

GRM1

MINIATURE CLAMPS FOR WORKHOLDING APPLICATIONS

*Ideal for robotic
and end effector
applications*




**ISO 9001
REGISTERED**

Quality Management
System Certified

GRM101B



PHD is a member of the
MAC Distributor Network

phd 
SOLUTIONS FOR INDUSTRIAL AUTOMATION

ORDERING DATA: SERIES GRM CLAMP SIZE 1

INDEX:

Ordering Data
Page 2

Benefits
Page 3

Dimensions
Page 4

Jaw Rotation Dimensions
Pages 5 and 6

Engineering Data
Page 7

Tip Mounting & Dimensions
Pages 8 and 9

Mounting Bracket Dimensions
Page 10

Port Fitting Dimensions
Page 11

Accessories: All-Inclusive Ordering Data
Page 12

Body Option
Page 13

Switch Mounting Option
Pages 14 to 16

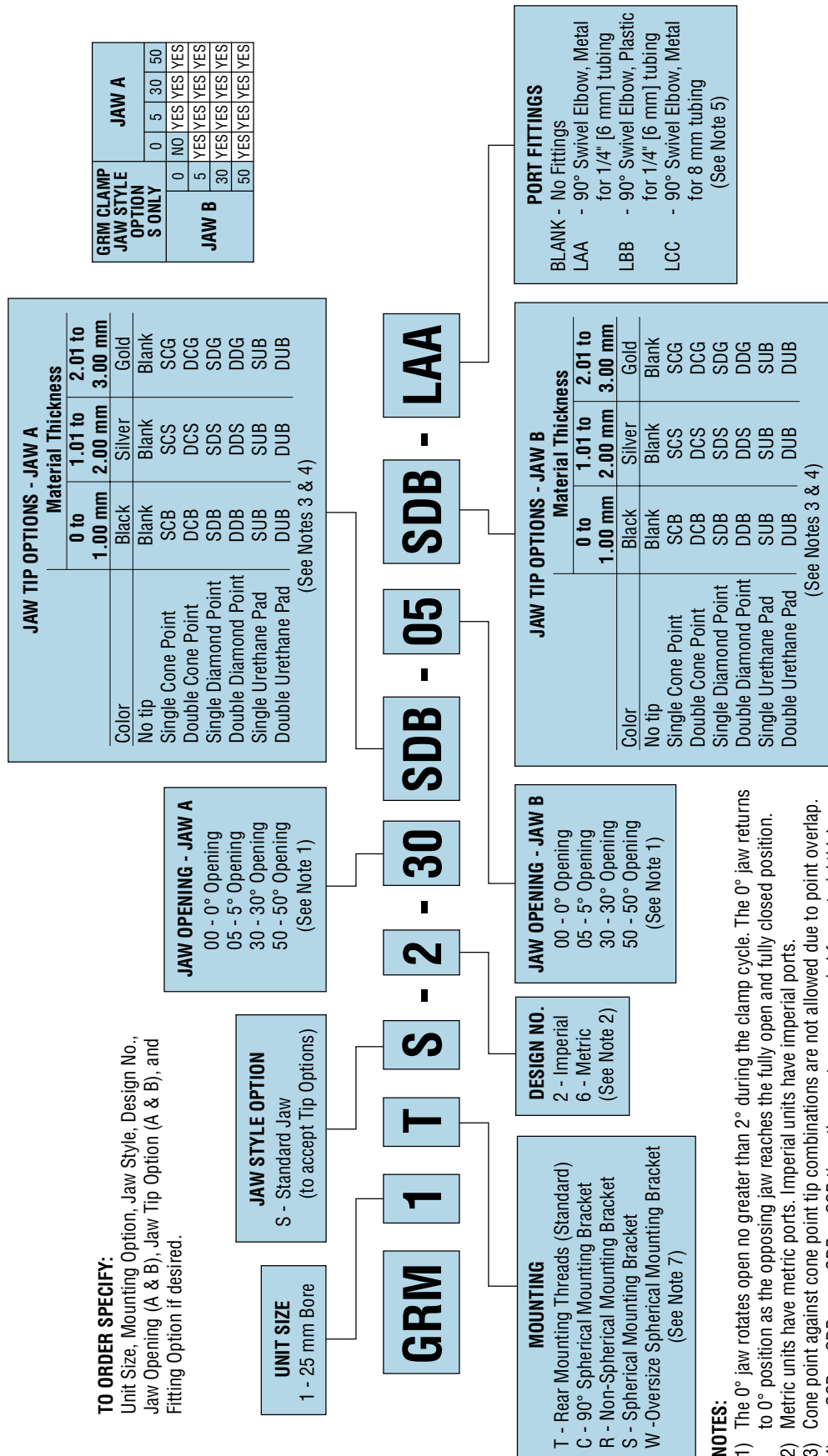
Tip Options
Pages 17 and 18

Seal Option
Page 19

Application Examples
Page 20

TO ORDER SPECIFY:

Unit Size, Mounting Option, Jaw Style, Design No., Jaw Opening (A & B), Jaw Tip Option (A & B), and Fitting Option if desired.



NOTES:

- The 0° jaw rotates open no greater than 2° during the clamp cycle. The 0° jaw returns to 0° position as the opposing jaw reaches the fully open and fully closed position.
- Metric units have metric ports. Imperial units have imperial ports.
- Cone point against cone point tip combinations are not allowed due to point overlap.
- xxSCB-xxSDB or -xxSDB-xxSCB tip options not recommended for material thickness below 0.25 mm.
- LCC port fitting option only available on Design 6 (metric) clamps.
- See Accessories section for non-standard options.
- Mounting options C, R, S, W, & Mxx require -B11 body option. See Accessories section.

SERIES GRM SIZE 1 MINIATURE CLAMPS

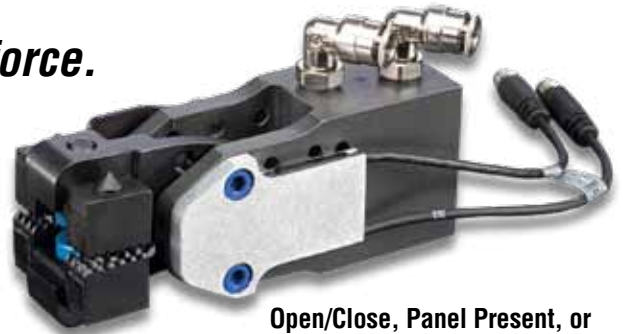


Ideal for applications that require a lightweight actuator and high clamp force.

50° Jaw Opening



hardcoated aluminum for wear resistance



Open/Close, Panel Present, or Double Sheet Detection

polymer seals for long life

cam design locks clamp in the closed position ensuring part retention if air pressure is lost

interchangeable hardened-steel jaws minimize costly inventory and maximize wear resistance for long life

field repairable in 10 minutes using metric hex wrenches

self-locking internal threads throughout eliminate need for thread locking adhesives or additional locking components

adjustable hardened-steel impact plates eliminate damage to body from part impact

Major Benefits

- Compact envelope size, lightweight, and strong. Under 1 lb [0.4 kg] without tips. Series GRM size 1 generates up to 225 lb [1000 N] of total clamp force.
- Simple design, long life, and fast field maintenance.
- The jaws of the Series GRM Clamp lock in the closed position, ensuring part retention if air pressure is lost due to line rupture or power loss.
- Four jaw openings for design flexibility.
- Best price to clamp force ratio in its class.
- Switch mounting option provides up to four sensing functions on one clamp.
- Best delivery in the industry.

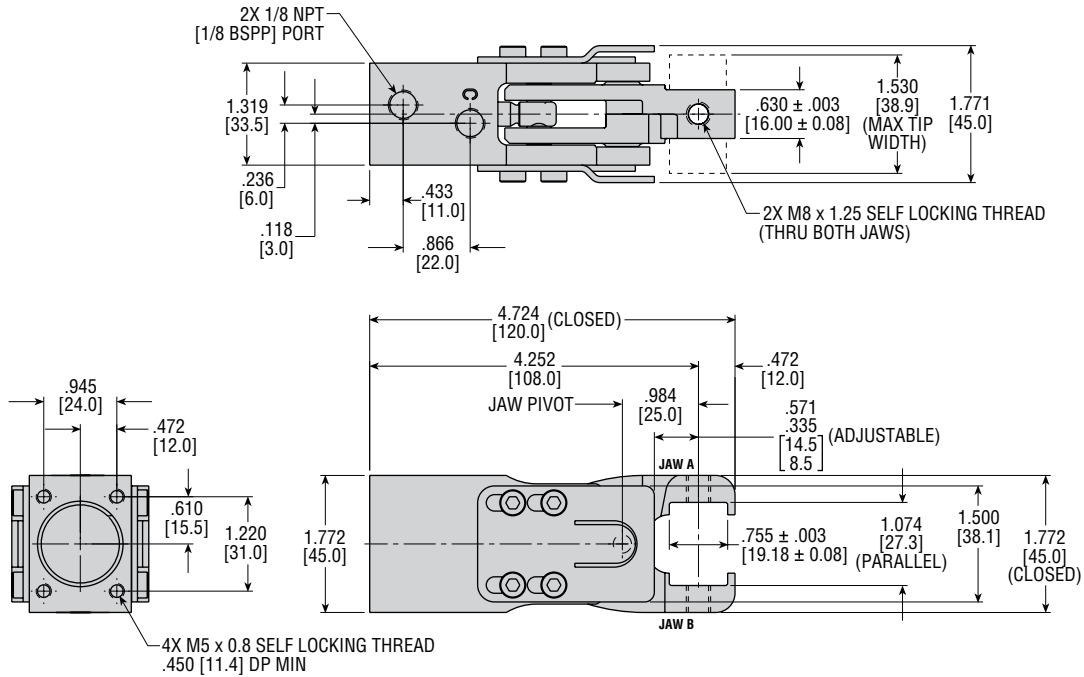
Industry Uses

- Workholding
- Robotics and end effectors
- Automotive
- Material handling
- General industrial automation



DIMENSIONS: SERIES GRM CLAMP SIZE 1

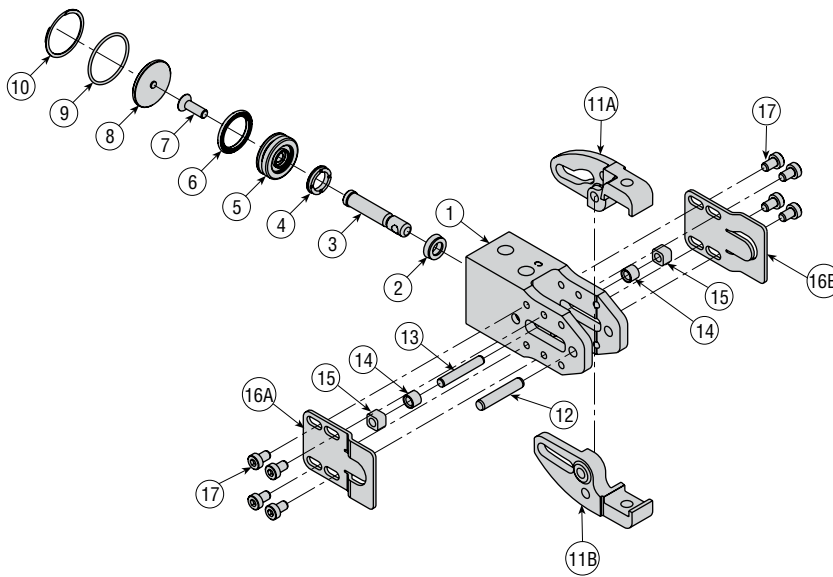
GRM1TS-x-xxxxx-xxxxx



NOTES:

- 1) ALL DIMENSIONS ARE REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED.
- 2) THE 0° JAW ROTATES 2° DURING THE CLAMP CYCLE, OPENING THE END OF THE JAW .035 [0.9]. THE JAW RETURNS TO THE 0° POSITION AS THE OPPOSING JAW REACHES FULL OPEN OR CLOSED.

