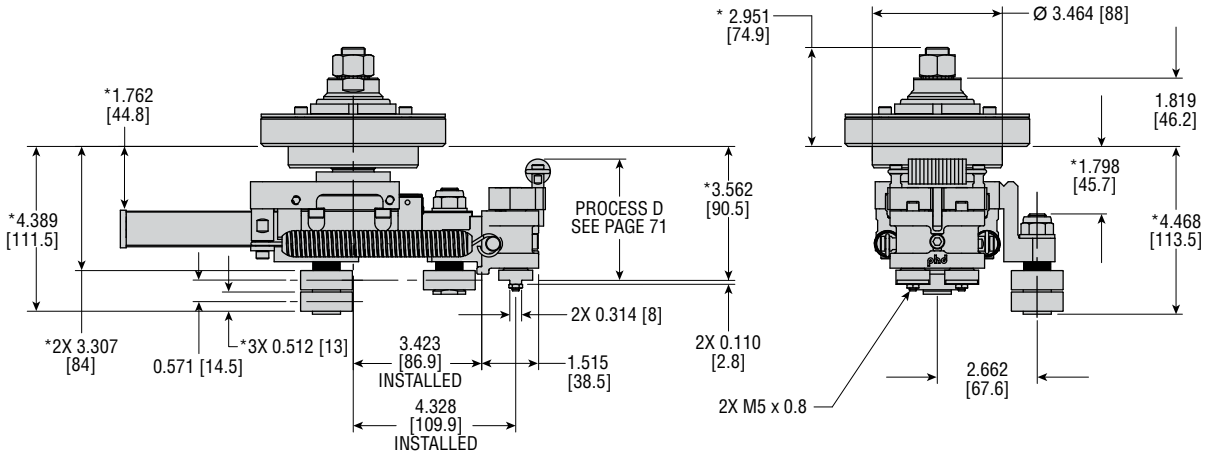
NOTES:
1) DIMENSIONS IN [ ] INDICATE VALUES IN mm
2) JAW ROTATION IS 90° TOTAL, 45° EACH JAW
3) MAXIMUM TRAVEL OF SLIDE IS 4.567 [116.0]
4) UNIT DESIGNED FOR STROKE OF 3.543 [90.0]
5) RETRACT OVERTRAVEL IS 0.551 [14.0]
6) EXTEND OVERTRAVEL IS 0.472 [12.0]

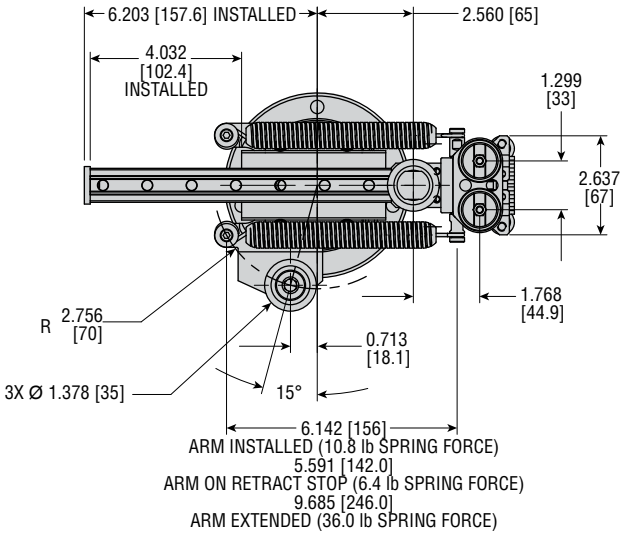
All dimensions are reference only unless specifically toleranced.

