

Modular Tooling

Tri-Axis Transfer Press Components Series

- Engineered for maximum strength, rigidity, and economy
- Precision fit, eliminating movement when torquing
- Components are completely interchangeable

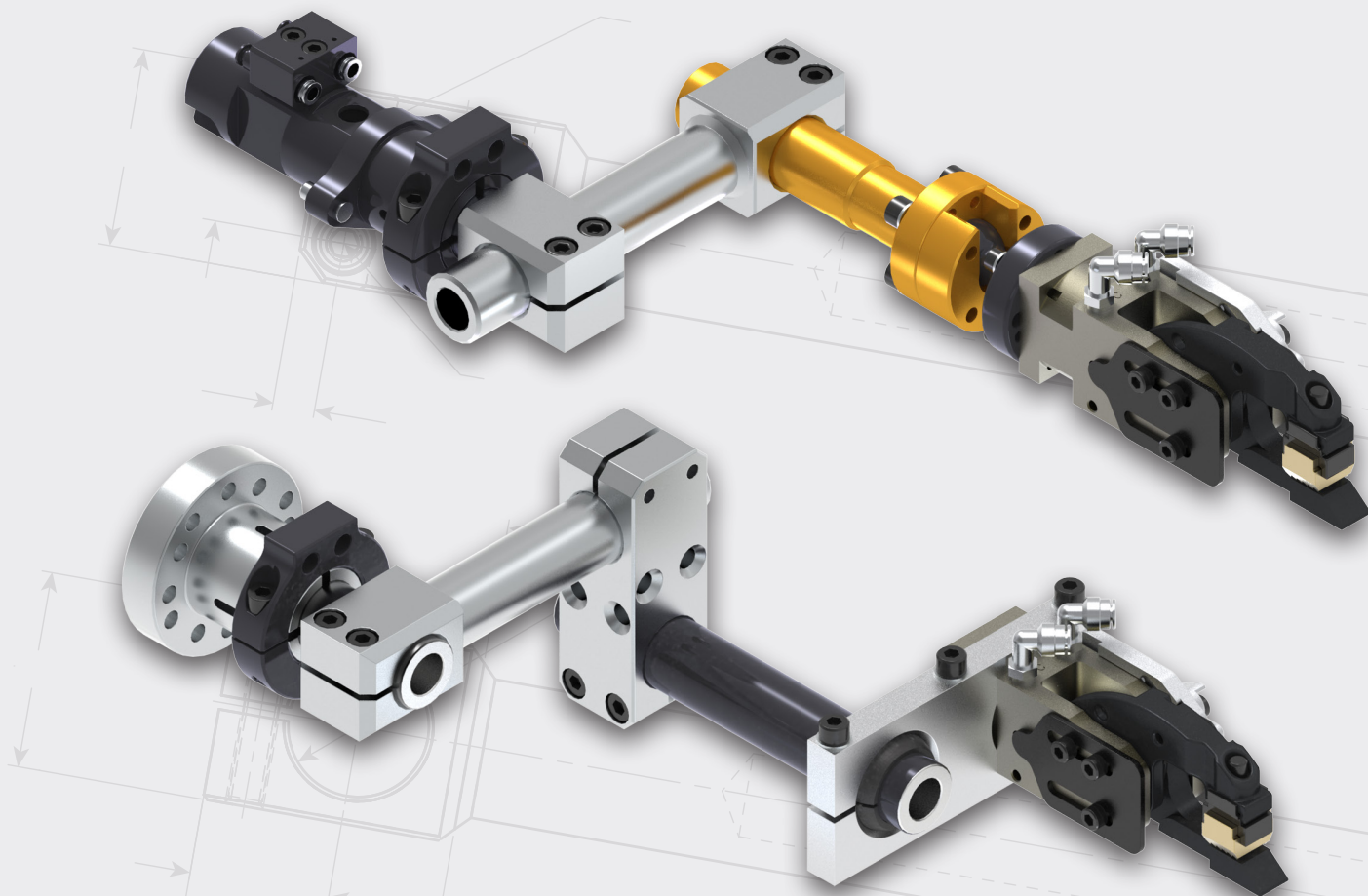
WHAT'S NEW

Added 1 inch Dia. Components

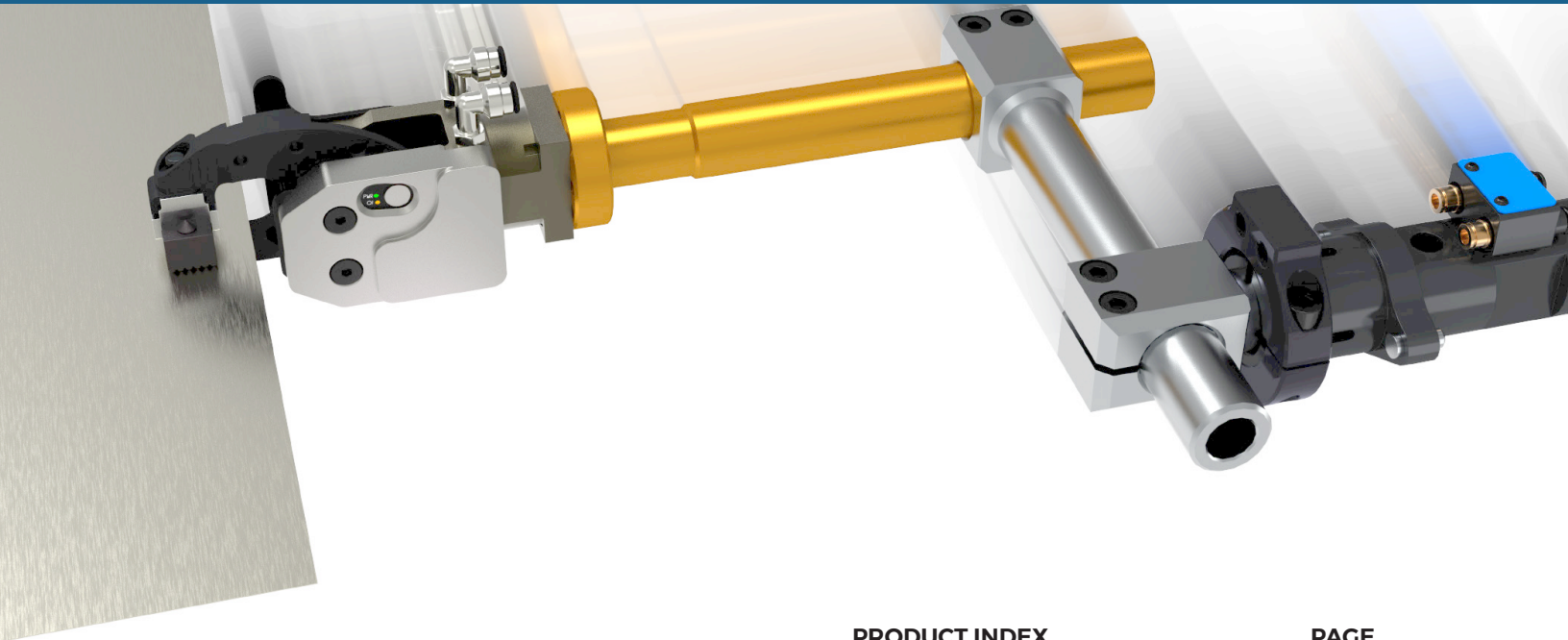
"SIZE 100"

GRM2 Mount, Slip Plug, & Receiver Block

Pages 23 & 24



TRI-AXIS TRANSFER PRESS MODULAR TOOLING



Tri-Axis Transfer Press Modular Tooling components are designed to be strong and lightweight while providing enhanced versatility for high performance. These components, available in two diameter sizes, are one-piece construction, completely interchangeable, and have been maximized for light weight and rigidity. Additionally, multiple bolt patterns have been utilized where possible to keep the interchangeability and ordering process as simple as possible. PHD assists with your tri-axis press needs, whether with individual components, system design, full build, implementation, or improvements to existing operations. These systems, combined with the industry-leading PHD Series GRM family of sheet metal handling clamps, now provide a total solution delivering optimal performance to your high-speed tri-axis transfer presses.

Contact PHD Canada for all your Tri-Axis components questions and application assistance:

PHDCanada.Support@phdinc.com

Phone (289) 204-8511

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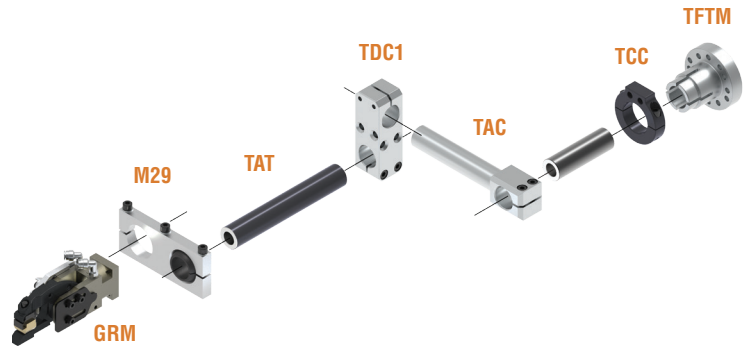
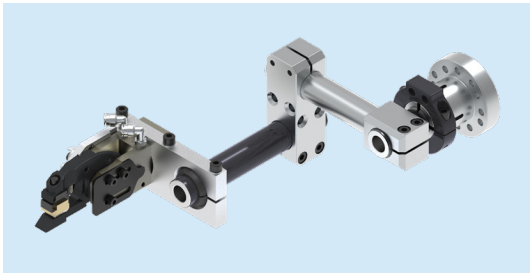
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A Wide Range of Components to Create Tooling Systems

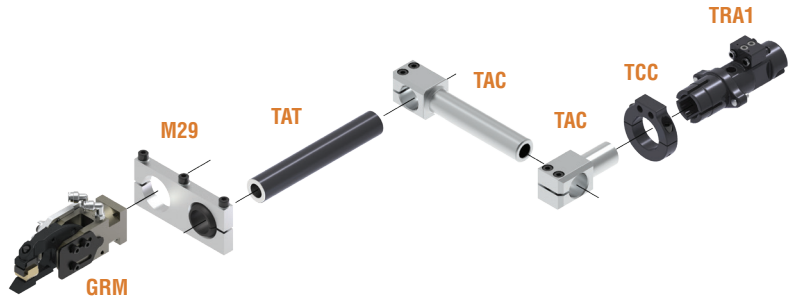
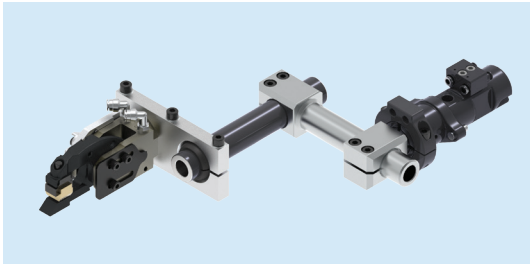


FINGER CONFIGURATION EXAMPLES

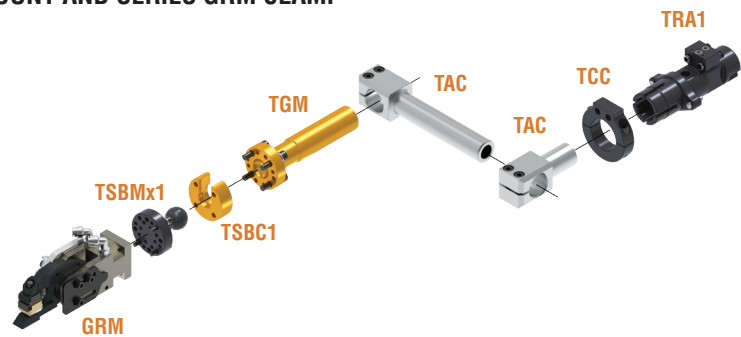
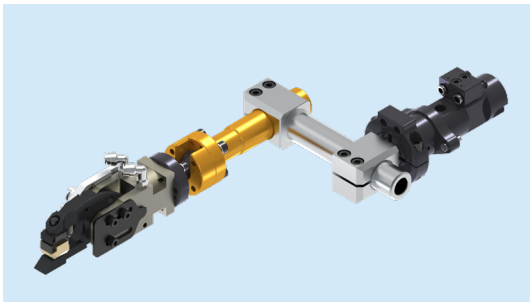
FLANGE MOUNT WITH SPHERICAL BRACKET AND SERIES GRM CLAMP



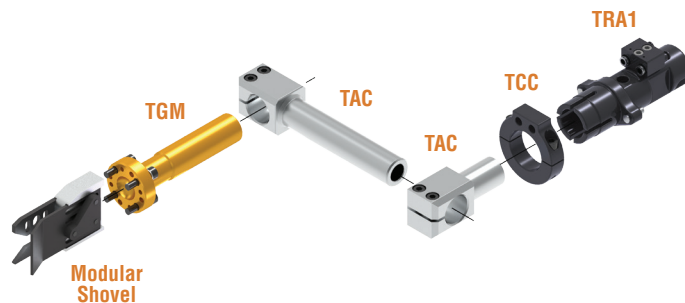
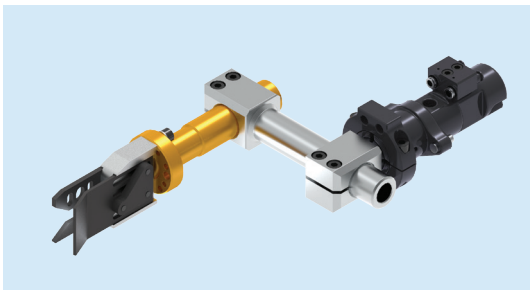
FEMALE RECEIVER ADAPTER WITH SPHERICAL BRACKET AND SERIES GRM CLAMP



FEMALE RECEIVER ADAPTER WITH SWIVEL BALL MOUNT AND SERIES GRM CLAMP



FEMALE RECEIVER ADAPTER WITH GRIPPER MOUNT AND MODULAR SHOVEL



TRA

Benefits

- Integral attachment component of the transfer finger assembly to the press feedbar.
- Plugs into the rail receiver (docking device) and, when securely latched, creates automatic air and electrical connection.
- Utilizes two hardened pins inserted into hardened bushings located at the rail receiver face, allowing for an overall positive anti-rotation mount.
- Available with or without air block and electric options.

TRA1 - FEMALE RECEIVER ADAPTER

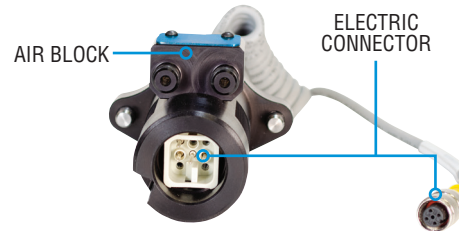
Size 100 - 1.00" inside diameter to accommodate all 1.00" featured components which utilize 1.50" Collar Clamp (TCCx-150).

Size 125 - 1.25" inside diameter to accommodate all 1.25" featured components which utilize 1.75" Collar Clamp (TCCx-175).

TRA2 - MALE RECEIVER ADAPTER

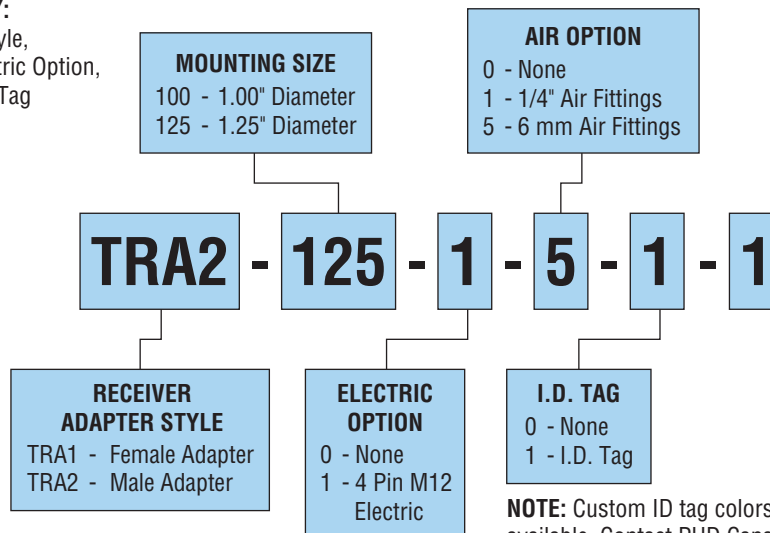
Size 100 - 1.00" outside diameter to accommodate all 1.00" featured components

Size 125 - 1.25" outside diameter to accommodate all 1.25" featured components



TO ORDER SPECIFY:

Receiver Adapter Style,
Mounting Size, Electric Option,
Air Option, and I.D. Tag

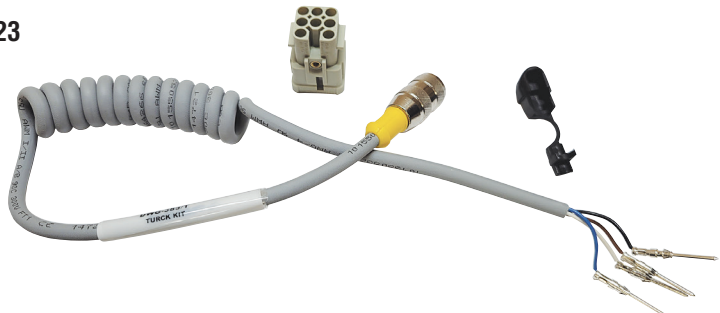


ELECTRICAL REPLACEMENT KIT NO. 91823

(For all receiver adapters)

Kit includes:

- 1 4-Pin M12 Connector
- 1 Strain Relief
- 1 M3 x 14 SHCS
- 1 Harting Connector



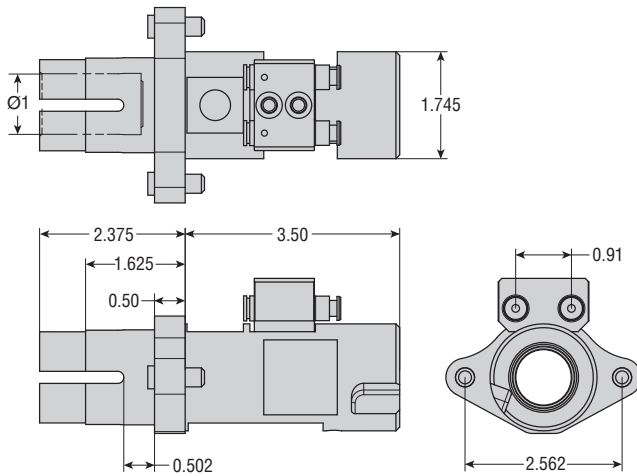
RECEIVER ADAPTERS

FEMALE RECEIVER ADAPTER

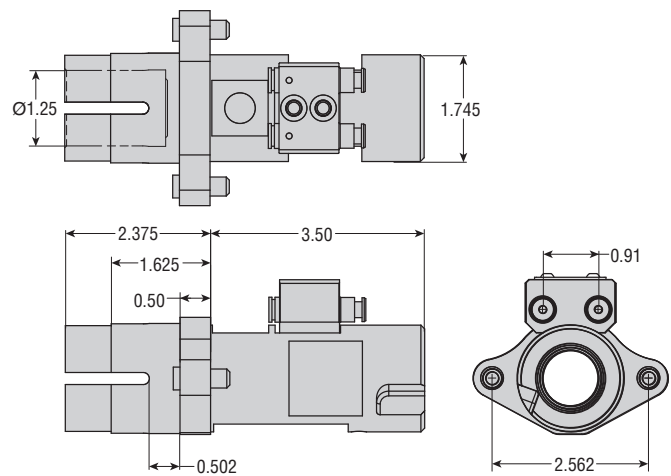
TRA1-125-x-1-1-1 Shown



TRA1-100



TRA1-125

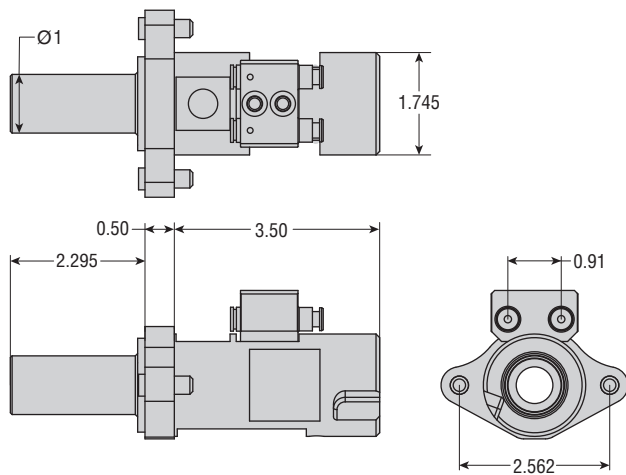


MALE RECEIVER ADAPTER

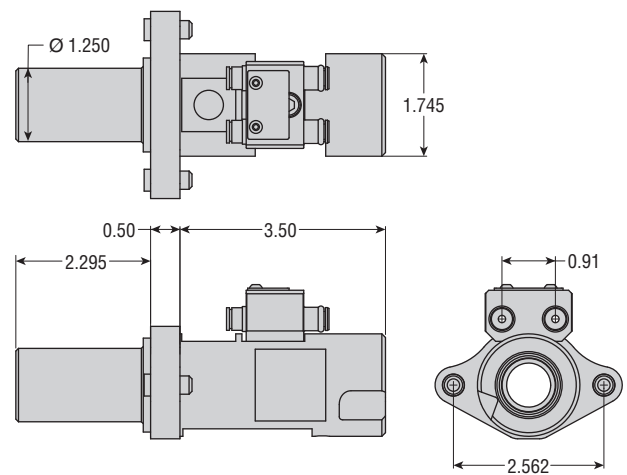
TRA2-125-0-1-1-1 Shown



TRA2-100



TRA2-125



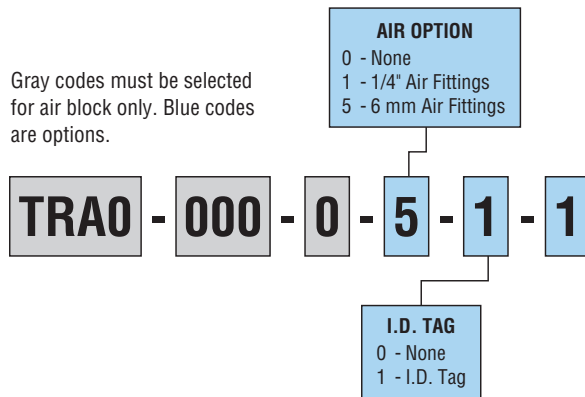
All dimensions are reference only unless specifically toleranced.

RECEIVER ADAPTERS

AIR BLOCK ONLY

TRA0-000

Gray codes must be selected for air block only. Blue codes are options.



TRA0-000-0-1-x-x
FITTING 1/4 INCH AIR TUBING

TRA0-000-0-5-x-x
FITTING 6 mm AIR TUBING

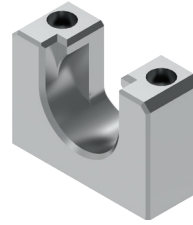


TFH

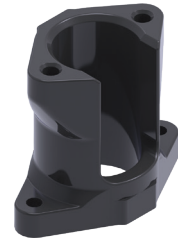
TFH1-1 - SINGLE FINGER HOLDER - ALUMINUM

Benefits

- Finger holders offer the ability to hang transfer fingers directly on dies or in storage carts.
- Compact design and multiple hole patterns cover most mounting scenarios.
- Hanging bracket or vertical storage base option

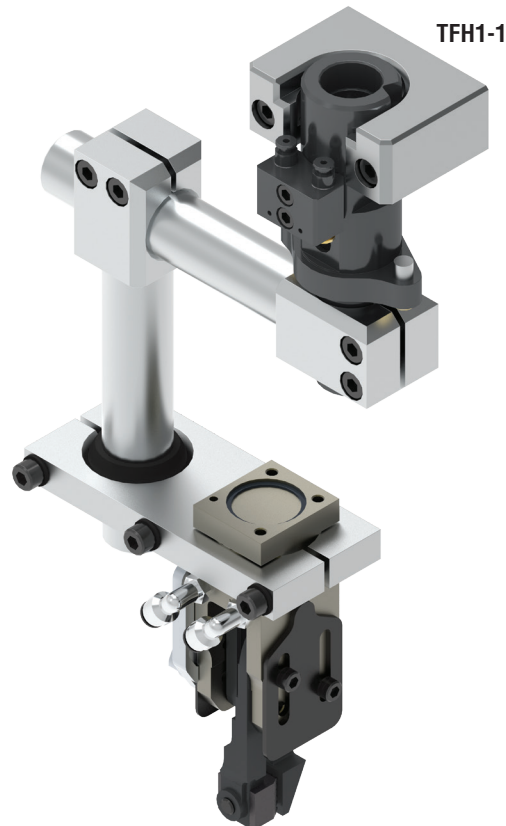
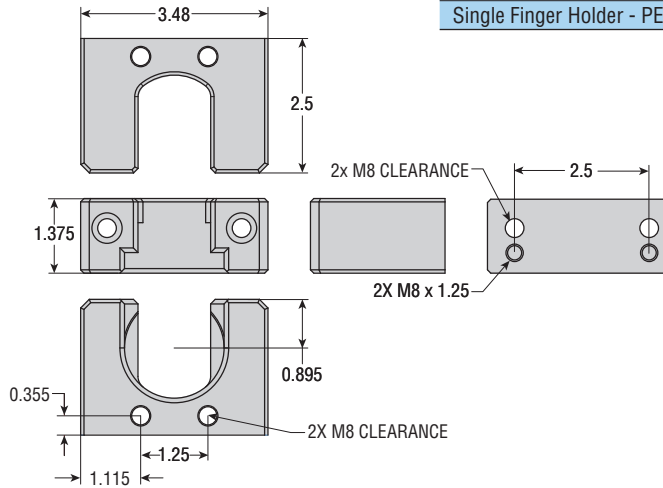


Aluminum
TFH1-1



PETG
TFH2-2

MODEL	PART NO.	WEIGHT (lb)
Single Finger Holder - Aluminum	TFH1-1	0.74
Single Finger Holder - PETG Material	TFH2-2	0.41

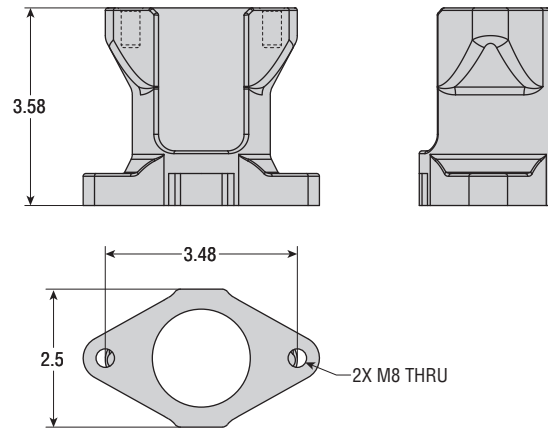


All dimensions are reference only unless specifically toleranced.

TFH2-2 - SINGLE FINGER HOLDER – PETG MATERIAL

Benefits

- Finger holders offer the ability to hold finger assemblies in the up-right position.
- The bright color on top of the design allows the holders to be easily visible (i.e. from the bottom of the bin, etc.)



TCC

Benefits

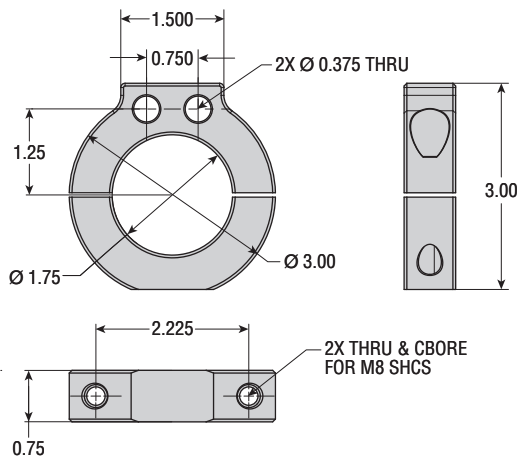
- Collar Clamps secure modular tooling components to female receiver adapters (TRA1) or female flange mounts (TFTM) or universal arm clamp adapters (TSC)
- TCC1 and TCC2 offer additional holes for secure routing of air lines
- Available in rugged black oxide coating to protect steel surface or black anodized aluminum for surface protection and long service life
- Features either 1.50" ID or 1.75" ID and utilizes two 8 mm socket head cap screws for superior clamping force

SERIES TCC COLLAR CLAMPS

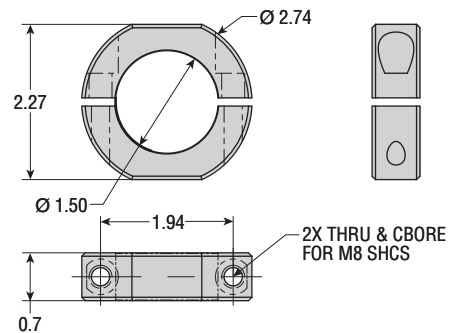
MODEL	PART NO.	WEIGHT (lb)
Steel with Air Line Holes	TCC1-175	0.88
Aluminum with Air Line Holes	TCC2-175	0.38
Steel without Air Line Holes	TCC3-150	0.54
	TCC3-175	0.60
Aluminum without Air Line Holes	TCC4-150	0.22
	TCC4-175	0.25



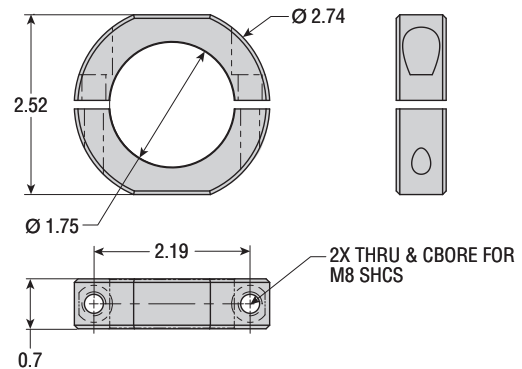
TCC1-175 & TCC2-175



TCC3-150 & TCC4-150



TCC3-175 & TCC4-175



All dimensions are reference only unless specifically toleranced.

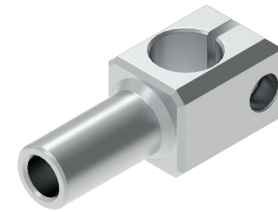
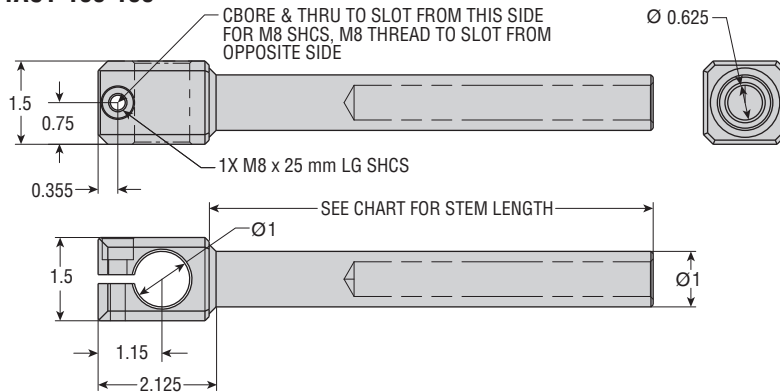
TAC

Benefits

- Optimized design for lighter weight and rigidity
- Solid one-piece construction for ease of adjustability and superior strength
- Clamps down using 8 mm socket head cap screws for ultimate grip force
- Holding force when tightened to approx. 20 ft/lbs:
Size 100 is 220 ft/lbs
Size 125 is 280 ft/lbs
- No torque wrench required.
- Standard stem lengths are available for application flexibility:
Size 100 – 2 to 10 inches
Size 125 – 2 to 14 inches
- Precision bore fit so finger assembly doesn't move when tightening bolts
- Anodized aluminum for superior appearance and protection

SIZE 100 - 1.00" COMPONENT

TAC1-100-100

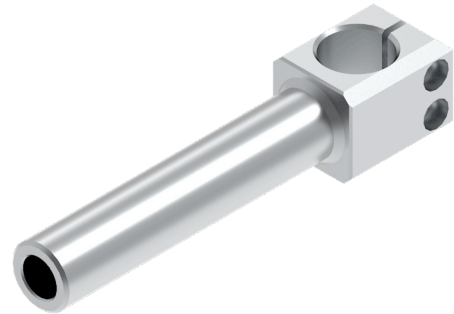
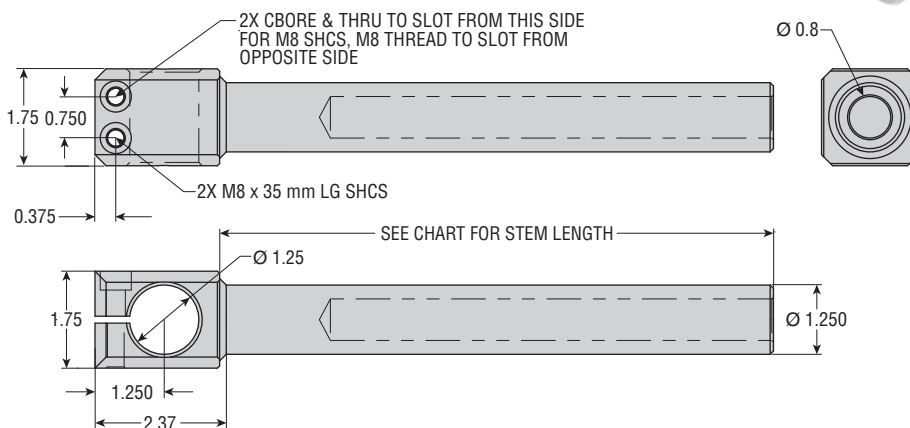


STEM LENGTH (in)	PART NO.	WEIGHT (lb)
2	TAC1-100-100X2	0.42
4	TAC1-100-100X4	0.53
6	TAC1-100-100X6	0.68
8	TAC1-100-100X8	0.84
10	TAC1-100-100X10	1

NOTE: Length is stem only. Does not include the head.

SIZE 125 - 1.25" COMPONENT

TAC1-125-125



STEM LENGTH (in)	PART NO.	WEIGHT (lb)
2	TAC1-125-125X2	0.64
4	TAC1-125-125X4	0.8
6	TAC1-125-125X6	1
8	TAC1-125-125X8	1.26
10	TAC1-125-125X10	1.5
12	TAC1-125-125X12	1.76
14	TAC1-125-125X14	2

NOTE: Length is stem only. Does not include the head.

All dimensions are reference only unless specifically tolerated.

UNIVERSAL ARM CLAMP ADAPTER

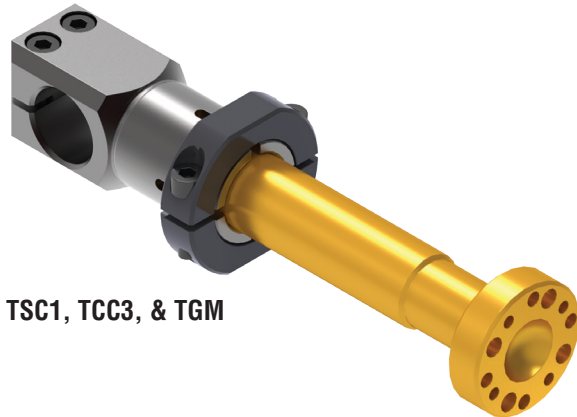
TSC

Benefits

- This product is intended to be used with our existing components.
- Designed to create a more compact envelope when mounting to two gripper mounts/grippers while using one receiver adapter.

DOUBLE ARM CLAMP ASSEMBLY

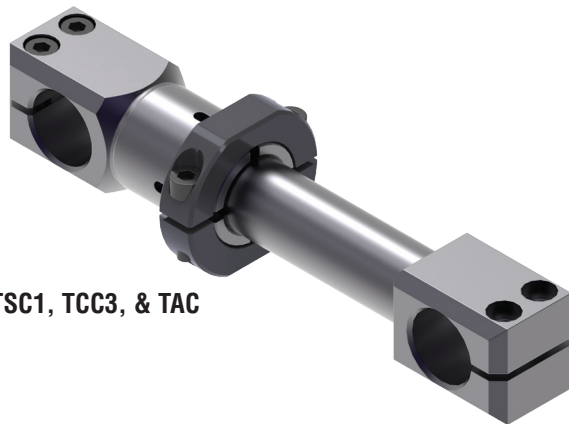
SIZE	PART NO.	WEIGHT (lb)
100	TSC1-100-100X2	0.49
125	TSC1-125-125X2	0.62



TSC1, TCC3, & TGM



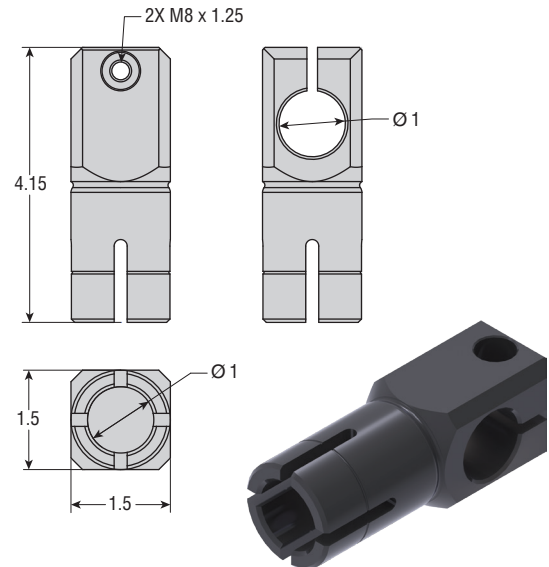
TSC1, TCC1, & TAT



TSC1, TCC3, & TAC

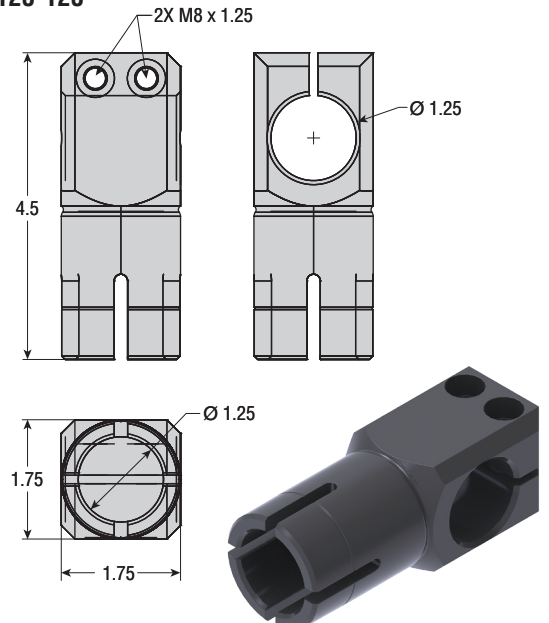
SIZE 100 - 1.00" COMPONENT

TSC1-100-100



SIZE 125 - 1.25" COMPONENT

TSC1-125-125



All dimensions are reference only unless specifically toleranced.

