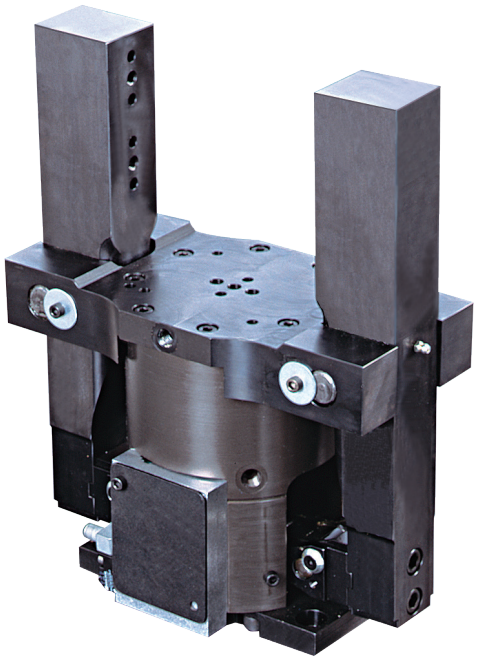
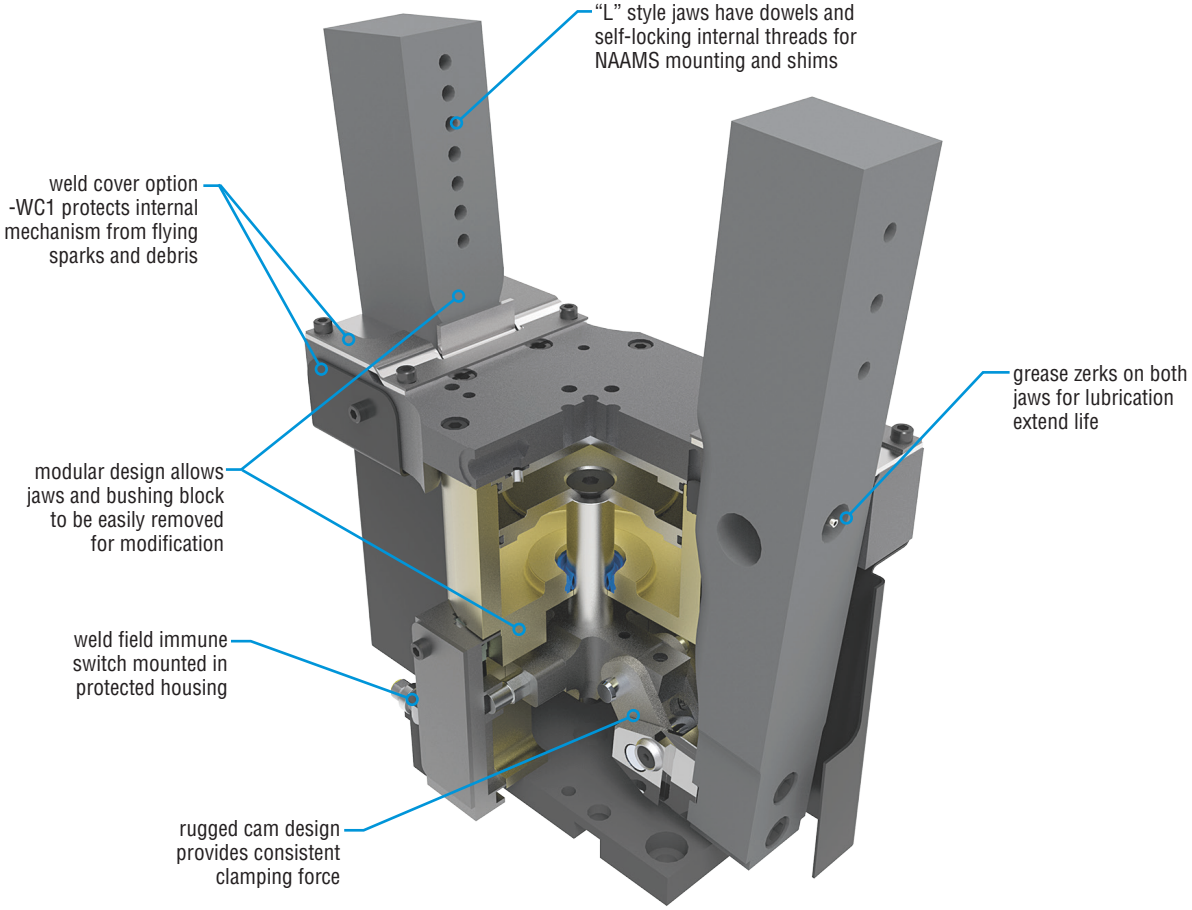
PFC

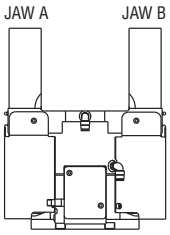
Major Benefits

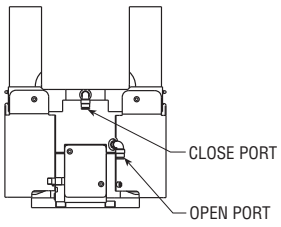
- Rugged cam design provides consistent clamping force throughout a wide power window.
- Constant high clamp force available throughout a wide power window. The PFC4TL is 11250 lb [50040 N] at 3.940 in [100 mm] above tooling surface. The PFC4TW is 7200 lb [32027 N] at 2.187 in [55.6 mm] above tooling surface.
- Wide jaw throat accommodates large parts with simple tooling.
- Tooling surface has dowels and threads to North American Automotive Metric Standards (NAAMS) NC blocks.





TO ORDER SPECIFY:
Size, Mounting, Jaw Style Option, Design No., Jaw Opening (A & B), Fitting Option, Sensing Option, Weld Cover Option if desired.





UNIT SIZE
4 - Medium Duty

JAW STYLE OPTION
L - Long Jaw Style
W - Wide Jaw Style

JAW OPENING - JAW A
16 - 16° Opening

PORT FITTINGS
BLANK - No Fitting
LAA - 90° Swivel Elbow, Metal

WELD COVER OPTION
WC1 - Weld Cover (Both Jaws)

PFC 4 T L - 1 - 16 - 16 - LAA - PS3D9 - WC1 - B001

MOUNTING
REAR | T - Rear Mounting Plate

DESIGN NO.
1 - Imperial
5 - Metric

JAW OPENING - JAW B
16 - 16° Opening

POSITION SENSOR OPTION CODE
P x x x x

HOUSING OPTION
P - Positional Sensing

CONNECTOR POSITION
1 - Parallel to jaws
9 - Perpendicular to jaws

SENSING OPTION
S - Standard
R - Reversed

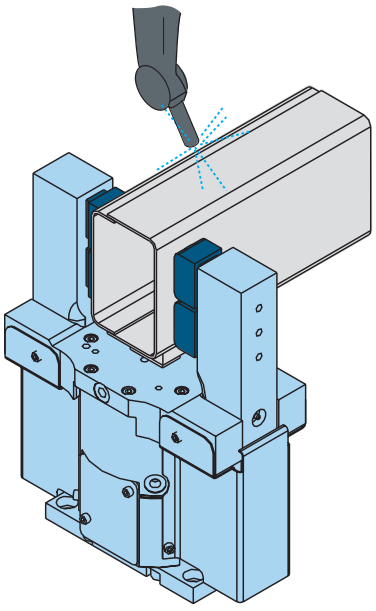
SWITCH OPTION
N - No Switch
A - 5-pin AC/DC Switch (Turck)
D - 4-pin PNP DC Switch (P + F)
E - 4-pin PNP DC Switch (Turck)
F - 4-pin PNP DC Switch (Efector)
H - 4-pin NPN DC Switch (P + F)
J - 4-pin NPN DC Switch (Turck)

SWITCH HOUSING OPTION
1 - Position 1 (Port Side)
3 - Position 3

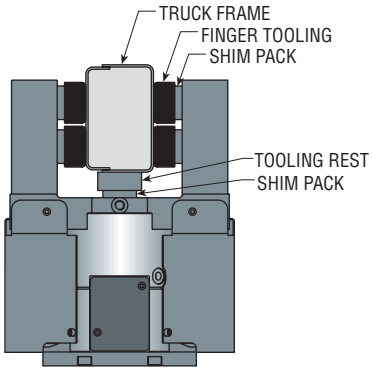
BUSHING BLOCK OPTION
B001 - Customer mounting pattern with M10 threads and 10 mm dowel pin holes

NOTES:
1) Metric units have metric ports and mounting.
2) -A switch only available as A1 (example PS3A1)

⚠ Options may affect unit length. See dimensional pages and option information details.