PARTS BREAKDOWN



KEY	DESCRIPTION	PART NUMBER	
			GRM1TS
1	BODY	-imperial	81666-001-11
		-metric	81666-001-12
2	ROD SEAL		59842-006-1
3	PISTON ROD/JAW DRIVER		81669-001
4	SHOCK PAD		54600-06
5	PISTON		81668-001
6	PISTON SEAL		74042-006
7	SFHCS (M5 x 16)		59104-587
8	BORE PLUG		61466
9	O-RING SEAL		3642-033-1
10	RETAINING RING		57618-028
11A	JAW (S) 0°		81667-002-000
	JAW (S) 5°		81667-002-050
	JAW (S) 30°		81667-002-300
	JAW (S) 50°		81667-002-500
11B	JAW (S) 0°		81667-002-000
	JAW (S) 5°		81667-002-050
	JAW (S) 30°		81667-002-300
	JAW (S) 50°		81667-002-500
12	DOWEL PIN (6 x 32)		17831-098
13	DOWEL PIN (5 x 32)		52416-020
14	ROLLER BUSHING		74506-01
15	SLIDER BUSHING		81670-001
16A	IMPACT PLATE		81671-001
16B	IMPACT PLATE		81671-001
17	LHCS (M5 x 8)		59104-414

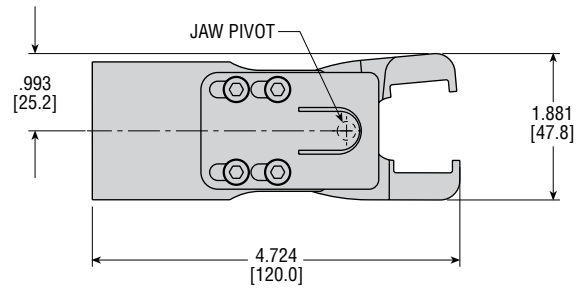
KIT DESCRIPTION	KIT NUMBER
	GRM1TS
SEAL KIT	81665-001-01
JAW REBUILD KIT	81665-002-00
FASTENER KIT	81665-003-00
IMPACT PLATE KIT	81665-004-00

JAW ROTATION DIMENSIONS: SERIES GRM CLAMP SIZE 1

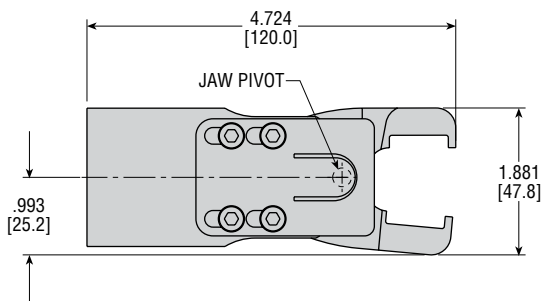
GRM1TS-x-**00**-00

Not Available

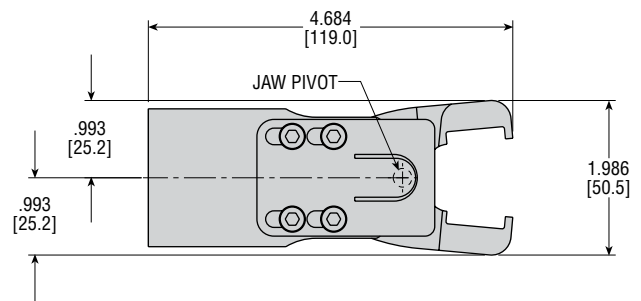
GRM1TS-x-**05**-00 (OPEN)



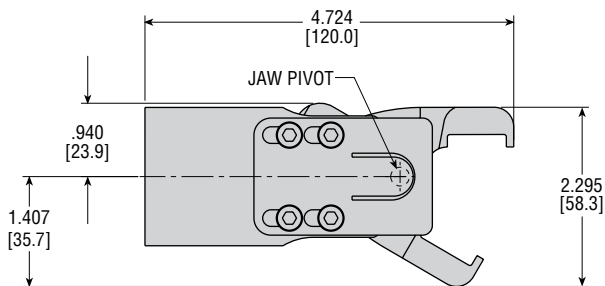
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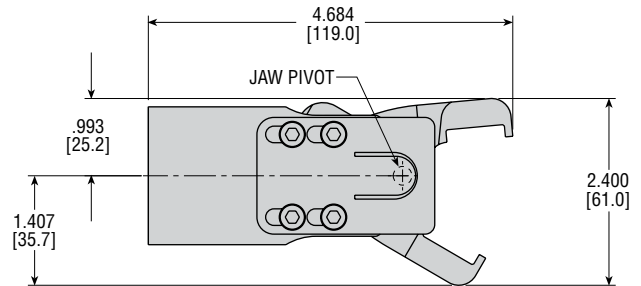
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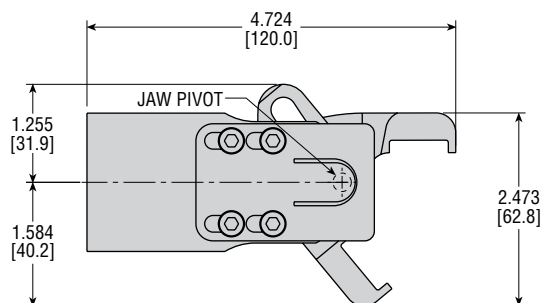
GRM1TS-x-**00**-30 (OPEN)



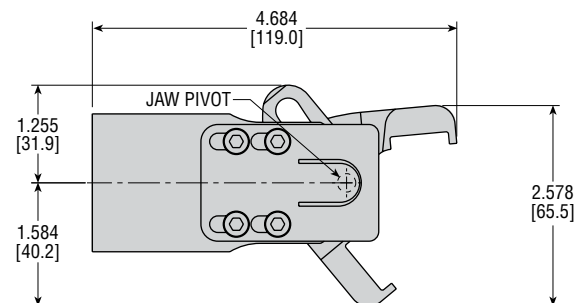
GRM1TS-x-**05**-30 (OPEN)



GRM1TS-x-**00**-50 (OPEN)

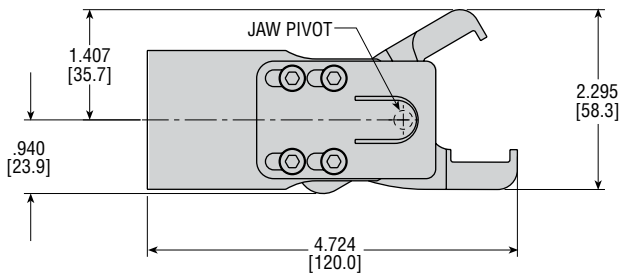


GRM1TS-x-**05**-50 (OPEN)

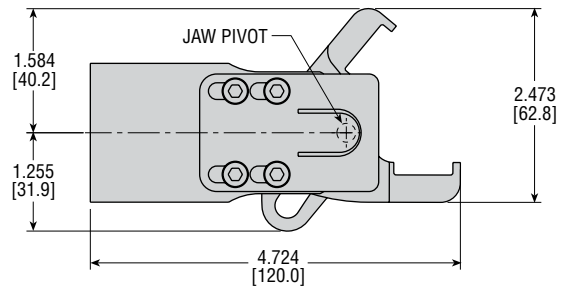


JAW ROTATION DIMENSIONS: SERIES GRM CLAMP SIZE 1

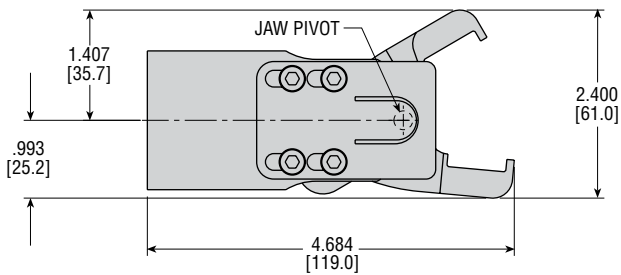
GRM1TS-x-30-00 (OPEN)



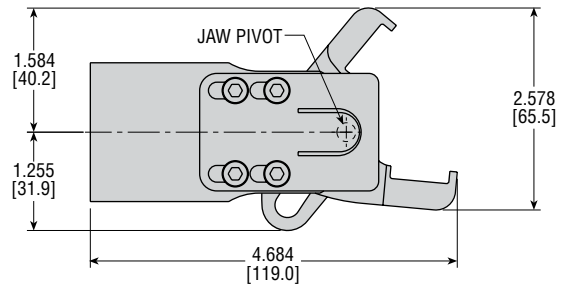
GRM1TS-x-50-00 (OPEN)



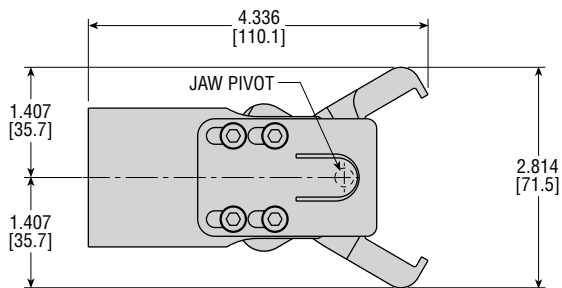
GRM1TS-x-30-05 (OPEN)