DOUBLE HOLE CLAMPS

TDC

Benefits

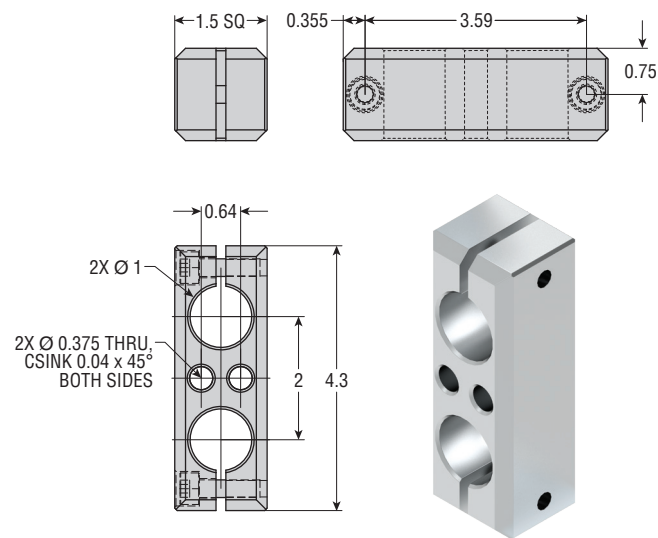
- Inline, 90 Degree, and Rotational Double Hole Clamps combine with other modular tooling components, such as arm clamps and tubes, in parallel, perpendicular, or rotational orientations
- Highest strength and versatility for superior tooling systems

- All mounts lock using 8 mm socket head cap screws for ultimate clamping force
- Additional holes for secure routing of air lines
- Anodized aluminum for superior appearance and protection, providing longer service life

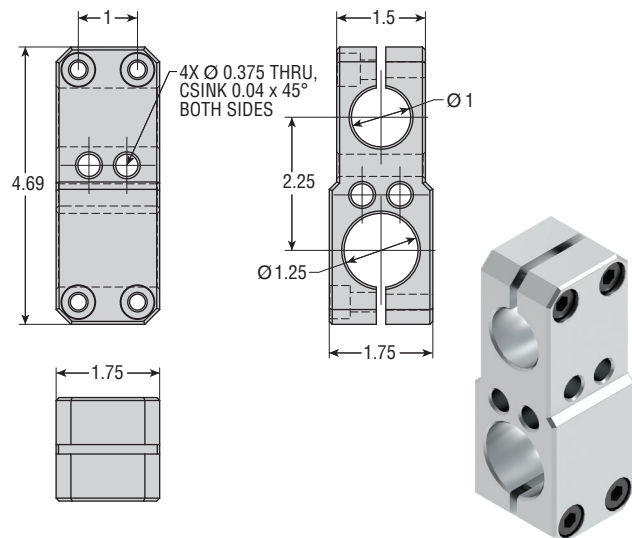
INLINE MOUNT

SIZE 100 - 1.00" COMPONENT

TDC1-000-100-100

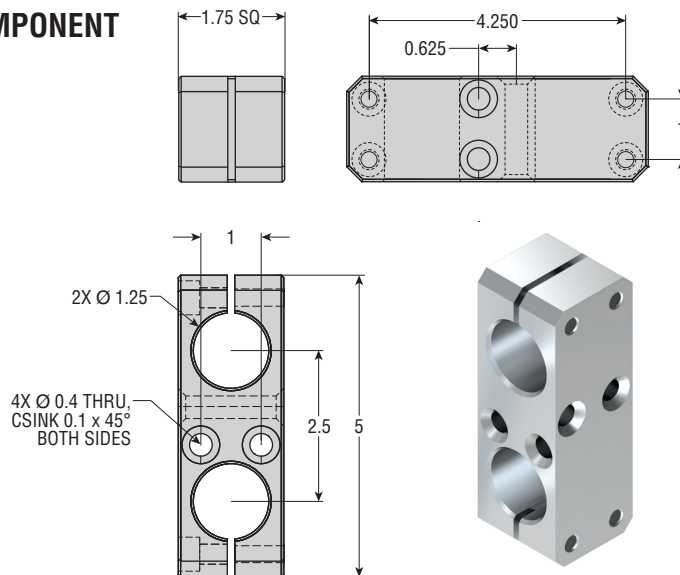


TDC1-000-100-125



SIZE 125 - 1.25" COMPONENT

TDC1-000-125-125



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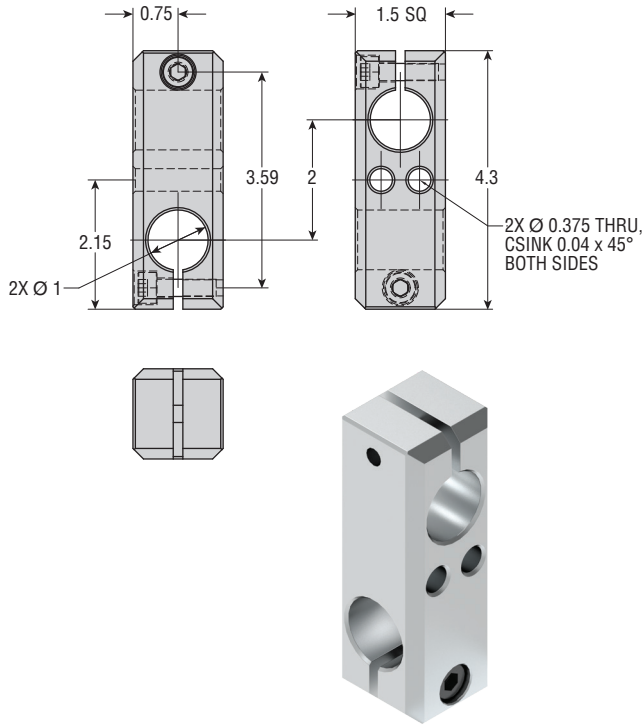
DOUBLE HOLE CLAMPS

90 DEGREE MOUNT

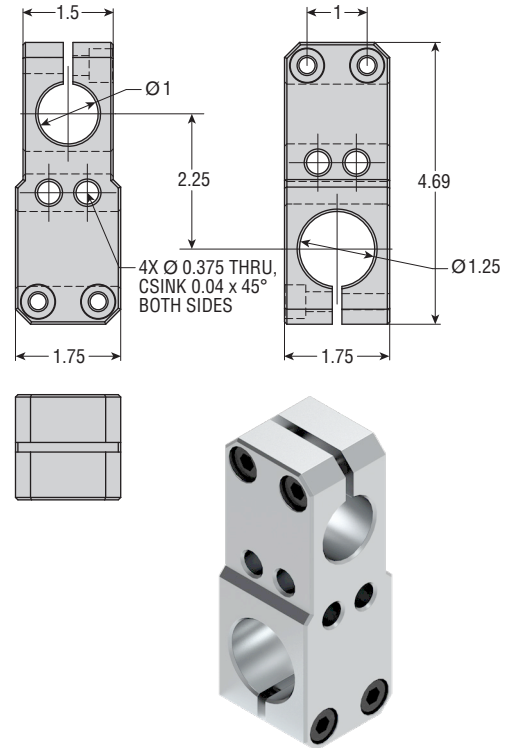
SIZE	PART NO.	WEIGHT (lb)
100	TDC1-090-100-100	0.65
100 to 125	TDC1-090-100-125	0.91
125	TDC1-090-125-125	1

SIZE 100 - 1.00" COMPONENT

TDC1-090-100-100

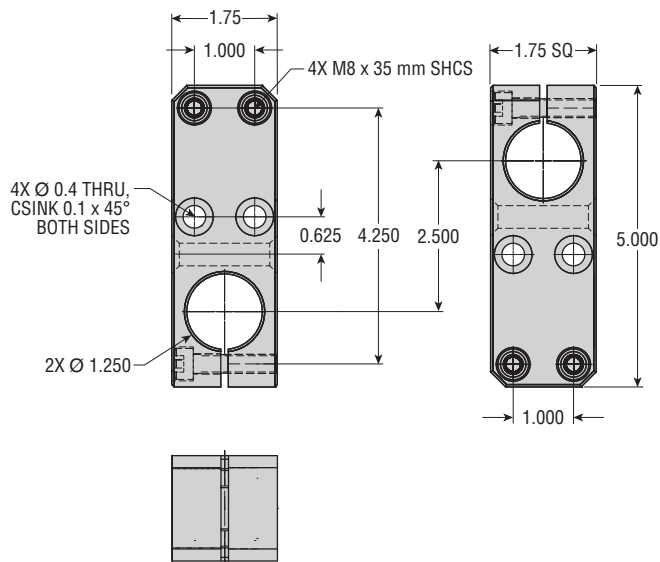


TDC1-090-100-125



SIZE 125 - 1.25" COMPONENT

TDC1-090-125-125



All dimensions are reference only unless specifically toleranced.

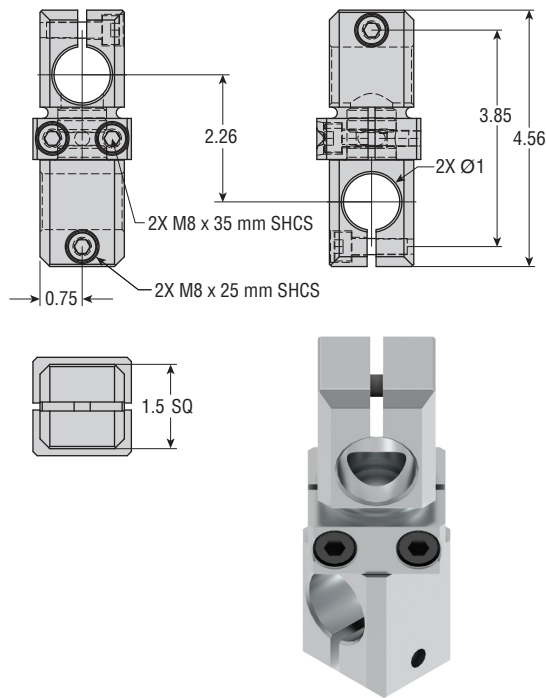
DOUBLE HOLE CLAMPS

ROTATIONAL MOUNT

SIZE	PART NO.	WEIGHT (lb)
100	TDC1-360-100-100	0.79
125	TDC1-360-125-125	1.13

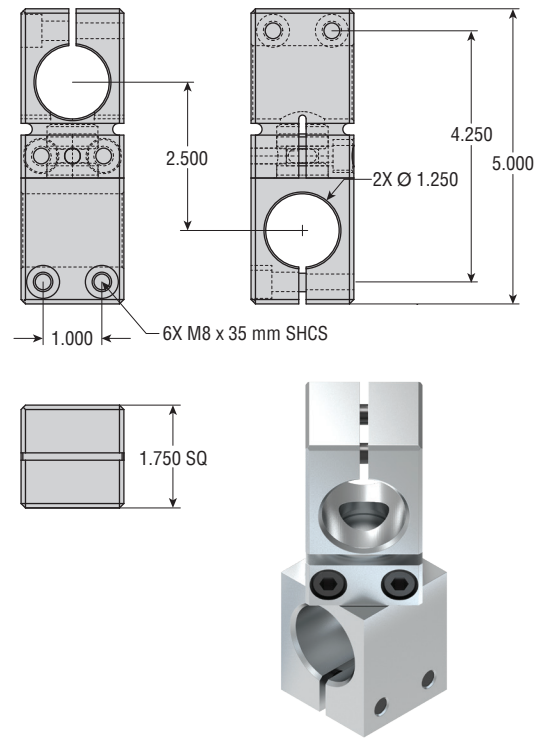
SIZE 100 - 1.00" COMPONENT

TDC1-360-100-100



SIZE 125 - 1.25" COMPONENT

TDC1-360-125-125

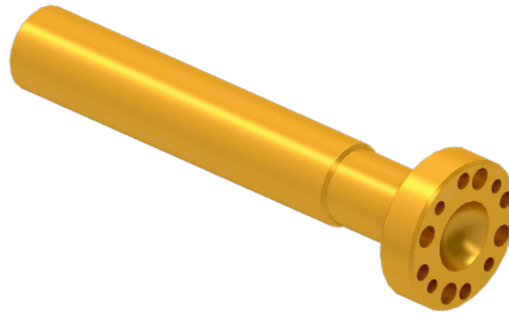


All dimensions are reference only unless specifically toleranced.

TGM

Benefits

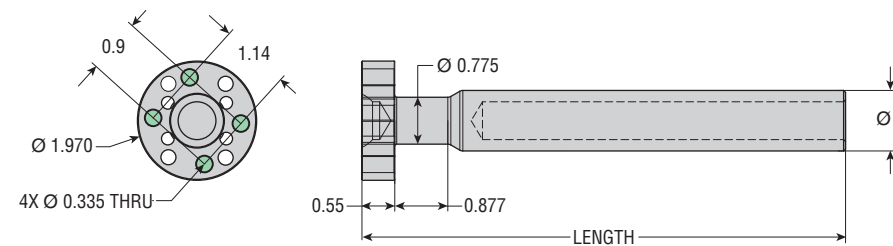
- Gripper Mounts for mounting and combination of common grippers and shovels to modular tooling systems
- Three common bolt patterns for application flexibility:
Size 100 – 4, 5, and 8 mm
Size 125 – 5, 6, and 8 mm
- Standard shaft lengths are available:
Size 100 – 4 to 10 inches
Size 125 – 4 to 14 inches
- Covers common gripper or shovel bolt patterns



- Dome in center allows use with ball swivel and application flexibility
- Anodized aluminum for superior appearance and protection

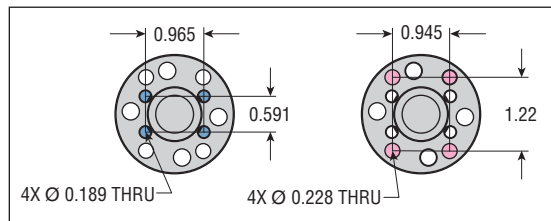
SIZE 100 - 1.00" COMPONENT

TGMx-1-100



OVERALL SHAFT LENGTH (in)	PART NO.*	WEIGHT (lb)
4	TGMx-1-100X4	0.3
6	TGMx-1-100X6	0.45
8	TGMx-1-100X8	0.61
10	TGMx-1-100X10	0.76

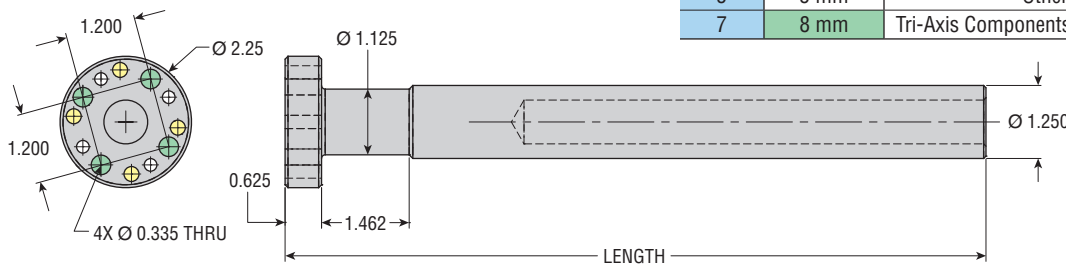
*See x Code chart below.



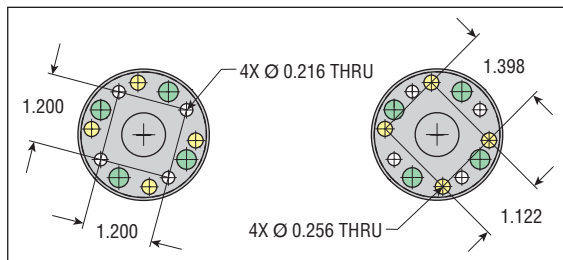
x CODE	FASTENERS	MOUNTS
2	4 mm 5 mm	GRM2 Conversion Puck (TGUC) to GRM2 Clamp
3	5 mm	GRM1 Gripper
7	8 mm	Tri-Axis
9	4 mm	GRM0

SIZE 125 - 1.25" COMPONENT

TGMx-1-125



x CODE	FASTENERS	MOUNTS
2	6 mm	GRM2 Clamps, or TGUM/TGUS Adapter Plates
5	5 mm	Other Grippers/Clamps
7	8 mm	Tri-Axis Components: Ball Swivel Clamp, Swing Plate



OVERALL SHAFT LENGTH (in)	PART NO.*	WEIGHT (lb)
4	TGMx-1-125X4	0.5
6	TGMx-1-125X6	0.69
8	TGMx-1-125X8	0.91
10	TGMx-1-125X10	1.16
12	TGMx-1-125X12	1.38
14	TGMx-1-125X14	1.63

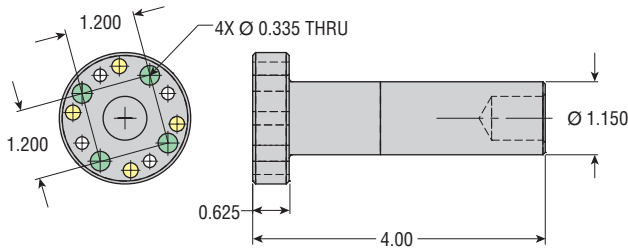
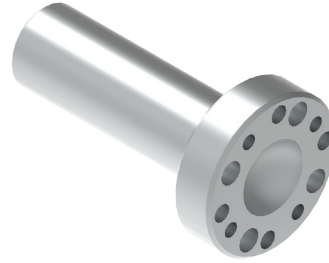
*See x Code chart.

All dimensions are reference only unless specifically tolerated.

GRIPPER MOUNTS

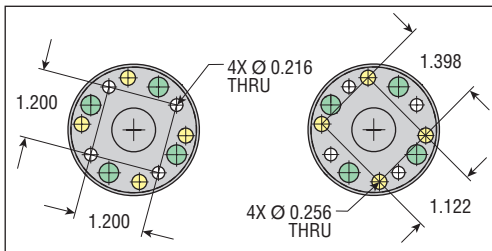
TELESCOPING GRIPPER MOUNT

- Telescoping gripper mounts are for mounting and combination of common grippers and shovels to modular tooling systems.
- Three common bolt patterns (5, 6, and 8 mm) for application flexibility
- One standard shaft length is available at 4 inches
- Covers common gripper or shovel bolt patterns
- Dome in center allows use with ball swivel and application flexibility
- Consult PHD for availability and ordering



OVERALL SHAFT LENGTH (in)	PART NO.*	WEIGHT (lb)
4	TGMx-1-115X4	0.5

*See x Code chart below.



