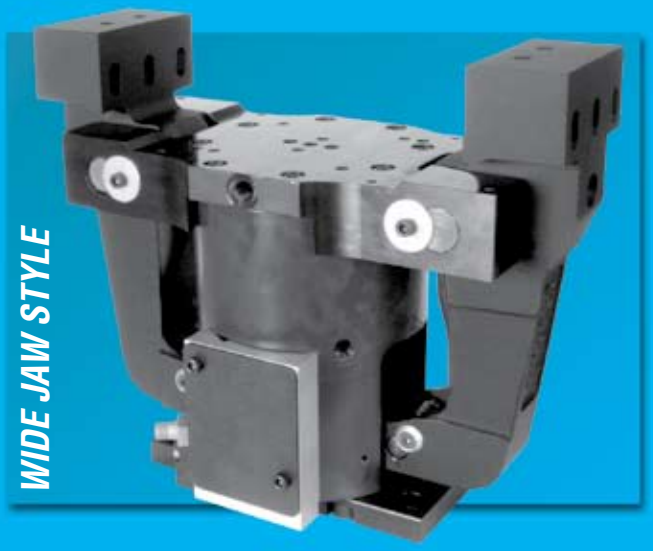
PFC SERIES PFC FRAME CLAMPS

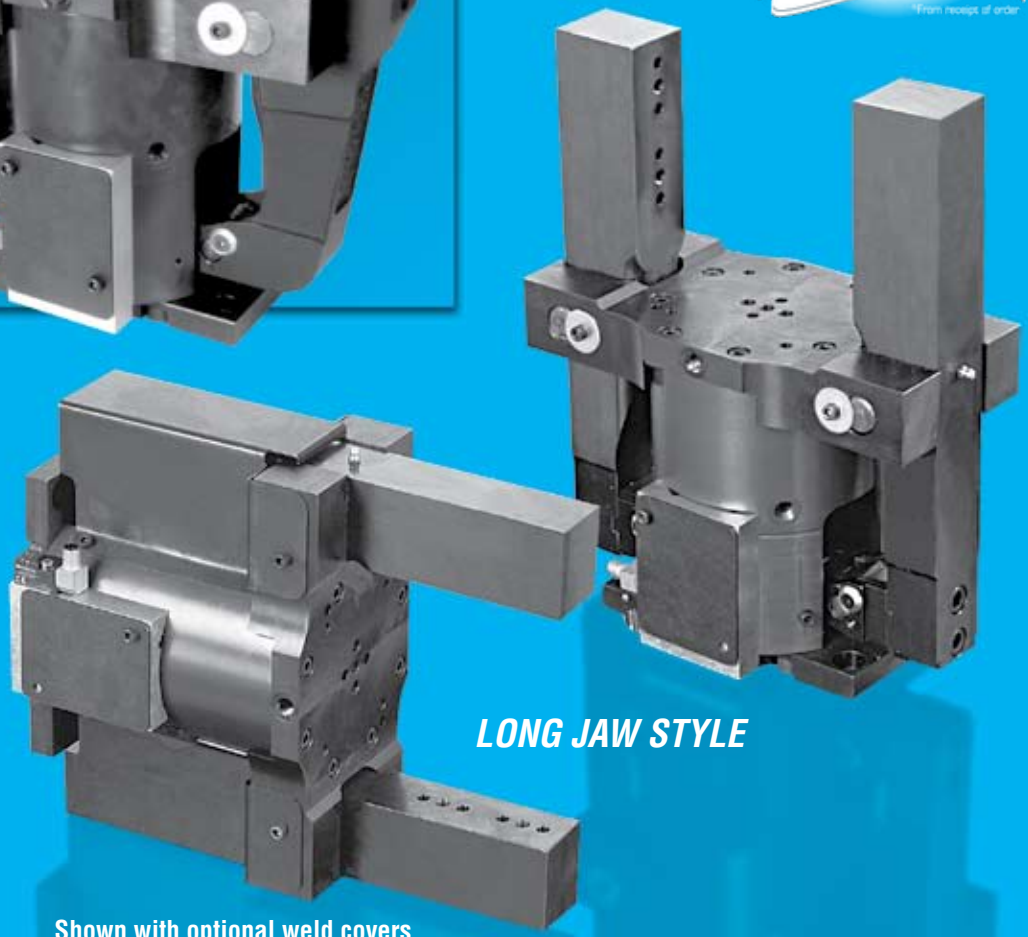
for the Automotive Industry

Ideal for heavy parts clamping

CLAMP DIVISION SUPERIOR DELIVERY 24 Hour* *From receipt of order



WIDE JAW STYLE