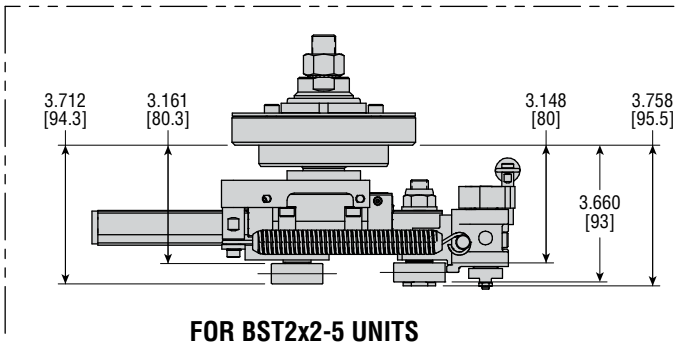
DIMENSIONS: SERIES BST2xx-5 TRANSFER ARM WITH-AP OPTION



* = VERTICAL HEIGHT ADJUSTMENT DIMENSIONS
THAT WILL CHANGE + / - 0.1575 [4 mm]
(ONE FULL TURN IS EQUAL TO 0.0394 [1 mm])







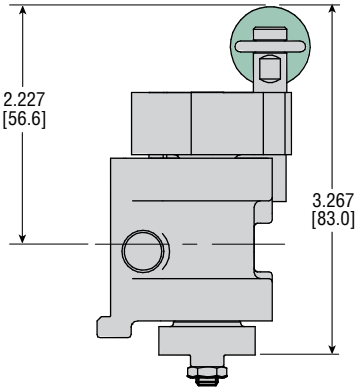
FOR BST2x2-5 UNITS

NOTES:
1) DIMENSIONS IN [ ] INDICATE VALUES IN mm
2) JAW ROTATION IS 90° TOTAL, 45° EACH JAW
3) MAXIMUM TRAVEL OF SLIDE IS 4.567 [116.0]
4) UNIT DESIGNED FOR STROKE OF 3.543 [90.0]
5) RETRACT OVERTRAVEL IS 0.551 [14.0]
6) EXTEND OVERTRAVEL IS 0.472 [12.0]

All dimensions are reference only unless specifically toleranced.

S COLD SET (CSD) PROCESS

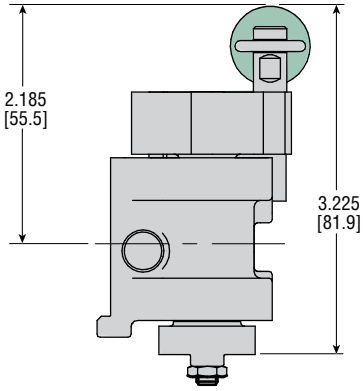
90° JAW OPENING
External extension springs provide the necessary grip force for Cold Set (CSD) bottle processes.



For forces, see engineering data on page 68 or alternate head spring on page 73.

D HEAT RESISTANT (HR) PROCESS

90° JAW OPENING
External extension springs with heavier spring force provide the necessary grip force for Heat Resistant (HR) bottle processes.



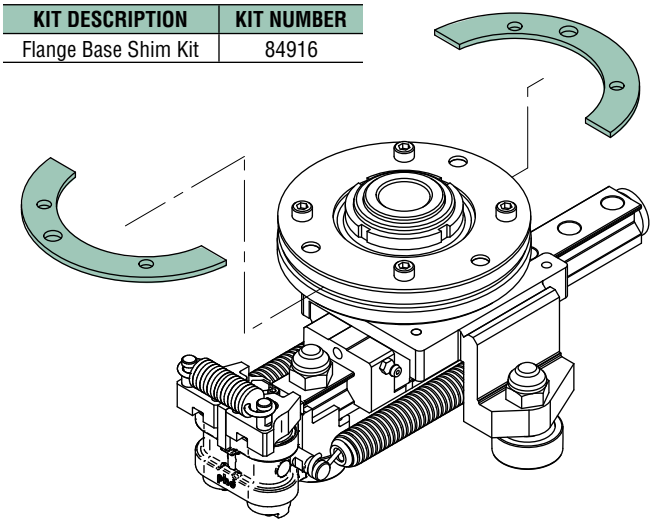
For forces, see engineering data on page 68 or alternate head spring on page 73.