PFC4TL-1-16-16 SHOWN



APPLICATION EXAMPLE

This application depicts clamping two channels of a truck frame and welding along the seams. Wide spacing between the jaws allows for clamping larger parts than the competition allows.

The Series PFC Frame Clamps provide a large power window and clamp force of 11250 lb [50040 N] at 3.94 in [100 mm] above tooling surface.

NAAMS standard mounting patterns on “L” style jaws and tooling surface provide fast setup with easy tooling and fixturing.

CAD & Sizing Assistance

Use PHD’s free online Product Sizing and CAD Configurator at **phdinc.com/myphd**

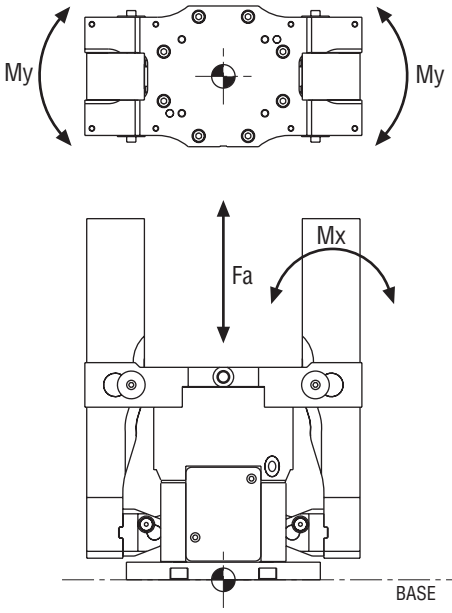
SPECIFICATIONS	SERIES PFC
WORKING PRESSURE	30 psi min. - 100 psi max. [2 bar min. - 7 bar max.]
BODY	Hardcoat Aluminum
JAWS	Steel
SEALS	Bidirectional Piston Seal, Lip Type Rod Seal
LUBRICATION	Permanent for Non-Lube Air
TEMPERATURE LIMITS	-20° to 180°F [-30° to 82°C]

OPTION	WEIGHT	
	lb	kg
LAA	0.2	0.09
PSxxx	0.9	0.4
WC1	3.0	1.4
B001	—	—

MODEL	UNIT WEIGHT		TOTAL CLAMP FORCE at 87 psi [6 bar]		CLOSE OR OPEN TIME 87 psi [6 bar]	DISPLACEMENT				CLAMP FORCE FACTOR (Cf)	
						CLOSE		OPEN			
	lb	kg	lb	N	second	in^3	cm^3	in^3	cm^3	Imperial	Metric
PFC4TL-1-16-16	74.6	33.8	11250	50040	0.11	44.72	724.3	43.1	706.3	606.1	992400
PFC4TW-1-16-16	72.4	33.0	7200	32027	0.12	44.72	724.3	43.1	706.3	181.0	296516

MOMENTS TEST

Take care to limit moment loads on the Series PFC. External loads and moments due to jaw clamp forces should be considered.

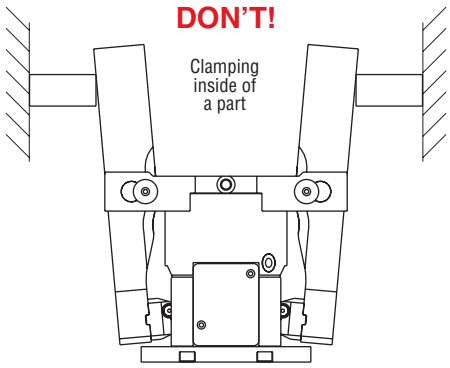


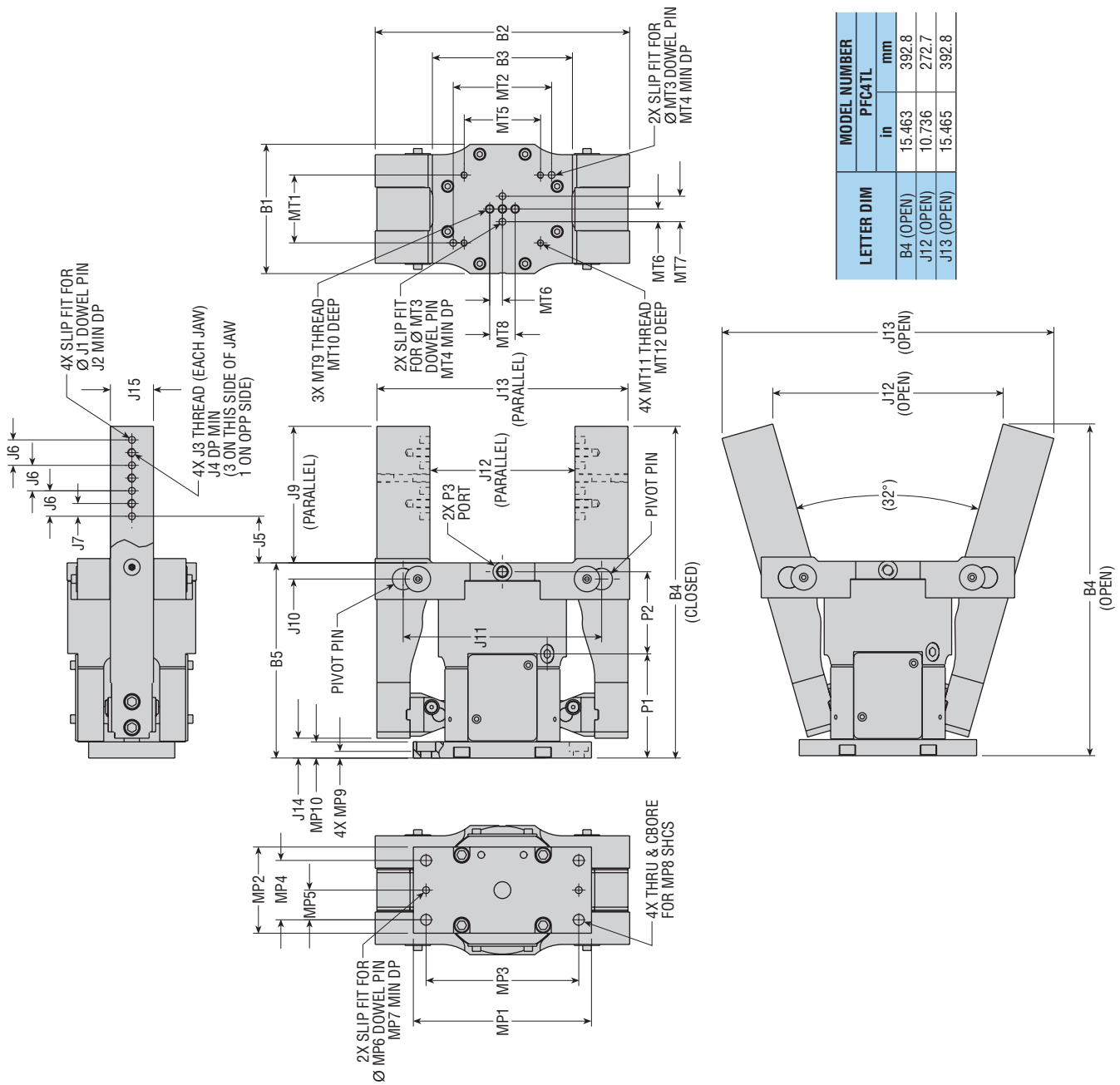
MODEL	Fa		Mx		My		Mz	
	lb	N	in-lb	Nm	in-lb	Nm	in-lb	Nm
PFC	1000	4448	20000	2261	10000	1130	10000	1130

Fa: Total for both jaws
Mx: Total for both jaws moments from base mounting surface
My: Total for both jaws moments from base mounting surface
Mz: Total for both jaws moments from base mounting surface

APPLICATION CONCERNS

The Series PFC has a robust mechanism designed to clamp the outside of a part. However, it should not be used to clamp the inside of a part, nor be limited externally from opening. The opening of one or both jaws should not be limited with external stops or tooling. Consult factory on internal applications.