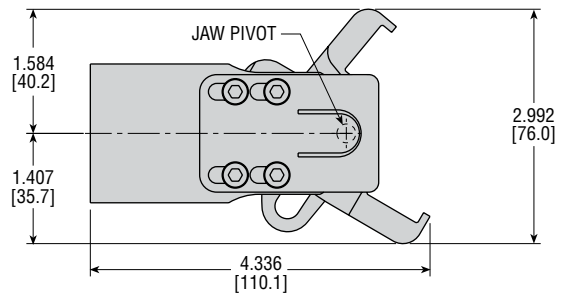
GRM1TS-x-50-05 (OPEN)



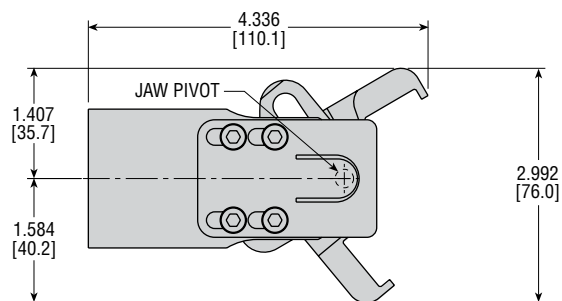
GRM1TS-x-30-30 (OPEN)



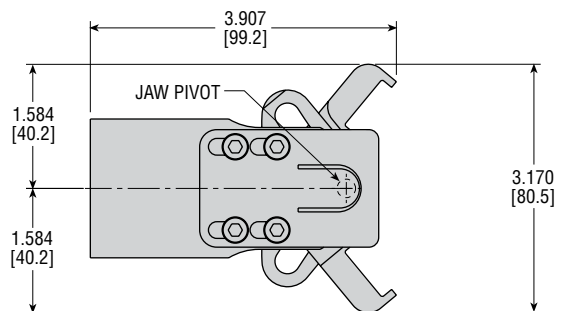
GRM1TS-x-50-30 (OPEN)



GRM1TS-x-30-50 (OPEN)



GRM1TS-x-50-50 (OPEN)



ENGINEERING DATA: SERIES GRM CLAMP SIZE 1

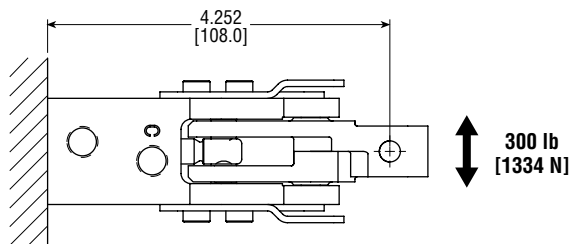
SPECIFICATIONS	SERIES GRM
WORKING PRESSURE	30 psi min. - 100 psi max. [2 bar min. - 7 bar max.]
BODY	Hardcoat Aluminum
JAWS	Hardened Steel
SEALS	Bidirectional Piston Seal Lip Type Rod Seal
LUBRICATION	Permanent for Non-Lube Air
TEMPERATURE LIMITS	-20° to 180°F [-30° to 82°C]

MODEL	UNIT WEIGHT*		TOTAL CLAMP FORCE at 87 psi [6 bar]		MAXIMUM EXTERNAL LOAD		CYCLE TIME OPEN OR CLOSE at 87 psi [6 bar]	DISPLACEMENT			
	lb	kg	lb	N	lb	N	sec	in ³	cm ³		
GRM1TS	.97	0.4	225	1000	300	1334	.20	.59	9.7	.51	8.4

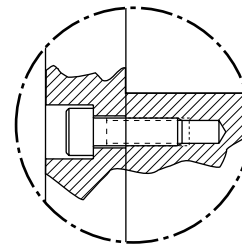
*Weight is for basic clamp without tips

TIP OPTIONS

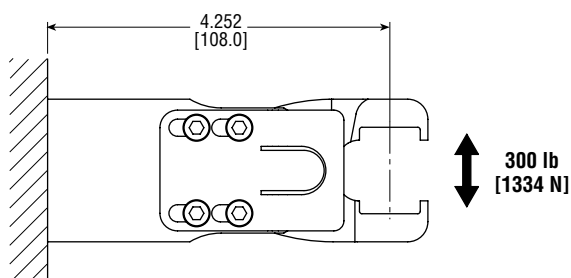
MODEL	TIP WEIGHT	
	SIZE 1	
	lb	kg
SCx	.03	.01
SDx	.07	.03
DCx	.13	.06
DDx	.13	.06
SUB	.04	.02
DUB	.10	.05



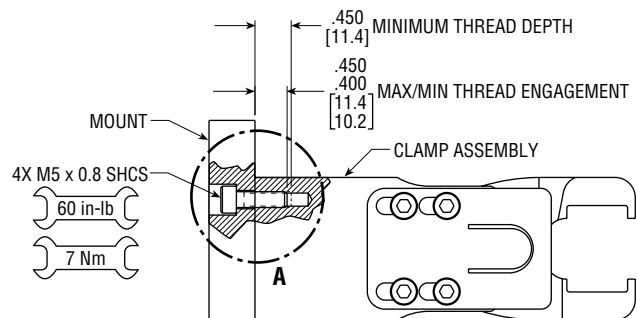
MAXIMUM EXTERNAL LOAD IN THE "X" DIRECTION



DETAIL A



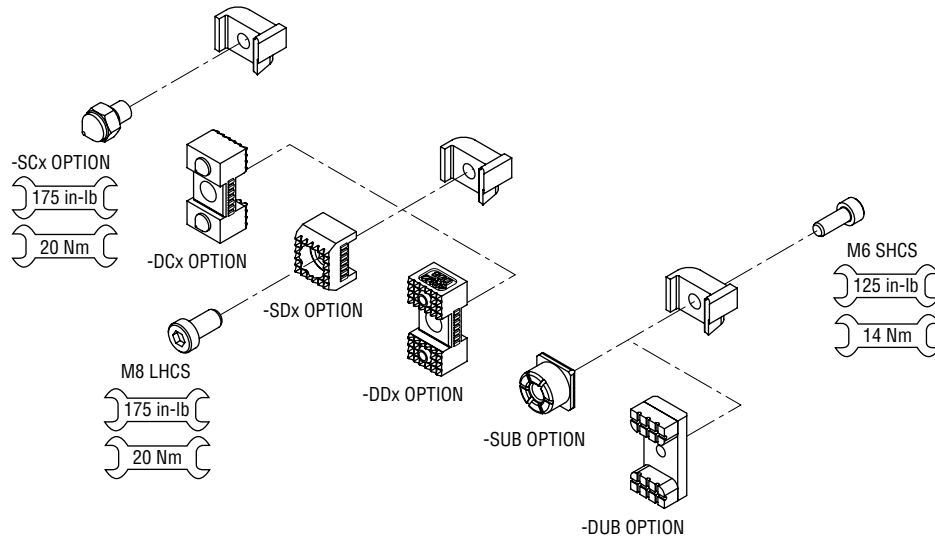
MAXIMUM EXTERNAL LOAD IN THE "Y" DIRECTION



THREAD ENGAGEMENT REQUIREMENTS

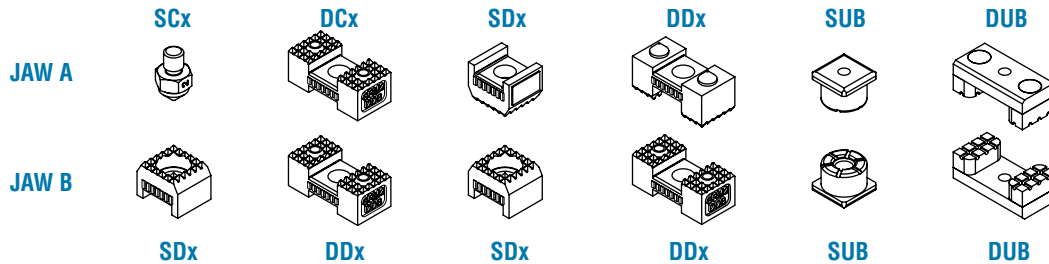
TIP MOUNTING: SERIES GRM CLAMP SIZE 1

TIP MOUNTING



RECOMMENDED TIP COMBINATIONS

(See Tip Dimensions page.)



	JAW TIP OPTIONS - JAW A		
	Material Thickness		
	0 to 1.00 mm	1.01 to 2.00 mm	2.01 to 3.00 mm
Color	Black	Silver	Gold
No tip	Blank	Blank	Blank
Single Cone Point	SCB	SCS	SCG
Double Cone Point	DCB	DCS	DCG
Single Diamond Point	SDB	SDS	SDG
Double Diamond Point	DDB	DDS	DDG
Single Urethane Pad	SUB	SUB	SUB
Double Urethane Pad	DUB	DUB	DUB

(See Notes 1 & 2)

	JAW TIP OPTIONS - JAW B		
	Material Thickness		
	0 to 1.00 mm	1.01 to 2.00 mm	2.01 to 3.00 mm
Color	Black	Silver	Gold
No tip	Blank	Blank	Blank
Single Cone Point	SCB	SCS	SCG
Double Cone Point	DCB	DCS	DCG
Single Diamond Point	SDB	SDS	SDG
Double Diamond Point	DDB	DDS	DDG
Single Urethane Pad	SUB	SUB	SUB
Double Urethane Pad	DUB	DUB	DUB

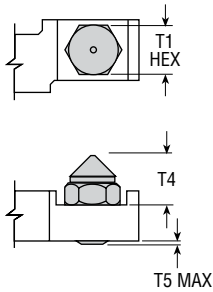
(See Notes 1 & 2)

NOTES:

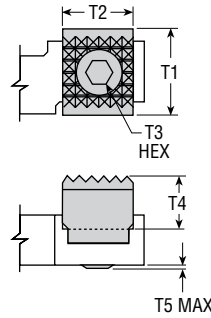
- 1) Cone point against cone point tip combinations are not allowed due to point overlap.
- 2) -xxSCB-xxSDB or -xxSDB-xxSCB tip options not recommended for material thickness below 0.25 mm.