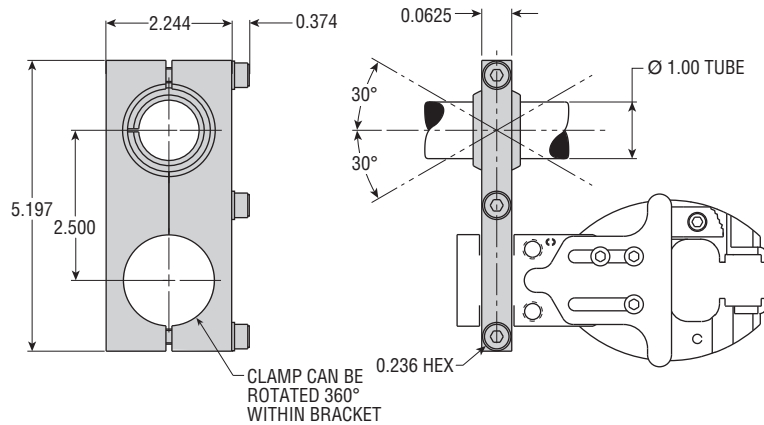
x CODE	FASTENERS	MOUNTS
2	6 mm	GRM2 Clamps, or TGUM/TGUS Adapter Plates
5	5 mm	Other Grippers/Clamps
7	8 mm	Tri-Axis Components: Ball Swivel Clamp, Swing Plate

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GRIPPER MOUNTS

M27

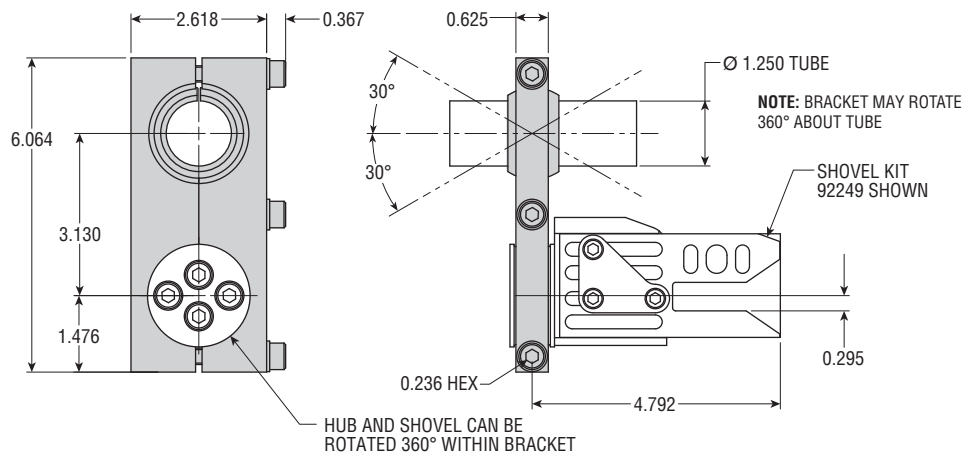
1.00 in SPHERICAL MOUNTING BRACKET WITH M8 FASTENERS



M29

1.25 in SPHERICAL MOUNTING BRACKET

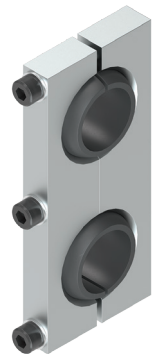
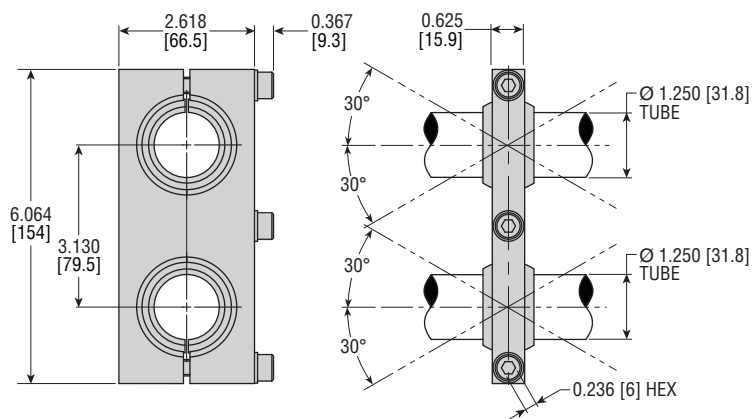
This option includes a spherical side-mounting bracket designed for 1.25-inch mounting tubes. The bracket assembly uses M8 screws instead of M6 screws, allowing for increased clamp force on both the ball and the tube.



1.25 in CUSTOM MOUNTING BRACKET

Part No. PHDCA000047

- Space-saving design, ideal for situations where compact automation is needed.
- Can be used as a breakaway point.
- One-screw adjustment for easy re-adjustment of fingers, reducing time spent on adjustments.
- 360-Degree rotational adjustment.
- Ability to achieve up to a 60-degree total angle between two mounting points
- M8 screws provide robust clamping without the risk of stripping.

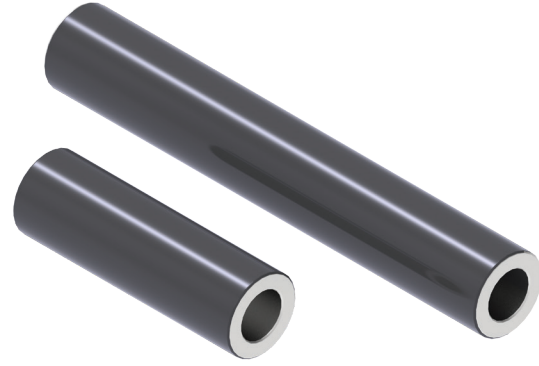


All dimensions are reference only unless specifically tolerated.

TAT

Benefits

- Aluminum Extension Tubes combined with other modular tooling components, such as arm clamps and tubes, in parallel, perpendicular, or rotational orientations.
- Wall thickness provides superior strength and support.
Size 100 – 0.160 inch
Size 125 – 0.200 inch
- Available from 3 to 24 inches in 3 inch increments for ease of system design and durability. Weight is 0.07 lb per inch.
- Custom lengths also available for application flexibility
- Anodized aluminum



SIZE 100 - 1.00" COMPONENT

OVERALL SHAFT LENGTH (in)	PART NO.	WEIGHT (lb)
3	TAT1-100X3	0.12
6	TAT1-100X6	0.25
9	TAT1-100X9	0.37
12	TAT1-100X12	0.50
15	TAT1-100X15	0.62
18	TAT1-100X18	0.74
21	TAT1-100X21	0.87
24	TAT1-100X24	0.99

SIZE 125 - 1.25" COMPONENT

OVERALL SHAFT LENGTH (in)	PART NO.	WEIGHT (lb)
3	TAT1-125X3	0.21
6	TAT1-125X6	0.42
9	TAT1-125X9	0.63
12	TAT1-125X12	0.84
15	TAT1-125X15	1.05
18	TAT1-125X18	1.26
21	TAT1-125X21	1.47
24	TAT1-125X24	1.68

SWIVEL BALL MOUNTS/CLAMPS

TSB

Benefits

- Applies to 1.25" Series - Swivel Ball Mount/Clamp attaches to Gripper Mount and provides holding force of 180 ft/lbs when all four screws are hand tightened (approximately 20 ft/lbs).
- Covers most common gripper and shovel patterns

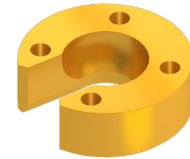
SWIVEL BALL MOUNT

Benefits

- Swivel Ball Mounts allow for the mounted gripper to rotate up to 80 degrees and free spinning for system set-up.
- Available in five different bolt patterns of the most common grippers and shovels for design flexibility. All patterns are on all units.
- Locks with four M8 SHCS, ensures clamp orientation
- Available in rugged black oxide coating to protect steel surface or black anodized aluminum for surface protection and long service life.



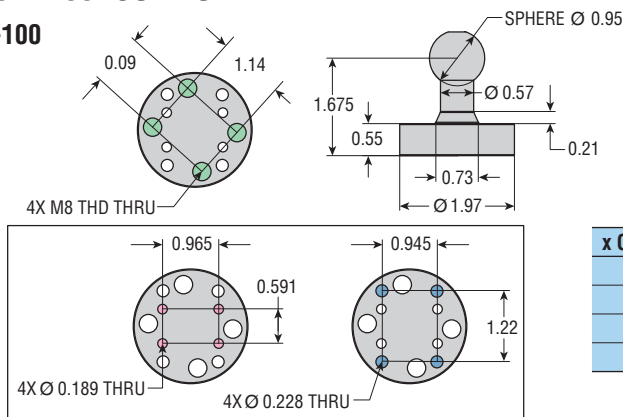
Swivel Ball Mount
TSBM



Swivel Ball Clamp
TSBC

SIZE 100 - 1.00" COMPONENT

TSBMx-1-100



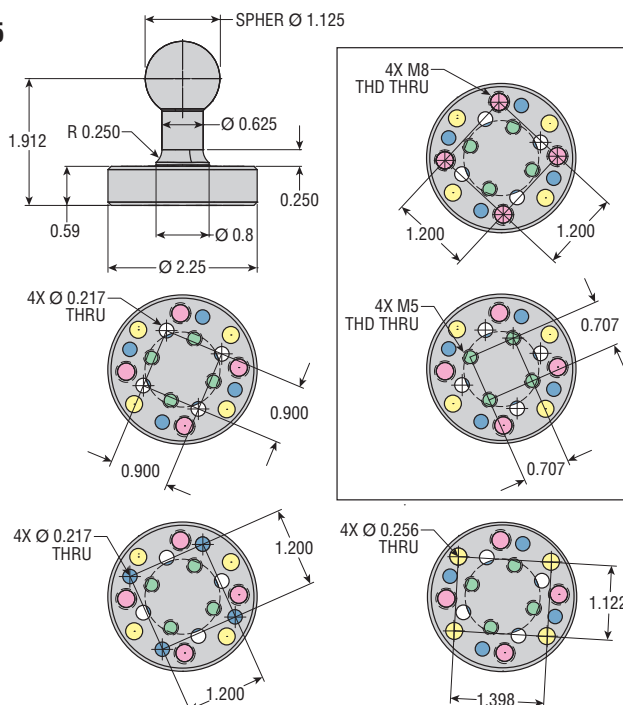
MODEL	PART NO.	WEIGHT (lb)
Steel Swivel Ball Mount	TSBMx-1-100	0.57
Aluminum Swivel Ball Mount	TSBMx-2-100	0.2

*See x Code chart below.

x CODE	FASTENERS	MOUNTS
2	4 mm 5 mm	GRM2 Conversion Puck (TGUC) to GRM2 Clamp
3	5 mm	GRM1 Gripper
4	4 mm	GRM0 Gripper
	8 mm	Other

SIZE 125 - 1.25" COMPONENT

TSBMx-1-125



MODEL	PART NO.	WEIGHT (lb)
Steel Swivel Ball Mount	TSBMx-1-125	0.81
Aluminum Swivel Ball Mount	TSBMx-2-125	0.31

*See x Code chart below.

x CODE	FASTENERS	MOUNTS
2	6 mm	GRM2 Clamps, or TGUM/TGUS Adapter Plates
5	5 mm	Other Grippers/Clamps
7	8 mm	Tri-Axis Components: Ball Swivel Clamp, Swing Plate

All dimensions are reference only unless specifically toleranced.

SWIVEL BALL MOUNTS/CLAMPS

SWIVEL BALL CLAMP

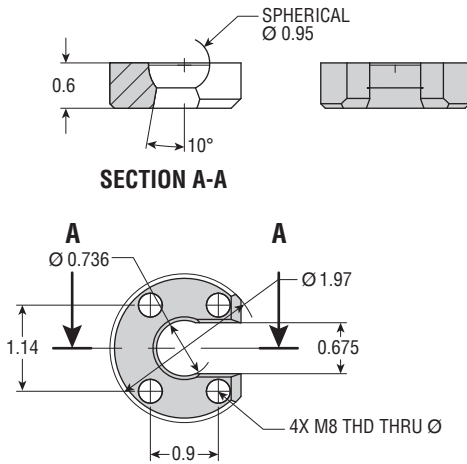
Benefits

- Combines with Swivel Ball Mount
- Rest of assembly can remain square to grid while providing for gripper compound angle adjustment
- Bolts directly to gripper mount for easy setup
- Anodized aluminum for superior appearance and protection

SIZE	PART NO.	WEIGHT (lb)
100	TSBC1-100	0.1
125	TSBC1-125	0.19

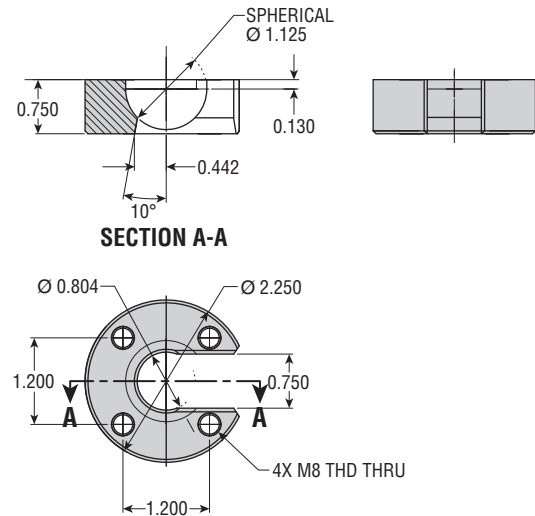
SIZE 100 - 1.00" COMPONENT

TSBC1-100



SIZE 125 - 1.25" COMPONENT

TSBC1-125



All dimensions are reference only unless specifically toleranced.

FLANGE MOUNTS

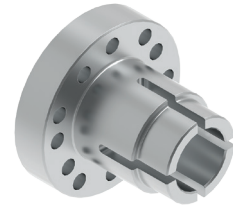
TFxM

Benefits

- Allows for mounting of arm clamps and tubes directly to transfer bar, extruded beam, or removable plates or in replacement of a receiver adapter
- Provides flange with tube as alternative mounting of other modular tooling components
- Anodized aluminum for superior appearance and protection



**Flange Finger Mount
TFFM**



**Flange Tube Mount
TFTM**

FLANGE FINGER MOUNT

SIZE 100 - 1.00" COMPONENT

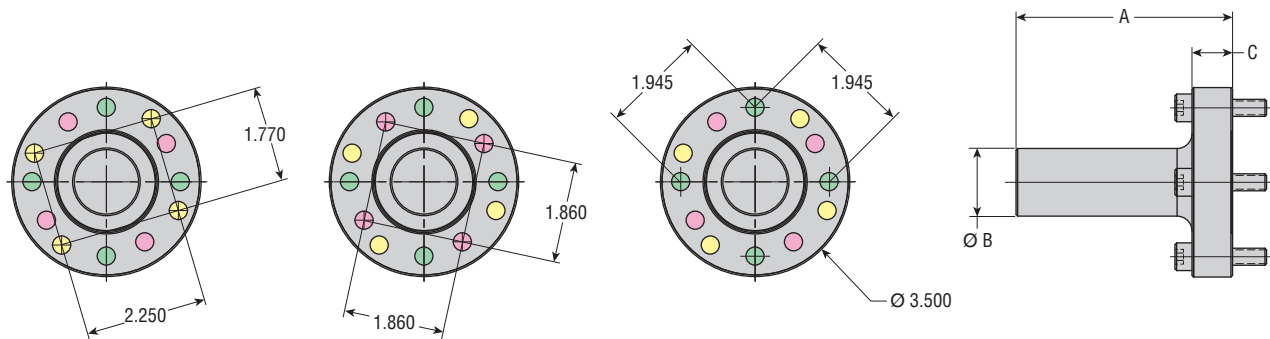
TFFM1-1-100

SIZE 125 - 1.25" COMPONENT

TFFM1-1-125

PART NO.	DIMENSION		
	A	B	C
TFFM1-1-100	3.60	1.00	0.55
TFFM1-1-125X3 Old Stock	4.00	1.25	0.75
TFFM1-1-125X3 New Stock	4.00	1.25	0.55

SIZE	PART NO.	WEIGHT (lb)
100	TFFM1-1-100X3	0.59
125	TFFM1-1-125X3 Old Stock	0.88
125	TFFM1-1-125X3 New Stock	0.74



FLANGE TUBE MOUNT

SIZE 100 - 1.00" COMPONENT

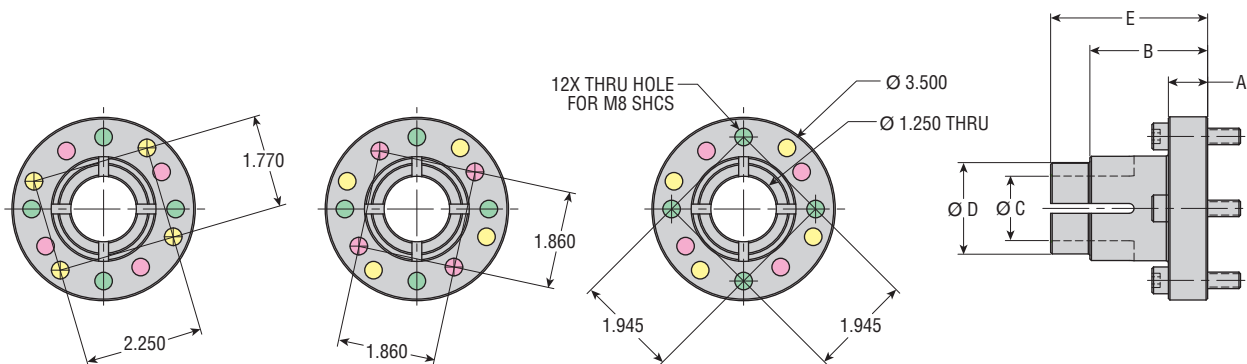
TFTM1-1-100

SIZE 125 - 1.25" COMPONENT

TFTM1-1-125

PART NO.	DIMENSION				
	A	B	C	D	E
TFTM1-1-100	0.55	2.10	1.00	1.50	2.80
TFTM1-1-125 Old Stock	0.75	2.25	1.25	1.75	3.00
TFTM1-1-125 New Stock	0.55	2.25	1.25	1.75	3.00

SIZE	PART NO.	WEIGHT (lb)
100	TFTM1-1-100X3	0.67
125	TFTM1-1-125X3 Old Stock	0.88
125	TFTM1-1-125X3 New Stock	0.77



All dimensions are reference only unless specifically tolerated.