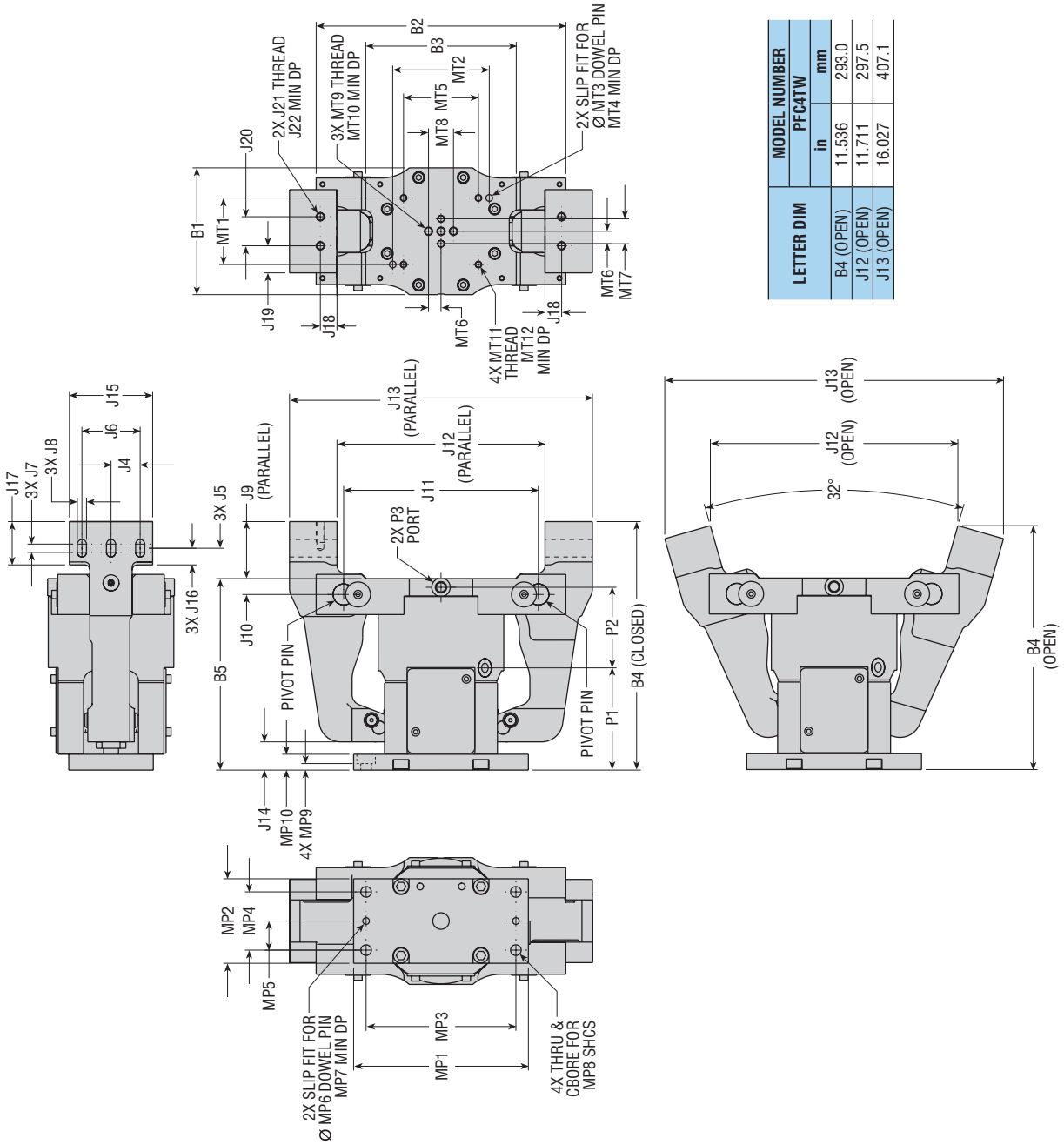


LETTER DIM	MODEL NUMBER PFC4TL in	mm
B4 (OPEN)	15.463	392.8
J12 (OPEN)	10.736	272.7
J13 (OPEN)	15.465	392.8

LETTER DIM	MODEL NUMBER PFC4TL in	mm
B1	6.000	152.4
B2	11.811	300.0
B3	7.120	180.8
B4 (CLOSED)	15.396	391.1
B5	9.058	230.1
J1	0.315	8.0
J2	0.472	12.0
J3	M10 x 1.5	
J4	0.787	20.0
J5	2.165	55.0
J6	1.181	30.0
J7	0.591	15.0
J8	1.181	30.0
J9	6.338	161.0
J10	0.750	19.1
J11	9.212	234.0
J12 (CLOSED)	6.732	171.0
J13 (CLOSED)	11.652	296.0
J14	0.920	23.4
J15	2.000	50.8
P1	4.835	122.8
P2	3.813	96.9
P3	1/4 NPT	1/4 BSPP
MP1	8.268	210.0
MP2	4.000	101.6
MP3	7.087	180.0
MP4	2.756	70.0
MP5	1.378	35.0
MP6	0.315	8.0
MP7	0.472	12.0
MP8	7/16	M12
MP9	0.315	8.0
MP10	0.750	19.1
MT1	3.150	80.0
MT2	4.567	116.0
MT3	0.315	8.0
MT4	0.472	12.0
MT5	3.543	90.0
MT6	0.591	15.0
MT7	1.181	30.0
MT8	1.181	30.0
MT9	M10 x 1.5	
MT10	0. 669	17.0
MT11	M8 x 1.25	
MT12	0. 669	17.0

All dimensions are reference only unless specifically toleranced.

DIMENSIONS: Series PFC - "W" Wide Jaw Style



LETTER DIM	MODEL NUMBER PFC4TW in	mm
B4 (OPEN)	11.536	293.0
J12 (OPEN)	11.711	297.5
J13 (OPEN)	16.027	407.1

LETTER DIM	MODEL NUMBER PFC4TW in	mm
B1	6.000	152.4
B2	11.811	300.0
B3	7.120	180.8
B4 (CLOSED)	11.755	298.6
B5	9.058	230.1
J4	1.378	35.0
J5	1.437	36.5
J6	2.756	70.0
J7	0.394	10.0
J8	0.433	11.0
J9	2.697	68.5
J10	0.750	19.1
J11	9.212	234.0
J12 (CLOSED)	9.843	250.0
J13 (CLOSED)	14.331	364.0
J14	1.335	33.9
J15	3.937	100.0
J16	0.787	20.0
J17	2.047	52.0
J18	0.787	20.0
J19	1.280	32.5
J20	1.378	35.0
J21	M10 x 1.5	
J22	0.984	25.0
P1	4.835	122.8
P2	3.813	96.9
P3	1/4 NPT	1/4 BSPP
MP1	8.268	210.0
MP2	4.000	101.6
MP3	7.087	180.0
MP4	2.756	70.0
MP5	1.378	35.0
MP6	0.315	8.0
MP7	0.472	12.0
MP8	7/16	M12
MP9	0.315	8.0
MP10	0.750	19.1
MT1	3.150	80.0
MT2	4.567	116.0
MT3	0.315	8.0
MT4	0.472	12.0
MT5	3.543	90.0
MT6	0.591	15.0
MT7	1.181	30.0
MT8	1.181	30.0
MT9	M10 x 1.5	
MT10	0. 669	17.0
MT11	M8 x 1.25	
MT12	0. 669	17.0

All dimensions are reference only unless specifically toleranced.

