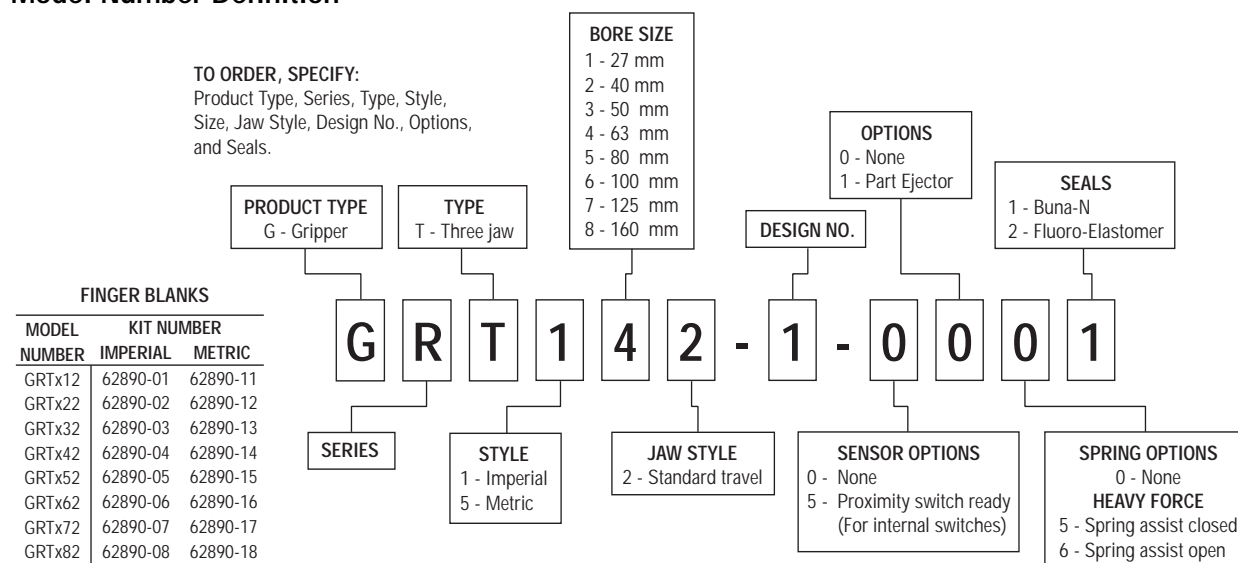


phd SERIES GRT 3 JAW PARALLEL GRIPPERS INFORMATION SHEET

IMPORTANT DOCUMENTATION DO NOT DISCARD!

Use this information sheet to assist with gripper installation and setup.
File with maintenance or machine documentation.

Model Number Definition



INTERNAL PROXIMITY SWITCHES

GRIPPER SIZE	SWITCH DESCRIPTION	PART NO.
GRTx1, 2, 3, 4, & 5	4 mm Round NPN (Sink)	18430-001-02
	4 mm Round PNP (Source)	18430-002-02
GRTx6, 7, & 8	8 mm Threaded NPN (Sink)	51422-005-02
	8 mm Threaded PNP (Source)	51422-006-02

INTERNAL PROXIMITY SWITCH TARGET KITS

DIRECTION	KIT NUMBER							
	GRTx1x	GRTx2x	GRTx3x	GRTx4x	GRTx5x	GRTx6x	GRTx7x	GRTx8x
JAWS OPENING	62805-05	62805-01	62805-02	62805-02	62805-02	62805-03	62805-04	62805-04
JAWS CLOSING	62806-06	62806-01	62806-01	62806-02	62806-03	62806-04	62806-05	62806-05

Kit includes: 1 Proximity Target, 1 Proximity Adjustment Screw, 2 Target Adjustment Screws

EXTERNAL PROXIMITY SWITCHES

GRIPPER SIZE	SWITCH DESCRIPTION	PART NO.
GRTx1, 2, 3, 4, & 5	8 mm Threaded NPN (Sink)	51422-005-02
	8 mm Threaded PNP (Source)	51422-006-02
GRTx6, 7, & 8	12 mm Threaded NPN (Sink)	15561-001
	12 mm Threaded PNP (Source)	15561-002
	12 mm Threaded AC 20-250 VAC	15561-003

EXTERNAL PROXIMITY SWITCH MOUNTING BRACKETS

KIT NUMBER							
GRTx1x	GRTx2x	GRTx3x	GRTx4x	GRTx5x	GRTx6x	GRTx7x	GRTx8x
61552-01	61552-02	61552-03	61552-04	61552-05	61552-06	61552-07	61552-08

CUSTOM PRODUCTS

A model number "ML-xxxxx" indicates the unit is a custom product. Contact your local distributor or PHD, Inc. for a complete product description.

