SERIES GRV DESIGN 5 GRIPPER INFORMATION SHEET

IMPORTANT INFORMATION DO NOT DISCARD!

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

ORDERING DATA

TO ORDER SPECIFY:
Product, Design No., Size, Minimum Total Jaw Opening, and any options required.

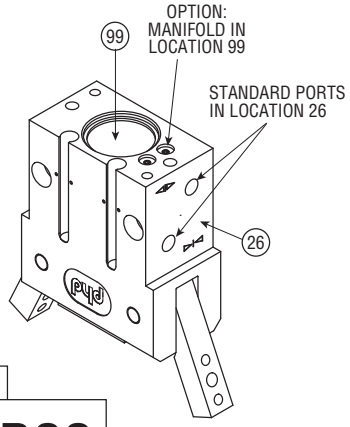
OPTIONS (Omit if not required)

MANIFOLD OPTION
L11-UB99 - Manifold option in location 99

MOUNTING OPTION
GR9 - Mounting flange in location 99

FLUID COMPATIBILITY
V1 - Fluoro-elastomer seals and lubricants

LUBRICATION
Y4 - Cleanroom grade lubricant



DESIGN NO.
5 - Metric

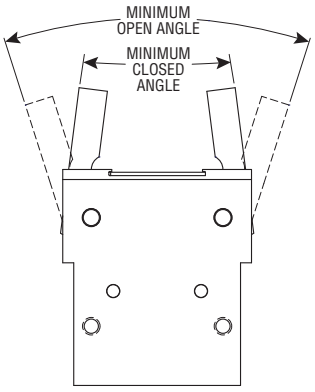
GRV - 5 - 6 x 40 - L11-UB99

PRODUCT
Small Profile Precision Jaw Movement Angular Gripper

PRODUCT SIZE	BORE SIZE		MINIMUM TOTAL JAW OPENING Total Opening Per Bore Size
	mm	inch	degrees
6	6	(.236)	40
10	10	(.394)	40
16	16	(.630)	40
20	20	(.787)	40

NOTES:
1) Design No. indicates metric mountings, dowel pin holes, and ports.
2) -V1 option may reduce gripper life. PHD recommends reducing tooling inertia to 60% of maximum values for optimal life.

MINIMUM JAW TRAVEL = MINIMUM OPEN ANGLE + MINIMUM CLOSED ANGLE



SERIES JC1SD MAGNETIC SWITCHES

PART NO.	SWITCH DESCRIPTION
JC1SDP-5	PNP (Source), Solid State, 10-30 VDC, 5 meter cable
JC1SDP-K	PNP (Source), Solid State, 10-30 VDC, Quick Connect
JC1SDN-5	NPN (Sink), Solid State, 10-30 VDC, 5 meter cable
JC1SDN-K	NPN (Sink), Solid State, 10-30 VDC, Quick Connect

Includes one switch and installation directions. Series JC1SD Switches only function on 16 and 20 mm units. Series 6790 Reed Switches are not applicable.

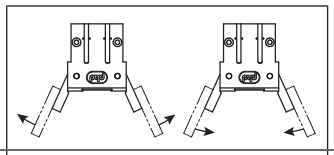
SERIES JC1ST 2 POSITION TEACHABLE MAGNETIC SWITCHES

PART NO.	SWITCH DESCRIPTION
JC1STP-2	PNP (Source), Solid State, 12-30 VDC, 2 meter cable
JC1STP-K	PNP (Source), Solid State, 12-30 VDC, Quick Connect

Includes one switch and installation directions.