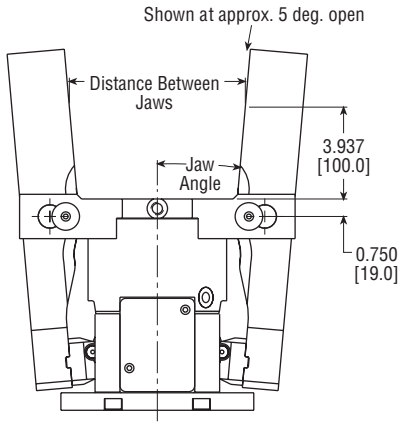
EFFECTIVE CLAMPING RANGE

Total clamp force can be determined by multiplying air pressure by the clamp force multiplier (C_f), then dividing by the distance from clamping location to jaw pivot.

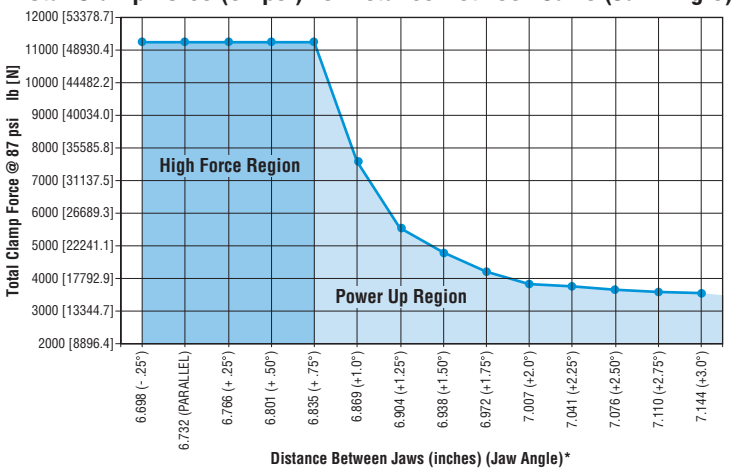
To achieve maximum clamp force, custom tooling or spacers must be used to close the jaws in the high force region. Refer to charts for high force region.

"L" LONG JAW STYLE

PFC4TL
High force region C_f (Imperial) = 606.1
High force region C_f (Metric) = 992400



Total Clamp Force (87 psi) vs Distance Between Jaws (Jaw Angle)



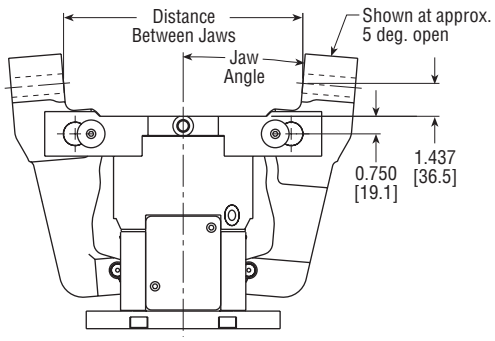
Distance Between Jaws (inches) (Jaw Angle)*
(* - Distance measured 3.937 [100.0 mm] above mounting face of clamp
Jaw Angle measured in degrees per jaw)

Imperial Example:
Your air line pressure: 87 psi
Clamp force multiplier: 606.1
(Within high force region)
Distance from clamping location to pivot: 4.687 in
(87 x 606.1)/4.687 = 11250 lb

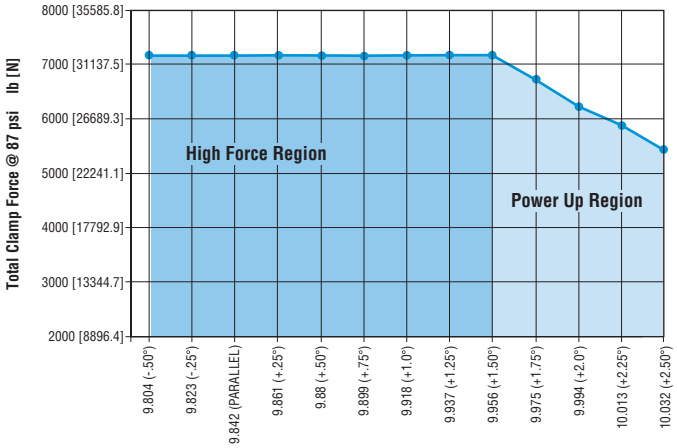
Metric Example:
Your air line pressure: 6 bar
Clamp force multiplier: 992400
(within high force region)
Distance from clamping location to pivot: 119 mm
(6 x 992400)/119 = 50042 N

"W" WIDE JAW STYLE

PFC4TW
High force region C_f (Imperial) = 181.0
High force region C_f (Metric) = 296516



Total Clamp Force (87 psi) vs Distance Between Jaws (Jaw Angle)



Distance Between Jaws (inches) (Jaw Angle)*
(* - Distance measured at customer mounting holes - approx. 1.437 [36.5 mm]
Jaw Angle measured in degrees per jaw)

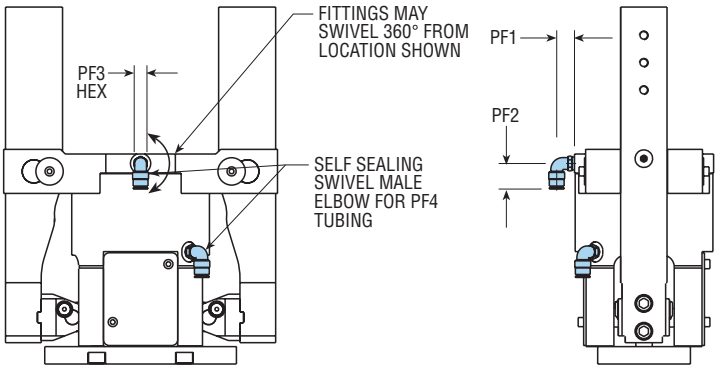
All dimensions are reference only unless specifically toleranced.

LAA PORT FITTINGS

90° swivel elbow (in both ports) for ease of air line hook-up.

LETTER DIM	MODEL NUMBER PFC4xx	
	in	mm
PF1 (MIN)	0.767	20.5
PF2	1.102	28.0
PF3	0.551	14.0
PF4	3/8	10.0
PART NO.	62178-010	62195-010

NOTE: FITTINGS ARE ORDERED SEPARATELY

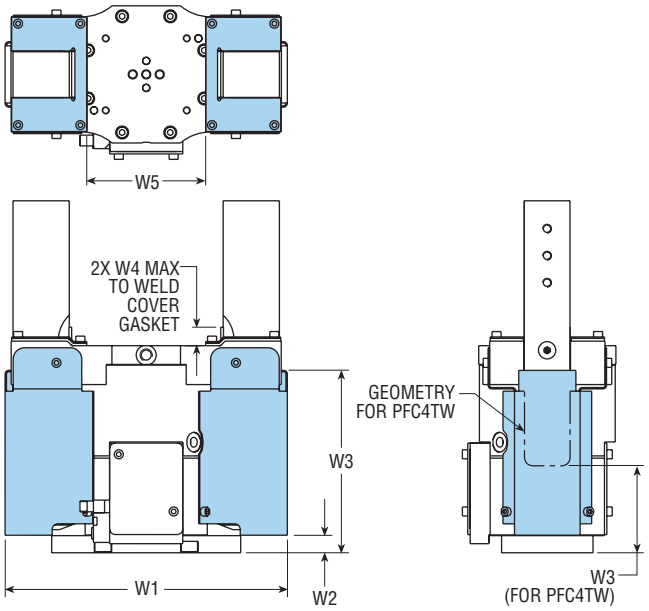


WC1 WELD COVER

This option provides plated steel covers around the jaws above and below the mounting surface to enclose the clamp mechanism, protecting it from weld splatter.