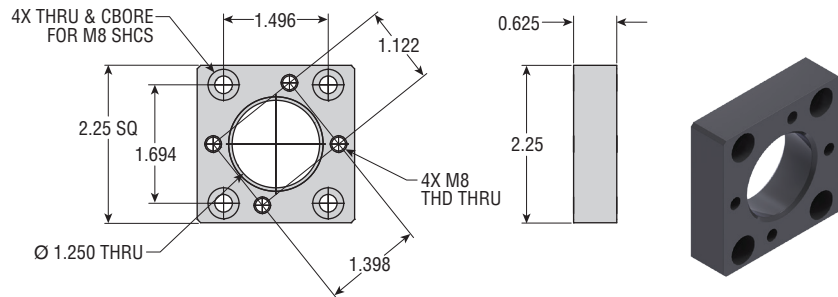
GRIPPER/CLAMP ADAPTABILITY

Benefits

- Standard bolt patterns fit most common grippers
- Used with PHD adapter plates and mounts, any gripper or shovel can take advantage of entire product range
- Contact PHD for gripper adaptability

GRM4 UNIVERSAL MOUNT - TGUS

- Provides flexibility to use PHD Series GRM4 Clamps with modular tooling components and systems
- To be used with Size 125 - 1.25" Tooling components and systems.
- Series GRM4 is used when higher clamping forces are necessary in transfer process

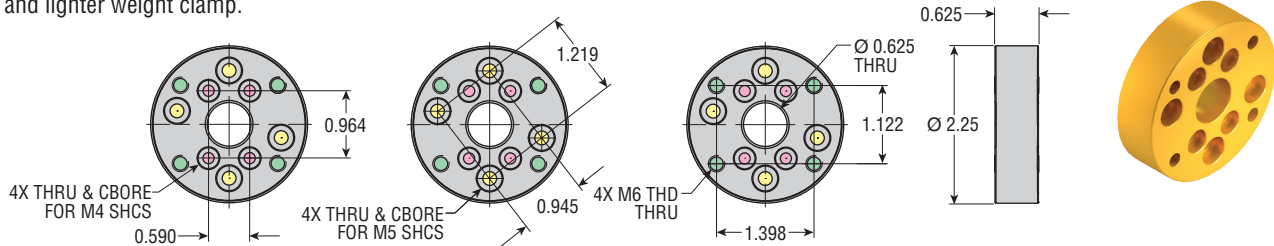


MODEL	PART NO.	WEIGHT (lb)
GRM4 Universal Mount	TGUS4-1-125	0.63
GRM0 & GRM1 Universal Mount	TGUM1-1-125	0.19
PUM-011 Universal Mount	TPUM1-1-125	0.19
GRM2 Mount to 1" Series Tooling	TGUC2-1-125	0.11
Slip Plug	TPLG-100-125	0.08
Receiver Block - 1.00"	TMB-100-001-3	0.44
Receiver Block - 1.25"	TMB-125-001-3	0.60

GRM0 & 1 UNIVERSAL MOUNT - TGUM

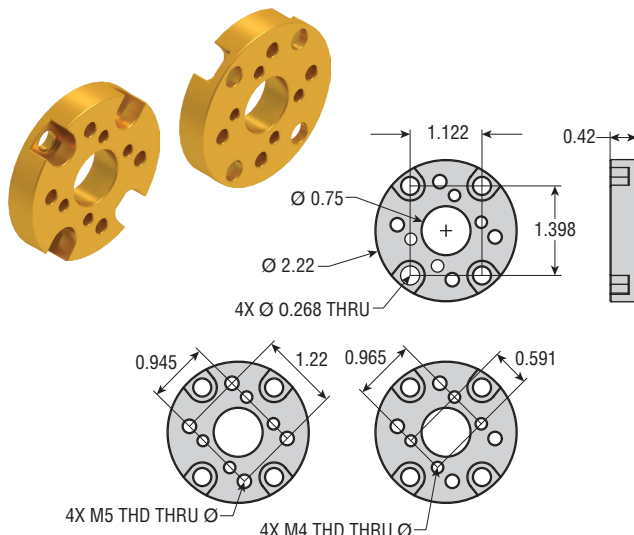
- Provides flexibility to use PHD Series GRM1 and GRM0 Clamps with modular tooling components and systems. GRM1 and GRM0 are an ideal solution when application requires a more compact and lighter weight clamp.

- To be used with Size 125 - 1.25" Tooling components and systems.



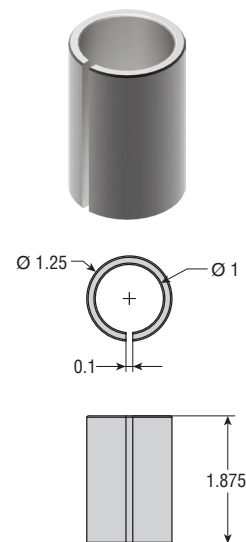
GRM2 MOUNT FROM 1-INCH SERIES TOOLING - TGUC

- Provides flexibility to use GRM2 Clamps with Size 100 - 1.00" Tooling components and systems.



SLIP PLUG - TPLG

- Provides flexibility to use 1.00" tooling components with 1.25" tooling components.

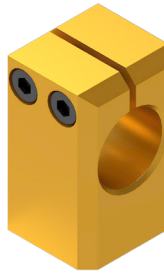


All dimensions are reference only unless specifically toleranced.

GRIPPER/CLAMP ADAPTABILITY

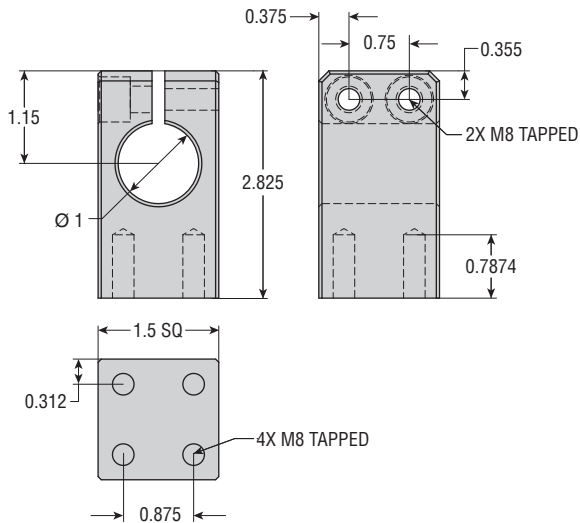
RECEIVER BLOCK – TMB

- Universal mounting block to use either 1.25" or 1.00" tri-axis series.



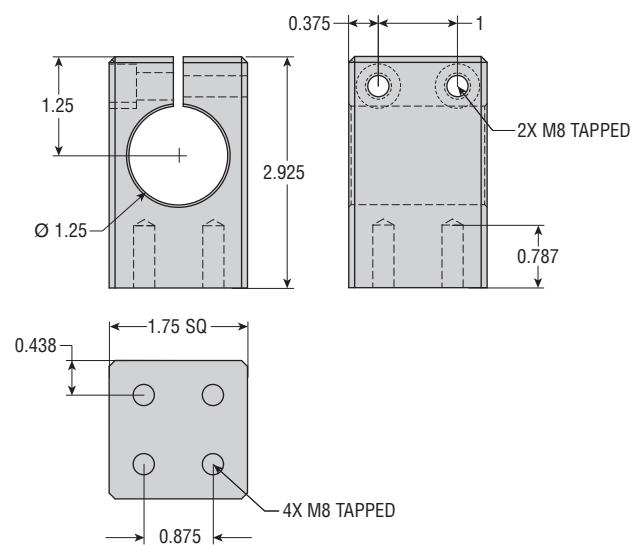
SIZE 100 - 1.00" COMPONENT

TMB-100



SIZE 125 - 1.25" COMPONENT

TMB-125



ROTATOR AND SLIDE MOUNTS

Provide your specifications and we can design and create required mounts. Contact PHD Customer Service for more information.

All dimensions are reference only unless specifically toleranced.

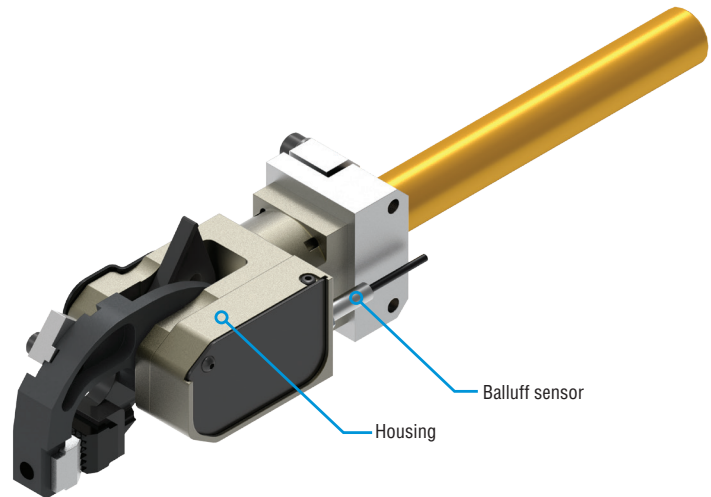
HOT STAMPING SENSOR HOUSING KITS

SPECIAL HIGH TEMPERATURE BALLUFF 8 mm THREADED SENSOR

Balluff Part Number: BES02HM

Alternative sensor options may be used at the discretion of the customer. Contact PHD to ensure that the optimal sensing and operating temperature range is sufficient for the application.

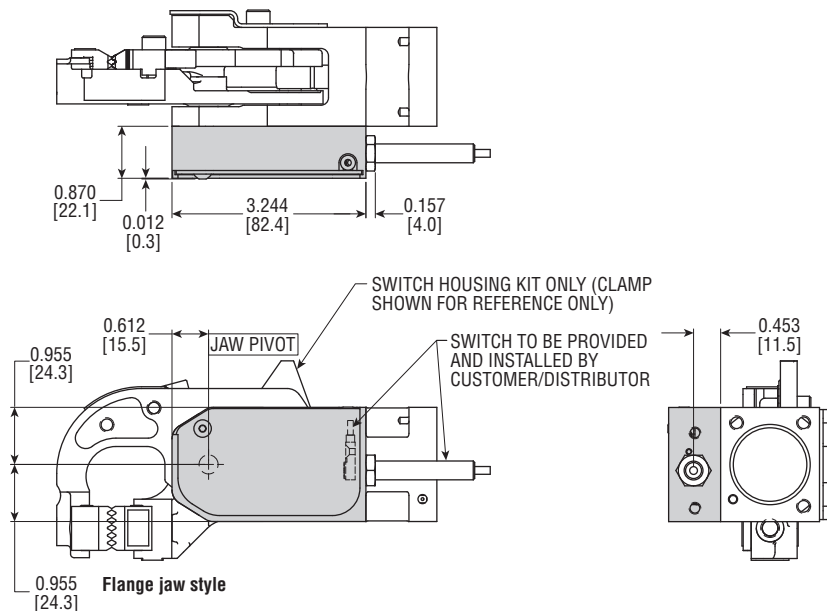
PHD offers a wide range of Hot Stamping solutions. For more information, please contact your local PHD distributor.



When set, the sensor housing is designed to provide a signal when exactly one sheet is gripped. Therefore, the sensor can show:

No Part Present = No Signal
Part Present = Signal
Double Sheets = No Signal

ML319570 Housing Kit for GRM Size 2 Clamp



ML319151 - Housing Kit for GRM Size 1 Clamp

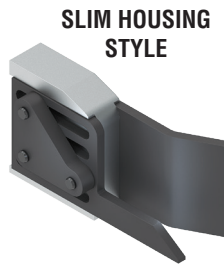
Contact PHD for dimensions.

All dimensions are reference only unless specifically toleranced.

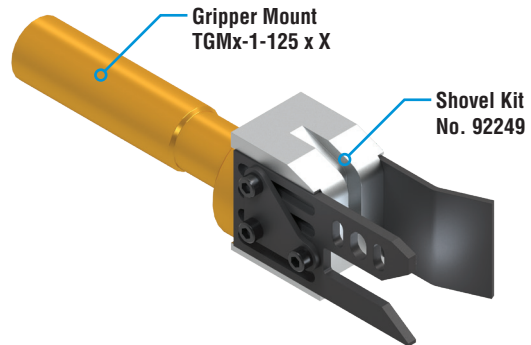
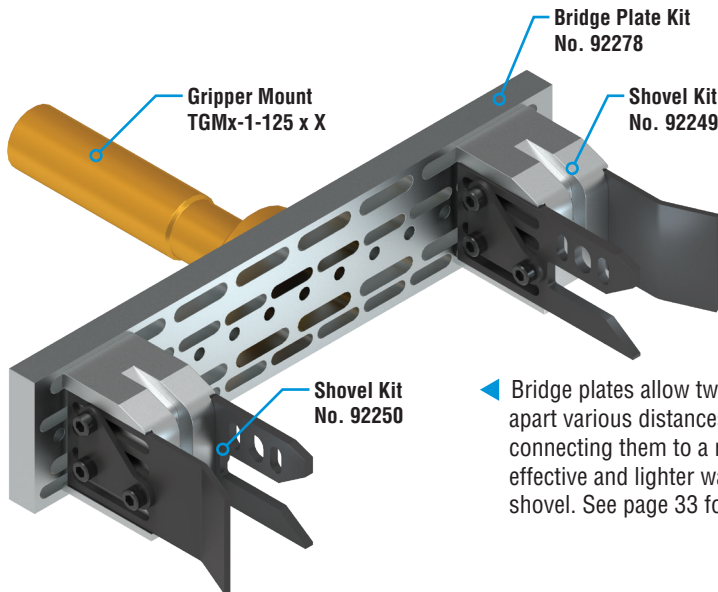
MODULAR SHOVELS

Benefits

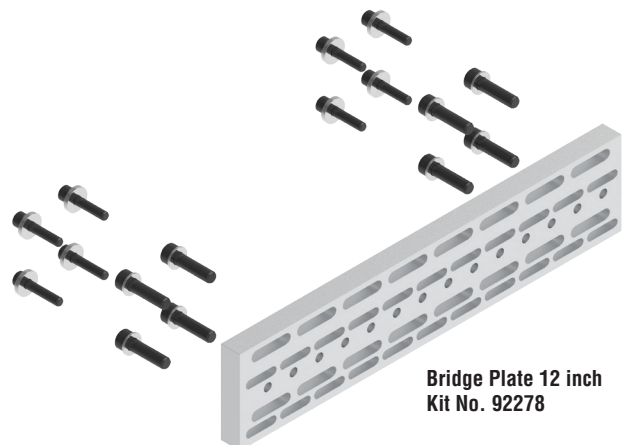
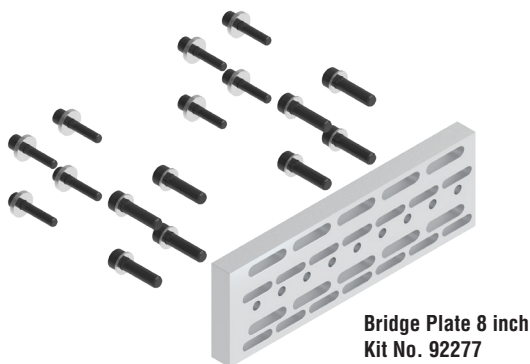
- Allows the designer or automation engineer to build various sizes or configurations to encapsulate the panel in all directions.
- All steel components are hardened to provide maximum life expectancy.
- In the event of a crash, damaged components are replaceable in minutes thus reducing press downtime.
- Optional sensors allow for part present sensing if required.
- Shovel assembly units mount to PHD's standard Gripper Mounts.
- For a wide variety of complete Modular Shovel Kit configurations, see pages 36 to 42. These kits provide a fast and easy way to choose a shovel design. They can be modified by ordering other components as needed.
- All steel components are case hardened to provide maximum performance and long service life.



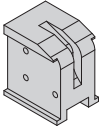
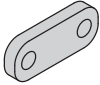
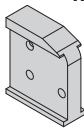
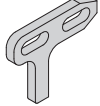
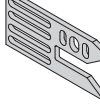
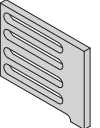
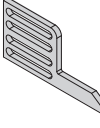
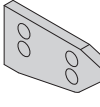
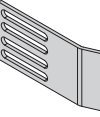
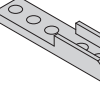

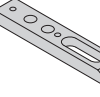

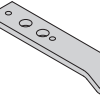
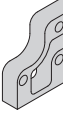
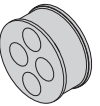
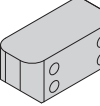
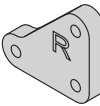
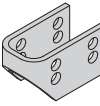
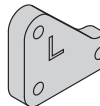
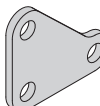
▲ PHD, Inc. listened closely to the customer's needs and, due to the Modular Shovel System capability, were able to deliver the solution shown.



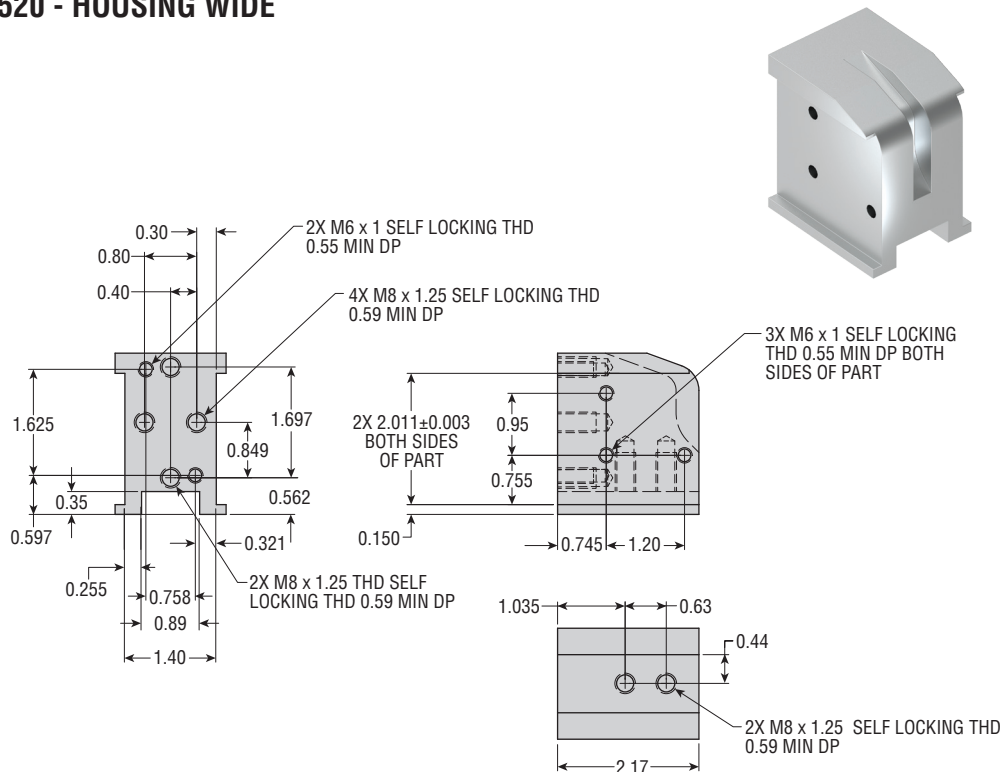
◀ Bridge plates allow two shovels or clamps to be spread apart various distances with only one gripper mount connecting them to a rail. This provides a more cost effective and lighter way to position more than one shovel. See page 33 for bridge plate dimensions and kit.