KS SHIM HEIGHT ADJUSTMENT FACTORY INSTALLED FLANGE BASE SHIM PACK

A factory installed flange base shim pack is required for transfer height setup in the machine. This option allows for vertical adjustment of the unit.

NOTE: Standard unit does not include flange shim spacers. PHD offers this in kit form (see below). 'S' style shims are interchangeable with the PHD transfer arm.

KIT DESCRIPTION	KIT NUMBER
Flange Base Shim Kit	84916

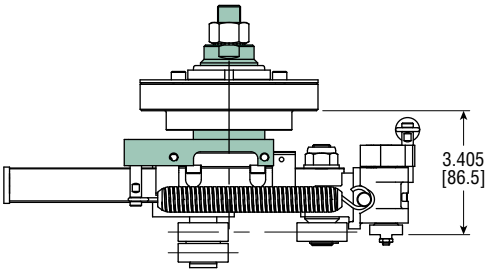


All dimensions are reference only unless specifically toleranced.

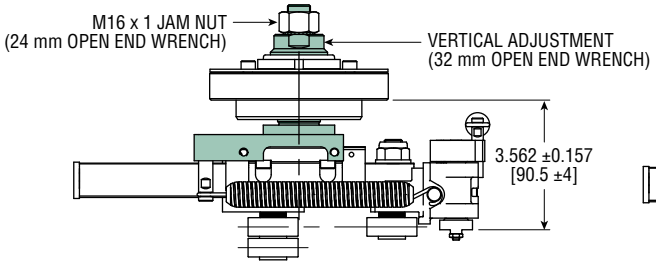
AP THREADED VERTICAL HEIGHT ADJUSTMENT

This option allows for fast and easy vertical height adjustment once the unit is positioned in the machine. There is no need to remove the unit from the machine while adjusting the height. This option eliminates the need for a shim pack.

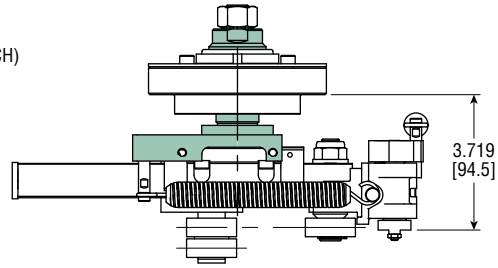
NOTE: One full turn is equal to 0.0394 in [1 mm] adjustment.