LONG JAW STYLE

ISO-9001 CERTIFIED
Quality Management System Certified

Shown with optional weld covers

PFC02B

MDN

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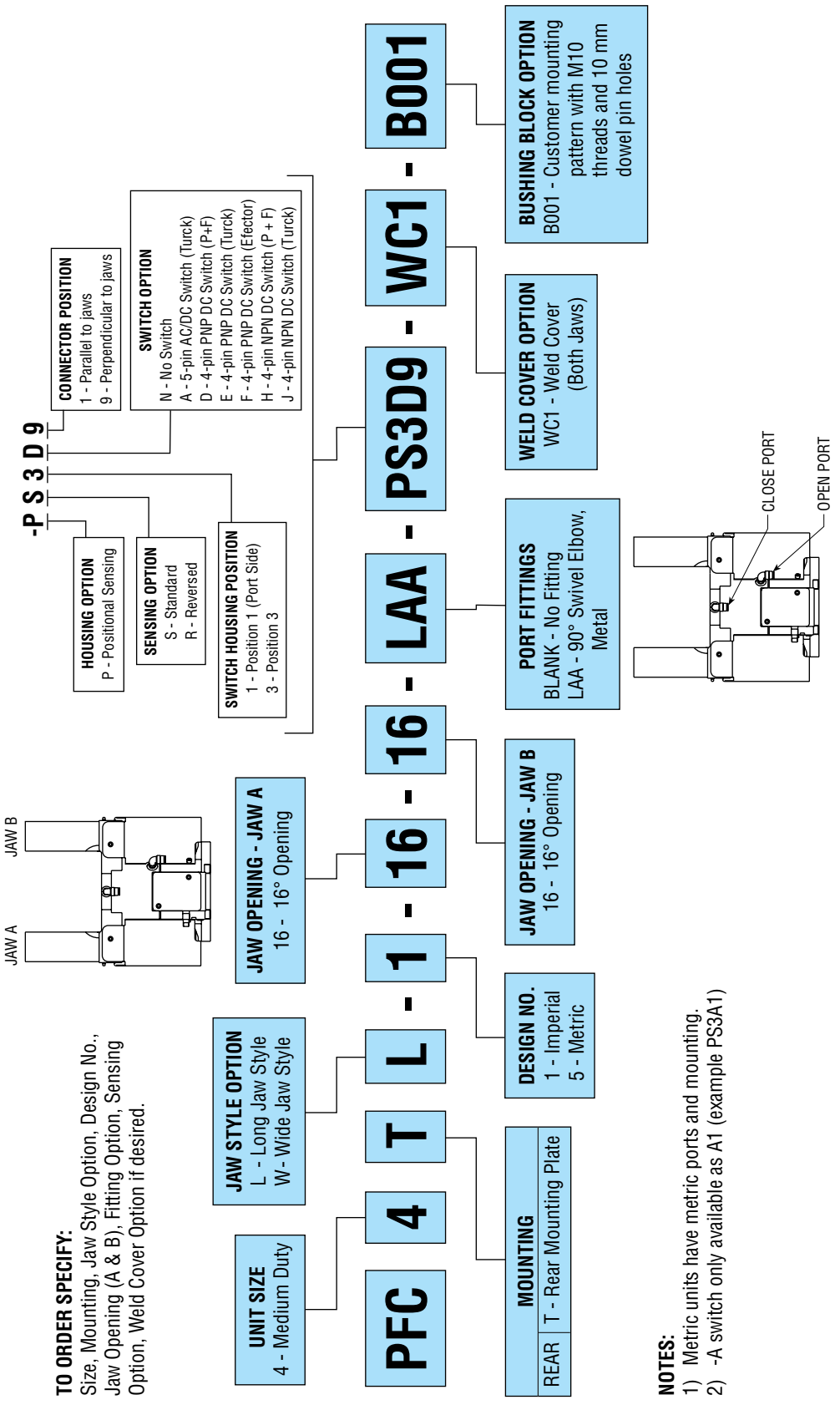
ORDERING DATA: SERIES PFC CLAMPS