For additional technical assistance, call:

phd, Inc.

P.O. Box 9070, Fort Wayne, IN 46899
1-800-624-8511

ENGINEERING DATA: SERIES GRT GRIPPERS

PRESSURE RATINGS

Operating pressure is 30 psi [2 bar] minimum to 100 psi [7 bar] maximum for standard units and 60 psi [4 bar] minimum to 100 psi [7 bar] maximum for spring assist units.

SEALS AND FLUIDS

Buna-N and Nitrile seals are standard on all Series GRT Grippers. Piston seals are long life Nitrile and rod seals are lip type. Both are compatible with standard paraffin-based lubrication oils used for pneumatic cylinders. For compatibility with other fluids, consult PHD.

TEMPERATURE LIMITS

Seals and gripper mechanism are designed for use in ambient temperatures from -20° to 180°F [-30° to 82°C]. For higher temperatures, consult PHD.

LIFE EXPECTANCY

All standard units with Buna-N and Nitrile seals have been designed for a minimum of 10 million trouble free cycles, with minimal seal wear and backlash.

INTERNAL SPRINGS

Internal springs are intended to assist the gripper and add to grip force in one specific direction. They can be used to open or close the gripper without pneumatic pressure or to maintain spring grip force if pressure is lost. Spring life in excess of 1.5 million cycles can be expected.

START-UP PROCEDURES

Gripper should be securely mounted with all tooling and external flow control devices attached prior to applying pressure to unit. Care should be taken to provide adequate clearance for the jaws to open and close. At initial start-up, apply pressure slowly to the unit.

PART EJECTOR SPRINGS

Spring life in excess of 5 million cycles can be expected for the part ejector springs.

LUBRICATION

Seals and gripper mechanism are lubricated at the factory for service under normal operating conditions.

MATERIAL

Gripper body and piston are made of hardcoated aluminum. Jaws and operating mechanism are manufactured from hardened steel.

SPECIAL GRIPPERS

Grippers for special applications, severe duty, or constructed of special materials are available. Consult PHD.

REPEATABILITY

Grip repeatability is within .002 inch [0.05 mm] of original centered position.

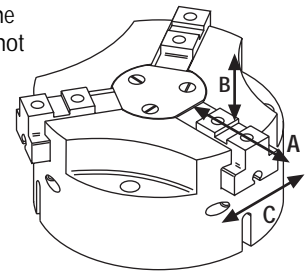
BACKLASH

Jaw backlash in the (A) direction will not exceed .010 in [0.24 mm] per jaw.

Total clearance between the parallel jaws and the body will not exceed the following figures:

(B) .003 in [0.075 mm]

(C) .0027 in [0.068 mm]



OPTIONS/ACCESSORIES: SERIES GRT GRIPPERS

5

PROXIMITY SWITCH READY-INTERNAL

This option equips the gripper with sleeves to provide for the mounting of up to three round proximity switches. Target Kits and

Proximity Switches are ordered separately. See Switches and Sensors section in PHD's main catalog for complete switch specifications. Adjustable positioning target assembly protected under U.S. Patent No. 6019409

