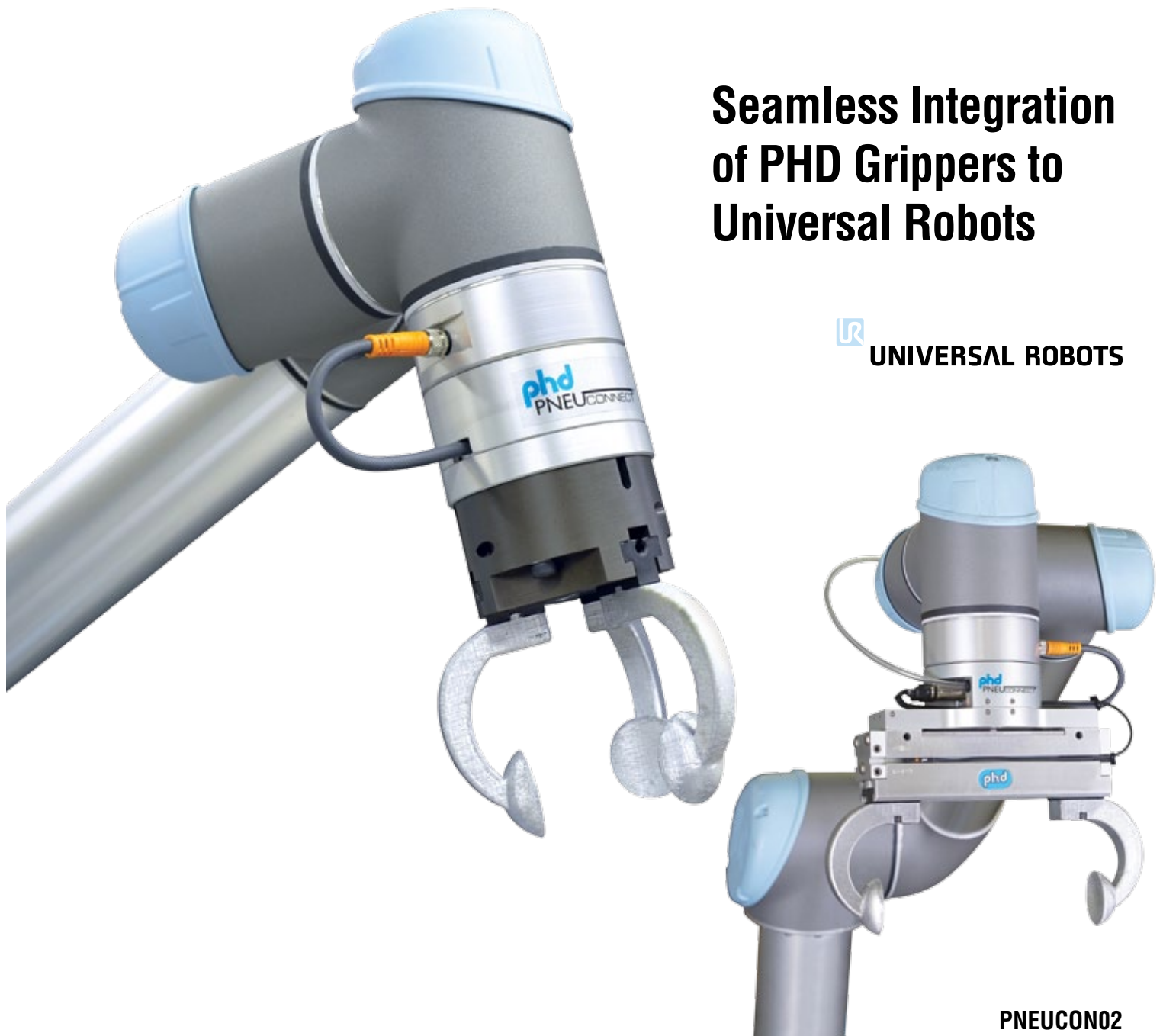


phd PNEUCONNECT™

Seamless Integration of PHD Grippers to Universal Robots


 UNIVERSAL ROBOTS



PNEUCON02



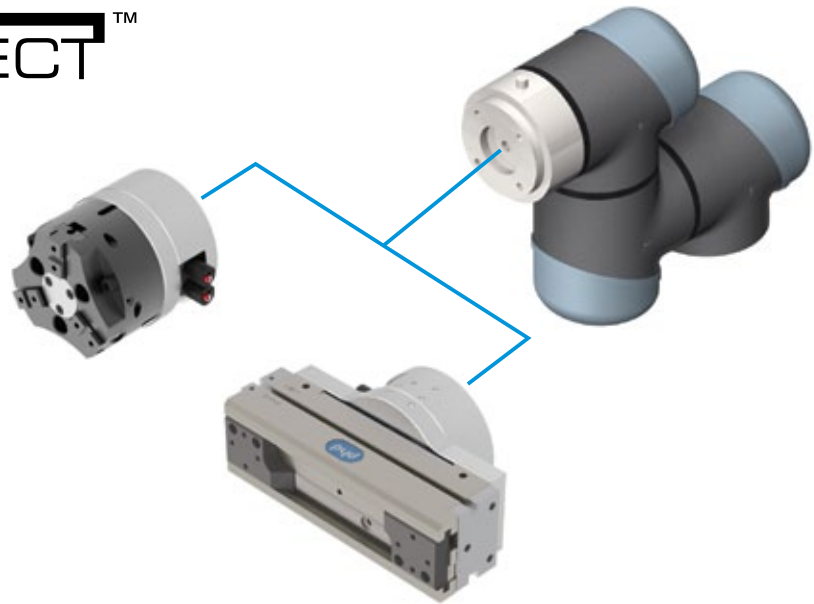
PHD is a member of the
MAC Distributor Network