ENGINEERING DATA: SERIES GRV GRIPPERS

SPECIFICATIONS	SERIES GRV ANGULAR GRIPPER
OPERATING AIR PRESSURE	1 bar min. - 8.3 bar max. [15 psi min. - 120 psi max.]
OPERATING TEMPERATURE	-28°C to +82°C [-20°F to 180°F]
GRIP REPEATABILITY	0.025 mm [± 0.001 inch] of original position
RATED LIFE	5 million cycles
LUBRICATION	Factory lubricated for rated life



SIZE	MINIMUM TOTAL JAW OPENING ANGLE	GRIP FORCE FACTOR INTERNAL AND EXTERNAL		GRIPPER WEIGHT		DISPLACEMENT		CLOSE OR OPEN TIME at 6 bar [87 psi]	MAXIMUM TOOLING LENGTH		MAXIMUM TOOLING INERTIA	
		METRIC	IMPERIAL	kg	lb	cm^3	in^3	sec	mm	in	$kg\text{-}mm^2$	$lb\text{-}in^2$
6	40°	13.7	0.0078	0.034	0.075	0.12	0.008	0.025	30	1.181	22.1	0.0753
10	40°	46	0.026	0.070	0.155	0.39	0.024	0.030	40	1.575	66.8	0.228
16	40°	179	0.102	0.141	0.311	1.31	0.080	0.040	60	2.362	255	0.870
20	40°	320	0.183	0.244	0.538	3.18	0.194	0.050	80	3.150	519	1.770

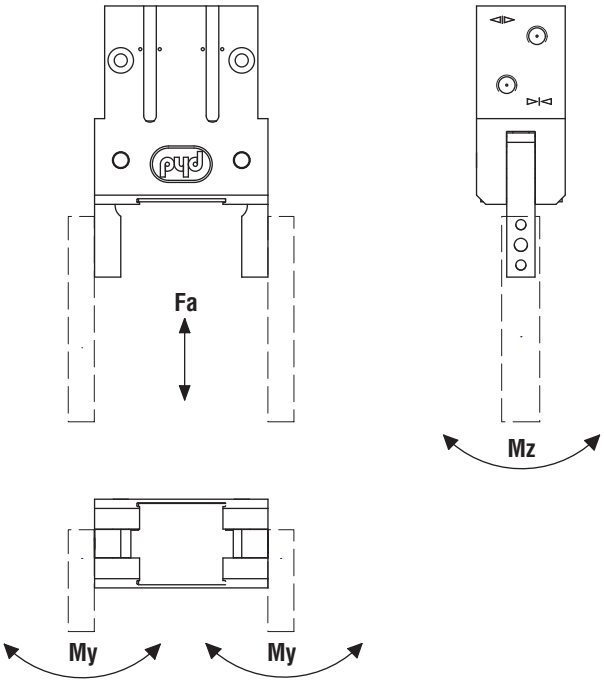
SIZE	AXIAL FORCE Fa		MAX. INDIVIDUAL MOMENTS My		Mz	
	N	lb	Nm	in-lb	Nm	in-lb
6	13	3	0.23	2.00	0.14	1.20
10	44	10	0.9	8.0	0.6	5.0
16	89	20	2.8	25	2.3	20
20	133	30	5.1	45	3.4	30

Fa: Total for both jaws

My: Maximum allowable moment per jaw, relative to the pivot pin

Mz: Maximum allowable moment per jaw, relative to the pivot pin

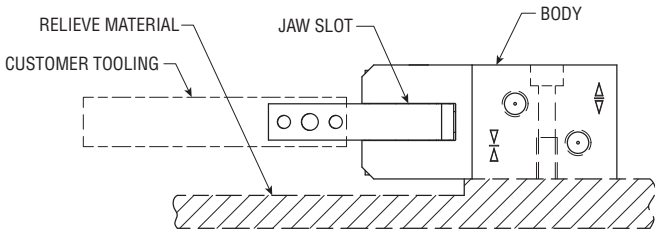
When calculating the value for Fa, include the tooling weight, part weight, external forces, and accelerations. When calculating values for My and Mz, include the grip force per jaw, tooling weight, part weight, external forces, and accelerations as applicable.



MOUNTING RECOMMENDATIONS

When mounting as shown below, PHD recommends relieving the material directly adjacent to the jaw slot.

When installing dowel pins into the jaws, make sure the jaw is fully supported to prevent transfer of excessive force to the gripper.