INDEX:



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

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

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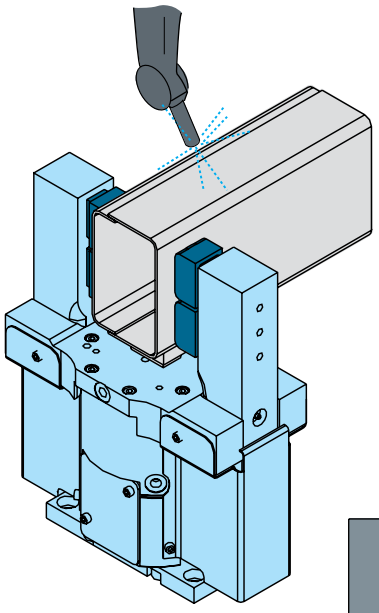
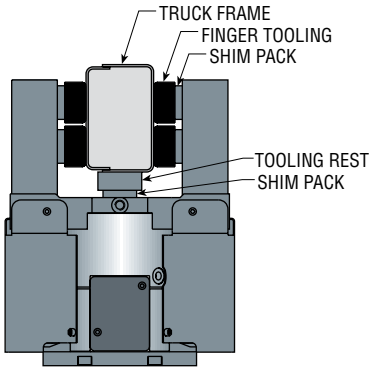


PFC4TL-1-16-16 SHOWN



PFC4TL

U.S. Patent
No. 7,066,458 B2

PFC4TW

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.