TIP DIMENSIONS: SERIES GRM CLAMP SIZE 1

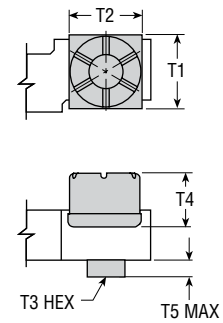
-SCB, -SCS, -SCG
SINGLE CONE POINT



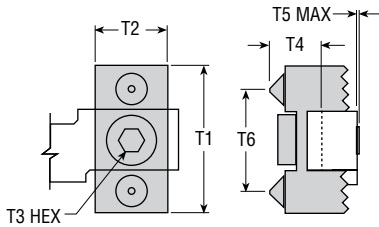
-SDB, -SDS, -SDG
SINGLE DIAMOND POINT PAD



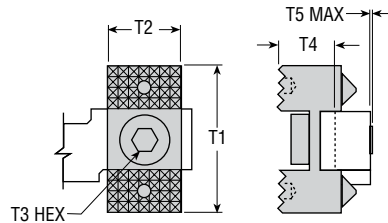
-SUB
SINGLE URETHANE PAD



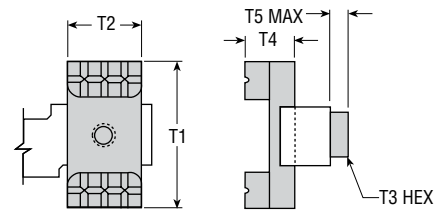
-DCB, -DCS, -DCG
DOUBLE CONE POINT



-DDB, -DDS, -DDG
DOUBLE DIAMOND POINT PAD



-DUB
DOUBLE URETHANE PAD

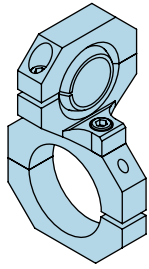


OPTION CODE	PART COLOR	KIT NUMBER	LETTER DIMENSION											
			T1		T2		T3		T4		T5		T6	
			in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
-SCB	BLACK	GRM2-SCB-1	.511	13.0	—	—	—	—	.545	13.8	.075	1.9	—	—
-SCS	SILVER	GRM2-SCS-1	.511	13.0	—	—	—	—	.520	13.2	.075	1.9	—	—
-SCG	GOLD	GRM2-SCG-1	.511	13.0	—	—	—	—	.507	12.9	.075	1.9	—	—
-SDB	BLACK	GRM2-SDB-1	.900	22.9	.750	19.0	.197	5.0	.535	13.6	.095	2.4	—	—
-SDS	SILVER	GRM2-SDS-1	.900	22.9	.750	19.0	.197	5.0	.510	13.0	.095	2.4	—	—
-SDG	GOLD	GRM2-SDG-1	.900	22.9	.750	19.0	.197	5.0	.497	12.6	.095	2.4	—	—
-SUB	BLACK	GRM2-SUB-1	.748	19.0	.748	19.0	.197	5.0	.535	13.6	.236	6.0	—	—
-DCB	BLACK	GRM2-DCB-1	1.530	38.9	.750	19.0	.197	5.0	.555	14.1	.075	1.9	1.070	27.2
-DCS	SILVER	GRM2-DCS-1	1.530	38.9	.750	19.0	.197	5.0	.530	13.5	.075	1.9	1.070	27.2
-DCG	GOLD	GRM2-DCG-1	1.530	38.9	.750	19.0	.197	5.0	.517	13.1	.075	1.9	1.070	27.2
-DDB	BLACK	GRM2-DDB-1	1.530	38.9	.750	19.0	.197	5.0	.535	13.6	.075	1.9	—	—
-DDS	SILVER	GRM2-DDS-1	1.530	38.9	.750	19.0	.197	5.0	.510	13.0	.075	1.9	—	—
-DDG	GOLD	GRM2-DDG-1	1.530	38.9	.750	19.0	.197	5.0	.497	12.6	.075	1.9	—	—
-DUB	BLACK	GRM2-DUB-1	1.530	38.9	.748	19.0	.197	5.0	.545	13.8	.236	6.0	—	—

MOUNTING BRACKET DIMENSIONS: SERIES GRM1

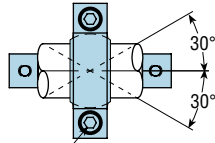
90° SPHERICAL MOUNTING BRACKET

GRM1 **C** x-x-xxxxx-xxxxx-B11

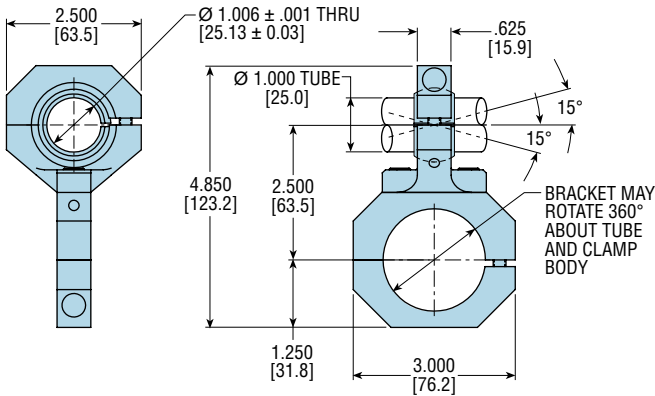


"C" MOUNT

WEIGHT ADDER = .62 lb [0.28 kg]
ORDER KIT NO. 64658-02 - IMPERIAL
64658-03 - METRIC

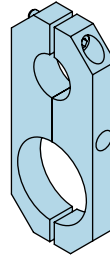


6X .197 [5.0] HEX



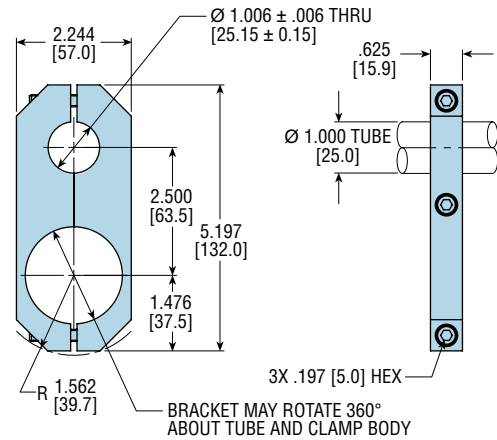
NON-SPHERICAL MOUNTING BRACKET

GRM1 **R** x-x-xxxxx-xxxxx-B11



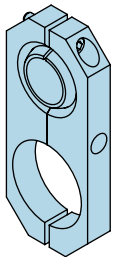
"R" MOUNT

WEIGHT ADDER = .46 lb [0.21 kg]
ORDER KIT NO. 62149-02 - IMPERIAL
62196-02 - METRIC



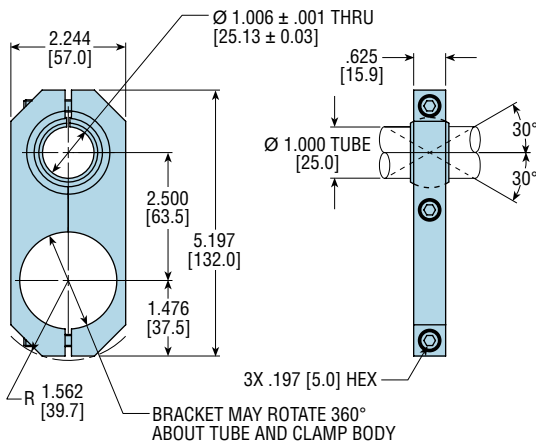
SPHERICAL MOUNTING BRACKET

GRM1 **S** x-x-xxxxx-xxxxx-B11



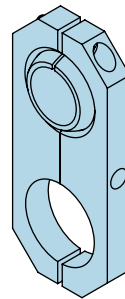
"S" MOUNT

WEIGHT ADDER = .53 lb [0.24 kg]
ORDER KIT NO. 62149-01 - IMPERIAL
62196-01 - METRIC



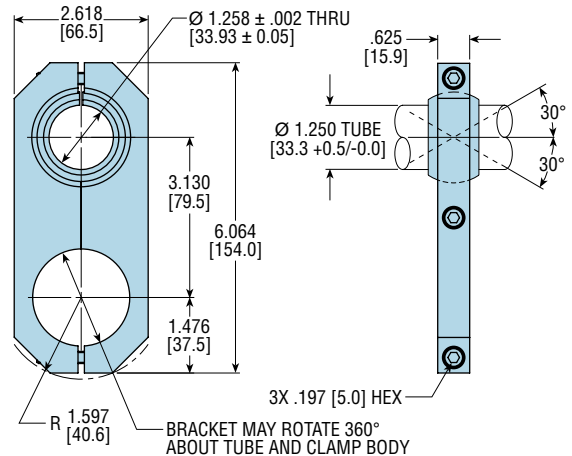
OVERSIZE SPHERICAL MOUNTING BRACKET

GRM1 **W** x-x-xxxxx-xxxxx-B11



"W" MOUNT

WEIGHT ADDER = .86 lb [0.39 kg]
ORDER KIT NO. 62201-01 - IMPERIAL
62201-03 - METRIC

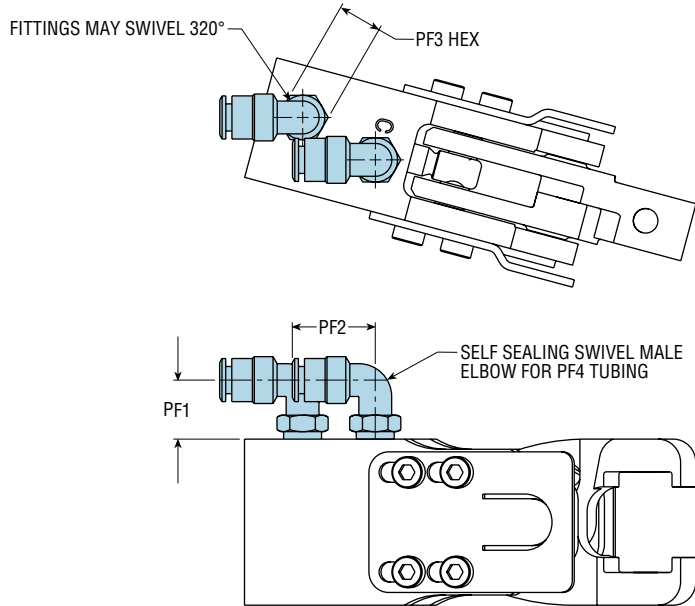


PORT FITTING DIMENSIONS: SERIES GRM CLAMP SIZE 1

-LAA OPTION - 90° Swivel Elbow, Metal Fittings for 1/4" [6 mm] Tubing

-LBB OPTION - 90° Swivel Elbow, Plastic Fittings for 1/4" [6 mm] Tubing

-LCC OPTION - 90° Swivel Elbow, Metal Fittings for 8 mm Tubing



NOTES:

- 1) ALL DIMENSIONS ARE REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED.
- 2) CLOSED PORTS ARE MARKED WITH THE LETTER C.
- 3) -LCC PORT FITTING OPTION ONLY AVAILABLE ON DESIGN 6 (METRIC) CLAMPS.