LETTER DIM	MODEL NUMBER PFC4TL		PFC4TW	
	in	mm	in	mm
W1	12.346	313.6	12.346	313.6
W2	0.768	19.5	0.768	19.5
W3	7.978	202.6	3.668	93.2
W4 MAX	0.906	23.0	0.906	23.0
W5	5.120	130.0	5.120	130.0
KIT NUMBER	73121-01		73121-02	

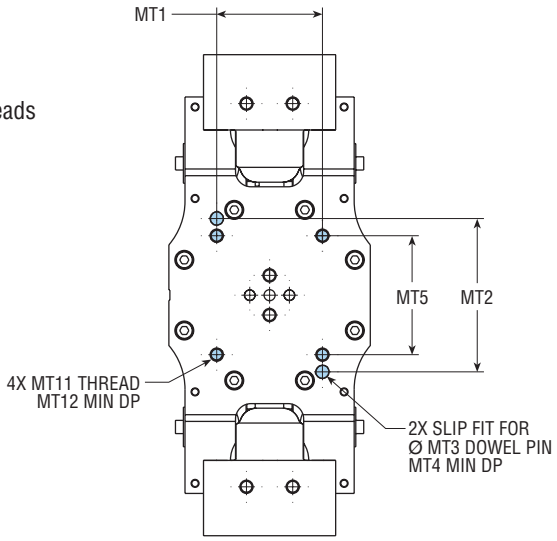
KIT INCLUDES: 2 WELD COVERS
2 WELD COVER PLATES
2 WELD COVER GASKETS
MOUNTING SCREWS



B001 BUSHING BLOCK

This option provides a customer mounting pattern with M10 threads and 10 mm dowel pin holes.

LETTER DIM	MODEL NUMBER PFCxxx	
	in	mm
MT1	3.150	80.0
MT2	4.567	116.0
MT3	0.394	10.0
MT4	0.591	15.0
MT5	3.543	90.0
MT11	M10 x 1.5	
MT12	0.669	17.0



All dimensions are reference only unless specifically toleranced.

PSxxx STANDARD POSITION SENSING

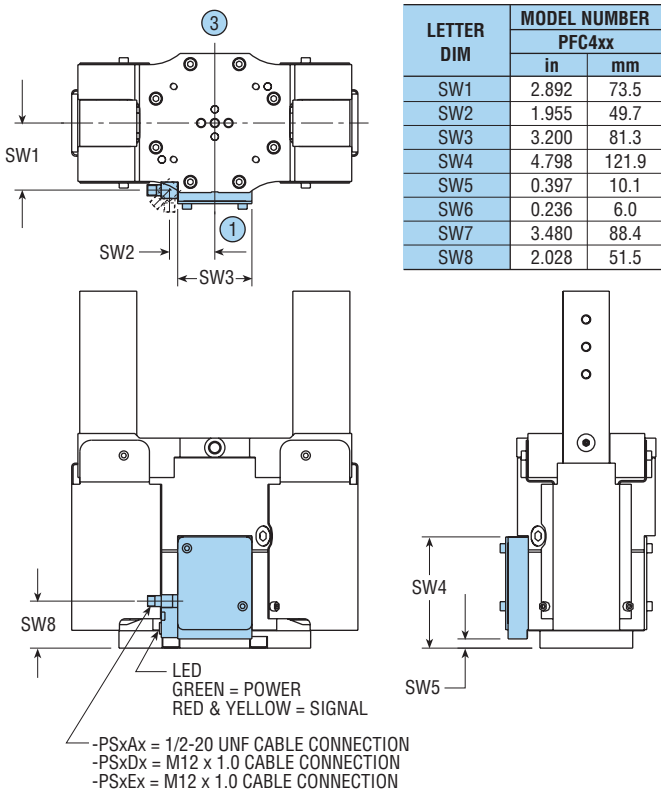
PRxxx REVERSED POSITION SENSING

This option provides jaw open and jaw closed sensing by affixing an aluminum housing to the side of the clamp body. The adjustable switches sense the position of a target on the drive pin as the clamp opens and closes.

PR positions satellite switch S01 to sense open and S02 to sense close. PS positions satellite switch S02 to sense open and S01 to sense close. See charts below or switch information for satellite switch to quick connect pin to relationships.

For use with the following PHD or customer supplied switches or equivalent:

Ni 2-Q6.5-ADZ32-0.16-FSB 5.4X4/S304 (Turck)
NBN2-F581-160S6-E8-V1 (P + F)
Ni 2-Q6.5-0.16-BDS-2AP6X3-H1141/S34 (Turck)
IN 5375 (Efector)
NBN2-F581-160S6-E10-V1 (P + F)
Ni 2-Q6.5-AN6-0.16-FS 4.4X3/S304 (Turck)



LETTER DIM	MODEL NUMBER PFC4xx	
	in	mm
SW1	2.892	73.5
SW2	1.955	49.7
SW3	3.200	81.3
SW4	4.798	121.9
SW5	0.397	10.1
SW6	0.236	6.0
SW7	3.480	88.4
SW8	2.028	51.5

NOTE:
1) POSITIONAL SENSOR MAY BE LOCATED IN POSITION 1 OR POSITION 3
2) CIRCLED NUMBERS INDICATE POSITION. POSITION 1 IS PORT SIDE

POSITION SENSOR OPTION CODE

P x x x x

- **HOUSING OPTION**
  P - Positional Sensing
- **CONNECTOR POSITION**
  1 - Parallel to jaws
  9 - Perpendicular to jaws
- **SENSING OPTION**
  S - Standard
  R - Reversed
- **SWITCH OPTION**
  N - No Switch
  A - 5-pin AC/DC Switch (Turck)
  D - 4-pin PNP DC Switch (P + F)
  E - 4-pin PNP DC Switch (Turck)
  F - 4-pin PNP DC Switch (Efector)
  H - 4-pin NPN DC Switch (P + F)
  J - 4-pin NPN DC Switch (Turck)
- **SWITCH HOUSING OPTION**
  1 - Position 1 (Port Side)
  3 - Position 3

REPLACEMENT KIT NUMBERS IF ORDERED SEPARATELY

ACCESSORY	KIT DESCRIPTION	KIT NUMBER
PS(R)xNx	Housing without switch kit	73120-01
PS(R)xA1	Housing with 5-pin AC/DC switch kit	73120-02
PS(R)xDx	Housing with 4-pin DC switch kit	73120-03
PS(R)xEx	Housing with 4-pin DC switch kit	73120-04
PS(R)xFx	Housing with 4-pin DC switch kit	73120-05
PS(R)xHx	Housing with 4-pin DC switch kit	73120-06
PS(R)xJx	Housing with 4-pin DC switch kit	73120-07

Kit includes: Switch housing, target, target driver, dowel pins, mounting screws, and switch (when specified)