phd® 
SOLUTIONS FOR INDUSTRIAL AUTOMATION

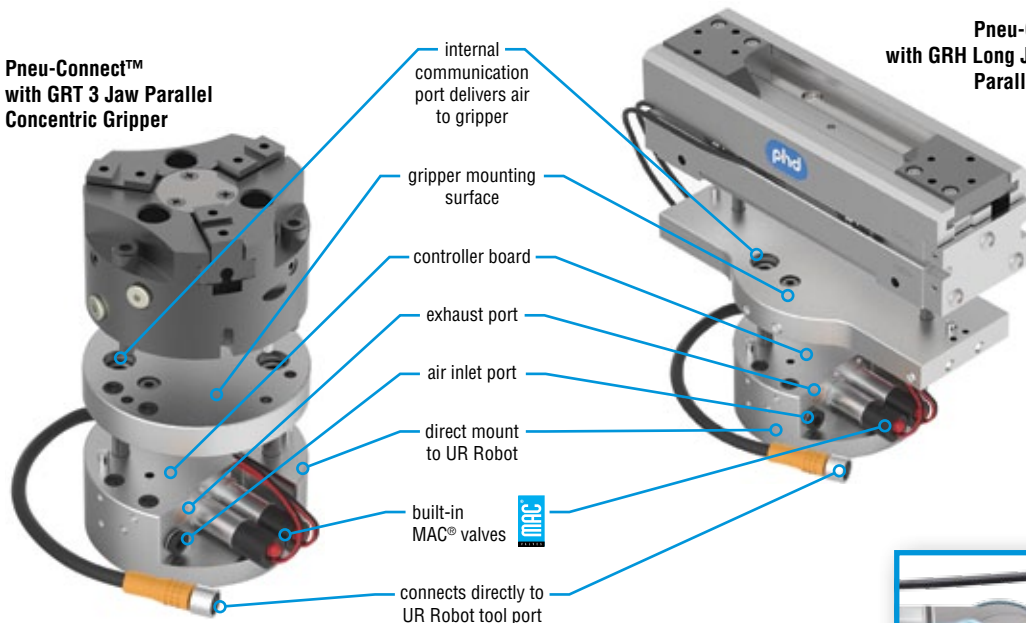
www.phdinc.com

BENEFITS

- Provides seamless, cost-effective, pneumatic end-effector integration for collaborative robots
- Incorporated MAC® valves
- Couples directly to the robot arm tool port enabling pneumatic gripping capability
- Coming soon to the Universal Robots+ online showroom
- Requires customer-supplied tooling



Pneu-Connect™ with GRT 3 Jaw Parallel Concentric Gripper



Pneu-Connect™ with GRH Long Jaw Travel Parallel Gripper

PNEU-CONNECT™ KITS

KIT NUMBER	KIT INCLUDES
89387-01-012-0001	Pneu-Connect™, GRH12-5-12x75-L11-UB99, gripper mounting plate, 2 integrated switches for sensing gripper open and close
89387-02-050-0001	Pneu-Connect™, GRT532-1-0001, gripper mounting plate

NOTE: Kits include URCap integration software

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INTEGRATION SOFTWARE: URCAP

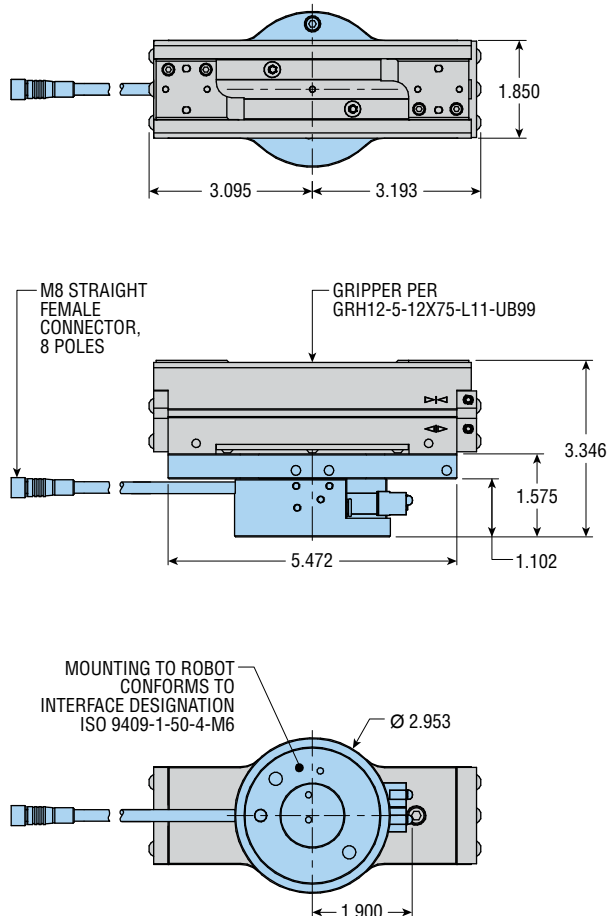
Intuitive, easy setup and programming of the Pneu-Connect™ end of arm devices through the UR Robot Teach Pendant.