LETTER DIMENSION	PORT FITTING OPTION	
	in	mm
PF1 (MIN)	.630	16.0
PF1 (MAX)	.748	19.0
PF2	.886	22.5
PF3 - LAA	.472	12.0
- LBB	.437	11.1
- LCC	.472	12.0
PF4 - LAA	1/4	6.0
- LBB	1/4	6.0
- LCC	—	8.0

TO ORDER FITTING SEPARATELY,

FOR LAA OPTION:

PART NO. 62178-003 -IMPERIAL

PART NO. 62195-005 -METRIC

FOR LBB OPTION:

PART NO. 71120-001 -IMPERIAL

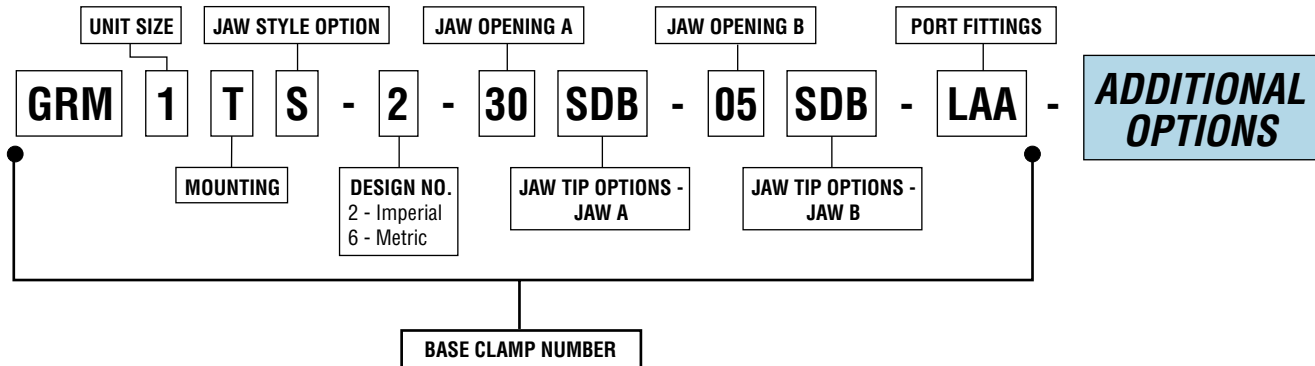
PART NO. 71121-001 -METRIC

FOR LCC OPTION:

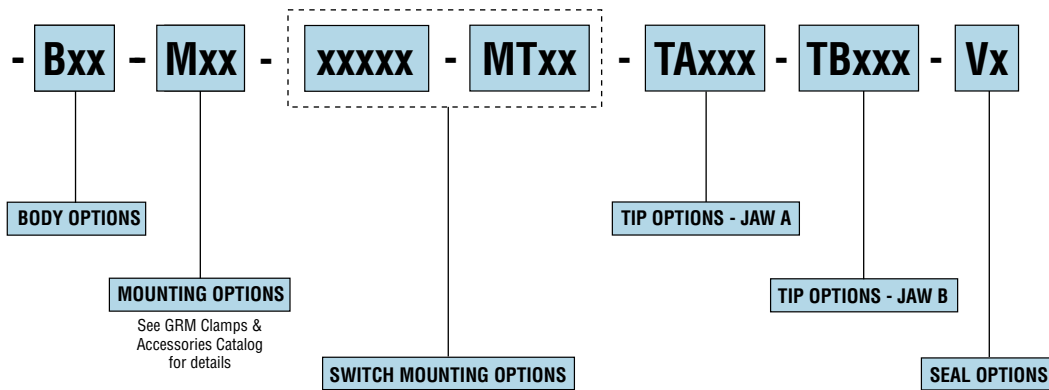
PART NO. 62195-007 -METRIC

ORDERING DATA: CLAMP ACCESSORIES

Example:



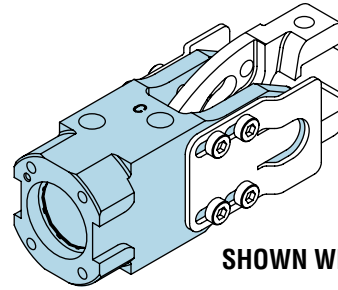
ADDITIONAL OPTIONS



BODY OPTION: SERIES GRM CLAMP SIZE 1

B11 BAYONET MOUNTING

This option provides a body that accepts GRM Clamp Size 2 C, R, S, W, and other non-standard mounts (M01, M02, M07, M21, M22, M23, M25, M27, M28, M29, M30, M36, M37, M38, M39, M42, M46, and M47). Information for non-standard mounts may be found in the GRM Clamps & Accessories Catalog.



SHOWN WITHOUT MOUNT

AVAILABLE ON	DESIGN NO.	ACCESSORY	PRICE ADDER
GRM1	2 [6]	B11	\$15.50

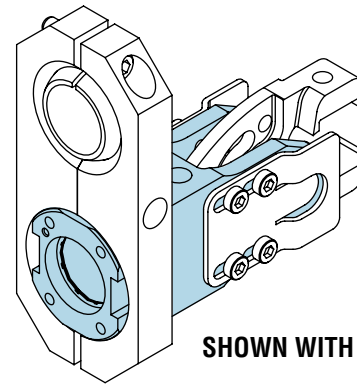
Example Ordering Data:

GRM1SS-2-50SDB-50SDB-LAA -B11

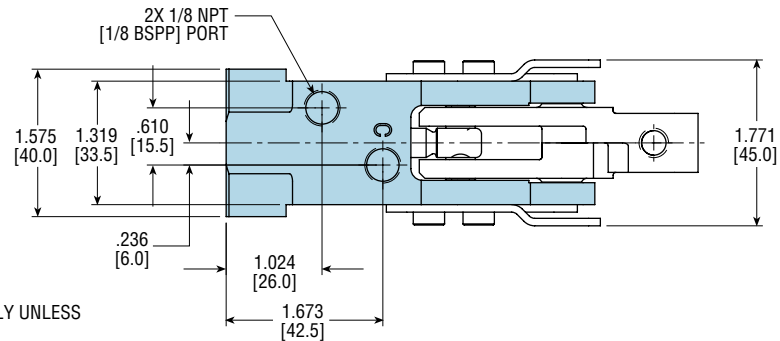
SHADED CODES are required for this option.

All unshaded model codes are example only.

For compatibility with other units, consult PHD.

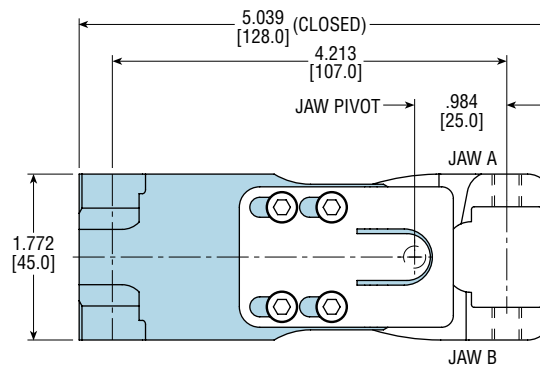
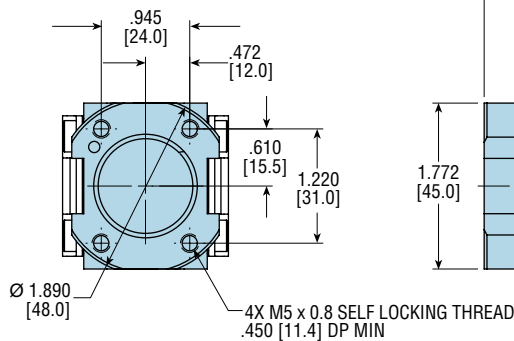


SHOWN WITH "S" MOUNT



NOTES:

- 1) ALL DIMENSIONS ARE REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED.
- 2) WEIGHT ADDER = .05 lbs [0.02 kg]
- 3) LENGTH ADDER = .315 [8.0]



BODY PART NUMBERS AND PRICE IF ORDERED SEPARATELY

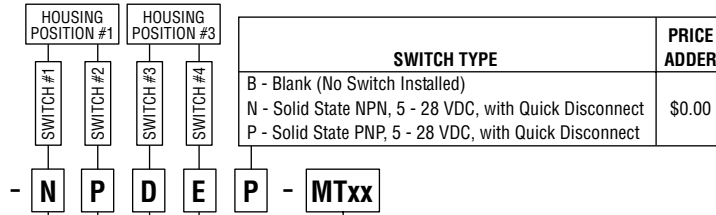
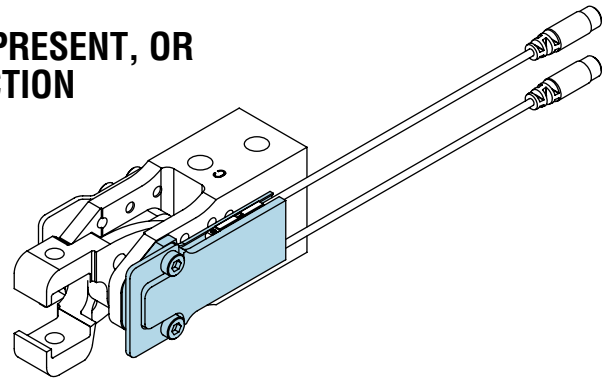
CLAMP SIZE	JAW STYLE	PORTS		LIST PRICE
		IMPERIAL	METRIC	
1	S	81663-005-00-11	81663-005-00-12	\$64.85

SWITCH MOUNTING OPTION: SERIES GRM CLAMP SIZE 1

XXXXX - MTxx

OPEN/CLOSE, PANEL PRESENT, OR DOUBLE SHEET DETECTION

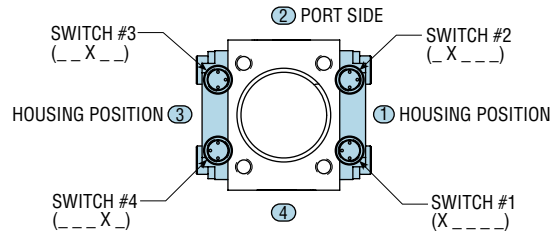
The switch mounting option offered on the Series GRM1 Clamp is a compact, cost effective solution to your sensing needs. Within one clamp you can have up to four functions: Panel Present Detection, Double Sheet Detection, and Open/Close Detection. All sensors are Ø 4.0 mm round solid-state switches with 8.0 mm quick disconnects and are available in NPN and PNP outputs. **Steel tips are recommended. For urethane tip applications, consult PHD. These switches operate off of magnetic fields and should not be used around welding environments or equipment.**



SWITCH TYPE	PRICE ADDER
B - Blank (No Switch Installed)	\$0.00
N - Solid State NPN, 5 - 28 VDC, with Quick Disconnect	
P - Solid State PNP, 5 - 28 VDC, with Quick Disconnect	

HOUSING POSITION/SWITCH FUNCTION	PRICE ADDER
B - BLANK (No Switch or Housing)	\$0.00
N - No Switch Installed (Switch Ready)	\$19.55
S - Switch Installed (Not Preset)	\$42.05
E - Open (Extend) Sensing (Preset)	\$42.05
R - Close (Retract) Sensing (Preset)	\$42.05
P - Panel Present Detection (Preset)	\$42.05
D - Double Sheet Detection (Preset)	\$42.05

MATERIAL THICKNESS
 xx - 0.30 mm to 3.00 mm
 in 0.10 mm increments
 (See Notes 1 & 2)



X = ALL OPTIONS OTHER THAN "B" OR "N"

Each switch # is a price adder.