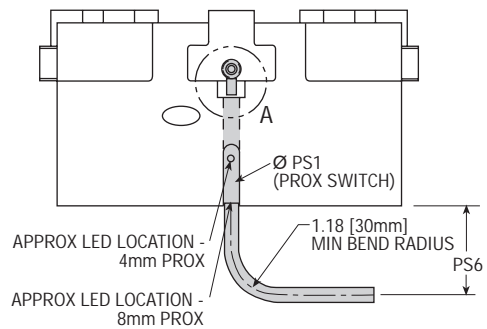
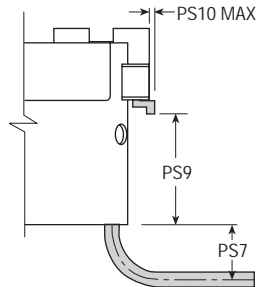
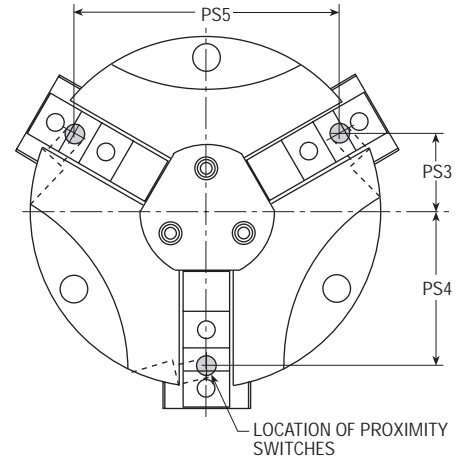
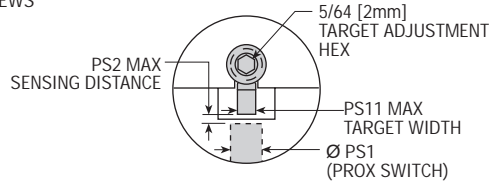
LETTER DIM	MODEL NUMBER															
	GRTx1x		GRTx2x		GRTx3x		GRTx4x		GRTx5x		GRTx6x		GRTx7x		GRTx8x	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
PS1	4mm ROUND		4mm ROUND		4mm ROUND		4mm ROUND		4mm ROUND		8mm THREADED		8mm THREADED		8mm THREADED	
PS2	.020	.5	.020	.5	.020	.5	.020	.5	.020	.5	.030	.76	.030	.76	.030	.76
PS3	.388	9.86	.527	13.37	.620	15.75	.778	19.75	.945	24.0	1.181	30.0	1.447	36.75	1.821	46.25
PS4	.775	19.69	1.053	26.75	1.240	31.5	1.555	39.5	1.890	48.0	2.362	60.0	2.894	73.5	3.642	92.5
PS5	1.342	34.09	1.824	46.33	2.148	54.55	2.693	68.41	3.273	83.13	4.091	103.91	5.012	127.30	6.307	160.20
PS6	1.21	30.7	1.42	36.0	1.22	31.0	1.18	30.0	1.18	30.0	1.38	35.0	1.14	29.0	1.18	30.0
PS7	1.21	30.7	1.42	36.0	1.22	31.0	1.04	26.5	.83	21.0	1.38	35.0	1.14	29.0	.81	20.5
PS9	.555	14.1	.773	19.6	.971	24.7	1.147	29.1	1.364	34.6	1.524	38.7	1.760	44.7	2.095	53.2
PS10	.030	.75	.030	.75	.030	.75	.030	.75	.060	1.5	.167	4.25	.276	7.0	.404	10.25
PS11	.157	4.0	.157	4.0	.157	4.0	.157	4.0	.157	4.0	.315	8.0	.315	8.0	.315	8.0

NOTES: 1) (PS10) THE PROX TARGET MAY EXTEND OUT OF THE JAW WHEN THE JAWS CLOSE. TARGET IS ADJUSTED TO SENSE LESS THAN .039 [1mm] MOVEMENT FROM THE FULL CLOSED POSITION
2) JAWS SHOWN IN FULL OPEN POSITION

SENSING DIRECTION	TARGET KIT NUMBER							
	GRTx1x	GRTx2x	GRTx3x	GRTx4x	GRTx5x	GRTx6x	GRTx7x	GRTx8x
JAWS OPENING	62805-05	62805-01	62805-02	62805-02	62805-02	62805-03	62805-04	62805-04
JAWS CLOSING	62806-06	62806-01	62806-01	62806-02	62806-03	62806-04	62806-05	62806-05

EACH KIT WILL MOUNT ONE SWITCH.