RECOMMENDATIONS

Design tooling so that the grip point is as close to the gripper surfaces as possible. The grip force factor (Gf) values given in the table above apply at 0° jaw angle only.

The maximum load that grippers can handle will vary based on: size of the part being picked up, shape of the part, texture of the part, speed at which the part is transferred, working pressure, shape of the fingers, etc.

START UP PROCEDURES

The gripper should be securely mounted with all tooling and external flow control devices attached prior to applying pressure to the 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.

SEALS AND FLUIDS

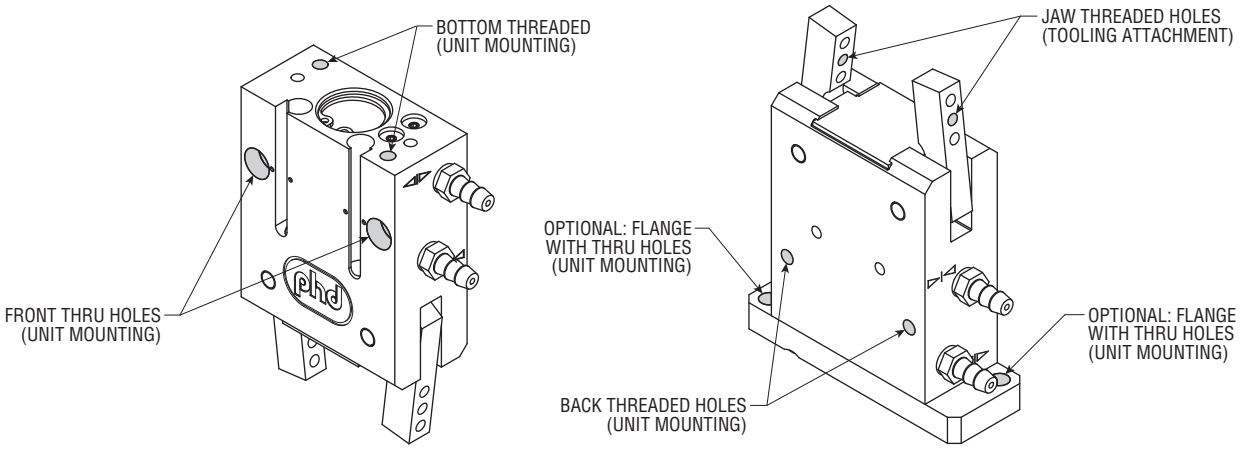
Long life seals are standard on all Series GRV Grippers. These seals are compatible with standard paraffin-based lubrication oils used for pneumatic cylinders. For compatibility with other fluids, consult PHD.

MOUNTING INFORMATION: SERIES GRV GRIPPERS

MAXIMUM RECOMMENDED MOUNTING TORQUES

MODEL NO.	2X JAW THREADS (TOOLING ATTACHMENT)		2X BODY BACK THREADS (UNIT MOUNTING)		2X BODY BOTTOM THREADS		2X BODY FRONT THRU HOLES (UNIT MOUNTING)		2X FLANGE THRU HOLES (UNIT MOUNTING)	
	in-lb	Nm	in-lb	Nm	in-lb	Nm	in-lb	Nm	in-lb	Nm
GRV-5-6	2	0.23	15	1.7	8	0.90	8	0.90	8	0.90
GRV-5-10	11	1.2	15	1.7	15	1.7	8	0.90	15	1.7
GRV-5-16	15	1.7	25	2.8	15	1.7	15	1.7	15	1.7
GRV-5-20	20	2.3	40	4.5	25	2.8	25	2.8	25	2.8

NOTES:
1) Assumes use of at least 75% of full thread depth
2) Assumes use of high strength steel socket head cap screws
3) PHD recommends use of threadlocker on mounting threads