UNIT SHOWN AT HIGHEST POSITION



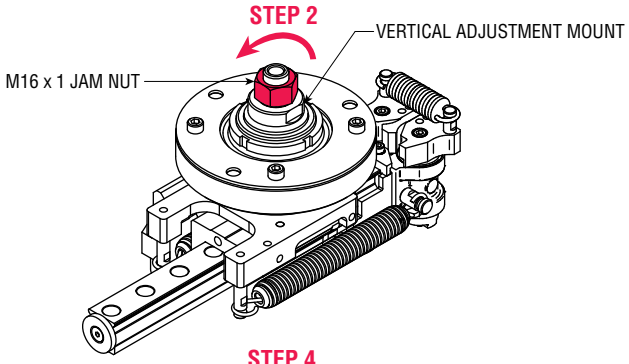
UNIT SHOWN AT MID POSITION

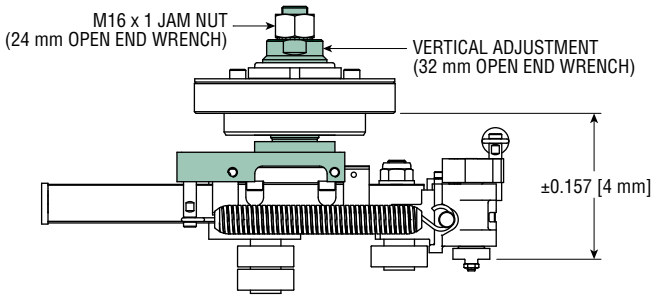


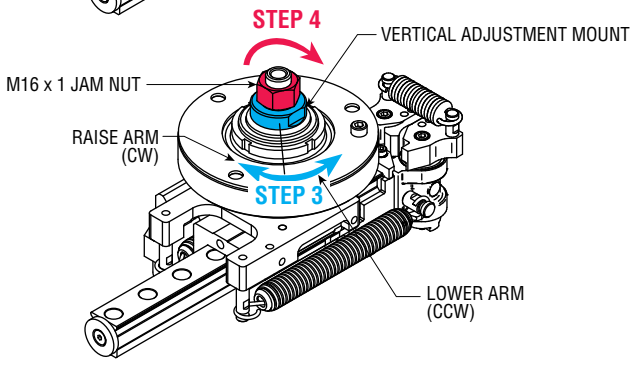
UNIT SHOWN AT LOWEST POSITION

HEIGHT ADJUSTMENT PROCEDURES

1) Install the arm into the machine.
2) Using a 24 mm box end wrench, loosen the locking nut.
3) Using a 32 mm open end wrench, rotate the vertical adjustment mount to adjust the arm height until the jaw fingers are at the proper height over the mold. Clockwise (CW) movement will raise the arm, counterclockwise (CCW) will lower the arm. The arm has a range of ± 0.157 [4 mm].
4) Tighten the lock nut while holding the vertical adjustment mount stationary to ensure that the height does not change.







ALTERNATE HEAD SPRINGS

Listed are alternative PHD designed springs for BST2 jaws. This list provides the customer with a variety of differing force springs that fit onto the posts of the transfer arm head. The springs are color coded with NSF registered DYKEM® per the chart below for ease of identification.

NOTE: PHD highly recommends the application of lubrication applied to the inside of the spring hooks and the post grooves for maximum life.

Forces are calculated based on the dimension from the center of the shafts to the center of the preform/bottle as shown in Figure 1. If tooling is longer or shorter than what is shown, the grip force will vary from the list given.

Consult PHD for grip force adjustments other than listed.

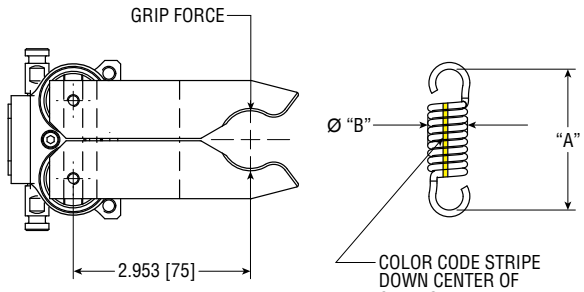


FIGURE 1

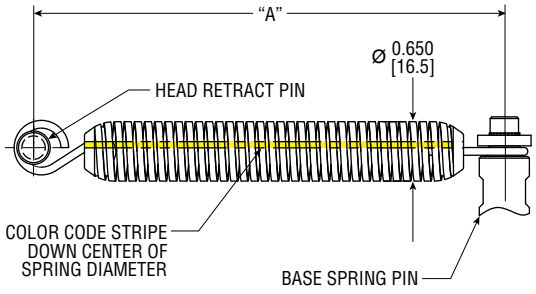
PHD PART #	GRIP FORCE		STRIPE COLOR	STRIPE QTY	STANDARD PHD USE	FREE STATE DIMENSION "A"		DIMENSION "Ø B"	
	lb	N				in	mm	in	mm
83884	3.4	15.1	Yellow	1	BST2 CSD	2.179	55.3	0.748	19.0
76655	5.1	22.7	Green	2	—	1.935	49.1	0.554	14.1
77602	6.7	29.8	White	1	—	1.721	43.7	0.600	15.2
84491	9.4	41.8	Yellow	2	BST2 HR	2.061	52.3	0.663	16.8
77603	11.9	52.9	White	2	—	1.855	47.1	0.670	17.0

NOTE: Pull out forces are related to grip forces, but will vary depending on finger tooling design. PHD springs will allow process refinement for both bottle and preform transfer.