KIT INCLUDES: 1 PROXIMITY TARGET, 1 PROXIMITY ADJUSTMENT SCREW, 2 TARGET ADJUSTMENT SCREWS



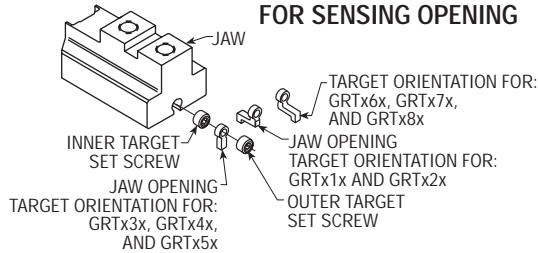
4 mm ROUND INDUCTIVE PROXIMITY SWITCHES

PART NUMBER	DESCRIPTION
18430-001-02	NPN (Sink) 10-30 VDC, 2 meter cable
18430-002-02	PNP (Source) 10-30 VDC, 2 meter cable

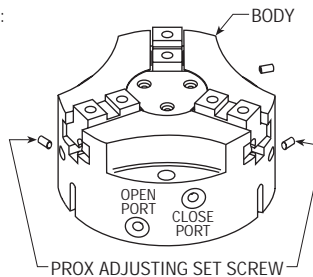
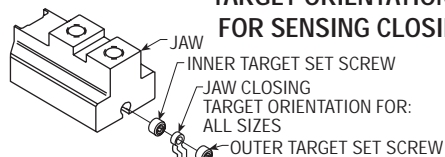
8 mm THREADED INDUCTIVE PROXIMITY SWITCHES

PART NUMBER	DESCRIPTION
51422-005-02	NPN (Sink) 5-30 VDC, 2 meter cable
51422-006-02	PNP (Source) 5-30 VDC, 2 meter cable

TARGET ORIENTATION FOR SENSING OPENING



TARGET ORIENTATION FOR SENSING CLOSING



PROCEDURE FOR ADJUSTING PROX TARGET

- 1) Loosen outer target set screw, by turning counter-clockwise, until seat is broken (set screw can turn freely).
- 2) Continue to turn target set screw counter-clockwise until wrench can slide through inner target set screw (1/6 turn or less).
- 3) Adjust target in by turning inner and outer target set screws clockwise or out by turning inner and outer target set screws counter-clockwise.
- 4) When target is in approximately the correct location, pull the wrench out of inner target set screw and turn outer target set screw clockwise until firmly seated.

All dimensions are reference only unless specifically tolerated.

ACCESSORIES: SERIES GRT GRIPPERS

PROXIMITY SWITCHES - EXTERNAL

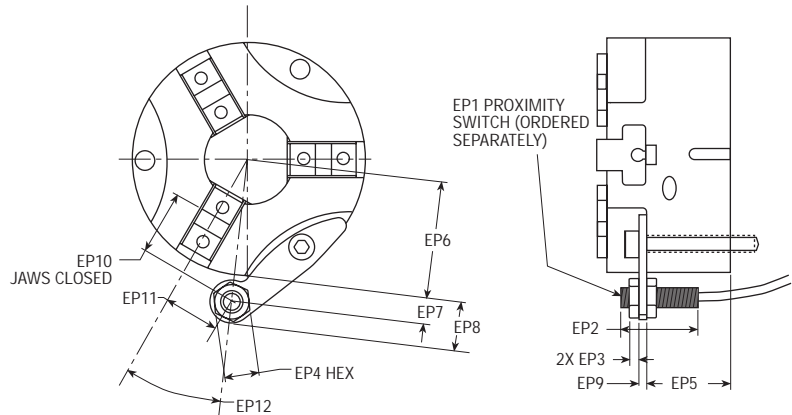
This accessory provides for the external mounting of round metal sensing proximity switches. Up to six switches may be mounted using multiple brackets. The user is required to design and

mount targets for the switch to sense. Proximity Switches are ordered separately. See Switches and Sensors section in PHD's main catalog for complete switch specifications.