REPLACEMENT SWITCH NUMBERS IF ORDERED SEPARATELY

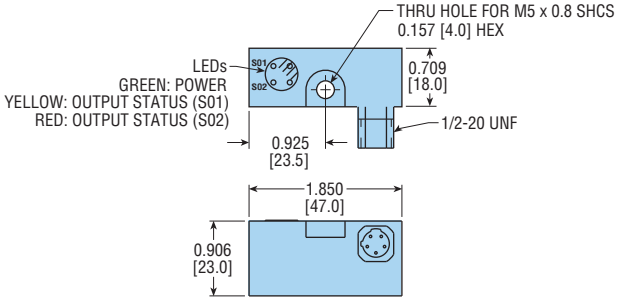
SWITCH OPTION	SWITCH TYPE	PHD SWITCH NUMBER	VENDOR	VENDOR PART NUMBER
A	5-pin AC/DC	71483-002-PFC	Turck	Ni 2-Q6.5-ADZ32-0.16-FSB 5.4X4/S304
D	4-pin DC - PNP	71483-001-PFC	P & F	NBN2-F581-160S6-E8-V1
E	4-pin DC - PNP	71483-003-PFC	Turck	Ni 2-Q6.5-0.16-BDS-2AP6X3-H1141/S34
F	4-pin DC - PNP	71483-004-PFC	Efector	IN 5375
H	4-pin DC - NPN	71483-005-PFC	Turck	NBN2-F581-160S6-E10-V1
J	4-pin DC - NPN	71483-006-PFC	Turck	Ni 2-Q6.5-AN6-0.16-FS 4.4X3/S304

MATCHING CORDSETS 2 METERS LONG

SWITCH OPTION	PHD PART NUMBER	CORDSET PART NUMBER
A	73317-00-02	KB 5T-2
D	65440-001-02	V1-G-YE2M-PVC
E	78039-00-02	RK 4.4T-2
F	65440-001-02	V1-G-YE2M-PVC
H	65440-001-02	V1-G-YE2M-PVC
J	78039-00-02	RK 4.4T-2

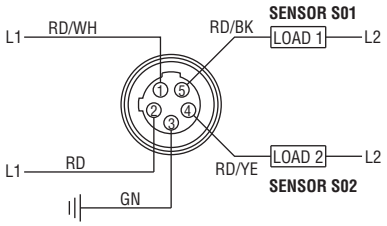
All dimensions are reference only unless specifically toleranced.

SWITCH OPTION A 71483-002-PFC Turck Part #: Ni 2-Q6.5-ADZ32-0.16-FSB 5.4X4/S304

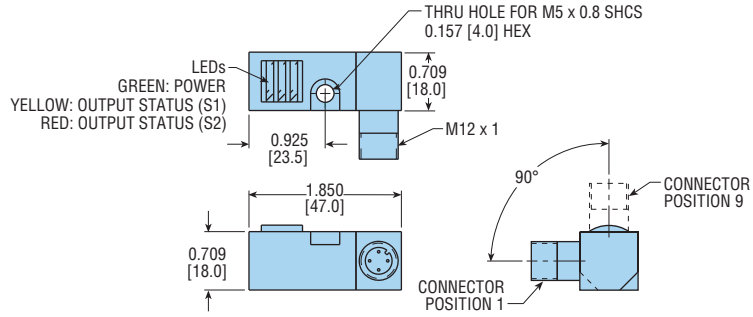


OPTION CODE	SATELLITE		QUICK DISCONNECT PIN NUMBER
	UNCLAMPED	CLAMPED	
PSxA1	S02	S01	S01 = Pin 5
PRxA1	S01	S02	S02 = Pin 4

4-WIRE AC/DC

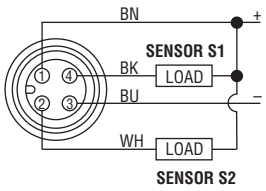


SWITCH OPTION D 71483-001-PFC P + F Part #: NBN2-F581-160S6-E8-V1 (PNP)
SWITCH OPTION H 71483-005-PFC P + F Part #: NBN2-F581-160S6-E10-V1 (NPN)

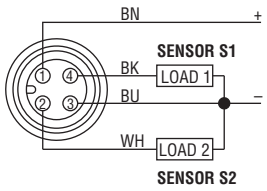


OPTION CODE	SATELLITE		QUICK DISCONNECT PIN NUMBER
	UNCLAMPED	CLAMPED	
PSxDx or PSxHx	S2	S1	S1 = Pin 4
PRxDx or PRxHx	S1	S2	S2 = Pin 2

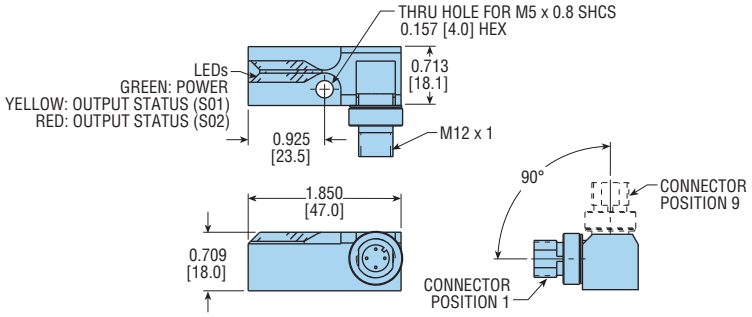
4-WIRE DC (V1 TYPE)
NPN DUAL NORMALLY OPEN



4-WIRE DC (V1 TYPE)
PNP DUAL NORMALLY OPEN

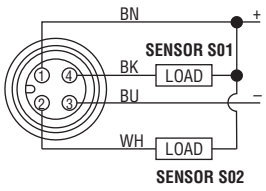


SWITCH OPTION E 71483-003-PFC Turck Part #: Ni 2-Q6.5-0.16-BDS-2AP6X3-H1141/S34 (PNP)
SWITCH OPTION J 71483-006-PFC Turck Part #: Ni 2-Q6.5-AN6-0.16-FS 4.4X3/S304 (NPN)

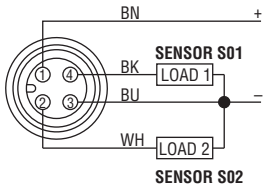


OPTION CODE	SATELLITE		QUICK DISCONNECT PIN NUMBER
	UNCLAMPED	CLAMPED	
PSxEx or PSxJx	S02	S01	S01 = Pin 4
PRxEx or PRxJx	S01	S02	S02 = Pin 2

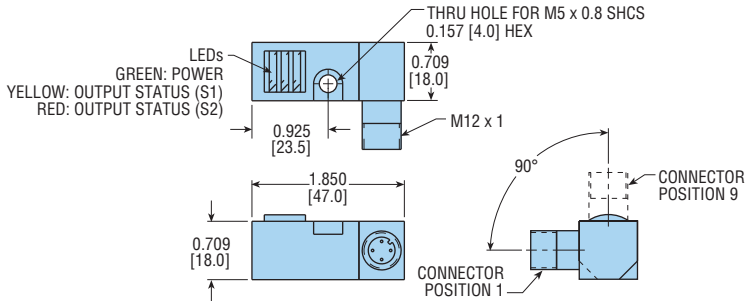
4-WIRE DC
NPN DUAL NORMALLY OPEN



4-WIRE DC
PNP DUAL NORMALLY OPEN

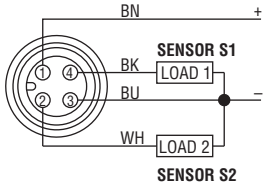


SWITCH OPTION F 71483-004-PFC Efector Part #: IN 5375 (PNP)



OPTION CODE	SATELLITE		QUICK DISCONNECT PIN NUMBER
	UNCLAMPED	CLAMPED	
PSxFx	S2	S1	S1 = Pin 4
PRxFx	S1	S2	S2 = Pin 2

4-WIRE DC
PNP DUAL NORMALLY OPEN

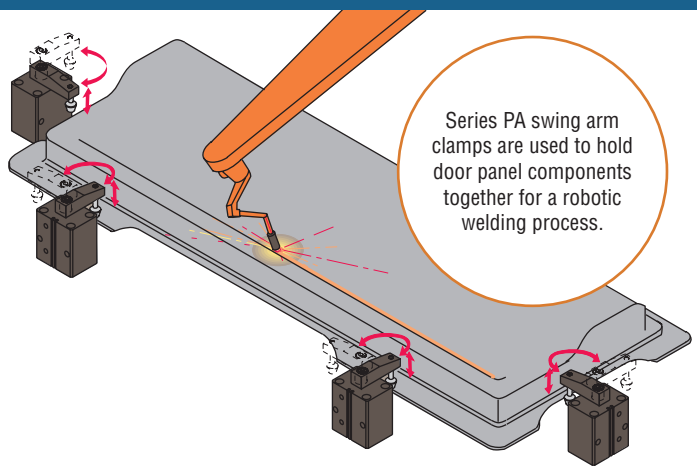


All dimensions are reference only unless specifically toleranced.