Example ordering scenario:

Customer wants the following:

1. Panel present detection on housing position #3/switch #4.
2. Switch to be PNP.
3. Material thickness is 1.3 mm.

To order: BBNPP-MT13

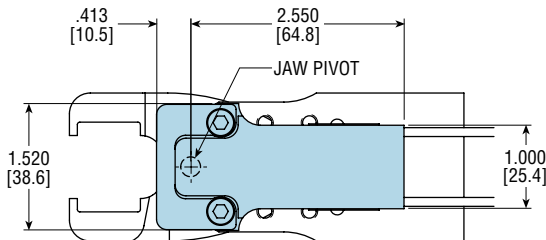
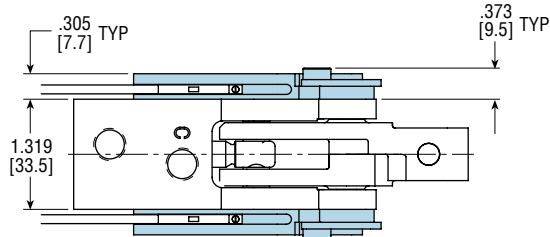
Total price adder = \$0.00 + \$0.00 + \$19.55 + \$42.05 + \$0.00 = \$61.60

NOTES:

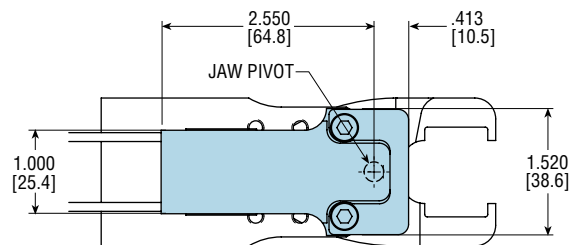
- 1) Material thickness must be specified for all switch functions other than "B" (no switch or housing), "N" (switch ready), or "S" (not preset).
- 2) Examples for specifying material thickness:
 Material thickness is 0.30 mm - specify MT03
 Material thickness is 1.50 mm - specify MT15
 Material thickness is 3.00 mm - specify MT30

NOTES:

- 1) ALL DIMENSIONS ARE REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED.
- 2) NUMBERS IN OVALS INDICATE POSITION (POSITION 2 IS PORT SIDE OF CLAMP).



SWITCH HOUSING POSITION 3



SWITCH HOUSING POSITION 1

REPLACEMENT KIT NUMBERS AND PRICES IF ORDERED SEPARATELY

KIT NUMBER	DESCRIPTION	LIST PRICE
81665-002-01	JAW REBUILD KIT (SINGLE HOUSING)	\$25.75
81665-002-02	JAW REBUILD KIT (DUAL HOUSING)	\$25.85

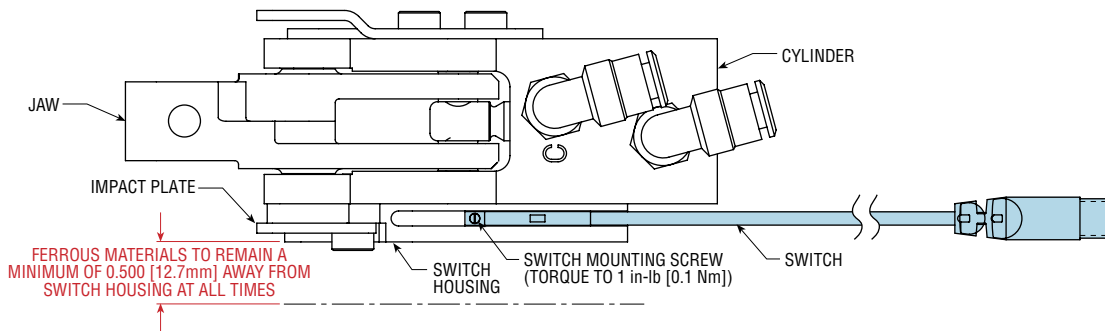
KIT INCLUDES: 2 DOWEL PINS, 2 ROLLER BUSHINGS, AND 2 SLIDER BUSHINGS

REPLACEMENT KIT NUMBERS AND PRICES IF ORDERED SEPARATELY

KIT NUMBER	DESCRIPTION	LIST PRICE
81665-005-00	SWITCH HOUSING KIT (SINGLE HOUSING)	\$52.65
81665-005-01	SWITCH HOUSING KIT (DUAL HOUSING)	\$95.40

KIT INCLUDES: SWITCH HOUSING(S), IMPACT PLATE(S) AND MOUNTING HARDWARE

SWITCH MOUNTING OPTION: SERIES GRM CLAMP SIZE 1



FIELD SET-UP PROCEDURES:

SWITCH FUNCTION “R” (CLOSE OR RETRACT SENSING)

- 1) Using air pressure, close clamp with part between tips.
- 2) Loosen switch mounting screw and remove switch from housing.
- 3) Install switch in housing, sliding it slowly toward jaws until switch just turns on.
- 4) Hold switch, making sure not to move it and tighten switch mounting screw.

To test the set-up:

- 1) Using air pressure, open and close clamp with part between tips. During close cycle, switch should turn on. If switch intermittently turns on, switch is not set properly.
- 2) Using air pressure, close clamp with part between tips.
- 3) To adjust, hold switch, making sure not to move it and loosen switch mounting screw.
- 4) Slowly slide switch toward jaws - approximately .020 in [0.25 mm] from its original location.
- 5) Hold switch, making sure not to move it and tighten switch mounting screw.
- 6) Repeat steps until switch turns on every time during close cycle.

SWITCH FUNCTION “D” (DOUBLE SHEET DETECTION)

- 1) Using air pressure, close clamp with one part between tips.
- 2) Loosen switch mounting screw and remove switch from housing.
- 3) Install switch in housing, sliding it slowly toward jaws until switch just turns on.
- 4) Hold switch, making sure not to move it and tighten switch mounting screw.

To test the set-up:

- 1) Using air pressure, open and close clamp with one part between tips. During close cycle, switch should turn on. If switch intermittently turns on, switch is not set properly. Proceed to step 3.
- 2) Using air pressure, open and close clamp with two parts between tips. During the close cycle, switch should remain off.
- 3) Using air pressure, close clamp with one part between tips.
- 4) To adjust, hold switch, making sure not to move it and loosen switch mounting screw.
- 5) Slowly slide switch toward jaws - approximately .020 in [0.25 mm] from its original location.
- 6) Hold switch, making sure not to move it and tighten switch mounting screw.
- 7) Repeat steps until switch turns on every time with one part between tips during close cycle and switch remains off every time with two parts between tips during close cycle.

NOTE: With no part present, switch will turn on and may remain on as target passes under switch.

SWITCH FUNCTION “E” (OPEN OR EXTEND SENSING)

- 1) Using air pressure, open clamp.
- 2) Loosen switch mounting screw and slide switch toward jaws until switch stops.
- 3) If switch remains on, hold switch and tighten switch mounting screw. Proceed to test set-up.
- 4) If switch turns off, proceed to step 5.
- 5) Slide switch slowly toward cylinder until switch just turns on.
- 6) Hold switch, making sure not to move it and tighten switch mounting screw.

To test the set-up:

- 1) Using air pressure, open and close clamp. During open cycle, switch should turn on. If switch intermittently turns on, switch is not set properly.
- 2) Using air pressure, open clamp.
- 3) To adjust, hold switch, making sure not to move it and loosen switch mounting screw.
- 4) Slowly slide switch toward cylinder - approximately .020 in [0.25 mm] from its original location.
- 5) Hold switch, making sure not to move it and tighten switch mounting screw.
- 6) Repeat steps until switch turns on every time during open cycle.

SWITCH FUNCTION “P” (PANEL PRESENT DETECTION)

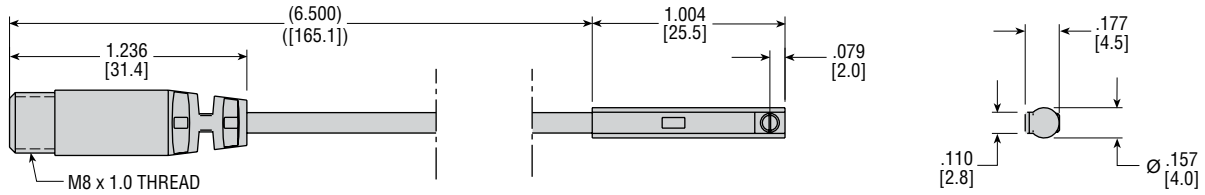
- 1) Using air pressure, close clamp with part between tips.
- 2) Loosen switch mounting screw and slide switch toward jaws until switch stops.
- 3) Slide switch slowly toward cylinder until switch just turns on.
- 4) Hold switch, making sure not to move it and tighten switch mounting screw.

To test the set-up:

- 1) Using air pressure, open and close clamp with part between tips. During the close cycle, switch should turn on. If switch intermittently turns on, switch is not set properly. Proceed to step 3.
- 2) Using air pressure, open and close clamp without part between tips. During the close cycle, switch should turn off.
- 3) Using air pressure, close clamp with part between tips.
- 4) To adjust, hold switch, making sure not to move it and loosen switch mounting screw.
- 5) Slowly slide switch toward cylinder - approximately .020 in [0.25 mm] from its original location.
- 6) Hold switch, making sure not to move it and tighten switch mounting screw.
- 7) Repeat steps until switch turns on every time with part between tips during close cycle and switch turns off every time without part between tips during close cycle.