LETTER DIM	MODEL NUMBER															
	GRTx1x		GRTx2x		GRTx3x		GRTx4x		GRTx5x		GRTx6x		GRTx7x		GRTx8x	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
EP1	8mm THREADED		8mm THREADED		8mm THREADED		8mm THREADED		8mm THREADED		12mm THREADED		12mm THREADED		12mm THREADED	
EP2	1.772	45.0	1.772	45.0	1.772	45.0	1.772	45.0	1.772	45.0	2.362	60.0	2.362	60.0	2.362	60.0
EP3	.157	4.0	.157	4.0	.157	4.0	.157	4.0	.157	4.0	.157	4.0	.157	4.0	.157	4.0
EP4	.512	13.0	.512	13.0	.512	13.0	.512	13.0	.512	13.0	.669	17.0	.669	17.0	.669	17.0
EP5	.748	19.0	.905	23.0	1.103	28.0	1.279	32.5	1.496	38.0	1.732	44.0	1.968	50.0	2.303	58.5
EP6	.925	23.5	1.221	31.0	1.418	36.0	1.772	45.0	2.087	53.0	2.638	67.0	3.170	80.5	3.977	101.0
EP7	.377	9.6	.413	10.5	.419	10.6	.403	10.25	.443	11.25	.512	13.0	.492	12.5	.515	13.1
EP8	.702	17.8	.738	18.75	.744	18.9	.728	18.5	.768	19.5	.935	23.75	.915	23.25	.938	23.8
EP9	.060	1.5	.105	2.7	.105	2.7	.105	2.7	.105	2.7	.105	2.7	.105	2.7	.105	2.7
EP10	.483	12.3	.693	17.6	.817	20.8	.983	25.0	1.077	27.4	1.433	36.4	1.522	38.7	1.944	49.4
EP11	.648	16.5	.689	17.5	.688	17.5	.836	21.2	.968	24.6	1.207	30.7	1.401	35.6	1.723	43.8
EP12	30°	30°	25°	25°	22.0°	22.0°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°

MOUNTING BRACKETS

PART NUMBER	BRACKET NUMBER
GRTx12	61552-01
GRTx22	61552-02
GRTx32	61552-03
GRTx42	61552-04
GRTx52	61552-05
GRTx62	61552-06
GRTx72	61552-07
GRTx82	61552-08



12 mm THREADED INDUCTIVE PROXIMITY SWITCHES

PART NUMBER	DESCRIPTION
15561-001	NPN (Sink) 24 VDC, 3 meter cable
15561-002	PNP (Source) 24 VDC, 3 meter cable
15561-003	AC 117 VAC, 3 meter cable

8 mm THREADED INDUCTIVE PROXIMITY SWITCHES

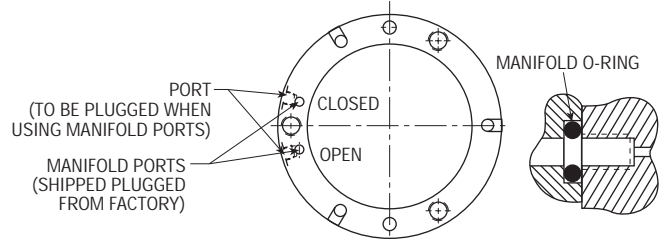
PART NUMBER	DESCRIPTION
51422-005-02	NPN (Sink) 5-30 VDC, 2 meter cable
51422-006-02	PNP (Source) 5-30 VDC, 2 meter cable

MANIFOLD SEAL KIT

All Series GRT grippers have manifold porting as standard. Port plugs must first be removed when using this feature.

MANIFOLD KIT INCLUDES

2 PORT PLUGS
2 MANIFOLD O-RING SEALS



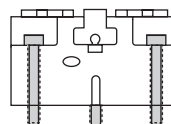
	MODEL NUMBER															
	GRT112	GRT512	GRT122	GRT522	GRT132	GRT532	GRT142	GRT542	GRT152	GRT552	GRT162	GRT562	GRT172	GRT572	GRT182	GRT582
KIT NUMBER: (STD SEALS)	61553-01-1	61553-05-1	61553-01-1	61553-05-1	61553-01-1	61553-05-1	61553-02-1	61553-06-1	61553-03-1	61553-07-1	61553-04-1	61553-08-1	61553-04-1	61553-08-1	61553-04-1	61553-08-1
(FLUORO-ELASTOMER SEALS)	61553-01-2	61553-05-2	61553-01-2	61553-05-2	61553-01-2	61553-05-2	61553-02-2	61553-06-2	61553-03-2	61553-07-2	61553-04-2	61553-08-2	61553-04-2	61553-08-2	61553-04-2	61553-08-2
O-RING SIZE	.157 ID x .059 CS	4.0 ID x 1.5 CS	.157 ID x .059 CS	4.0 ID x 1.5 CS	.157 ID x .059 CS	4.0 ID x 1.5 CS	.197 ID x .059 CS	5.0 ID x 1.5 CS	.197 ID x .059 CS	5.0 ID x 1.5 CS	2.36 ID x .059 CS	6.0 ID x 1.5 CS	2.36 ID x .059 CS	6.0 ID x 1.5 CS	2.36 ID x .059 CS	6.0 ID x 1.5 CS

All dimensions are reference only unless specifically tolerated.