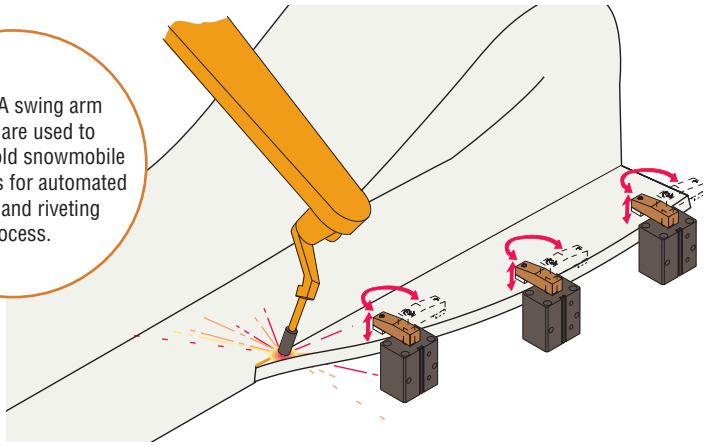
PHD SOLUTIONS AT WORK

- Our robust designs provide longer life over other actuators.
- PHD Clamps maintain repeatability over life providing superior performance and increased productivity by reducing downtime and scrap.
- PHD Clamps are field repairable and with the benefits listed above provide the lowest cost of ownership.
- Superior delivery

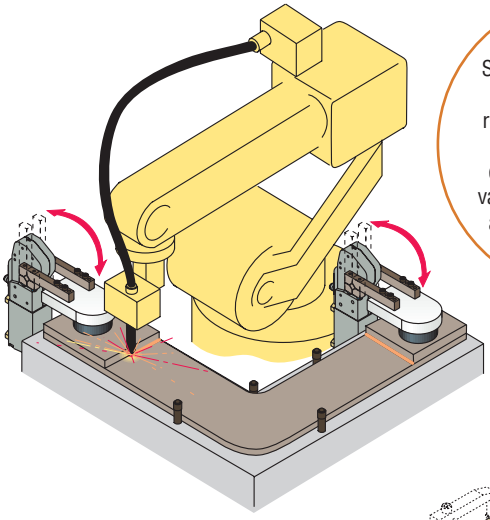
- **Assembly**
- **Frame Welding**
- **Frame Drilling**
- **Frame Bending**
- **Material Transfer**
- **Robotics**
- **Tube Welding**
- **Jigs**
- **Part Fixturing**



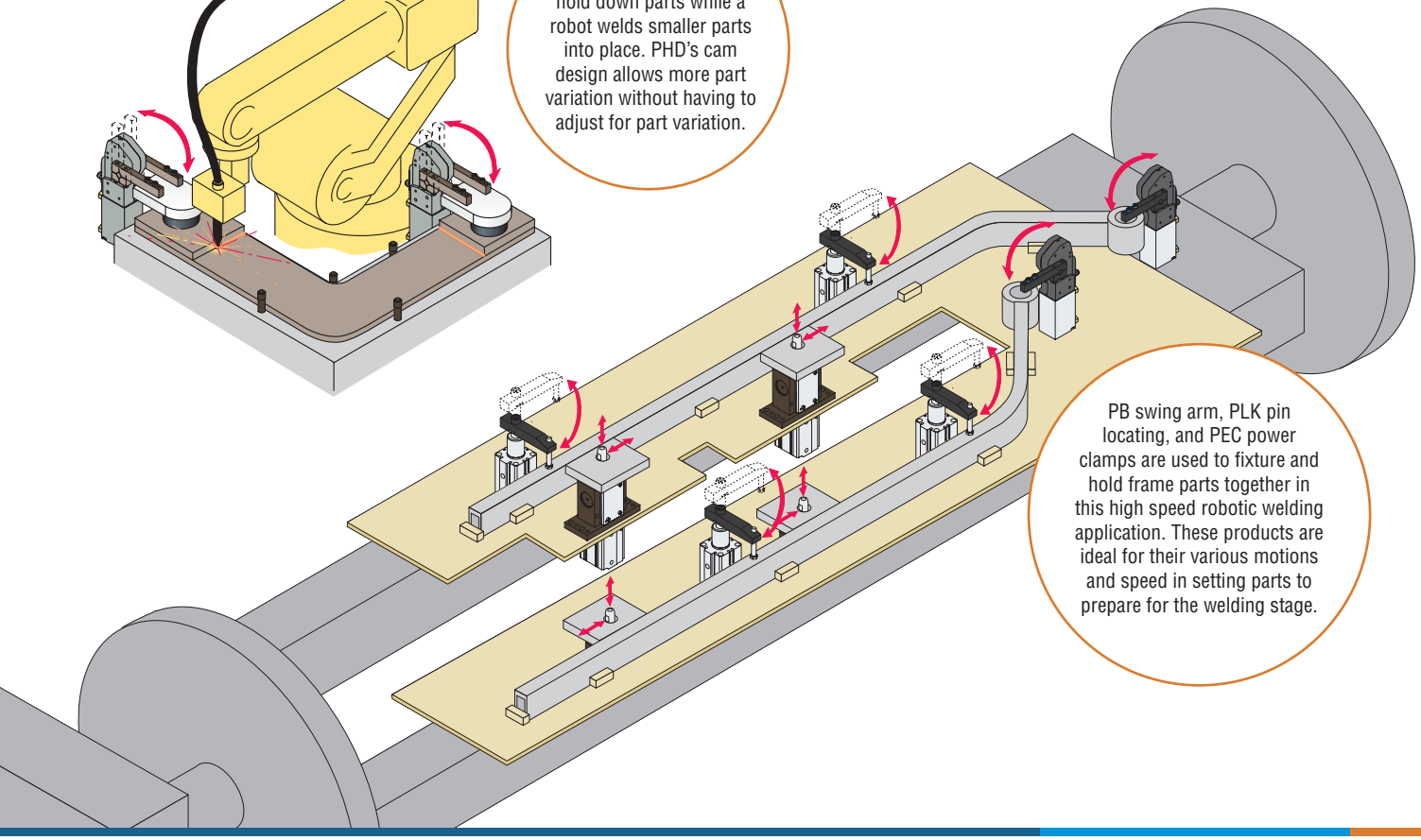
Series PA swing arm clamps are used to hold door panel components together for a robotic welding process.



Series PA swing arm clamps are used to securely hold snowmobile tunnel parts for automated welding and riveting process.



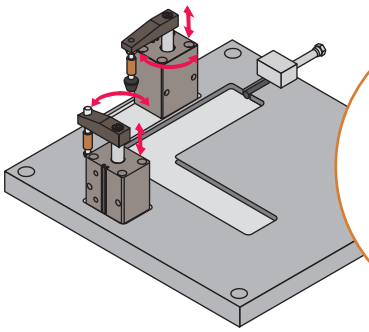
Series PEC power clamps hold down parts while a robot welds smaller parts into place. PHD's cam design allows more part variation without having to adjust for part variation.