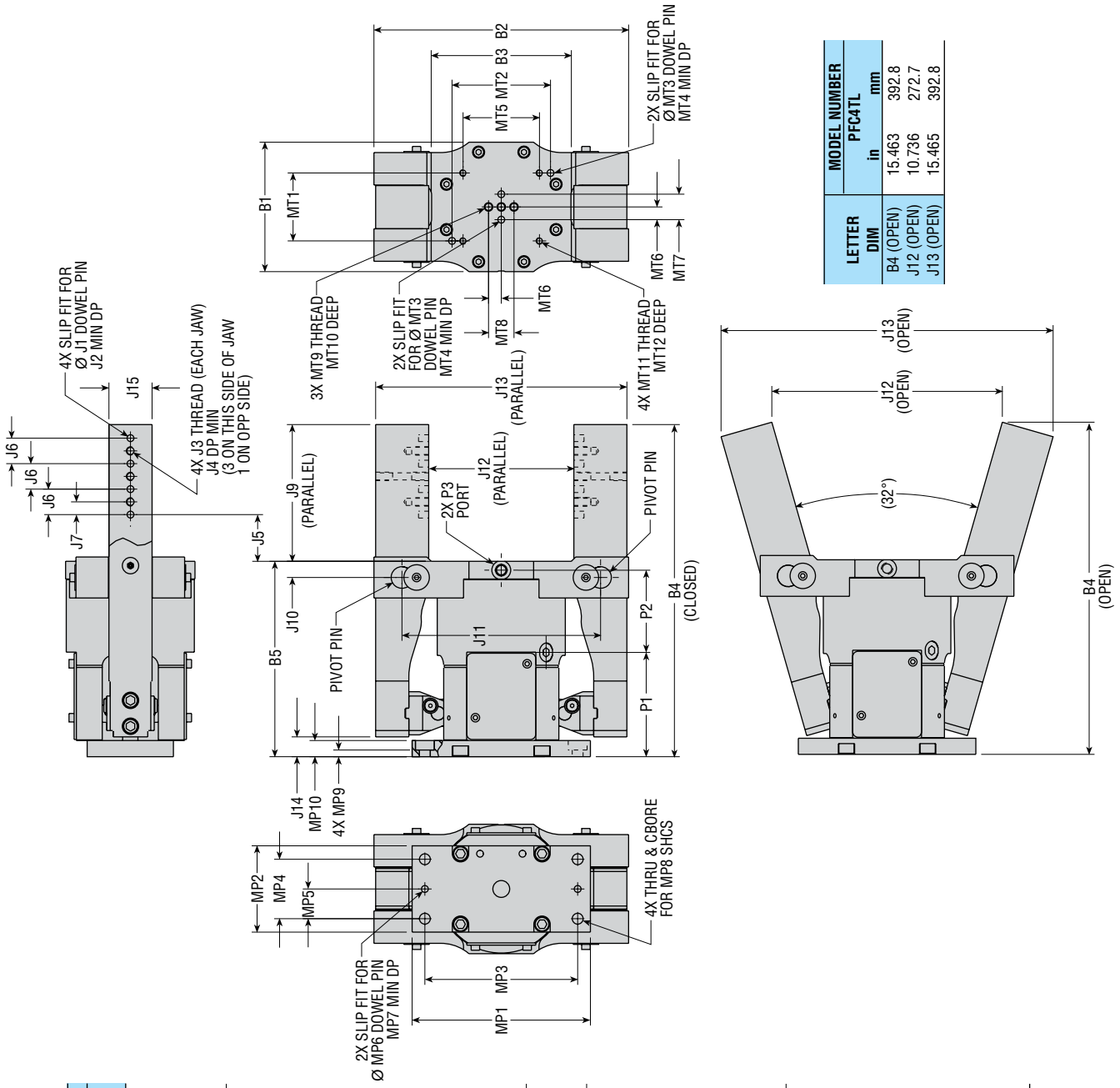
Benefits

- 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.
- "L" style jaws have dowels and threads for NAAMS™ mounting and shims.
- Modular design allows the jaws and bushing block to be easily removed for modification.
- Weld cover option protects internal mechanisms from flying sparks and debris.
- Position sensing option provides open and closed sensing with an industry standard AC or DC weldfield immune switch mounted in a protected housing.
- Operates quietly in less than .6 seconds. Flow controls are not required. Body has orifice communication which saves money and provides easy setup.
- Fully field repairable in less than 30 minutes using only 4 metric hex wrenches.
- Lowest cost of ownership due to option availability to standard clamp without further modifications.

Industry Uses

- Automotive
- General Industrial Automation

DIMENSIONS: SERIES PFC CLAMPS - "L" LONG JAW STYLE



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	.315	8.0
J2	.472	12.0
J3	M10 x 1.5	
J4	.787	20.0
J5	2.165	55.0
J6	1.181	30.0
J7	.591	15.0
J8	1.181	30.0
J9	6.338	161.0
J10	.750	19.1
J11	9.212	234.0
J12 (CLOSED)	6.732	171.0
J13 (CLOSED)	11.652	296.0
J14	.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	.315	8.0
MP7	.472	12.0
MP8	7/16	M12
MP9	.315	8.0
MP10	.750	19.1
MT1	3.150	80.0
MT2	4.567	116.0
MT3	.315	8.0
MT4	.472	12.0
MT5	3.543	90.0
MT6	.591	15.0
MT7	1.181	30.0
MT8	1.181	30.0
MT9	M10 x 1.5	
MT10	.669	17.0
MT11	M8 x 1.25	
MT12	.669	17.0

All dimensions are reference only unless specifically toleranced.