SERIES JC1STP-x TEACHABLE SWITCH

Figure 1

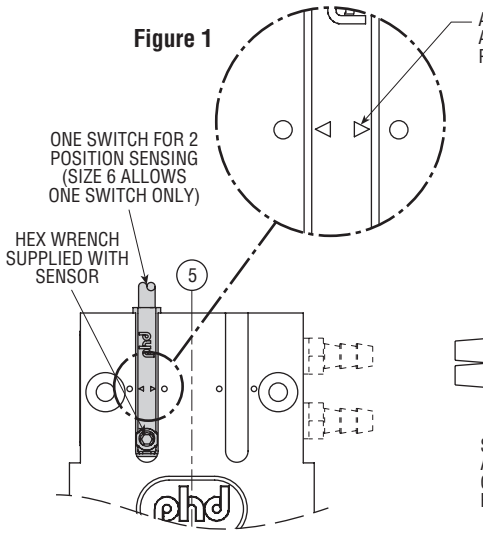
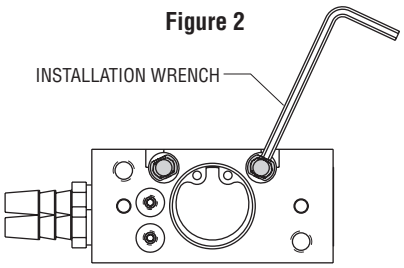


Figure 2



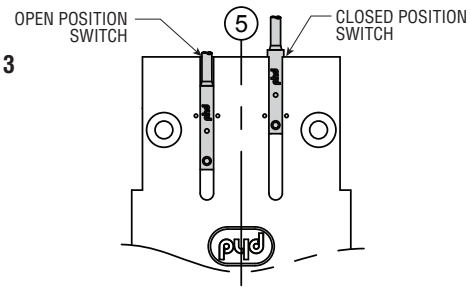
SIZE 6 AND 10 SWITCHES ARE INSTALLED AT AN ANGLE AS SHOWN. OFFSET SWITCH SLOTS CONTROL THE ROTATION. SWITCHES SLIDE IN FROM END.

INSTALLING SERIES JC1STP-x SWITCHES DO NOT EXCEED RECOMMENDED TORQUE SPECIFICATION

1) Insert the switch into the switch slot.
2) Take note of the ◁▷ symbol on the switch and carefully align the symbol as shown in Figure 1.
   NOTE: Sizes 6 and 10 switches are rotated as shown in Figure 2.
3) Torque the socket set screw to 14 in-oz [0.1 Nm].
4) Consult the JC1STP-x Information Sheet for the appropriate programming instructions.