ALTERNATE RETRACT SPRINGS

Listed are alternative PHD designed springs for BST2 retraction. This list provides the customer with alternative force spring that fits onto the posts of both the head and base spring pins. The springs are color coded with NSF registered DYKEM® per the chart below for ease of identification.

NOTE: PHD highly recommends the application of lubrication applied to the inside of the spring hooks and the post grooves for maximum life.

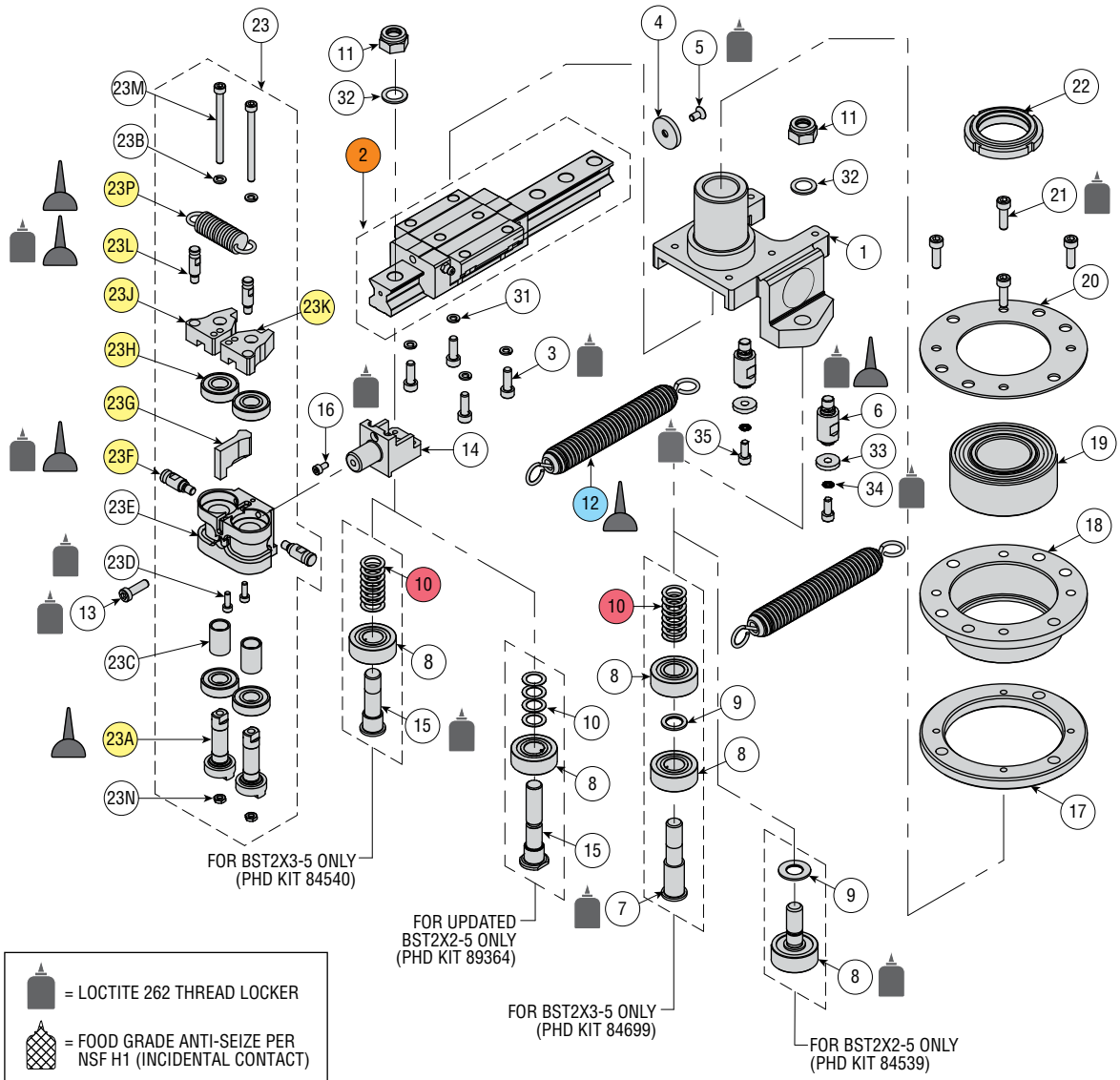


PHD PART #	STRIPE COLOR	STRIPE QTY	STANDARD PHD USE	DIMENSION "A" ARM ON STOP		TOTAL FORCE (lbs) ARM ON STOP		DIMENSION "A" ARM OUT MIN		TOTAL FORCE (lbs) ARM OUT MIN		DIMENSION "A" ARM OUT MAX		TOTAL FORCE (lbs) ARM OUT MIN	
				in	mm	lb	N	in	mm	lb	N	in	mm	lb	N
85051	Yellow	1	BST2	5.591	142.0	3.2	14.2	6.142	156.0	5.4	24.0	9.685	246.0	18.0	80.1
82892	Yellow	2	—	5.591	142.0	3.4	15.1	6.142	156.0	5.0	22.2	9.685	246.0	15.1	67.2

NOTES:

1) Pull out forces are related to grip forces, but will vary depending on finger tooling design. These spring options allow process refinement for both bottle and preform transfer.
2) Total retract forces are two times the above charted forces, as two springs are required per unit.

EXPLODED VIEW & REPAIR KITS: SERIES BST2 TRANSFER ARM

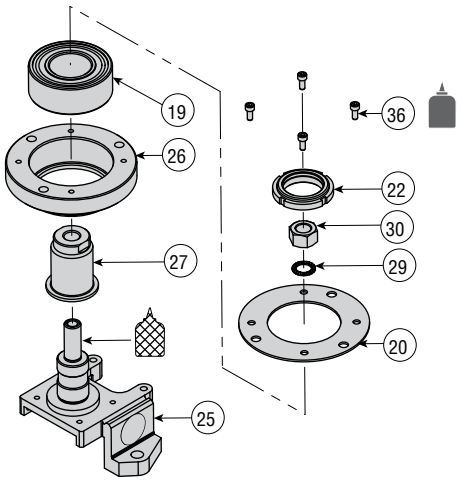


= LOCTITE 262 THREAD LOCKER

= FOOD GRADE ANTI-SEIZE PER NSF H1 (INCIDENTAL CONTACT)

= LUBRICANT PER FDA REGULATION 21CFR 178.3570

-AP VERTICAL HEIGHT ADJUSTMENT



KIT DESCRIPTION	KIT NO.		COLOR CODE
	BST2x3-5	BST2x2-5	
Rail & Carriage Assembly Repair Kit	84317	85895	
Head Repair Kit - Heat Resistant (HR)	84318-01		
Head Repair Kit - Cold Set (CSD)	84318-02		
Spring Extension Spring Kit	84319		
BST2x2 Pivot Cam Bearing Replacement Kit	84539		
BST2x2 Linear Cam Bearing Replacement Kit	89364		
BST2x3 Linear Cam Bearing Replacement Kit	84699		
Flange Base Shim Kit	84916		
Cam Bearing Shim Kit	84917		