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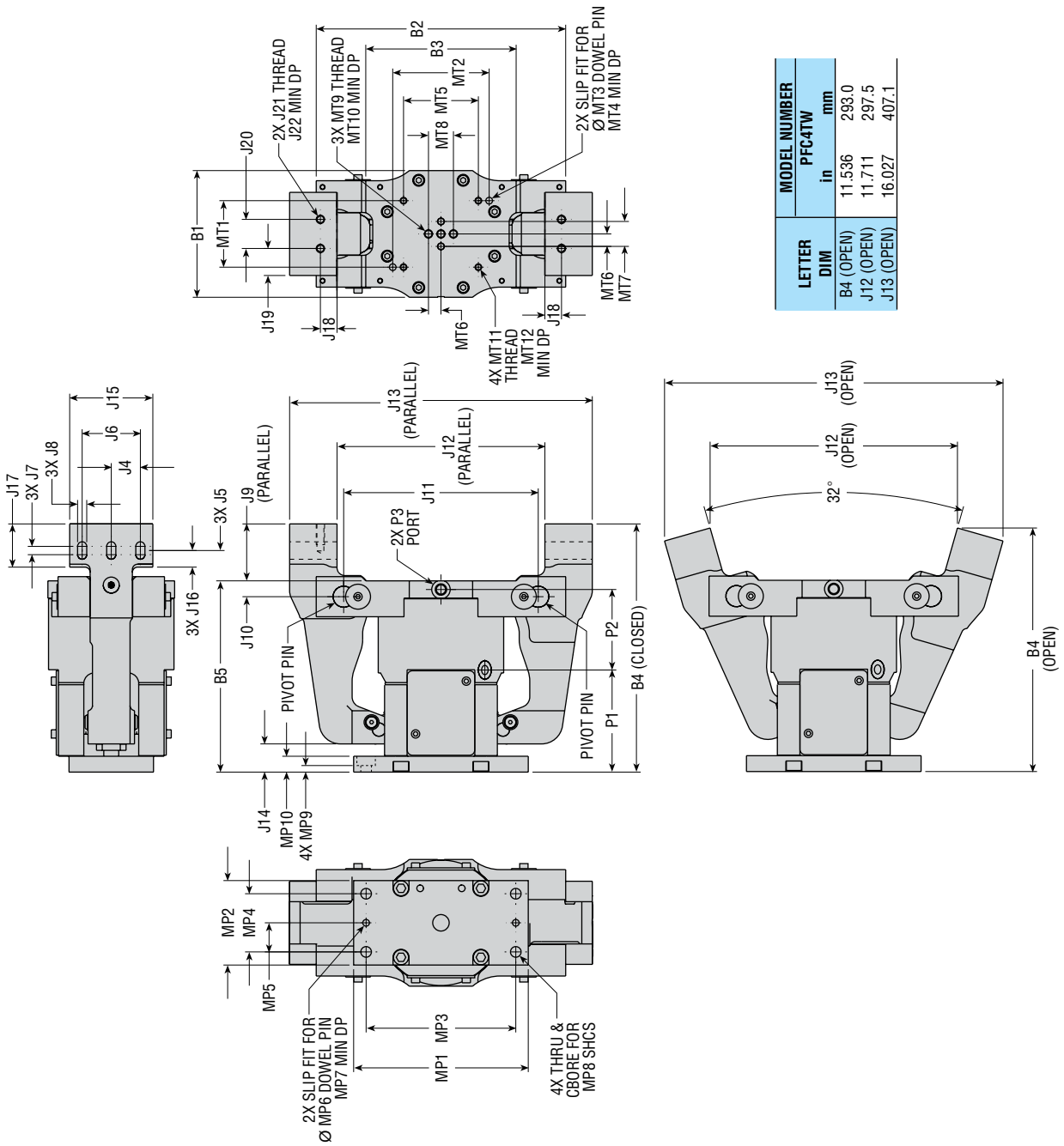
DIMENSIONS: SERIES PFC CLAMPS - "W" WIDE JAW STYLE