SERIES JC1SDx-x SINGLE POSITION SWITCH

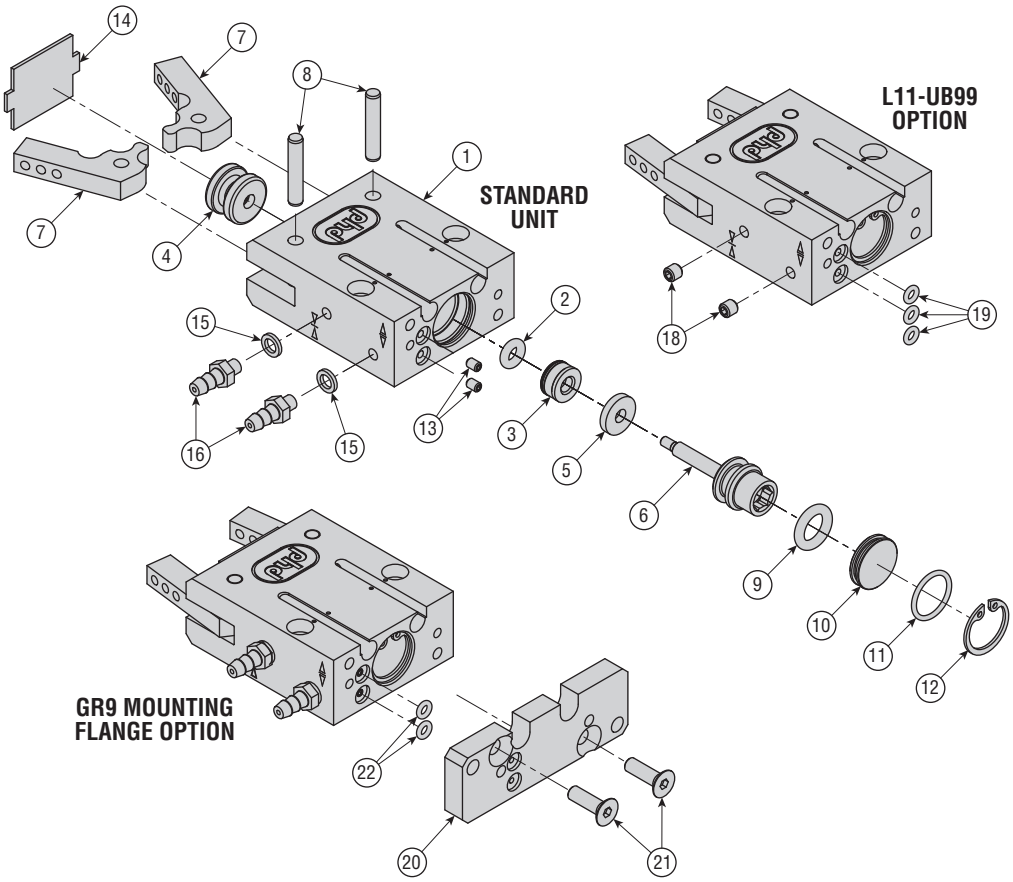
Figure 3



INSTALLING AND ADJUSTING SERIES JC1SDx-x SWITCHES (SIZES 6 & 20 ONLY)

1) Insert the switch into the switch slot.
2) Adjust on/off position per your requirements, see Figure 3.
3) Torque the socket set screw to 14 in-oz [0.1 Nm].

EXPLODED VIEW & PARTS LIST: SERIES GRV GRIPPERS



KEY	DESCRIPTION	PART NUMBER
1	Finished Body	Full unit description followed by -H2410
2	Rod Seal	Part of seal kit -H9000
3	Rod Seal Retainer	Part of seal kit -H9000
4	Driver	Full unit description followed by -H5610
5	Shock Pad	Full unit description followed by -H1800
6	Piston & Rod Assembly	Full unit description followed by -H1000
7	Jaw	Full unit description followed by -H2600
8	Dowel Pin (Jaw Pivot)	Full unit description followed by -H2621
9	Piston Seal	Part of seal kit -H9000
10	Bore Plug	Full unit description followed by -H3100
11	Bore Plug Seal	Part of seal kit -H9000
12	Retaining Ring	Full unit description followed by -H7101, or part of seal kit -H9000
13	Set Screw (Manifold Plug)	—
14	Jaw Slot Cover	—
15	Metric Barb Washer	Part of fitting kit -H2800
16	Metric Fitting Barb	Part of fitting kit -H2800
18	Set Screw (Port Plug)	Part of conversion kit -H9091
19	O-Ring Seal (Manifold)	Part of conversion kit -H9091, or part of seal kit -H9090
20	Mounting Flange	Part of flange kit -H9055
21	Mounting Flange To Body SFHCS	Part of flange kit -H9055
22	O-Ring Seal (Mounting Flange)	Part of flange kit -H9055, or part of seal kit -H9090

KITS

DESCRIPTION	MODEL NUMBER			
	GRV-X-6 x 40	GRV-X-10 x 40	GRV-X-16 x 40	GRV-X-20 x 40
Seal Kit	-H9000			
Flange Mounting Kit	-H9055			
Manifold Seal Replacement Kit	-H9090			
Manifold Conversion Kit	-H9091			
M3 Barb Fitting (Std)	-H2800			
M3 Barb Fitting (-V1)	-H2800			
M5 Barb Fitting (Std)	-H2800			
M5 Barb Fitting (-V1)	-H2800			

NOTE: -H codes must be used with full unit description. Example: GRV-5-10x40-V1-GR9-H9000 This ensures the correct configuration of components is provided.