DIMENSIONS: PNEU-CONNECT™ KITS

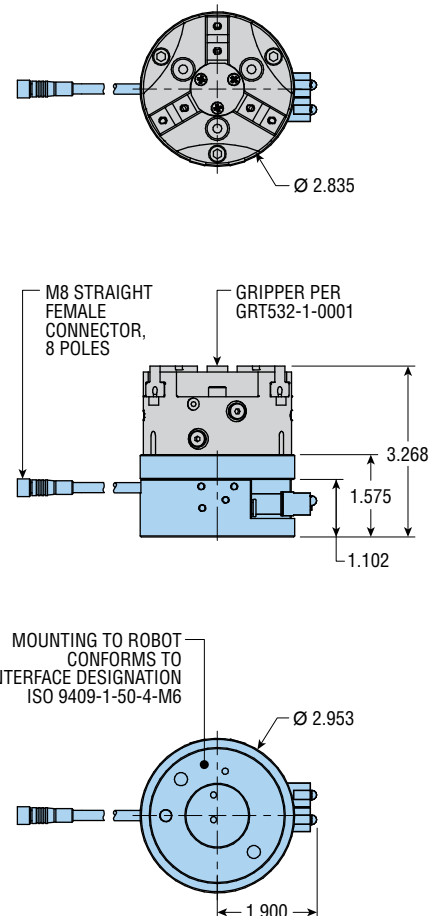
PNEU-CONNECT™ WITH LONG JAW TRAVEL PARALLEL GRIPPER

Total Weight: 1.34 kg [2.95 lb]



PNEU-CONNECT™ WITH 3 JAW PARALLEL CONCENTRIC GRIPPER

Total Weight: 1.08 kg [2.38 lb]



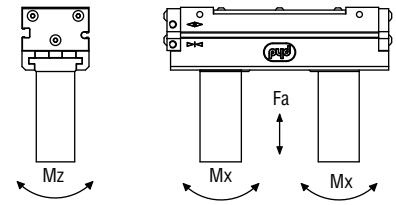
DETAIL VIEW OF FITTING

FITTING FOR 5/32 in
OR 4 mm OD TUBING

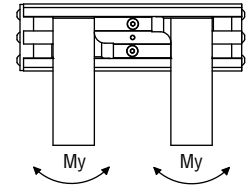
All dimensions are reference only unless specifically tolerated.

ENGINEERING DATA: LONG JAW TRAVEL PARALLEL GRIPPER

SPECIFICATIONS	SERIES GRH12-5-12	
	METRIC	IMPERIAL
OPERATING PRESSURE (SIZE 12)	1.4 bar min to 6.9 bar max	20 psi min to 100 psi max
OPERATING TEMPERATURE	-28°C min to 82°C max	-20°F min to 180°F max
GRIP REPEATABILITY	±0.05 mm of original position	±0.002 in of original position
RATED LIFE	5 million cycles	
LUBRICATION	Factory lubricated for rated life	



MODEL NO.	MINIMUM TOTAL JAW TRAVEL		TOTAL GRIP FORCE AT 6 bar [87 psi]		GRIPPER WEIGHT		ONE DIRECTION DISPLACEMENT		CLOSE OR OPEN TIME AT 6 bar [87 psi]	MAX TOOLING LENGTH		GRIP FORCE FACTOR	
	mm	in	N	lb	kg	lb	cm³	in³	sec	mm	in	METRIC	IMPERIAL
GRH12-5-12	75	2.953	120	27	0.79	1.75	10.47	0.639	0.215	100	3.94	20.0	0.31



MODEL NO.	AXIAL FORCE		MAXIMUM INDIVIDUAL MOMENTS					
	Fa		Mx		My		Mz	
	N	lb	N-m	in-lb	N-m	in-lb	N-m	in-lb
GRH12-5-12	222	50	11	95	7	65	7	65

Fa: Total for both jaws

Mx: Maximum allowable moment per jaw, relative to the reference plane

My: Maximum allowable moment per jaw, relative to the geometric center of the jaw finger

Mz: Maximum allowable moment per jaw, relative to the reference plane

When calculating the value for Fa, include the tooling weight, part weight, external forces, and accelerations.

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

TOOLING LENGTH FACTOR

As the grip point is moved away from the jaw surface the grip force is reduced due to additional friction generated by the grip induced moment. The tooling length factor allows calculation of the grip force at any grip point. The graph also indicates the maximum tooling length for each gripper size.

GRIP FORCE CALCULATION EQUATIONS:

METRIC:

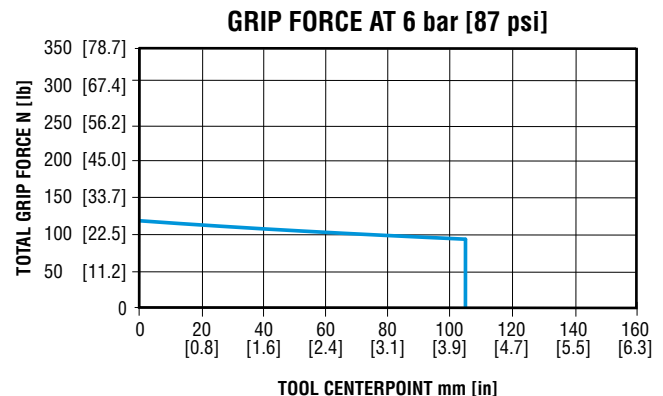
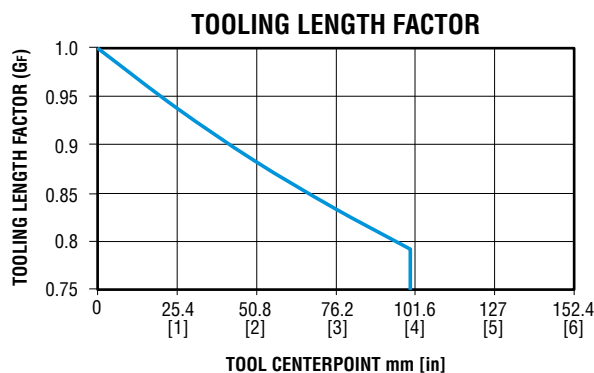
Total Grip Force (N) = (Pressure [bar] x Gf) x Tooling Length Factor

IMPERIAL:

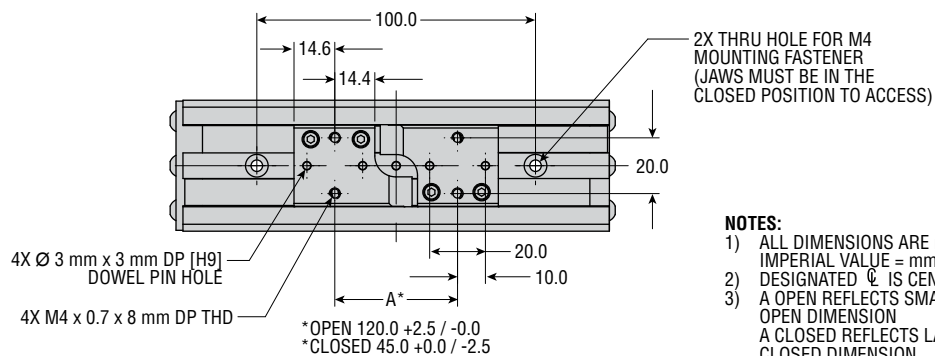
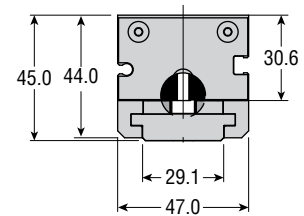
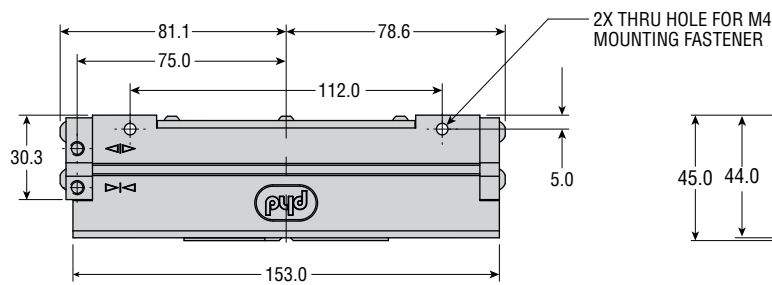
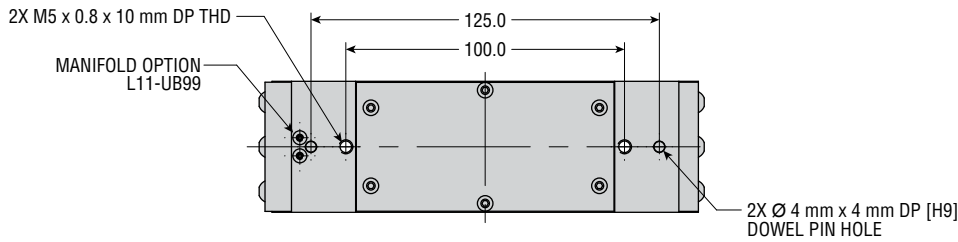
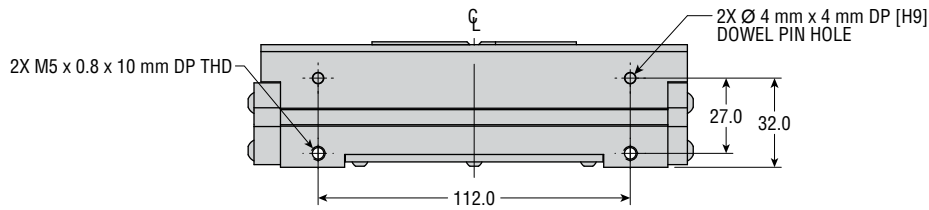
Total Grip Force (lb) = (Pressure [psi] x Gf) x Tooling Length Factor

GRIP FORCE

Total gripping force relative to tooling length is shown below at 6 bar [87 psi] pressure. Grip force per jaw equals the total grip force divided by two. The graphs also indicate the maximum tooling length for each gripper size.



DIMENSIONS: LONG JAW TRAVEL PARALLEL GRIPPER





NOTES:

- 1) ALL DIMENSIONS ARE mm
IMPERIAL VALUE = mm/25.4
- 2) DESIGNATED ϕ IS CENTERLINE OF UNIT
- 3) A OPEN REFLECTS SMALLEST POSSIBLE
OPEN DIMENSION
A CLOSED REFLECTS LARGEST POSSIBLE
CLOSED DIMENSION

All dimensions are reference only unless specifically tolerated.

ENGINEERING DATA: 3 JAW PARALLEL CONCENTRIC GRIPPER

SPECIFICATIONS	SERIES GRT532
OPERATING PRESSURE	30 psi min to 100 psi max [2 bar min to 7 bar max] air
OPERATING TEMPERATURE	-20° to +180°F [-28° to +82°C]
RATED LIFE	10 million cycles minimum with standard seals
GRIP REPEATABILITY	Within ±0.002 in [±0.05 mm] of original centered position
CYCLE TIME	See table below
LUBRICATION	Factory lubricated for rated life
MAINTENANCE	Field repairable

MODEL NO.	TOTAL DIAMETRAL JAW TRAVEL		TOTAL CLOSE GRIP FORCE AT 87 psi [6 bar]		GRIPPER WEIGHT		CLOSE OR OPEN TIME 87 psi [6 bar]	DISPLACEMENT		GRIP FORCE FACTOR G _F			
	mm	in	N	lb	kg	lb	sec	cm ³	in ³	EXTERNAL GRIP		INTERNAL GRIP	
GRT532	12	0.472	747	168	0.43	0.95	0.04	12	0.72	125	1.93	136	2.10

Minimum operating pressure is 30 psi [2 bar] for standard unit.