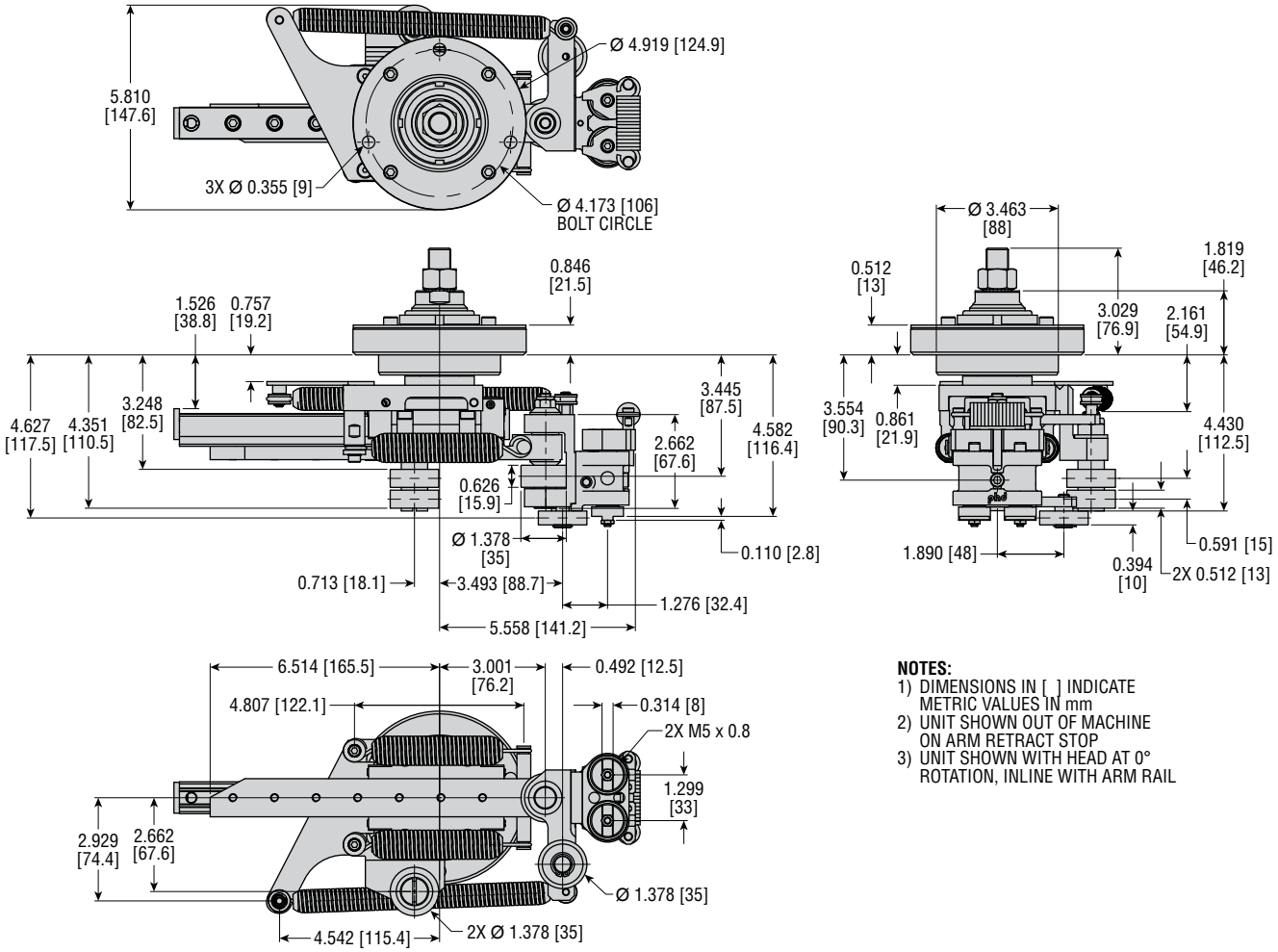
KEY	PART DESCRIPTION	PART NO.	
		BST2x3-5	BST2x2-5
1	Weldment Base Assembly	83000	
2	Rail & Carriage Assembly	Sold as Part of Rail Repair Kit	
3	Carriage to Base SHCS	14308-117	
4	Extend Stop	83867	
5	Extend Stop SHCS	14308-584	
6	Spring Holder Body Pin	85291	
7	Pivot Cam Bearing Shaft	82889	—
8	Bearing (Linear Cam)	2334-052-02	
8	Bearing (Pivot Cam)	—	84536-01
9	Bearing to Bearing Spacer	85364	83714
10	Commercial Shim Washer	77430-05-004-0	
11	Nylon insert Lock Nut (Linear / Pivot Cam)	65759-007	
11	Nylon insert Lock Nut (Pivot Cam)	—	65759-013
12	Extension Spring	Sold as Part of Extension Spring Kit	
13	Head to Arm SHCS	14308-436	
14	Arm Mount	82858	
15	Bearing Mount	83713	
16	Mounting Arm to Rail SHCS	14308-401	
17	Lower Bearing Ring Mnt	82888	
18	Mid Bearing Ring Mnt	82884	
19	Bearing	2334-051-01	
20	Upper Bearing Ring Mnt	82885	
21	Upper Bearing Ring Mnt SHCS	61054-117	
22	Locking Nut	82887	
23	Total Head Assembly	Full Unit Description followed by -H11x	
23A	Shaft	81388-01 or Sold as Part of Head Assembly	
23B	Split Lock Washer	61745-008 or Sold as Part of Head Assembly	
23C	Bearing Spacer	81393 or Sold as Part of Head Assembly	
23D	Body to Tang SHCS	14308-019 or Sold as Part of Head Assembly	
23E	Body	81332 or Sold as Part of Head Assembly	
23F	Body Sprint Holder Pin	84683 or Sold as Part of Head Assembly	
23G	Tang	81394 or Sold as Part of Head Assembly	
23H	Bearing	2334-050-01 or Sold as Part of Head Assembly	
23J	Left Jaw	84475 or Sold as Part of Head Assembly	
23K	Right Jaw	84476 or Sold as Part of Head Assembly	