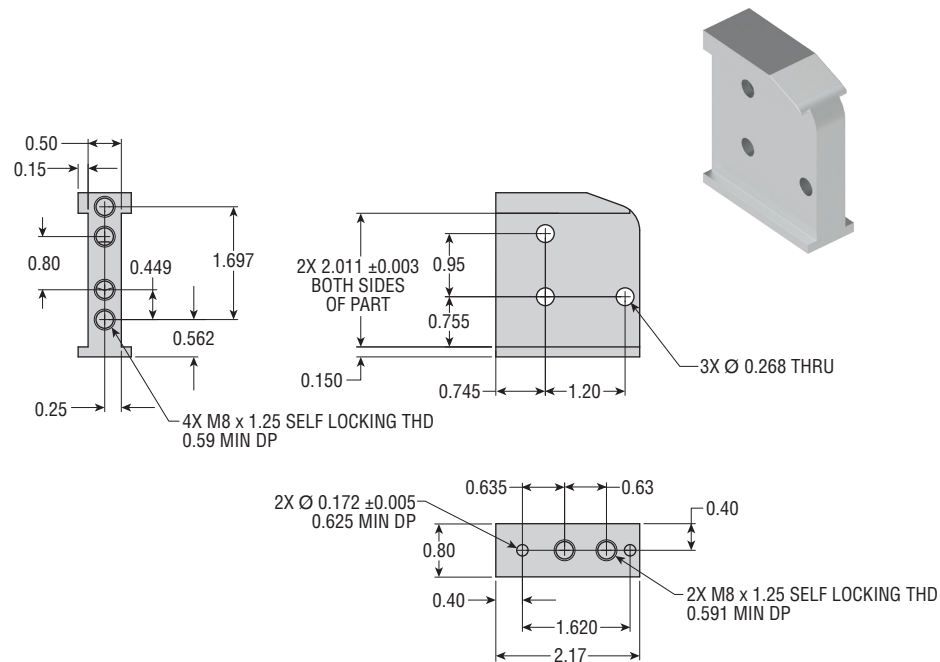
COMPONENTS: Modular Shovels

PART NO.	DESCRIPTION	MATERIAL	WEIGHT (lb)	PART NO.	DESCRIPTION	MATERIAL	WEIGHT (lb)
91520	Housing Wide  1.4" Wide	Aluminum	0.62	91553-3	Washer Plate Switch  Centers or offsets switch housing	Steel	0.04
91521	Housing Slim  0.5" Wide	Aluminum	0.25	91556	Depth Adjustment Bracket  Controls panel depth	Steel	0.06
91530	Upper/Lower Containment Blade  Panel control, upper and lower	Steel	0.25	91557	Wide Shovel Throat Adjust  Controls wide flanged panel	Steel	0.18
91531	Lower Support Blade  Panel support, lower	Steel	0.18	91558	Taper Bracket  Locates parts against lower surface	Steel	0.08
91540	Guide  Side panel containment	Steel	0.22	91560	Lift - Wide  Panel support, wide	Steel	0.27
91550-1	Spacer Plate 1/8"  Allows for custom width of shovel assembly	Aluminum	0.026	91561	Lift - Slim  Panel support, narrow	Steel	0.25
91550-2	Spacer Plate 1/4"  Allows for custom width of shovel assembly	Aluminum	0.055	91562	Lift - Lower Flat  Thin profile for tight space under panel	Steel	0.15
91550-3	Spacer Plate 1/2"  Allows for custom width of shovel assembly	Aluminum	0.10	91572	Mounting Hub  Allows shovel housing mounting to Spherical Mounting Bracket Part No. 62201-01	Aluminum	0.18
91553-1	Switch Bracket  Completes sensor bracket assembly	Aluminum	0.10	91573	RH Tapping Plate  Holds slim housing assembly together	Steel	0.15
91553-2	Switch Bracket  Protective housing	Steel	0.12	91573-1	LH Tapping Plate  Holds slim housing assembly together	Steel	0.15
				91574	Washer Plate  Secures components to slim housing	Steel	0.05

PART NO. 91520 - HOUSING WIDE

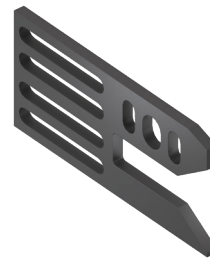


PART NO. 91521 - HOUSING SLIM

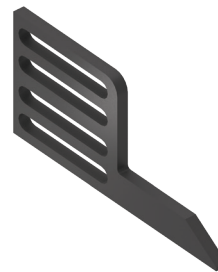


All dimensions are reference only unless specifically toleranced.

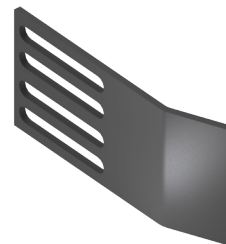
PART NO. 91530 - UPPER/LOWER CONTAINMENT BLADE



PART NO. 91531 - LOWER SUPPORT BLADE

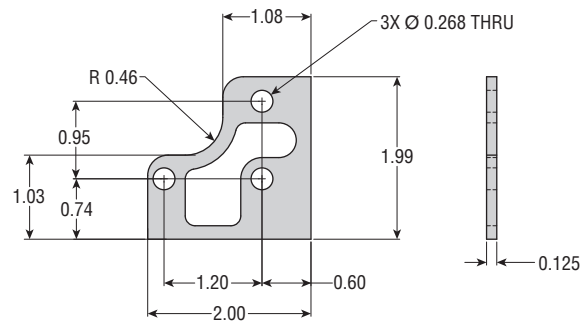


PART NO. 91540 - GUIDE

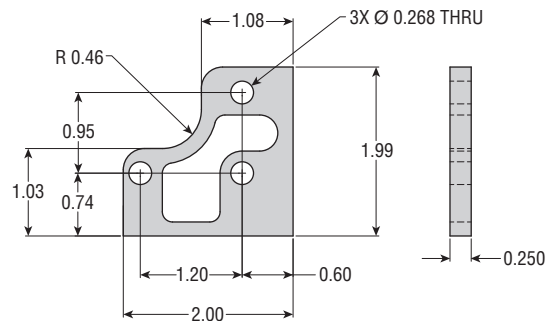


All dimensions are reference only unless specifically toleranced.

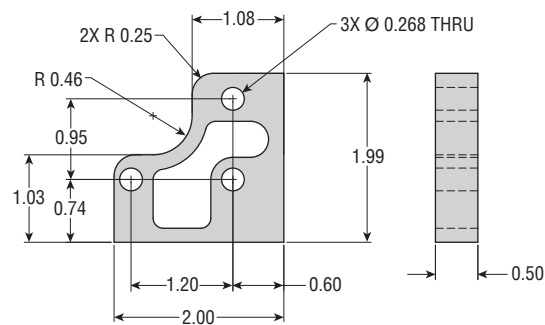
PART NO. 91550-1 - SPACER PLATE 1/8"



PART NO. 91550-2 - SPACER PLATE 1/4"

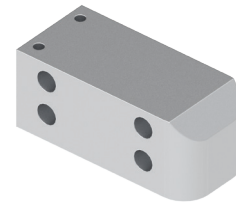
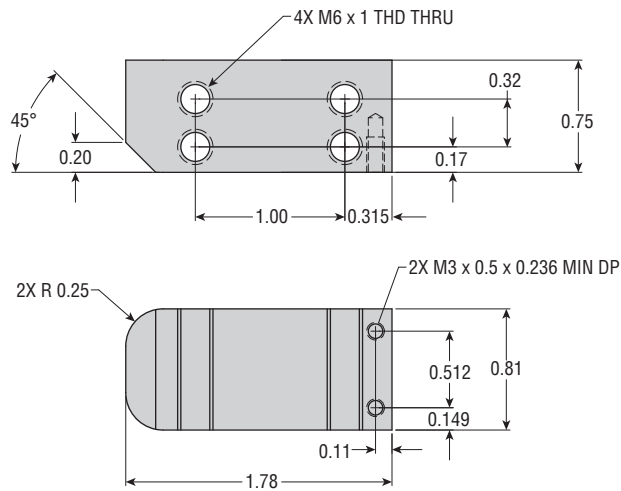


PART NO. 91550-3 - SPACER PLATE 1/2"

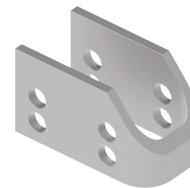
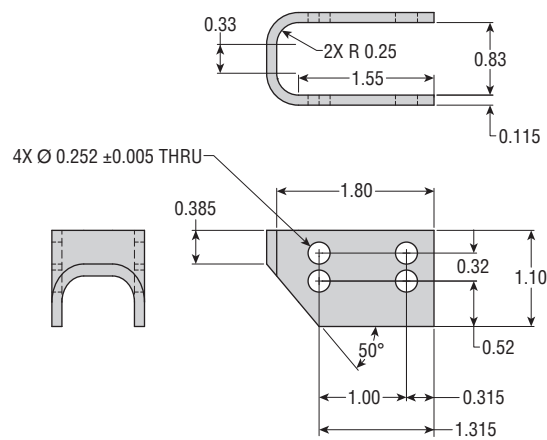


All dimensions are reference only unless specifically toleranced.

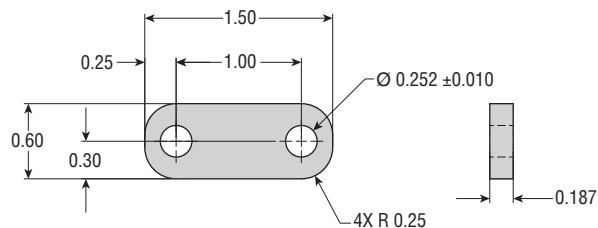
PART NO. 91553-1 - SWITCH BRACKET



PART NO. 91553-2 - SWITCH BRACKET

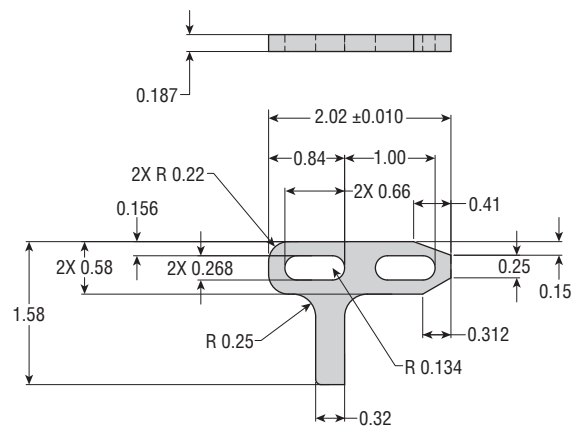


PART NO. 91553-3 - WASHER PLATE SWITCH

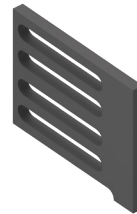
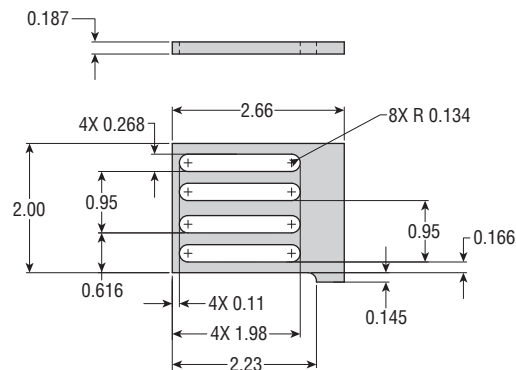


All dimensions are reference only unless specifically toleranced.

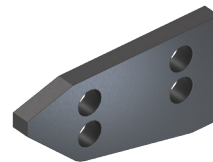
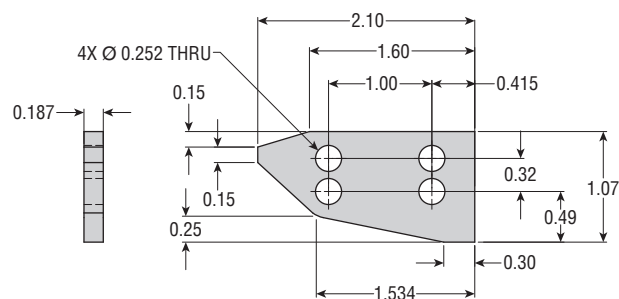
PART NO. 91556 - DEPTH ADJUSTMENT BRACKET



PART NO. 91557 - WIDE SHOVEL THROAT ADJUST

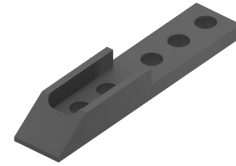
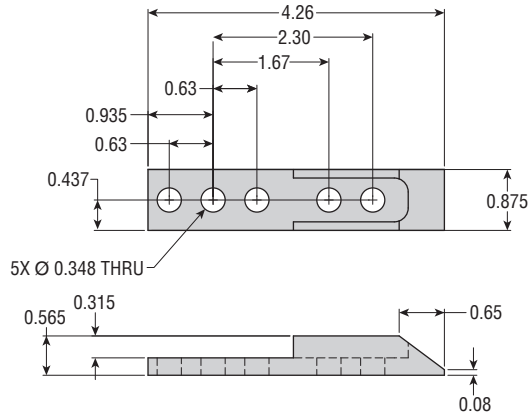


PART NO. 91558 - TAPER BRACKET

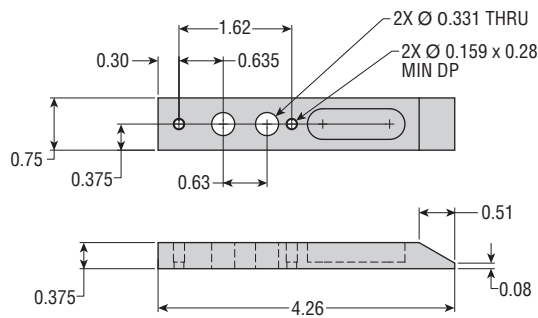


All dimensions are reference only unless specifically toleranced.

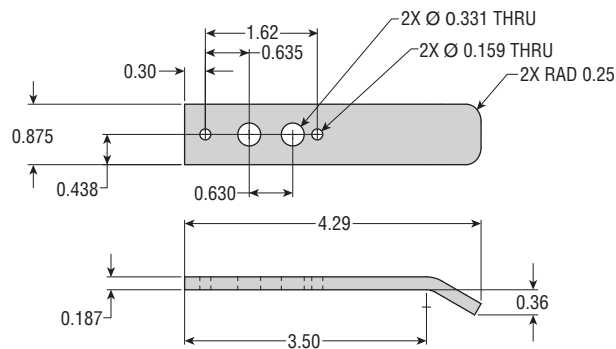
PART NO. 91560 - LIFT - WIDE



PART NO. 91561 - LIFT - SLIM

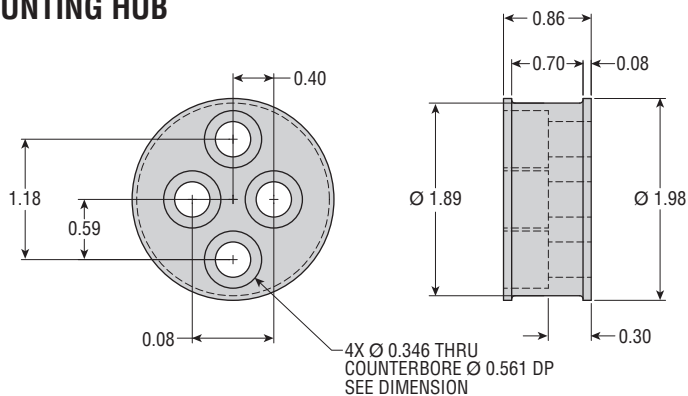


PART NO. 91562 - LIFT - LOWER FLAT

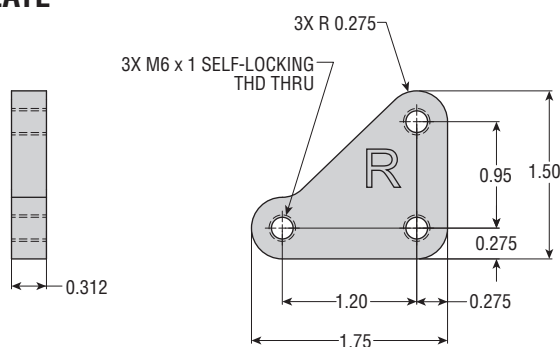


All dimensions are reference only unless specifically toleranced.

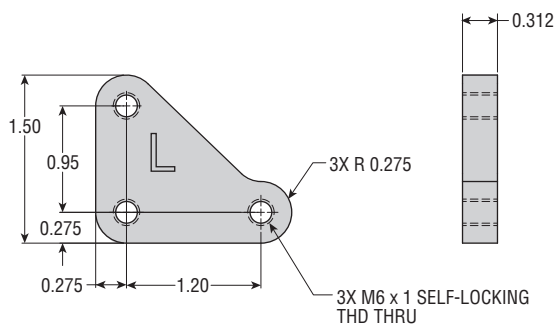
PART NO. 91572 - MOUNTING HUB



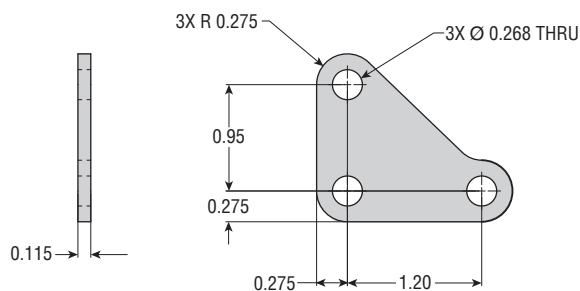
PART NO. 91573 - RH TAPPING PLATE



PART NO. 91573-1 - LH TAPPING PLATE



PART NO. 91574 - WASHER PLATE

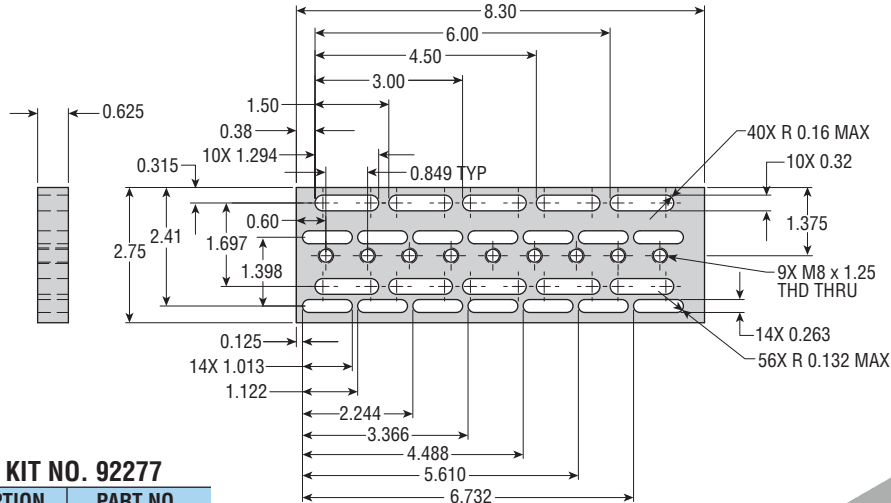


All dimensions are reference only unless specifically tolerated.