MODEL NO.	TOOL CENTERPOINT		TOOLING WEIGHT MAX. PER JAW	
	mm	in	kg	lb
GRT532	65	2.56	0.33	0.72

TOOLING LENGTH FACTOR

Tooling should be designed so that the grip point is as close to the body surface as possible. When the grip point moves away, jaw friction increases, which decreases grip force. The G_F information given to the right is for zero tooling length (body surface). The graph shows how force decreases as the grip point moves away from the body surface.

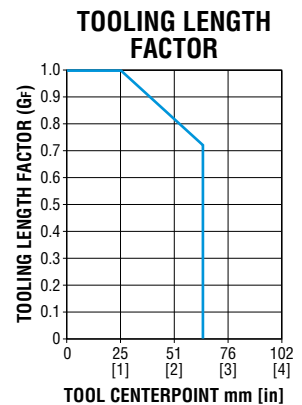
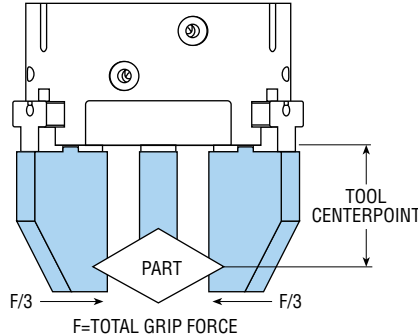
GRIP FORCE CALCULATION EQUATIONS:

METRIC:

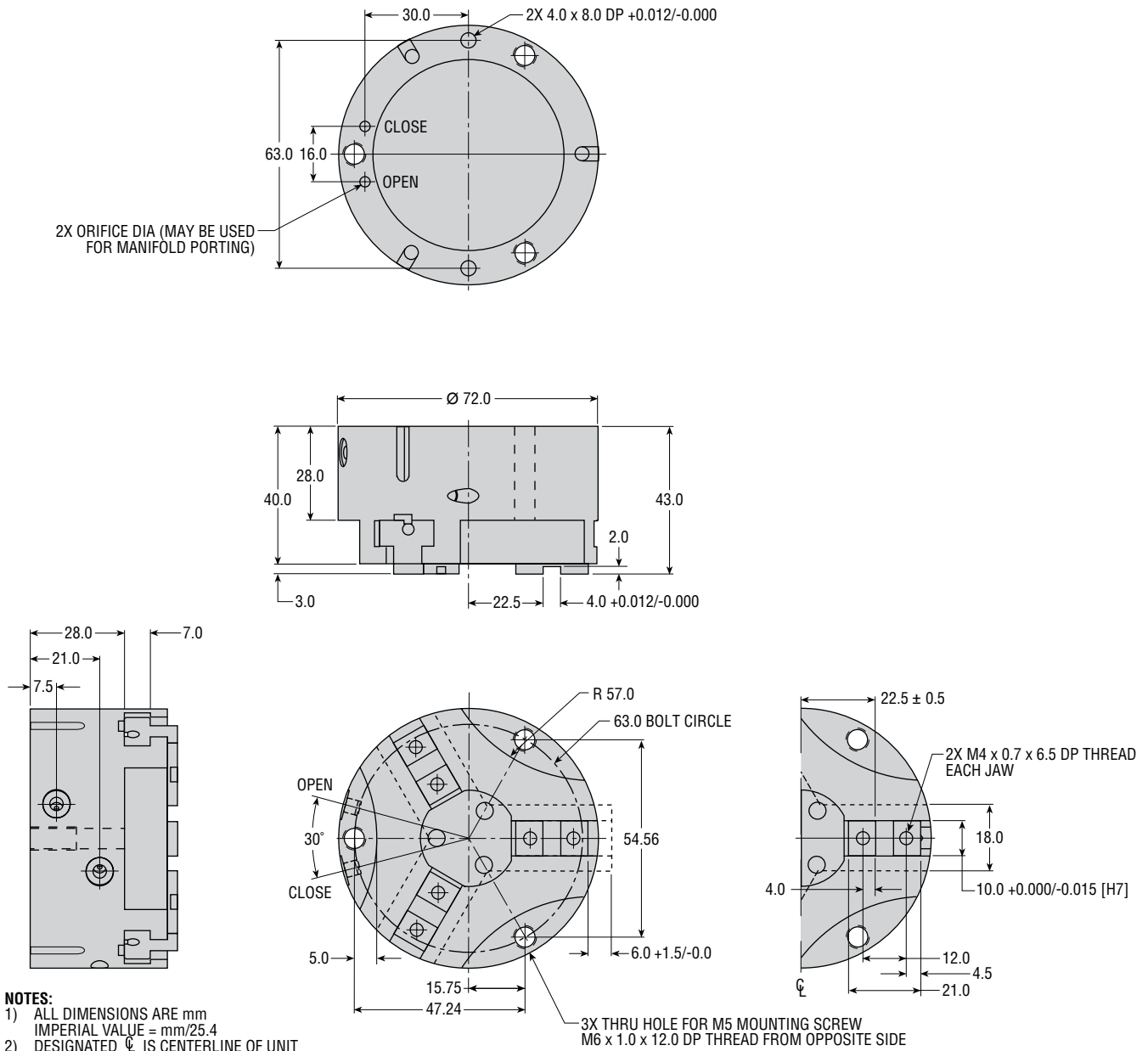
Total Grip Force (N) = (Pressure [bar] x G_F) x Tooling Length Factor

IMPERIAL:

Total Grip Force (lb) = (Pressure [psi] x G_F) x Tooling Length Factor

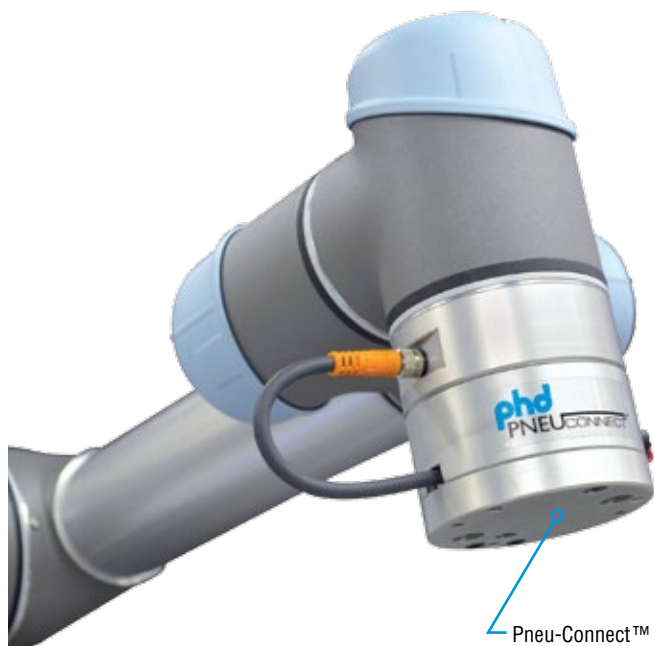


DIMENSIONS: 3 JAW PARALLEL CONCENTRIC GRIPPER



All dimensions are reference only unless specifically toleranced.

OTHER GRIPPERS TO CONSIDER



Pneu-Connect™ mounting surface can be modified to accept additional grippers and actuators.



GRB

Grip Force:
13 to 549 lb [57 to 2443 N]
Minimum Distance:
0.44 to 1.90 in [11.3 to 48.3 mm]

Three total jaw rotations are available 60°, 90°, and 180°
Potentially eliminates need for additional axis in some applications



GRS

Grip Force:
68 to 289 lb [302 to 1287 N]
Nominal Jaw Travel:
0.177 to 1.732 in [4.5 to 44 mm]

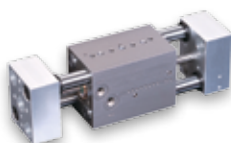
Low profile, high force
Rugged jaw support, hardened jaws and hardcoated bearing surfaces
Two jaw travels each size



GRV

Grip Force:
2.0 to 28 lb [10 to 159 N]
Minimum Distance:
0.322 to 0.594 in [8.2 to 15.1 mm]

Compact, flexible design provides large moment capacities and long tooling lengths
Robust construction ensures long operating life
Double acting for use in both internal and external gripping applications



GRW

Grip Force:
36 to 429 lb [160 to 1908 N]
Nominal Jaw Travel:
0.79 to 4.61 in [20 to 117 mm]

Jaws have large tooling surfaces and precision dowel holes for accurate tooling attachment
Large diameter jaw guides allow long tooling lengths and high moment capabilities and reduce deflection
Dependable design



GRA

Grip Force:
2.55 to 27.7 lb [11 to 123 N]
Nominal Jaw Travel:
0.158 to 0.512 in [4 to 13 mm]

Compact, flexible design for large moment capacities and longer tooling
Fully supported hardened steel jaws for long life, minimal wear and high moment capability
Robust construction



GRL

Grip Force:
28 to 41 lb [124 to 182 N]
Nominal Jaw Travel:
0.28 to 1.02 in [7 to 26 mm]

Parallel jaw motion simplifies jaw tooling design and is ideal for gripping parts of varying sizes
Narrow width, low profile, and long jaw travel



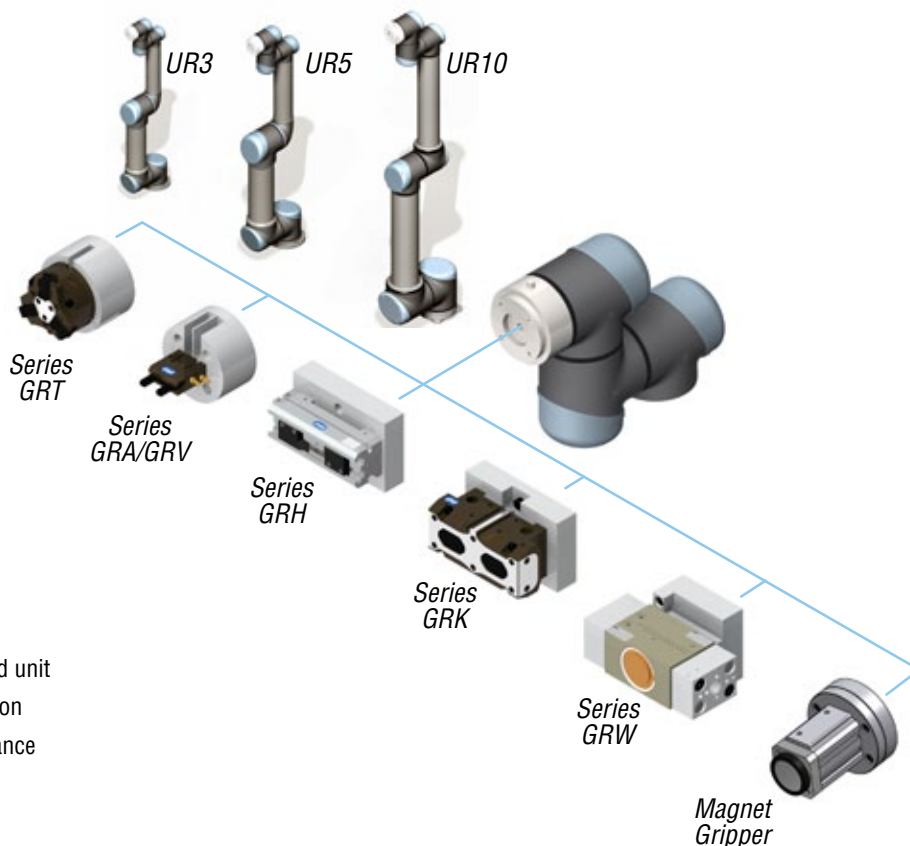
MAGNETIC MODEL 86560

Max Pull Force:
0.500 to 11.000 lb [2.2 to 49 N]