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	.394	10.0
J8	.433	11.0
J9	2.697	68.5
J10	.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	.787	20.0
J17	2.047	52.0
J18	.787	20.0
J19	1.280	32.5
J20	1.378	35.0
J21	M10 x 1.5	
J22	.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	.315	8.0
MP7	.472	12.0
MP8	7/16	M12
MP9	.315	8.0
MP10	.750	19.1
MT1	3.150	80.0
MT2	4.567	116.0
MT3	.315	8.0
MT4	.472	12.0
MT5	3.543	90.0
MT6	.591	15.0
MT7	1.181	30.0
MT8	1.181	30.0
MT9	M10 x 1.5	
MT10	.669	17.0
MT11	M8 x 1.25	
MT12	.669	17.0

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ENGINEERING DATA: SERIES PFC CLAMPS

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]

MODEL	UNIT WEIGHT lb	UNIT WEIGHT kg	TOTAL CLAMP FORCE at 87 psi [6 bar] lb	TOTAL CLAMP FORCE at 87 psi [6 bar] N	CLOSE OR OPEN TIME 87 psi [6 bar] second	DISPLACEMENT CLOSE in³	DISPLACEMENT CLOSE cm³	DISPLACEMENT OPEN in³	DISPLACEMENT OPEN cm³	CLAMP FORCE FACTOR (Cf) Imperial	CLAMP FORCE FACTOR (Cf) Metric
PFC4TL-1-16-16	74.6	33.8	11250	50040	0.5	44.2	724.3	43.1	706.3	606.1	992400
PFC4TW-1-16-16	72.4	33.0	7200	32027	0.5	44.2	724.3	43.1	706.3	181.0	296516

OPTION WEIGHT ADDERS

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

SEALS AND FLUIDS

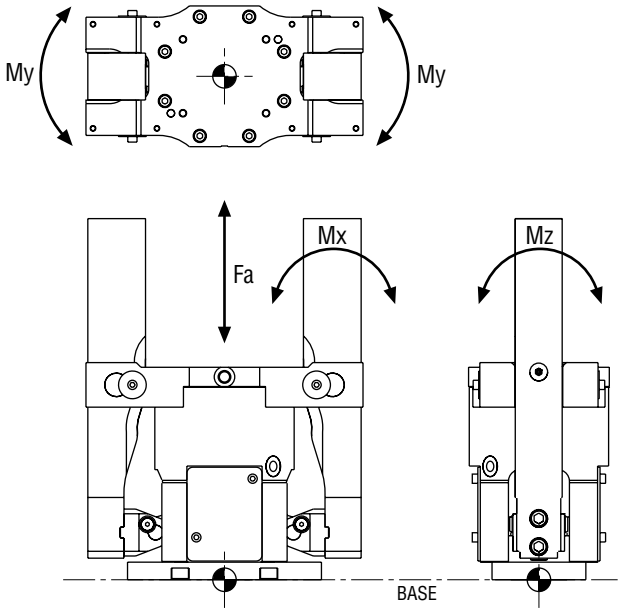
Buna-N and Nitrile seals are standard on Series PFC Clamps. Piston seals are long life Nitrile and rod seals are lip type. Both are compatible with standard paraffin-based lubrication oils used for pneumatic cylinders. For compatibility with other fluids, consult PHD.

LIFE EXPECTANCY

All units with Buna-N and Nitrile seals have been designed for 5 million cycles with minimal seal wear and minimal backlash.