ACCESSORIES & ASSEMBLY INSTRUCTIONS

GRIPPER MOUNTING KIT

Gripper mounting kits are available. The kit includes three socket head cap screws.



STANDARD UNIT	MODEL NUMBER														
	GRT112	GRT512	GRT122	GRT522	GRT132	GRT532	GRT142	GRT542	GRT152	GRT552	GRT162	GRT562	GRT172	GRT572	GRT182
KIT NUMBER	61620-01	62813-01	61620-02	62813-02	61620-03	62813-03	61620-04	62813-04	61620-05	62813-05	61620-06	62813-06	61620-07	62813-07	61620-08
FASTENER (SHCS)	5-40 x 1-1/4	M3 x 0.5 x 25	8-32 x 1-1/4	M4 x 0.7 x 30	10-24 x 1-1/2	M5 x 0.8 x 40	1/4-20 x 1-3/4	M6 x 1.0 x 45	1/4-20 x 2	M6 x 1.0 x 50	5/16-18 x 2-1/4	M8 x 1.25 x 50	5/16-18 x 2-1/2	M8 x 1.25 x 65	3/8-16 x 3

SPRING ASSIST UNIT	MODEL NUMBER														
	GRT112	GRT512	GRT122	GRT522	GRT132	GRT532	GRT142	GRT542	GRT152	GRT552	GRT162	GRT562	GRT172	GRT572	GRT182
KIT NUMBER	64128-01	64129-01	64128-02	64129-02	64128-03	64129-03	64128-04	64129-04	64128-05	64129-05	64128-06	64129-06	64128-07	64129-07	64128-08
FASTENER (SHCS)	6-32 x 1-1/4	M3 x 0.5 x 30	8-32 x 1-1/2	M4 x 0.7 x 35	10-24 x 1-3/4	M5 x 0.8 x 45	1/4-20 x 2	M6 x 1.0 x 50	1/4-20 x 2-1/2	M6 x 1.0 x 60	5/16-18 x 2-3/4	M8 x 1.25 x 62	5/16-18 x 3	M8 x 1.25 x 75	3/8-16 x 3-1/2

PHD, Inc. makes no warranty as to the fitness of its products or as to the length of service life after being prepared or parts replaced by anyone other than authorized employees of PHD, Inc. In no event shall PHD, Inc. be liable for loss of profits, in direct, consequential, or incidental damages arising out of the use of PHD® Products.

DISASSEMBLY OF A STANDARD GRT GRIPPER

1. **Warning:** All air pressure in the unit must be relieved prior to disassembly of gripper.
2. On the bottom of the gripper, remove bore plug retaining ring (Figure 1).
3. Remove bore plug (note orientation) and bore plug seal.
4. Remove the piston fastener and piston from the unit.
5. When removing the piston seal from the piston, be careful not to damage the sealing surfaces.
6. From the top of the gripper remove the 3 cover fasteners and the cover (Figure 2).
7. Slowly move the jaws in the open direction until the center cam can be lifted out of the body. Remove the cam. **Be careful to prevent damage to the edges of the cam and gripper jaws.**
8. Remove the jaws from the body.
9. The rod seal is located in the center bore of the body and can be removed from the bottom of the gripper. Note orientation of the rod seal (Figure 1).
10. Clean and inspect all components. Excessively damaged or worn components should be replaced.

DISASSEMBLY OF A SPRING CLOSED GRT GRIPPER

1. **Warning:** All air pressure in the unit must be relieved prior to disassembly of gripper.
2. Unscrew fasteners from the cap of the gripper and remove the cap. Also remove the bore plug seal from the groove in the body. Note the location of the seal for re-installation.
3. On **Spring Closed Units** PHD suggests using a clamping device to keep the **piston** compressed while removing the piston fastener. After the piston fastener is removed, **GRADUALLY** release the compression of the piston. After the piston is removed, the spring(s) may be easily removed.
4. Complete steps 5-10 of **Standard GRT Gripper Disassembly**.