No expensive tooling
One less axis of motion
Variability of part pickup
Stainless steel cap improves durability
No electric lines required

OTHER UNIVERSAL ROBOT MOUNTING SOLUTIONS

Does not include integrated Pneu-Connect™ solutions



BENEFITS

- Gripper plate mounts directly to robot
- Low-cost solution without manifolding, valves, switches, or URCap software
- Six series of grippers available to fit unique application requirements
- Includes fasteners for mounting standard unit
- Switches available for sensing jaw position
- Contact PHD for further technical assistance

UNIVERSAL ROBOTS	UR3	UR5	UR10
MAXIMUM PAYLOAD	3 kg	5 kg	10 kg
REACH	500 mm	850 mm	1300 mm
WEIGHT	11 kg	18.4 kg	28.9 kg

SPECIFICATIONS	GRH GRIPPER Extra Long Jaw Travel, Low Profile Parallel	GRK GRIPPER High Force, Low Profile Parallel	GRA GRIPPER Small Profile Parallel	GRV GRIPPER Small Profile Angular	GRW GRIPPER Two Jaw, Wide Body Parallel	GRT GRIPPER Low Profile, Three Jaw Parallel	MAGNET GRIPPER Compact
SIZE RANGE	8, 12, 16	35, 46, 58	6, 10, 16, 20	6, 10, 16, 20	16, 25	1, 2, 3	4
CUSTOMER MOUNTING	metric	metric & imperial	metric	metric	metric & imperial	metric & imperial	metric & imperial
GRIP FORCE RANGE @ 6 BAR	53 N - 214 N	383 N - 2019 N	11 N - 123 N	10.5 N - 158 N	160 N - 400 N	196 N - 747 N	(2.2 N - 49 N)
TOTAL JAW TRAVEL RANGE / ANGLE°	50 mm - 100 mm	6.5 mm - 20 mm	4 mm - 13 mm	40°	20 mm - 53 mm	6 mm - 12 mm (diametral)	—
MAX TOOLING LENGTH RANGE	75 mm - 125 mm	102 mm - 162 mm	30 mm - 100 mm	30 mm - 80 mm	125 mm - 200 mm	40 mm - 65 mm	—
WEIGHT RANGE	0.34 kg - 1.46 kg	0.38 kg - 1.11 kg	0.036 kg - 0.28 kg	0.034 kg - 0.244 kg	0.3 kg - 1.1 kg	0.12 kg - 0.43 kg	0.12 kg - 0.38 kg
MIN PRESSURE	1.4 bar	2.5 bar	2 bar	1 bar	2 bar	2 bar	0.7 bar
MAX PRESSURE	6.9 bar	8 bar	8.3 bar	8.3 bar	7 bar	7 bar	10 bar
RATED LIFE	5 million cycles	10 million cycles	5 million cycles	10 million cycles	6 million cycles	10 million cycles	5 million cycles
SWITCHES	Series JC, Prox	Series JC, Prox	Series JC	Series JC	Prox	Prox	—
GRIP REPEATABILITY	± 0.05 mm	± 0.01 mm	± 0.01 mm	—	± 0.05 mm	± 0.05 mm	—
MAX MOMENT RANGE - FA	98 N - 400 N	1201 N - 2358 N	14 N - 178 N	13 N - 133 N	270 N - 670 N	218 N - 1500 N	—
MAX MOMENT RANGE - MX*	3 Nm - 24 Nm	99 Nm - 252 Nm	0.4 Nm - 5.1 Nm	—	22 Nm - 64 Nm	13 Nm - 30 Nm (Close)	—
MAX MOMENT RANGE - MY*	2 Nm - 17 Nm	74 Nm - 184 Nm	0.19 Nm - 5.1 Nm	0.23 Nm - 5.1 Nm	22 Nm - 64 Nm	4.6 Nm - 25 Nm	—
MAX MOMENT RANGE - MZ*	2 Nm - 17 Nm	45 Nm - 102 Nm	0.19 Nm - 3.4 Nm	0.14 Nm - 3.4 Nm	10 Nm - 22 Nm	5 Nm - 15 Nm	—

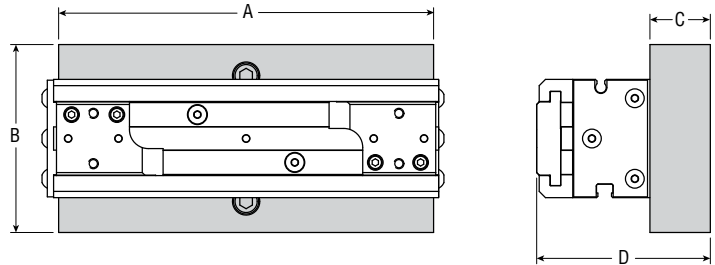
* Maximum moment with all jaws

OTHER UNIVERSAL ROBOT MOUNTING SOLUTIONS

Does not include integrated Pneu-Connect™ solutions

GRH GRIPPER ML#313288

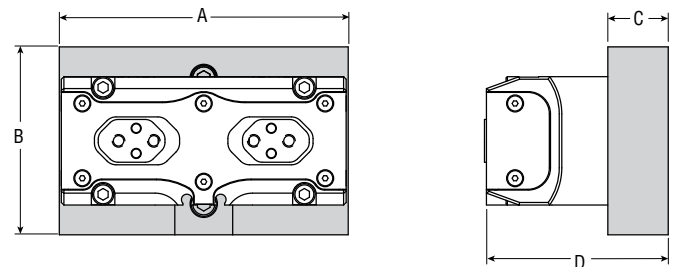
GRH Size	PHD Part Number	A (mm)	B (mm)	C (mm)	D (mm)	Weight (kg)
8	313288-01-5	115	75	24	59	0.860
12	313288-02-5	149	75	24	69	1.483
16	313288-03-5	188	75	24	78	2.350