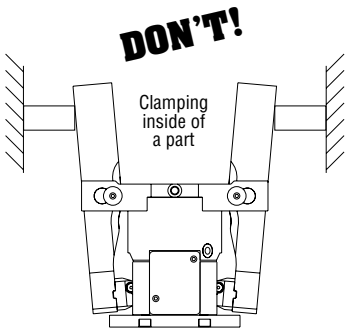
MOMENTS TEST

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



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.



MAX. ALLOWABLE FORCES & MOMENTS FOR JAWS

MODEL	Fa lb	Fa N	Mx in-lb	Mx Nm	My in-lb	My Nm	Mz in-lb	Mz 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

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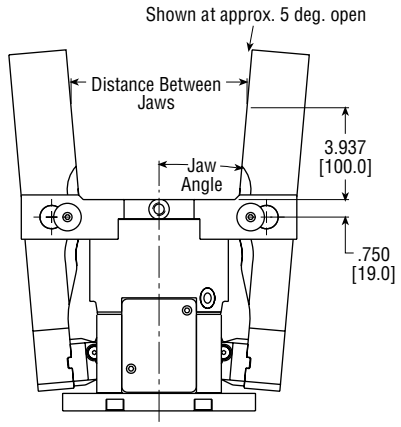
EFFECTIVE CLAMPING RANGE

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.

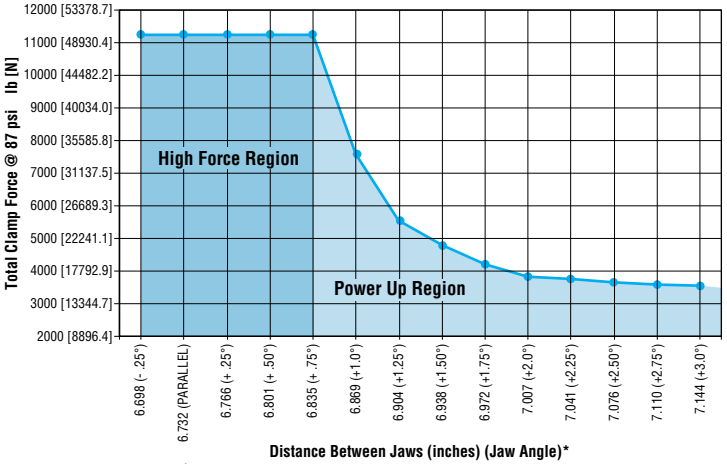
To achieve maximum clamp force, custom tooling or spacers must be used to close the jaws in the high force region. Refer to charts for high force region.

"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)



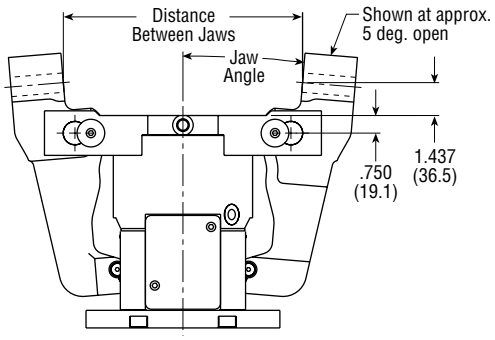
Distance Between Jaws (inches) (Jaw Angle)*
(* - Distance measured 3.937 [100.0 mm] above mounting face of clamp
Jaw Angle measured in degrees per jaw)

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

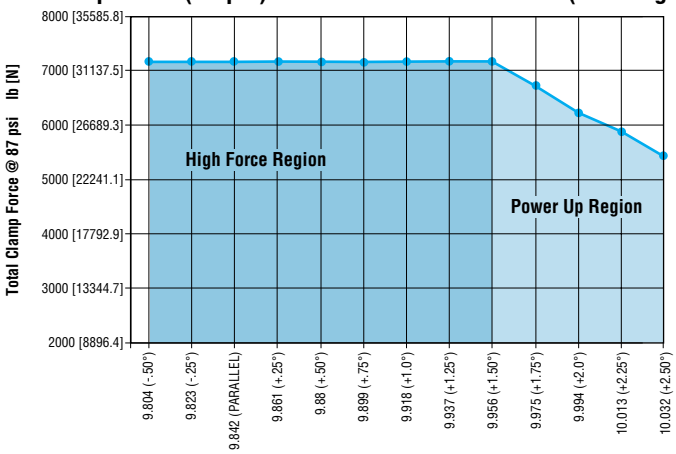
Metric Example:
Your air line pressure: 6 bar
Clamp force multiplier: 992400
(within high force region)
Distance from clamping location to pivot: 119 mm
(6 x 992400)/119 = 50042 N