DISASSEMBLY OF A SPRING OPEN GRT GRIPPER

1. **Warning:** All air pressure in the unit must be relieved prior to disassembly of gripper.
2. On **Spring Open Units** PHD suggests using a clamping device to keep the cap compressed while removing the fasteners. After fasteners are removed, **GRADUALLY** release the compression of the cap. After the cap is removed, the spring(s) may be easily removed.
3. Remove bore plug seal, noting location in the body.
4. Complete steps 4-10 of **Standard GRT Gripper Disassembly**.

RE-ASSEMBLY OF A STANDARD GRT GRIPPER

1. Be careful to prevent cutting or damaging seals during re-assembly.
2. In general, use a petroleum-based lubricant/grease (compatible with pneumatic devices) to lubricate the **internal** parts of the GRT gripper. However, for lubrication of the body jaw slots, jaws, and the cam, it is recommended that you use a heavier petroleum-based lubricant.
3. Use removable thread locker on all fasteners.
4. Pre-lubricate rod seal cavity and install the rod seal. Orientation of the rod seal is critical (Figure 1).
5. Refer to Step 2 for description of lubricants. Lubricate each body jaw slot, jaw, and lobes on the cam with the heavier lubricant. Lubricate the round shank of the cam with the lighter petroleum-based lubricant.
6. After each part is lubricated, insert each jaw halfway into a slot. Next, insert the cam into the center of the body so that each cam lobe rests on the top of a jaw. Slowly pull the jaws out so the cam lobes slip into the grooves in the jaws. Once the cam and the jaws are engaged, push the jaws to the fully closed position.
7. Position the cover in the spot face provided in the top of the body. Insert the fasteners into the cover. Torque cover fasteners finger tight.
8. Lightly lubricate the piston seal and install it in the groove on the piston.
9. Lubricate the gripper bore and insert the piston, noting proper orientation.
10. Install the piston fastener through the piston and into the cam and torque per the table on page 6.
11. Lubricate the bore plug seal groove and install the seal in the groove closest to the gripper bore (Figure 1).
12. Press the bore plug into the body of the gripper and then install the bore plug retaining ring. Care should be taken to insure that the retaining ring is properly seated in the groove in the body.
13. See start-up procedures on page 2.

ASSEMBLY INSTRUCTIONS: SERIES GRT GRIPPERS

RE-ASSEMBLY OF A SPRING CLOSED GRT GRIPPER

1. Complete steps 1-9 of **Standard GRT Gripper Re-assembly**.
2. Lightly lubricate spring cavity(ies) in the piston.
3. Lubricate the gripper bore piston sealing surface and the area where the spring(s) contact the body.
4. Place piston with bottom down on a flat, clean surface. Place spring(s) into piston cavity(ies). Carefully set gripper on top of spring(s). It may be necessary to compress the spring(s) in order to install the piston fastener (Figure 3). Torque piston fastener per the table below.
5. Lubricate the bore plug seal groove and install the seal in the groove closest to the gripper bore (Figure 3).
6. Lightly lubricate the outside rim (sealing surface) on the cap that is inserted into the body of the gripper. Lightly lubricate the manifold mount o-rings and place them over the manifold holes. Press the cap into place on the bottom of the gripper, noting proper alignment of holes with the body. Install the cap assembly screws and torque per the table below.
7. See start-up procedures on page 2.

RE-ASSEMBLY OF A SPRING OPEN GRT GRIPPER

1. Complete steps 1-9 of **Standard GRT Gripper Re-assembly**.
2. Lubricate the gripper bore and insert the piston with the spring cavity(ies) facing the bottom of the gripper.
3. Install the piston fastener through the piston and into the cam and torque per the table below.
4. Lubricate the bore plug seal groove and install the seal in the groove closest to the gripper bore. (Figure 4)
5. Lightly lubricate spring cavity(ies) in the piston and insert spring(s).
6. Lightly lubricate the inside of the cap where the spring(s) contact and the outside rim (sealing surface) that is inserted into the body of the gripper. Lightly lubricate the manifold mount o-rings and place them over the manifold holes. Place cap on bottom of gripper, noting proper alignment of holes with the body. Compress cap on the unit, install cap assembly screws and torque per the table below.
7. See start-up procedures on page 2.