GRK GRIPPER ML#313290

GRH Size	PHD Part Number	A (mm)	B (mm)	C (mm)	D (mm)	Weight (kg)
35	313290-01-x	115	75	24	63	0.899
46	313290-02-x	115	75	24	73	1.227
58	313290-03-x	115	75	24	79	1.667

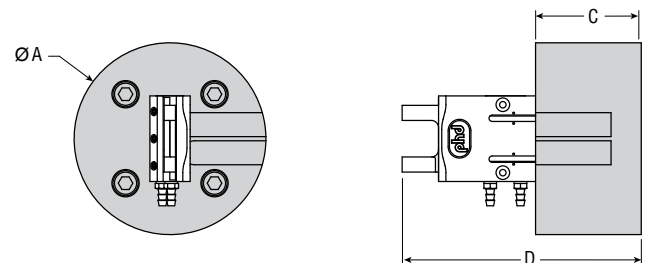
x = -1 for imperial, -5 for metric



GRA/GRV GRIPPER ML#313289

GRA/GRV Size	PHD Part Number	Ø A (mm)	C (mm)	D (mm)	Weight (kg)
6	313289-01-5	76.2	35	87.5	0.442
10	313289-02-5	76.2	35	97.0	0.480
16	313289-03-5	76.2	35	109.2	0.565
20*	313289-04-5	76.2	35	124.8	0.754

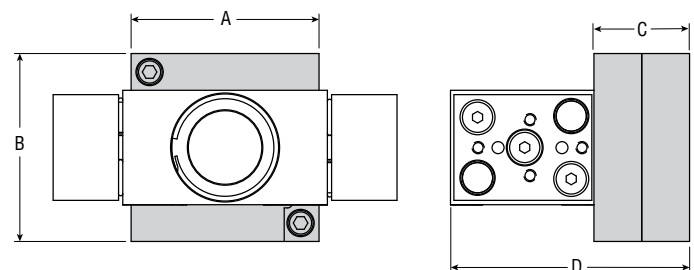
*Size 20 requires -GR9 option for mounting



GRW GRIPPER ML#313305

GRW Size	PHD Part Number	A (mm)	B (mm)	C (mm)	D (mm)	Weight (kg)
16	313305-01-x	75	75	38	79.3	0.806
25	313305-02-x	75	75	38	95	1.614

x = -1 for imperial, -5 for metric



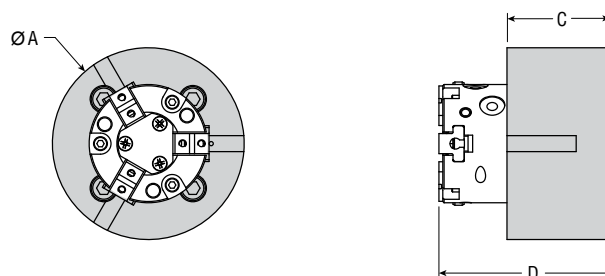
OTHER UNIVERSAL ROBOT MOUNTING SOLUTIONS

Does not include integrated Pneu-Connect™ solutions

GRT GRIPPER ML#313291

GRT Size	PHD Part Number	Ø A (mm)	C (mm)	D (mm)	Weight (kg)
1	313291-01-x	76.2	35	68.9	0.550
2	313291-02-x	76.2	35	78.5	0.697
3	313291-03-x	76.2	35	85	0.852

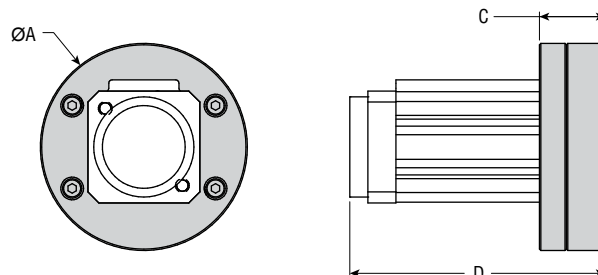
x = -1 for imperial, -5 for metric



MAGNET GRIPPER ML#316333

Size	PHD Part Number*	Ø A (mm)	C (mm)	D (mm)	Weight (kg)
4	316333-1	75	24	92.7	0.25
4	316333-5	75	24	92.7	0.25

*-1 for imperial, -5 for metric



ADDITIONAL OPTIONS AVAILABLE

SERIES GRH	SERIES GRK	SERIES GRA	SERIES GRV	SERIES GRW	SERIES GRT
fluoroelastomer seals cleanroom lube manifold NPN & PNP solid state switches Imperial ports (size 20)	fluoroelastomer seals spring assist closed spring assist open manifold NPN & PNP solid state switches inductive proximity switches Imperial interface	fluoroelastomer seals cleanroom lube manifold NPN & PNP solid state switches	fluoroelastomer seals cleanroom lube manifold NPN & PNP solid state switches	corrosion resistant manifold inductive proximity switches hall effect switches Imperial interface	fluoroelastomer seals part ejector manifold NPN proximity switches spring assist closed spring assist open finger blanks Imperial interface
www.phdinc.com/grh	www.phdinc.com/grk	www.phdinc.com/gra	www.phdinc.com/grv	www.phdinc.com/grw	www.phdinc.com/grt

All dimensions are reference only unless specifically tolerated.

The Right Gripper for Your Part

- **Robotic end effector solutions**
- **Angular & parallel, many sizes and options available**
- **Unique solutions available**
- **For handling various sized parts**
- **Superior design & delivery**