BRIDGE PLATE NO. 91601

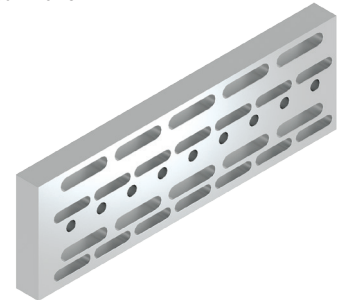
Material: Aluminum

Weight: 0.91 lb



BRIDGE PLATE KIT NO. 92277

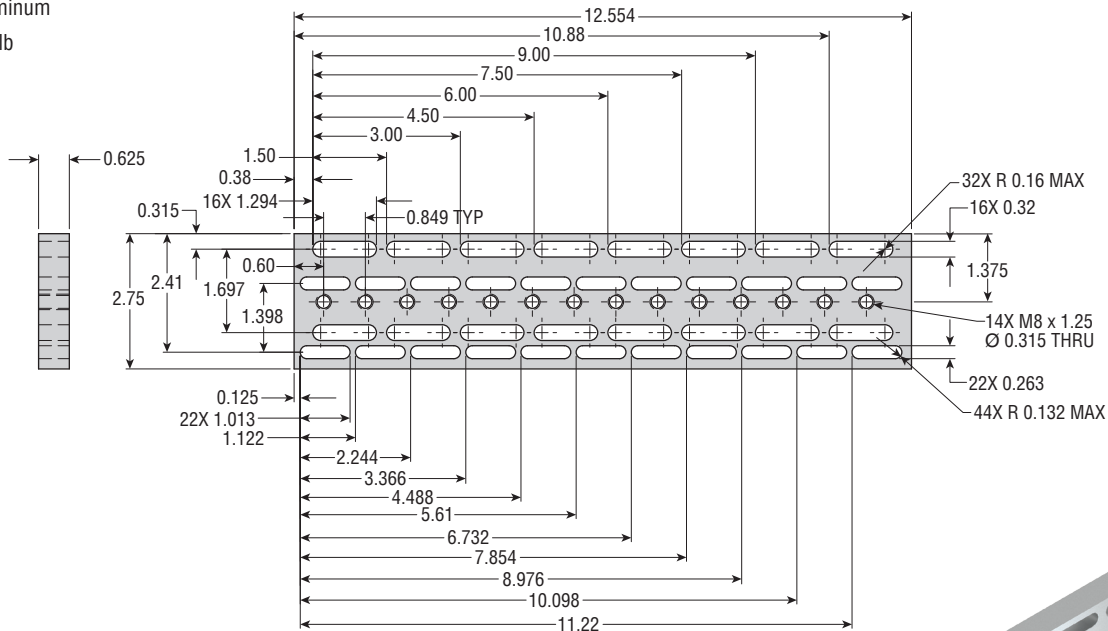
QTY	PART DESCRIPTION	PART NO.
1	Bridge Plate 8 inch	91601
8	SHCS M8 x 30 mm	14308-026
8	Flat Washer M8	59022-007-1
8	SHCS M6 x 30 mm	14308-025
8	Flat Washer M6	70365-003



BRIDGE PLATE NO. 91602

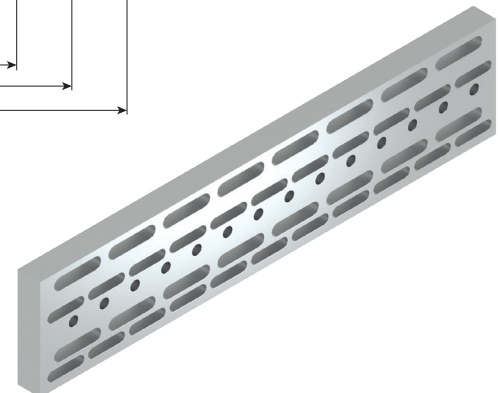
Material: Aluminum

Weight: 1.34 lb



BRIDGE PLATE KIT NO. 92278

QTY	PART DESCRIPTION	PART NO.
1	Bridge Plate 12 inch	91602
8	SHCS M8 x 30 mm	14308-026
8	Flat Washer M8	59022-007-1
8	SHCS M6 x 30 mm	14308-025
8	Flat Washer M6	70365-003

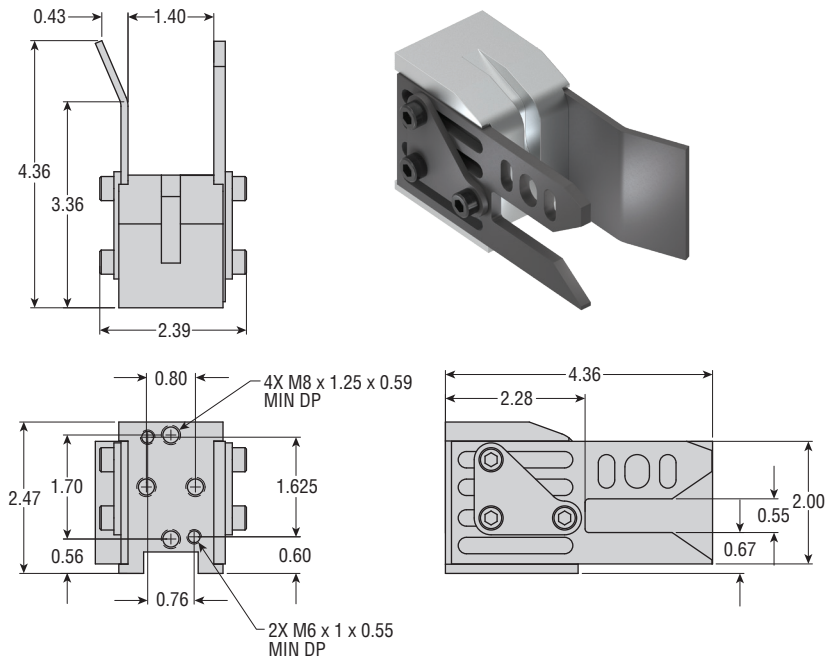


All dimensions are reference only unless specifically tolerated.

KIT NO. 92249

Weight 1.35 lb

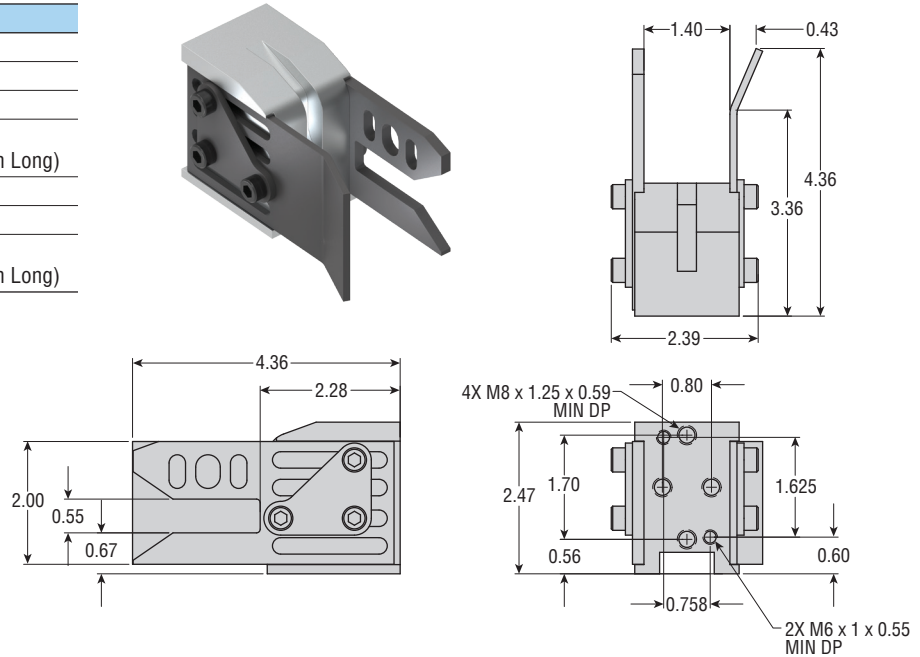
PART DESCRIPTION	PART NO.
Wide Housing	91520
Blade	91530
Washer Plate	91574
SHCS (qty 3)	14308-118 (M6 x 1.0 x 20 mm Long)
Guide	91540
Washer Plate	91574
SHCS (qty 3)	14308-118 (M6 x 1.0 x 20 mm Long)



KIT NO. 92250

Weight 1.35 lb

PART DESCRIPTION	PART NO.
Wide Housing	91520
Guide	91540
Washer Plate	91574
SHCS (qty 3)	14308-118 (M6 x 1.0 x 20 mm Long)
Blade	91530
Washer Plate	91574
SHCS (qty 3)	14308-118 (M6 x 1.0 x 20 mm Long)

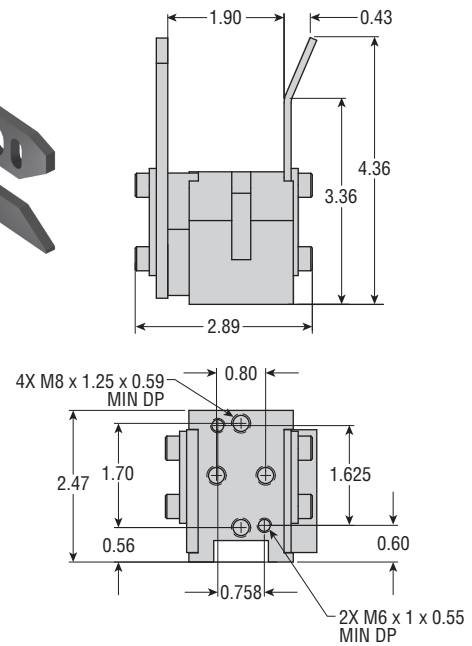
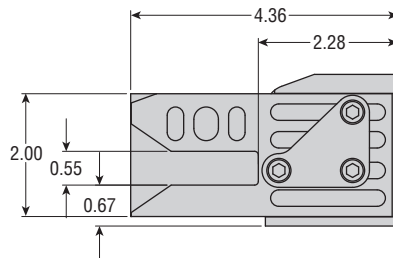
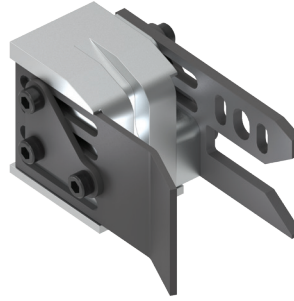


All dimensions are reference only unless specifically toleranced.

KIT NO.92253

Weight 1.86 lb

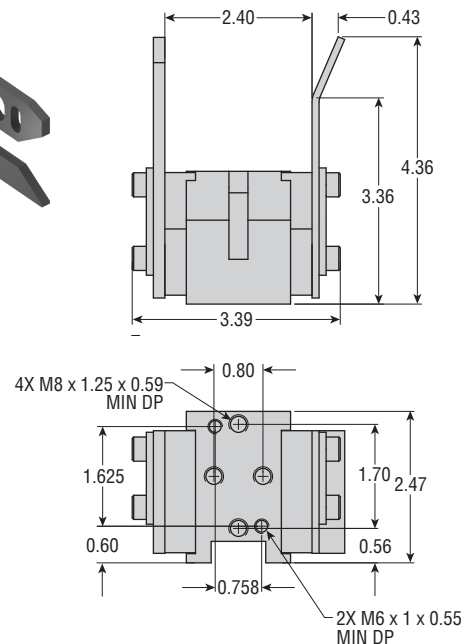
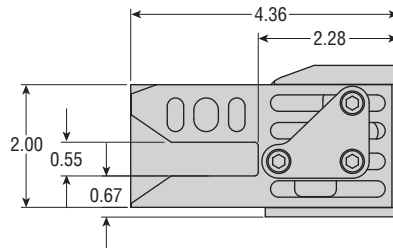
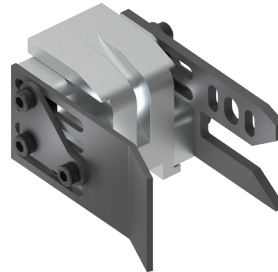
PART DESCRIPTION	PART NO.
Wide Housing	91520
Guide	91540
Washer Plate	91574
SHCS (qty 3)	14308-025 (M6 x 1.0 x 30 mm Long)
Spacer 1/2 inch thick	91550-3
Blade	91530
Washer Plate	91574
SHCS (qty 3)	14308-118 (M6 x 1.0 x 20 mm Long)



KIT NO.92256

Weight 2.38 lb

PART DESCRIPTION	PART NO.
Wide Housing	91520
Guide	91540
Spacer 1/2 inch thick	91550-3
Washer Plate	91574
SHCS (qty 3)	14308-025 (M6 x 1.0 x 30 mm Long)
Blade	91530
Spacer 1/2 inch thick	91550-3
Washer Plate	91574
SHCS (qty 3)	14308-025 (M6 x 1.0 x 30 mm Long)

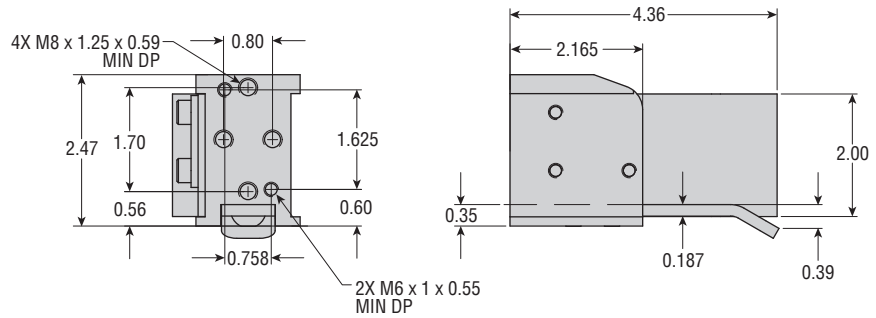
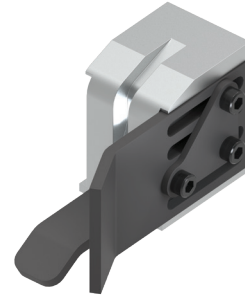
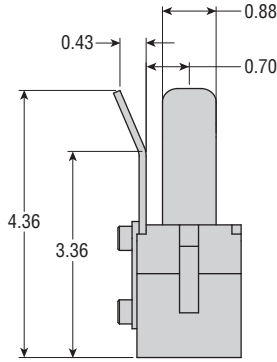


All dimensions are reference only unless specifically toleranced.

KIT NO.92262

Weight 1.17 lb

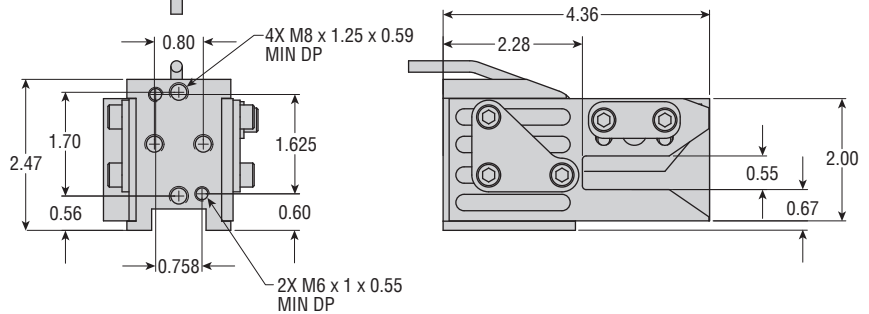
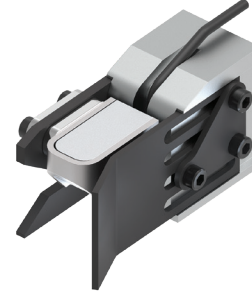
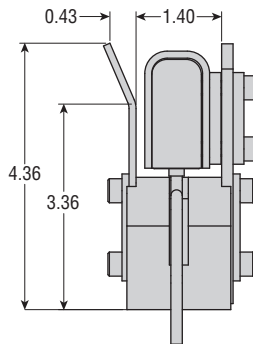
PART DESCRIPTION	PART NO.
Wide Housing	91520
Guide	91540
Washer Plate	91574
SHCS (qty 3)	14308-118 (M6 x 1.0 x 20 mm Long)
Lift Lower Flat	91562
SBHCS (qty 2)	14308-538 (M8 x 1.25 x 20 mm Long)



KIT NO.92263

Weight 1.66 lb

PART DESCRIPTION	PART NO.
Wide Housing	91520
Blade	91530
Washer Plate	91574
Switch Kit	65136-33
Switch Mtg Brkt Kit	91553-4
SHCS (qty 3)	14308-118 (M6 x 1.0 x 20 mm Long)
Guide	91540
Washer Plate	91574
SHCS (qty 3)	14308-118 (M6 x 1.0 x 20 mm Long)

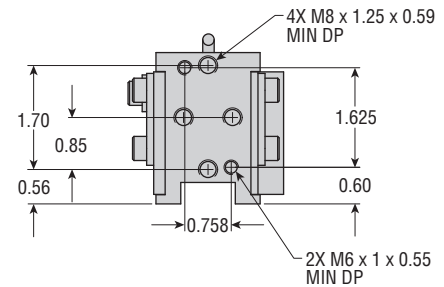
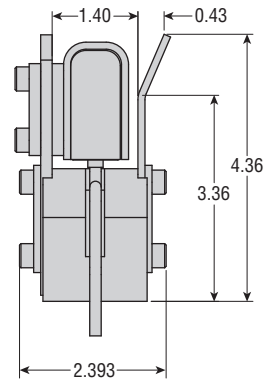
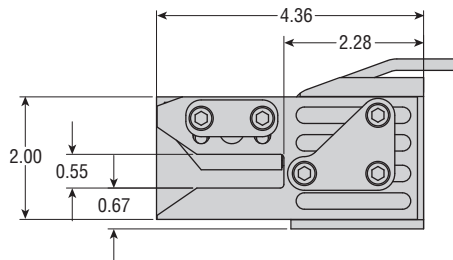
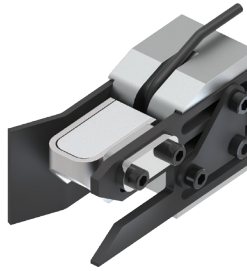


All dimensions are reference only unless specifically tolerated.