23L	Jaw Spring Holder Pin	82883 or Sold as Part of Head Assembly	
23M	Jaw to Nut SHCS	14308-111 or Sold as Part of Head Assembly	
23N	Metric Nut	3204-023 or Sold as Part of Head Assembly	
23P	Jaw Extension Spring	Full Unit description followed by -H1600 or Sold as Part of Head Assembly	
25	Weldment Base Assembly	84301	
26	Mid Bearing Ring Mnt	83990	
27	Vertical Adjustment Mnt	83871	
29	Serrated Washer	84141-017	
30	Metric Nut	3204-083-1	
31	Serrated Washer	84141-008	
32	Flat Metric Washer	64398-11-1-02	
33	Spring Base Washer	85290	
34	Serrated Washer	84141-007	
35	Washer to Spring Post SHCS	61054-099	
36	Upper Bearing Ring Mount SHCS	61054-115	

Articulated Transfer Arm

ML313644

Major Benefits

- Threaded vertical height adjustment eliminates need for shim pack, which greatly reduces setup adjustment time
- Linear rail and carriage bearing has increased in size and upgraded to roller bearing style assembly
- Base, shaft, and pivot incorporated into one piece weldment
- Head is designed with large radial bearings for increased rigidity and long life
- Hardened replaceable jaw stop for ease of repair and cost considerations
- Jaw and retract springs manufactured specifically for PHD provide greater life
- All spring return pins hardened and replaceable for ease of repair and cost considerations
- Unit is designed to operate over 20 million cycles.



NOTES:
1) DIMENSIONS IN [ ] INDICATE METRIC VALUES IN mm
2) UNIT SHOWN OUT OF MACHINE ON ARM RETRACT STOP
3) UNIT SHOWN WITH HEAD AT 0° ROTATION, INLINE WITH ARM RAIL

All dimensions are reference only unless specifically toleranced.