GRT GRIPPER ASSEMBLY TORQUES

PART DESCRIPTION	GRTx1x		GRTx2x		GRTx3x		GRTx4x		GRTx5x		GRTx6x		GRTx7x		GRTx8x	
	in-lb	N-m	in-lb	N-m	in-lb	N-m	in-lb	N-m	in-lb	N-m	in-lb	N-m	in-lb	N-m	in-lb	N-m
PISTON FASTENER	25	2.8	85	9.6	85	9.6	200	22.5	400	45.0	700	78.8	700	78.8	1000	112.6
CAP ASSEMBLY SCREWS	17	1.9	17	1.9	17	1.9	40	4.5	75	8.4	125	14.1	125	14.1	300	33.8

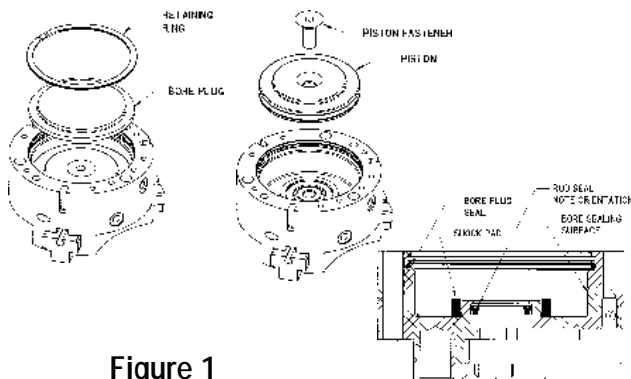


Figure 1

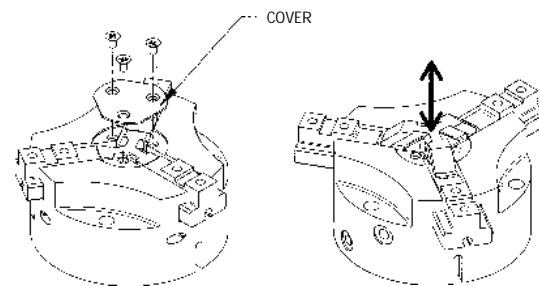


Figure 2

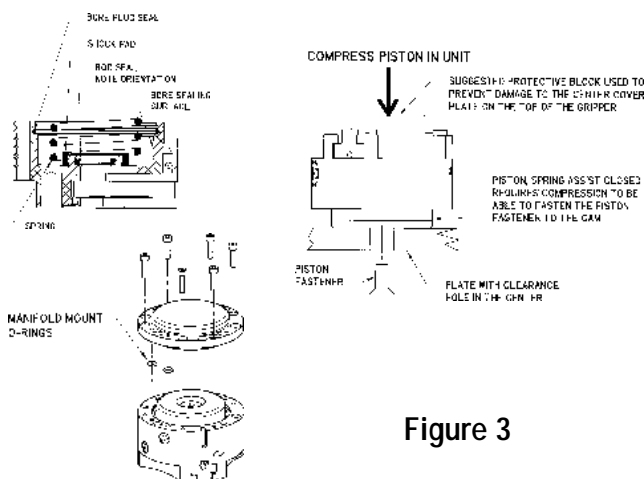


Figure 3

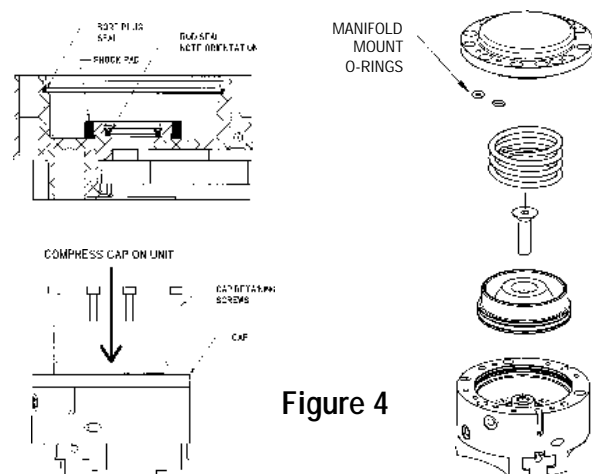


Figure 4

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