KIT NO. 92264

Weight 1.66 lb

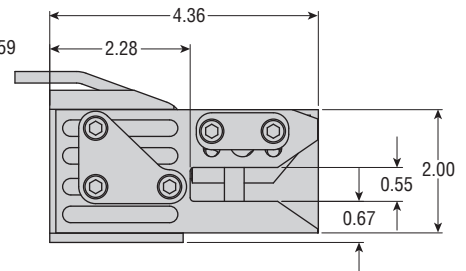
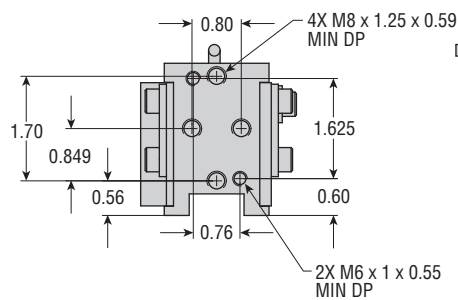
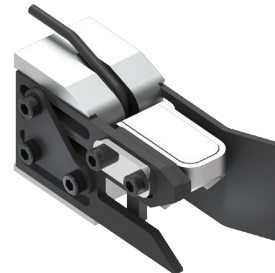
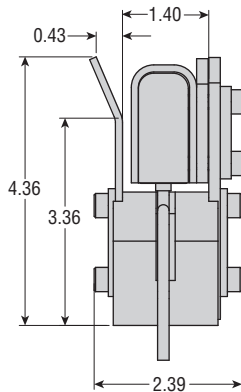
PART DESCRIPTION	PART NO.
Wide Housing	91520
Guide	91540
Washer Plate	91574
SHCS (qty 3)	14308-118 (M6 x 1.0 x 20 mm Long)
Blade	91530
Washer Plate	91574
SHCS (qty 3)	14308-120 (M6 x 1.0 x 25 mm Long)
Switch Kit	65136-33
Switch Mtg Brkt Kit	91553-4



KIT NO. 92265

Weight 1.68 lb

PART DESCRIPTION	PART NO.
Wide Housing	91520
Blade	91530
Washer Plate	91574
Depth Adjustment Brkt	91556
Switch Kit	65136-33
Switch Mtg Brkt Kit	91553-4
SHCS (qty 3)	14308-118 (M6 x 1.0 x 20 mm Long)
Guide	91540
Washer Plate	91574
SHCS (qty 3)	14308-118 (M6 x 1.0 x 20 mm Long)

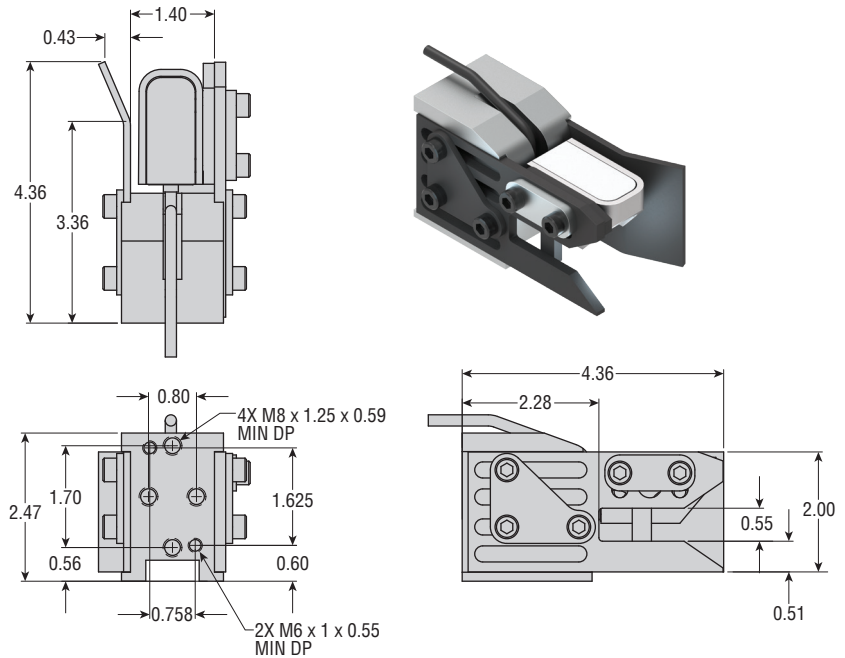


All dimensions are reference only unless specifically tolerated.

KIT NO. 92267

Weight 1.66 lb

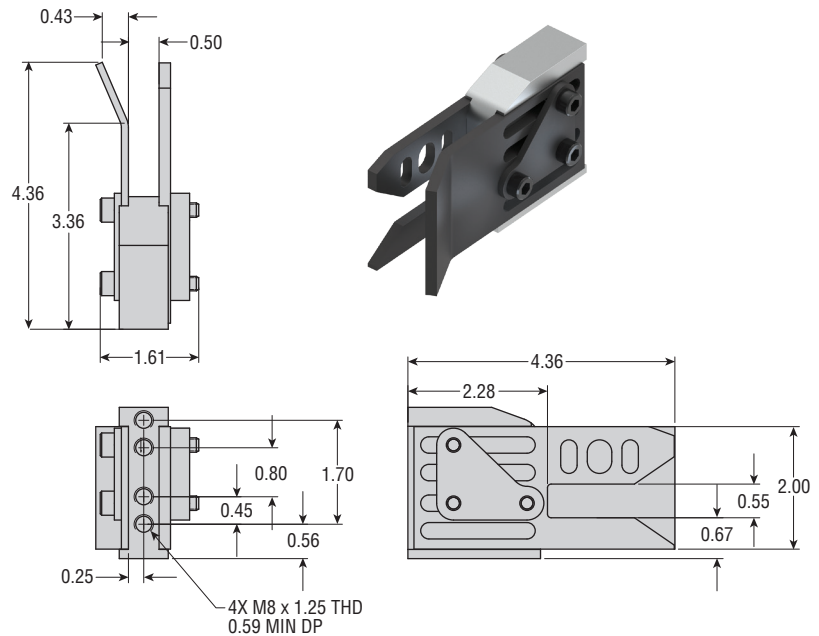
PART DESCRIPTION	PART NO.
Wide Housing	91520
Blade	91530
Washer Plate	91574
SHCS (qty 3)	14308-118 (M6 x 1.0 x 20 mm Long)
Guide	91540
Washer Plate	91574
SHCS (qty 3)	14308-118 (M6 x 1.0 x 20 mm Long)
Switch Kit	65136-33
Switch Mtg Brkt Kit	91553-4
Depth Adjustment Brkt	91556



KIT NO. 92269

Weight 1.00 lb

PART DESCRIPTION	PART NO.
Slim Housing	91521
Blade	91530
Tapping Plate Left	91573-1
Guide	91540
Washer Plate	91574
SHCS (qty 3)	14308-121 (M6 x 1.0 x 35 mm Long)

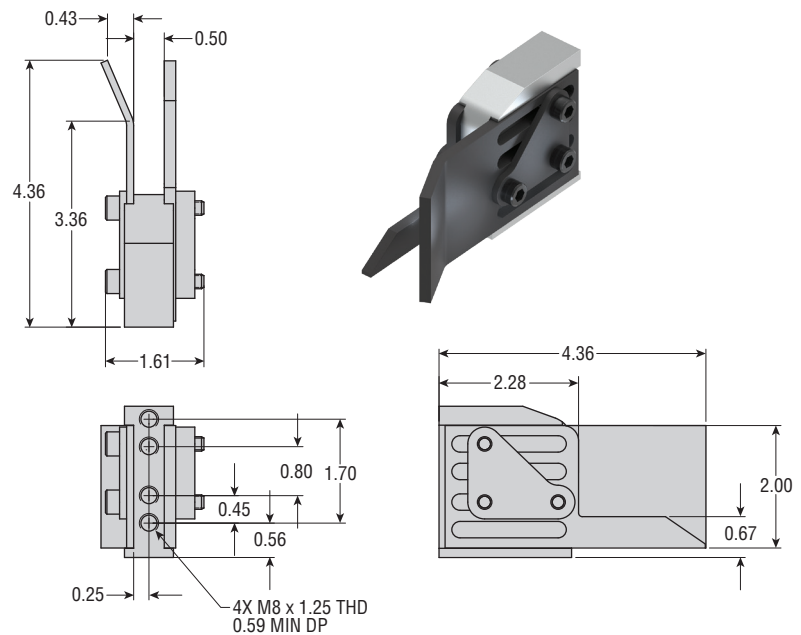


All dimensions are reference only unless specifically toleranced.

KIT NO. 92271

Weight 0.93 lb

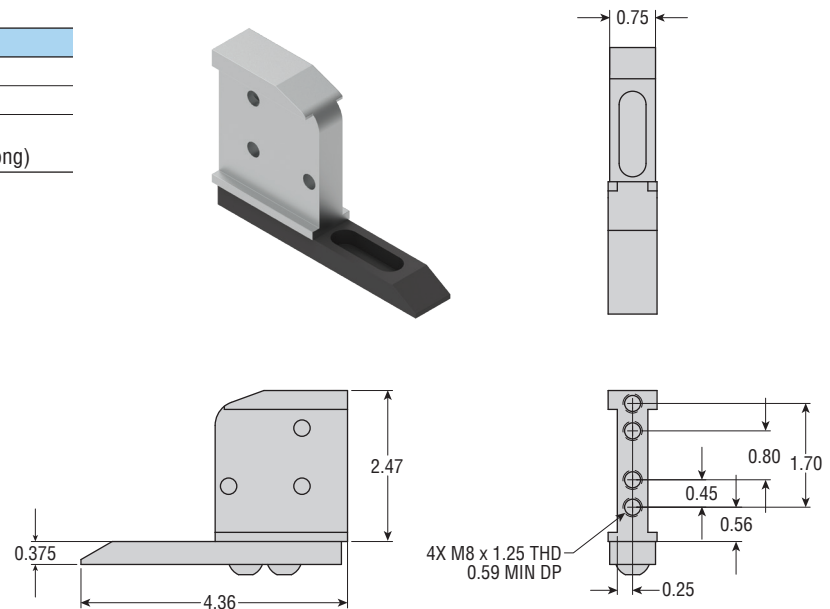
PART DESCRIPTION	PART NO.
Slim Housing	91521
Blade	91531
Tapping Plate Left	91573-1
SHCS (qty 3)	14308-121 (M6 x 1.0 x 35 mm Long)
Guide	91540
Washer Plate	91574



KIT NO. 92274

Weight 0.55 lb

PART DESCRIPTION	PART NO.
Slim Housing	91521
Lift Slim	91561
BHCS (qty 2)	14308-538 (M8 x 1.25 x 25 mm Long)

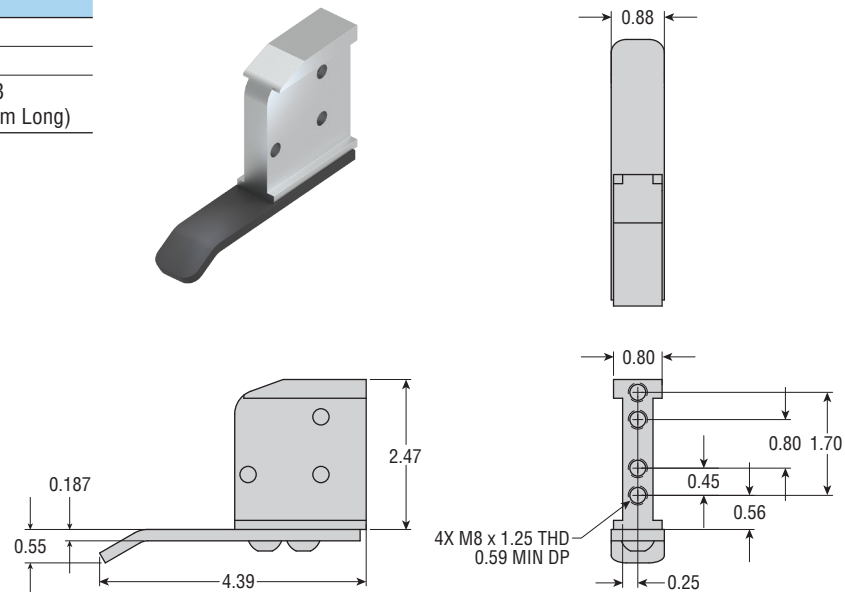


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KIT NO. 92275

Weight 0.45 lb

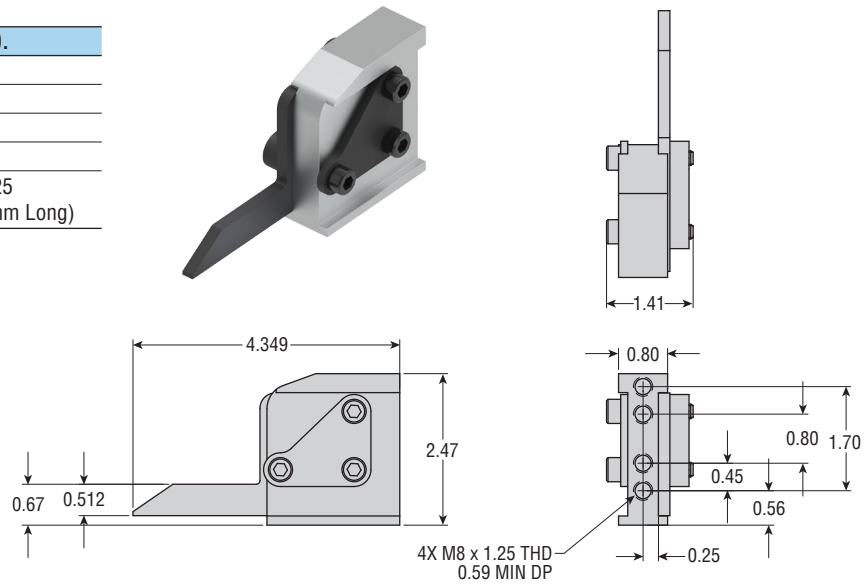
PART DESCRIPTION	PART NO.
Slim Housing	91521
Lift Lower Flat	91562
BHCS (qty 2)	14308-538 (M8 x 1.25 x 20 mm Long)



KIT NO. 92276

Weight 0.69 lb

PART DESCRIPTION	PART NO.
Slim Housing	91521
Lower Support Blade	91531
Tapping Blade Left	91573-1
Washer Plate	91574
SHCS (qty 3)	14308-025 (M6 x 1.0 x 30 mm Long)



All dimensions are reference only unless specifically toleranced.

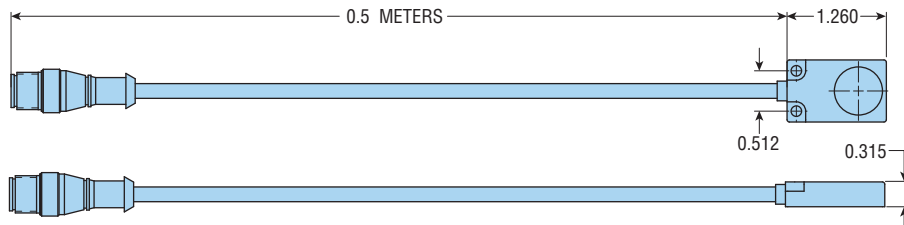
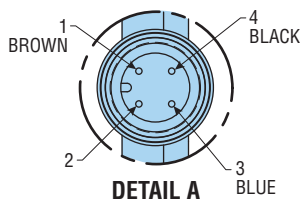
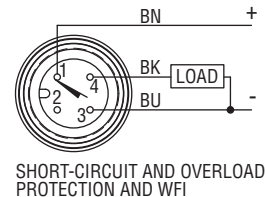
SWITCH NO. 65403-016

(SOLD SEPARATELY)

Switch 65403-016 (Turck Part No. Bi8U-Q08-AP6X2-0.5M-RS4T) is intended to mount to the Switch Mounting Bracket Kit 91553-4 for the modular shovel. The switch is a 3 wire, DC, 10-30 VDC, Normally open PNP (sourcing). It has a 0.5 mm cable with an M12, 4-pin connector. It has a sensing range of 8 mm for ferrous material.

SWITCH KIT 65136-33

QTY	PART DESCRIPTION	PART NO.
1	Switch	65403-016
2	SHCS M3 x 10 mm	14308-075
1	Tie Down Strap	8164-391



SWITCH MOUNTING BRACKET KIT NO. 91533-4

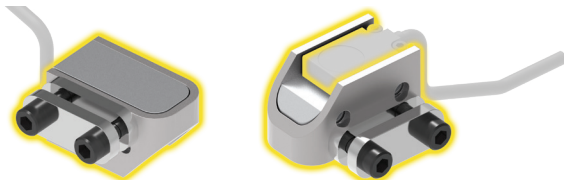
(DESIGNED TO MOUNT SWITCH 65403-016)

This kit is designed to mount the Switch 65403-016 on modular shovels. It attaches by means of threaded holes on each side so it can be mounted on the left or right side. These holes mate to the slots in Containment Blade 91530. Using the holes and slots allow the switch to be adjusted for various panel thicknesses.



SWITCH MOUNTING BRACKET KIT 91533-4

QTY	PART DESCRIPTION	PART NO.
1	Inner Switch Housing Bracket	91553-1
1	Outer Switch Housing Bracket	91553-2
2	Washer Plate	91553-3
2	SHCS M6 x 20 mm	14308-118
2	SHCS M3 x 10 mm	14308-075
1	Tie Down Strap	8164-391

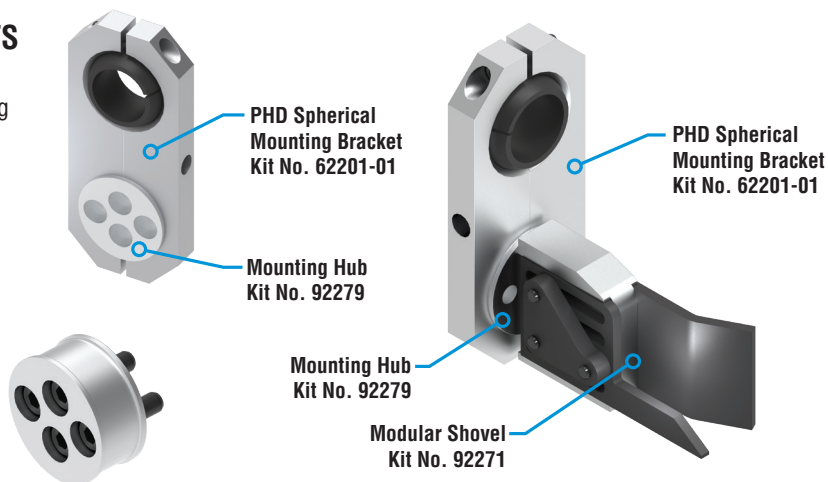


MOUNTING HUB AND SWIVEL BRACKETS

Mounting Hub Kit No. 92279, when attached to the back of a wide or slim shovel, accommodates mounting of Spherical Mounting Bracket 62201-01. This mount allows the shovel to be adjusted spherically about the ball and to be slid closer or farther for precise adjustment.

MOUNTING HUB KIT 92279

QTY	PART DESCRIPTION	PART NO.
1	Hub Rear Mounting	91572
4	SHCS M8 x 25 mm	14308-141

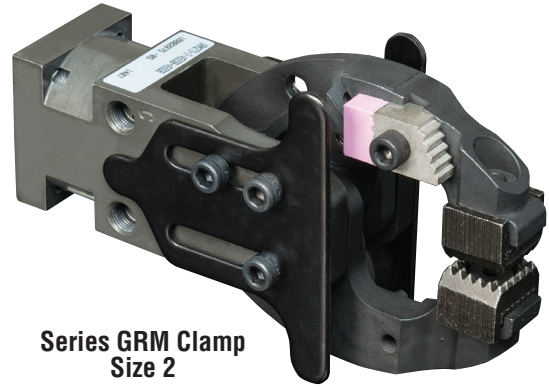


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GRM

Major Benefits

- Simple design
- Compact envelope size
- Long life
- High grip force
- Fast field maintenance
- Jaws lock in the closed position ensuring part retention if air pressure is lost due to line rupture or power loss
- Lowest cost of ownership
- Proven design for longevity
- Modular jaws and tips - easily changed
- Non-adjustable color-coded tips
- Modular mounting brackets
- Adjustable jaw rotations
- Hardened adjustable impact plates
- Integral shock pads
- Imperial and metric ports and mounting



**Series GRM Clamp
Size 2**

The Series GRM Clamp continues to be the industry-leading pneumatic actuator of choice for material handling solutions worldwide. Its simple design and rugged construction have proven customer satisfaction and loyalty since 1998. Four standard sizes, 15 standard jaw styles, and countless options and accessories, make the Series GRM Clamp the most versatile and modular clamp in the world.

NEW OPTION FOR GRM CLAMP SIZE 2!

TEACHABLE PANEL PRESENT DETECTION

- Option provides push button teachable sensor to detect presence of part.
- Position of internal target relates directly to jaw position and thickness of material being gripped.
- Ideal choice for backup or redundant signaling detection.
- Cordset replaceable without having to remove or replace sensor.
- Drop-in retrofittable for -Pxxxx Panel Present Switch option
- Option functions within a wide range of material thicknesses 0.020 to 0.197 in [0.5 to 5.0 mm]
- Available on all 15 jaw styles



PHD Canada

84 Wintemute Street
Fort Erie, Ontario L2A 2P1
CANADA
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