NOTE: With no part present, switch will flicker on as target passes under switch and turn off as jaws reach full closed.

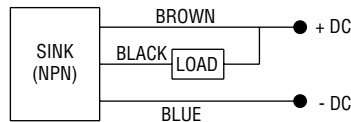
SWITCH MOUNTING OPTION: SERIES GRM CLAMP SIZE 1



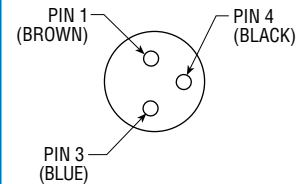
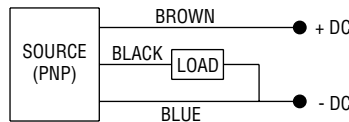
KIT NO.	DESCRIPTION
81665-005-02	Solid State NPN (Sink) 5 - 28 VDC, 165 mm Cable with Quick Disconnect
81665-005-03	Solid State PNP (Source) 5 - 28 VDC, 165 mm Cable with Quick Disconnect

SPECIFICATIONS	81665-005-02	81665-005-03
SWITCHING LOGIC	Solid State Output, Normally Open	
SENSOR TYPE	NPN Current Sinking	PNP Current Sourcing
OPERATING VOLTAGE	5 - 28 VDC	
SWITCHING CURRENT	200 mA max	
SWITCHING RATING	6 W max	
CURRENT CONSUMPTION	20 mA @ 24 VDC max (Switch Active)	
VOLTAGE DROP	0.5 V @ 200 mA max	
LEAKAGE CURRENT	0.01 mA max	
INDICATOR	Red LED	Green LED
CABLE	Ø 2.8, 3C, PVC	
SENSITIVITY	40 Gauss	
TEMPERATURE RANGE	14° to 158°F [-10° to 70°C]	
SHOCK	50 G	
VIBRATION	9 G	
ENCLOSURE CLASSIFICATION	IP67 (NEMA 6)	
PROTECTION CIRCUIT	Power Source Reverse Polarity, Surge Suppression	

81665-005-02



81665-005-03

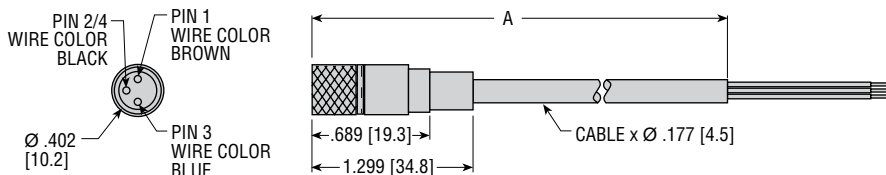


REPLACEMENT KIT NUMBERS AND PRICES IF ORDERED SEPARATELY

KIT NUMBER	SWITCH TYPE	DESCRIPTION	LIST PRICE
81665-005-02	N	SWITCH KIT (NPN)	\$29.90
81665-005-03	P	SWITCH KIT (PNP)	\$29.90

KIT INCLUDES: 1 SWITCH

63549-xx CORDSET WITH FEMALE QUICK CONNECT

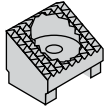


KIT NO.	LETTER DIM. A	LIST PRICE
63549-02	78.74 [2 m]	\$22.80
63549-05	196.85 [5 m]	\$33.75

TIP OPTIONS: SERIES GRM CLAMP SIZE 1

TA(B)xxx

RECOMMENDED TIP COMBINATIONS

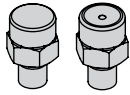


Used to grip 30° angled surfaces while keeping the clamp parallel.

Example Ordering Data:

GRM1TS-2-50 **blank** -50 **blank** -LAA **-TA001** **-TB001**

TIP OPTION	MATERIAL	TIP COLOR	TIP STYLE	MOUNTING			
JAW A	JAW B	THICKNESS (mm)	JAW A	JAW B	JAW A	JAW B	ORIENTATION
TA001	TB001	0.50-1.00	black	black	30° diamond		upward
TA003	TB003						downward
TA002	TB002	1.01-1.50	silver	silver	30° diamond		upward
TA004	TB004						downward



Used to grip parts without scratching or creating “fines.”

Example Ordering Data:

GRM1TS-2-50 **blank** -50 **blank** -LAA **-TA008** **-TB005**

TIP OPTION	MATERIAL	TIP COLOR	TIP STYLE			
JAW A	JAW B	THICKNESS (mm)	JAW A	JAW B	JAW A	JAW B
TA008	TB005	0.50-1.50	black	black	ball	socket
TA009	TB006	1.51-2.25	silver	silver	ball	socket
TA010	TB007	2.26-3.00	gold	gold	ball	socket

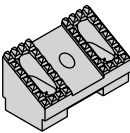


Used to penetrate or “dig into” the parts.

Example Ordering Data:

GRM1TS-2-50 **blank** -50 **SDB** -LAA **-TA019**

TIP OPTION	MATERIAL	TIP COLOR	TIP STYLE			
JAW A	JAW B	THICKNESS (mm)	JAW A	JAW B	JAW A	JAW B
TA019	SDB	0.50-1.00	black	black	cone	diamond
TA020	SDB	1.01-2.00	silver	black	cone	diamond
TA021	SDG	2.01-3.00	gold	gold	cone	diamond

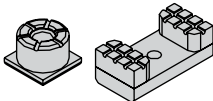


Used to grip 30° angled surfaces while keeping the clamp parallel.

Example Ordering Data:

GRM1TS-2-50 **blank** -50 **blank** -LAA **-TA034** **-TB034**

TIP OPTION	MATERIAL	TIP COLOR	TIP STYLE	MOUNTING			
JAW A	JAW B	THICKNESS (mm)	JAW A	JAW B	JAW A	JAW B	ORIENTATION
TA034	TB034	0.25-0.75	black	black	30° diamond		upward
TA037	TB037						downward
TA034	TB035	0.76-1.50	black	silver	30° diamond		upward
TA037	TB038						downward
TA034	TB036	1.51-2.25	black	gold	30° diamond		upward
TA037	TB039						downward
TA035	TB036	2.26-3.00	silver	gold	30° diamond		upward
TA038	TB039						downward
TA036	TB036	3.01-3.50	gold	gold	30° diamond		upward
TA039	TB039						downward

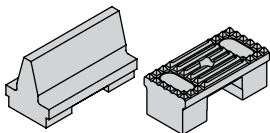


Harder urethane provides greater resistance to part slippage.

Example Ordering Data:

GRM1TS-2-50 **blank** -50 **blank** -LAA **-TA041** **-TB041**

TIP OPTION	MATERIAL	TIP COLOR	TIP STYLE	DUROMETER			
JAW A	JAW B	THICKNESS (mm)	JAW A	JAW B	JAW A	JAW B	
TA040	TB040	0.50-1.50	red	red	single urethane		93 Shore A
TA041	TB041				double urethane		
TA066	TB066	0.75-2.00	blue	blue	single urethane		85 Shore A
TA067	TB067	0.25-1.50	blue	blue	double urethane		



Used to grip the inside of a drawbead (curved channel).

Example Ordering Data:

GRM1TS-2-50 **blank** -50 **blank** -LAA **-TA061** **-TB030**

TIP OPTION	MATERIAL	TIP COLOR	TIP STYLE			
JAW A	JAW B	THICKNESS (mm)	JAW A	JAW B	JAW A	JAW B
TA061	TB030	0.00-1.00	black	black	bead	offset

PRICE ADDERS OR REPLACEMENT KIT NUMBERS AND PRICES IF ORDERED SEPARATELY

TIP OPTION	KIT NUMBER	TIP COLOR	TIP STYLE	LIST PRICE
Tx001 or Tx003	65106-01	black	30° diamond	\$48.10
Tx002 or Tx004	65106-02	silver	30° diamond	\$48.10

Kit includes: 1 tip and 1 screw

TIP OPTION	KIT NUMBER	TIP COLOR	TIP STYLE	LIST PRICE
Tx005	65100-13	black	socket	\$16.30
Tx006	65100-14	silver	socket	\$16.30
Tx007	65100-15	gold	socket	\$19.60
Tx008	65100-16	black	ball	\$23.10
Tx009	65100-17	silver	ball	\$23.10
Tx010	65100-18	gold	ball	\$30.05

Kit includes: 1 tip

TIP OPTION	KIT NUMBER	TIP COLOR	TIP STYLE	LIST PRICE
Tx019	65131-01	black	cone	\$9.50
Tx020	65131-02	silver	cone	\$9.50
Tx021	65131-03	gold	cone	\$15.20

Kit includes: 1 tip

TIP OPTION	KIT NUMBER	TIP COLOR	TIP STYLE	LIST PRICE
Tx034 or Tx037	65149-03	black	30° diamond	\$53.60
Tx035 or Tx038	65149-04	silver	30° diamond	\$53.60
Tx036 or Tx039	65149-05	gold	30° diamond	\$56.85

Kit includes: 1 tip and 1 screw

TIP OPTION	KIT NUMBER	TIP COLOR	TIP STYLE	LIST PRICE
Tx040	65163-03	red	single urethane	\$17.90
Tx041	65163-04	red	double urethane	\$18.35
Tx066	65163-07	blue	single urethane	\$28.10
Tx067	65163-08	blue	double urethane	\$20.85

Kit includes: 1 tip and 1 screw

TIP OPTION	KIT NUMBER	TIP COLOR	TIP STYLE	LIST PRICE
Tx030	65405-06	black	short offset	\$52.50
Tx061	65171-04	silver	draw bead	\$61.95

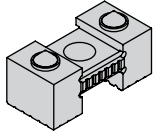
Kit includes: 1 tip, 1 screw, and 1 washer (65405-06)

Kit includes: 1 tip and 1 screw (65171-04)

TIP OPTIONS: SERIES GRM CLAMP SIZE 1

TA(B)xxx

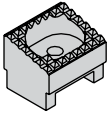
RECOMMENDED TIP COMBINATIONS



Used to penetrate or “dig into” the parts.
Example Ordering Data:

GRM1TS-2-50 **blank** -50 **DDB** -LAA **-TA063**

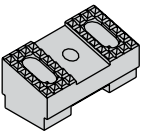
TIP OPTION		MATERIAL THICKNESS (mm)	TIP COLOR		TIP STYLE	
JAW A	JAW B		JAW A	JAW B	JAW A	JAW B
TA063	DDB	0.25-1.00	black	black	cone	diamond
TA063	DDG	1.01-2.00	black	gold	cone	diamond
TA065	DDG	2.01-3.00	gold	gold	cone	diamond



Used to grip 15° angled surfaces while keeping the clamp parallel.
Example Ordering Data:

GRM1TS-2-50 **blank** -50 **blank** -LAA **-TA071** **-TB071**

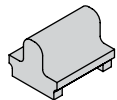
TIP OPTION		MATERIAL THICKNESS (mm)	TIP COLOR		TIP STYLE		MOUNTING ORIENTATION
JAW A	JAW B		JAW A	JAW B	JAW A	JAW B	
TA071	TB071	0.50-1.00	black	black	15° diamond		upward
TA074	TB074						downward
TA071	TB072	1.01-1.50	black	silver	15° diamond		upward
TA074	TB075						downward
TA072	TB072	1.51-2.25	silver	silver	15° diamond		upward
TA075	TB075						downward
TA072	TB073	2.26-2.75	silver	gold	15° diamond		upward
TA075	TB076						downward
TA073	TB073	2.76-3.25	gold	gold	15° diamond		upward
TA076	TB076						downward



Used to grip 15° angled surfaces while keeping the clamp parallel.
Example Ordering Data:

GRM1TS-2-50 **blank** -50 **blank** -LAA **-TA077** **-TB077**

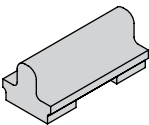
TIP OPTION		MATERIAL THICKNESS (mm)	TIP COLOR		TIP STYLE		MOUNTING ORIENTATION
JAW A	JAW B		JAW A	JAW B	JAW A	JAW B	
TA077	TB077	0.50-1.00	black	black	15° diamond		upward
TA080	TB080						downward
TA077	TB078	1.01-1.50	black	silver	15° diamond		upward
TA080	TB081						downward
TA078	TB078	1.51-2.25	silver	silver	15° diamond		upward
TA081	TB081						downward
TA078	TB079	2.26-3.00	silver	gold	15° diamond		upward
TA081	TB082						downward
TA079	TB079	3.01-3.75	gold	gold	15° diamond		upward
TA082	TB082						downward



Used to grip the inside of a drawbead (curved channel).
Example Ordering Data:

GRM1TS-2-50 **blank** -50 **SDB** -LAA **-TA083**

TIP OPTION		MATERIAL THICKNESS (mm)	TIP COLOR		TIP STYLE	
JAW A	JAW B		JAW A	JAW B	JAW A	JAW B
TA083	SDB	0.25-1.50	black	black	bead	diamond
TA083	SDG	1.51-2.50	black	gold	bead	diamond



Used to grip the inside of a drawbead (curved channel).
Example Ordering Data:

GRM1TS-2-50 **blank** -50 **DDB** -LAA **-TA084**

TIP OPTION		MATERIAL THICKNESS (mm)	TIP COLOR		TIP STYLE	
JAW A	JAW B		JAW A	JAW B	JAW A	JAW B
TA084	DDB	0.25-1.50	black	black	bead	diamond
TA084	DDG	1.51-2.50	black	gold	bead	diamond

PRICE ADDERS OR REPLACEMENT KIT NUMBERS AND PRICES IF ORDERED SEPARATELY

TIP OPTION	KIT NUMBER	TIP COLOR	TIP STYLE	LIST PRICE
Tx063	71231-03	black	cone	\$35.70
Tx065	71231-05	gold	cone	\$35.70

Kit includes: 1 tip and 1 screw

TIP OPTION	KIT NUMBER	TIP COLOR	TIP STYLE	LIST PRICE
Tx071 or Tx074	71229-03	black	15° diamond	\$56.35
Tx072 or Tx075	71229-04	silver	15° diamond	\$56.35
Tx073 or Tx076	71229-05	gold	15° diamond	\$56.35

Kit includes: 1 tip and 1 screw

TIP OPTION	KIT NUMBER	TIP COLOR	TIP STYLE	LIST PRICE
Tx077 or Tx080	71229-06	black	15° diamond	\$61.10
Tx078 or Tx081	71229-07	silver	15° diamond	\$62.35
Tx079 or Tx082	71229-08	gold	15° diamond	\$61.10

Kit includes: 1 tip and 1 screw

TIP OPTION	KIT NUMBER	TIP COLOR	TIP STYLE	LIST PRICE
Tx083	75646-03	black	draw bead	\$71.75

Kit includes: 1 tip and 1 screw

TIP OPTION	KIT NUMBER	TIP COLOR	TIP STYLE	LIST PRICE
Tx084	75646-04	black	draw bead	\$71.75

Kit includes: 1 tip and 1 screw

LEGEND: **SHADED CODES** are required for this option. **BORDERED CODES** will normally be ordered.

SEAL OPTION: SERIES GRM CLAMP SIZE 1

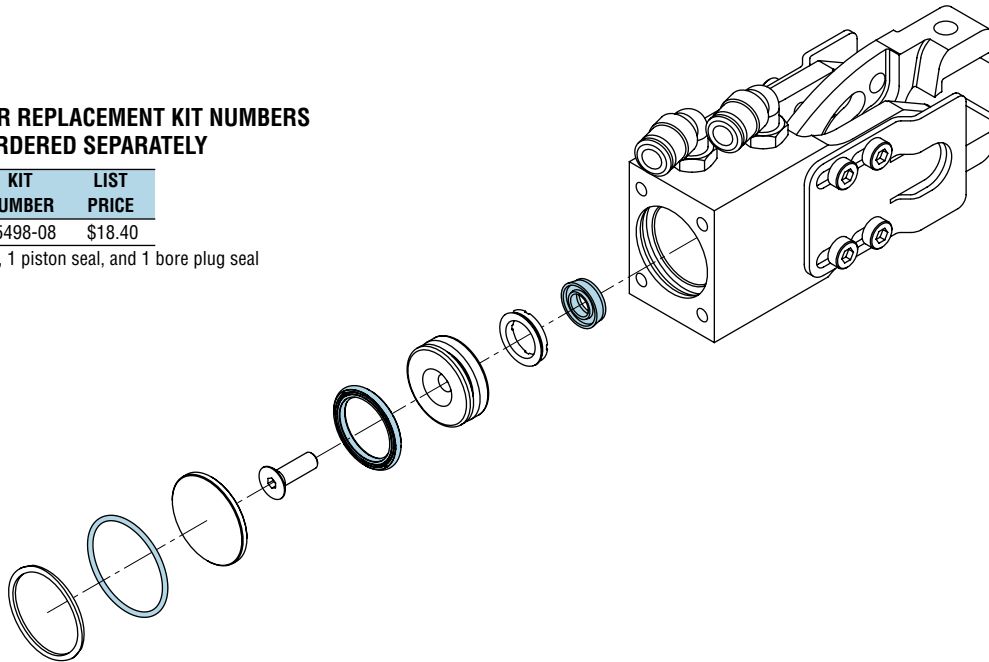
V2 FLUORO-ELASTOMER SEALS FOR FLUID COMPATIBILITY

This option provides a Series GRM Clamp with fluoro-elastomer seals that are compatible with certain fluids. Seal compatibility should be checked with the fluid manufacturer for proper application. ***This option is not for high temperature applications.*** Consult PHD Clamp Division for high temperature applications.

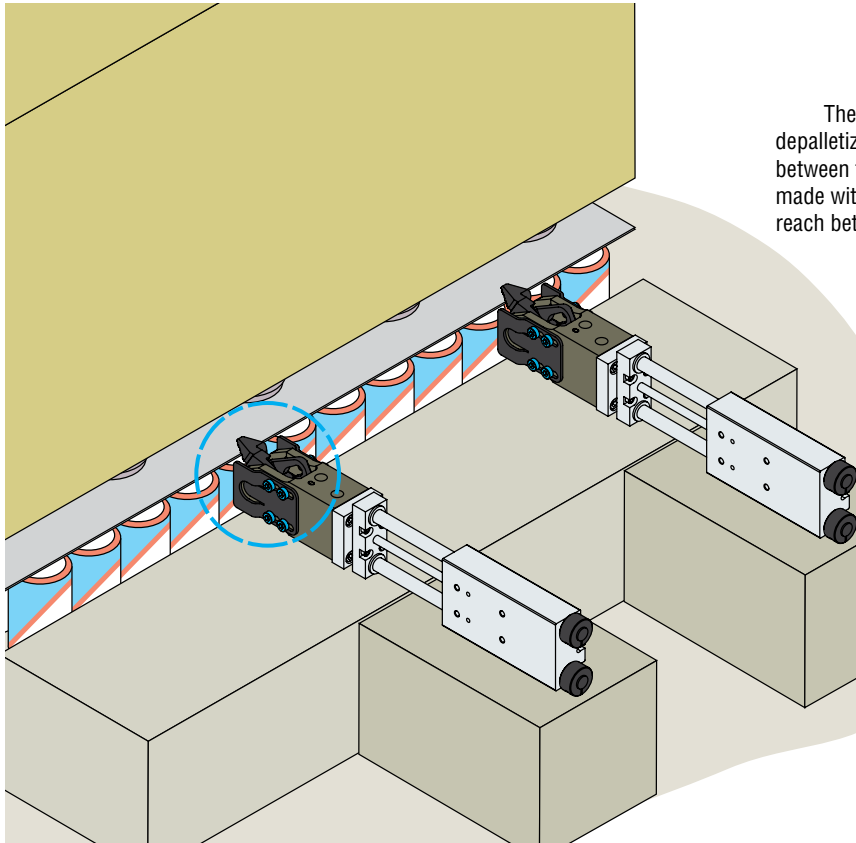
PRICE ADDERS OR REPLACEMENT KIT NUMBERS AND PRICES IF ORDERED SEPARATELY

SEAL OPTION	KIT NUMBER	LIST PRICE
V2	65498-08	\$18.40

Kit includes: 1 rod seal, 1 piston seal, and 1 bore plug seal



APPLICATION EXAMPLES: SERIES GRM CLAMP SIZE 1



The slide extends the clamp into and out of the depalletizing machine where the clamp grabs the slip sheet between the layers of cans. Specialized “needlenose” jaws were made with a tapered profile and smooth edges so they could reach between the cans without damaging them.



Series GRM1 Clamps transfer washing machine instrument panels during a stamping process. Features like compact size, light weight, and competitive pricing make these clamps ideal for your workholding applications.