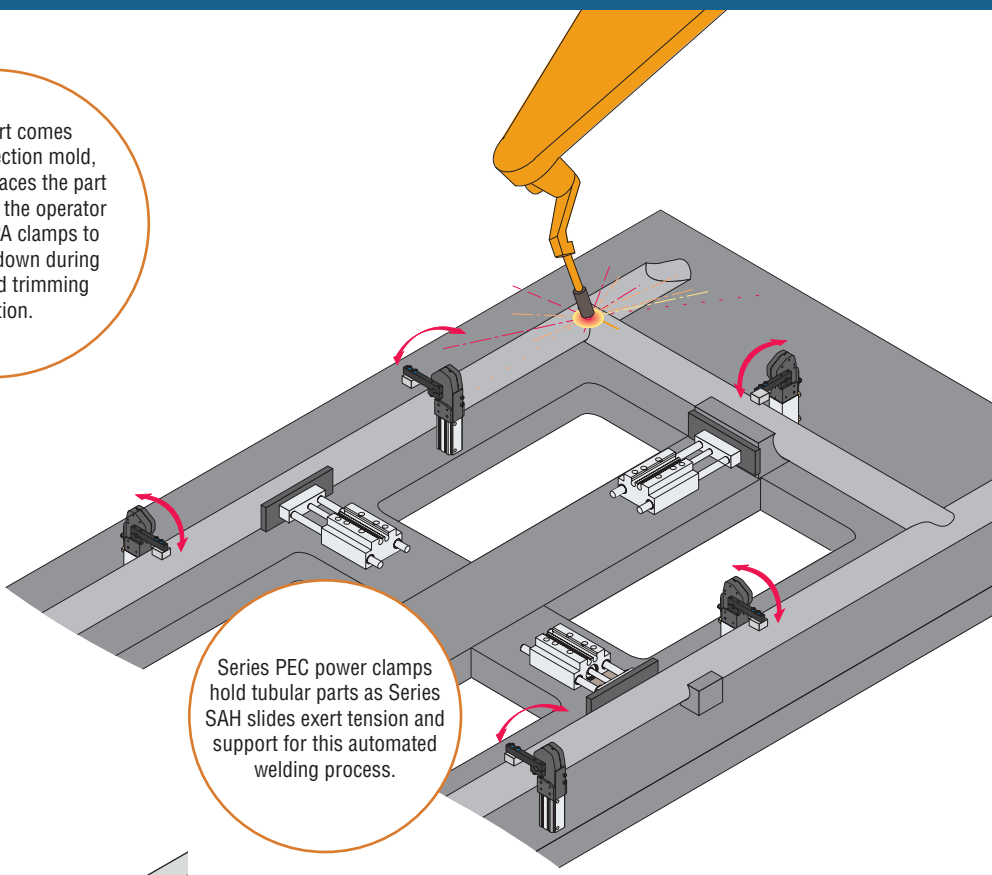
PB swing arm, PLK pin locating, and PEC power clamps are used to fixture and hold frame parts together in this high speed robotic welding application. These products are ideal for their various motions and speed in setting parts to prepare for the welding stage.

LDA Solutions for Life
Hoge Buizen 53 -1980 EPPEGEM (BE)
www.LDA.be - LDA@LDA.be
+32(0) 2 266 13 13

METAL FABRICATION APPLICATIONS

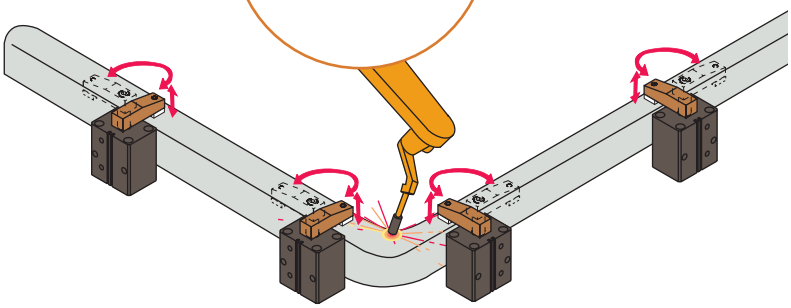


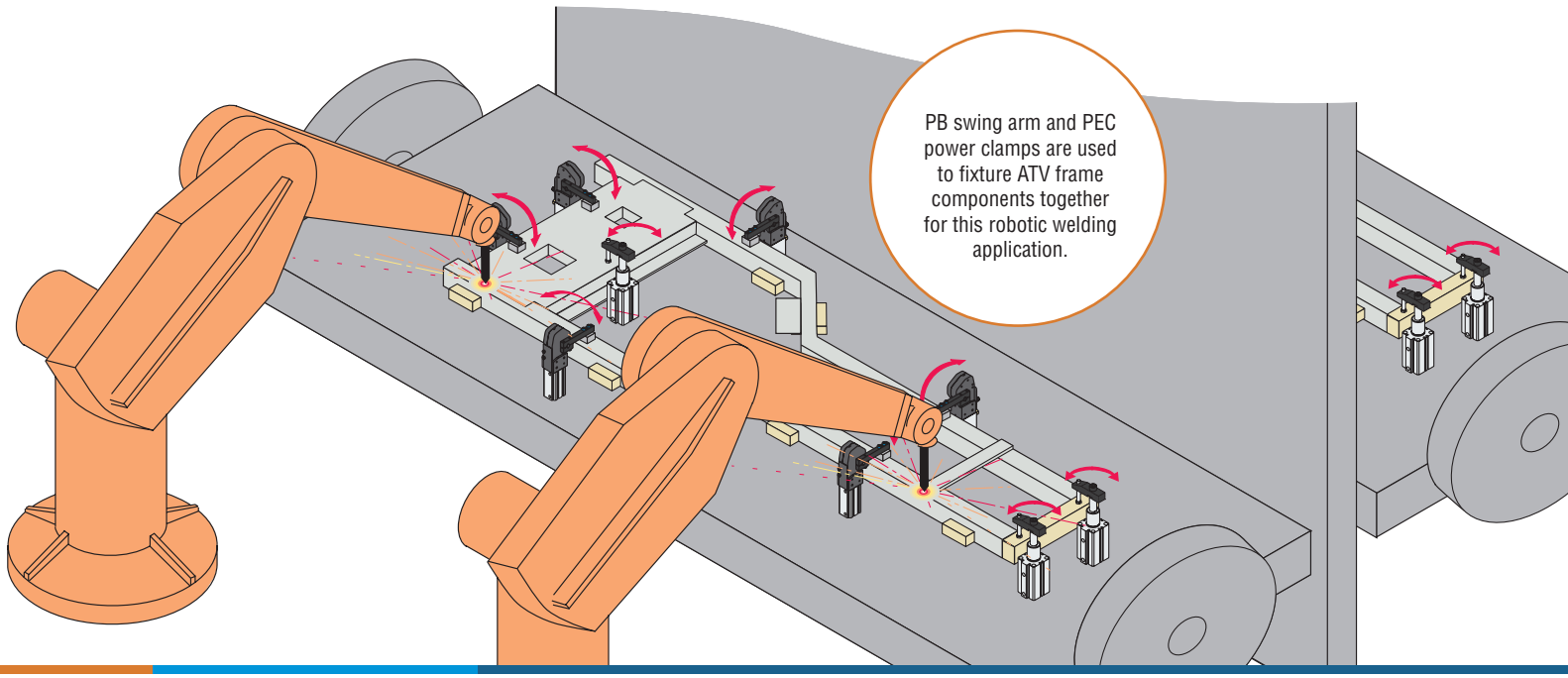
When a part comes out of the injection mold, the operator places the part in a nest. Then the operator actuates the PA clamps to hold the part down during an automated trimming operation.



Series PEC power clamps hold tubular parts as Series SAH slides exert tension and support for this automated welding process.

Series PA swing arm clamps are well suited for this fixtured tube holding application.





PB swing arm and PEC power clamps are used to fixture ATV frame components together for this robotic welding application.