"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)



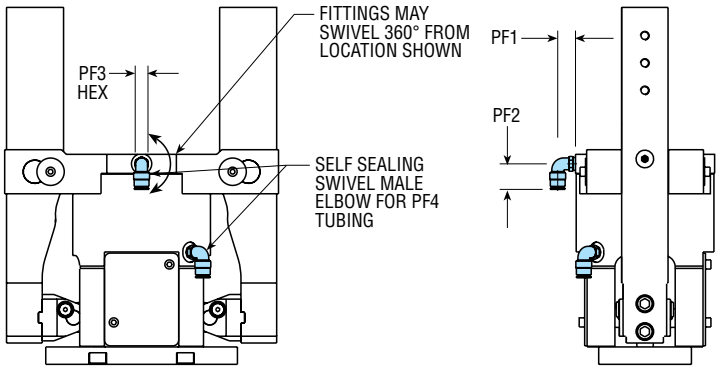
Distance Between Jaws (inches) (Jaw Angle)*
(* - Distance measured at customer mounting holes - approx. 1.437 [36.5 mm]
Jaw Angle measured in degrees per jaw)

LAA PORT FITTINGS

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

LETTER DIMENSION	MODEL NUMBER PFC4xx in	mm
PF1 (MIN)	.767	20.5
PF2	1.102	28.0
PF3	.551	14.0
PF4	3/8	10.0
PART NO.	62178-010	62195-010

NOTE: FITTINGS ARE ORDERED SEPARATELY



All dimensions are reference only unless specifically toleranced.

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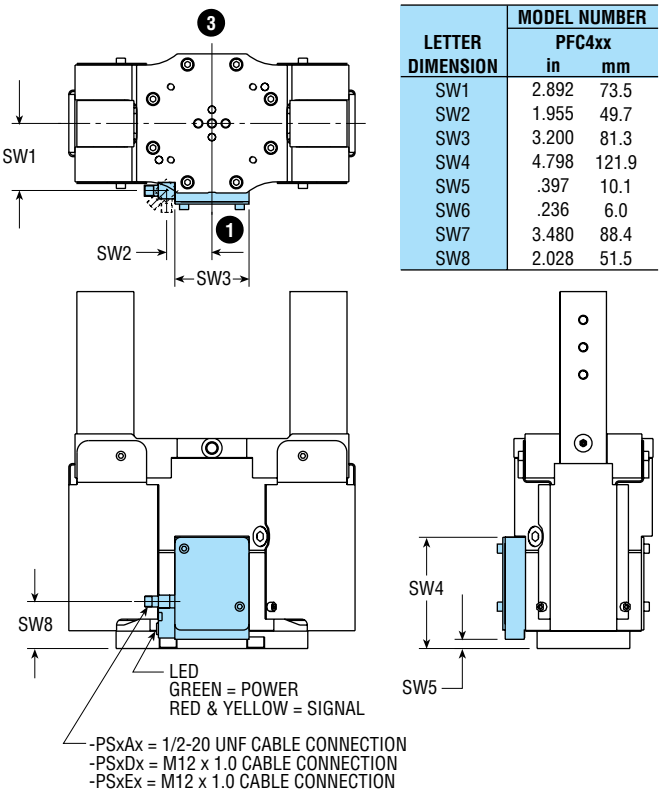
PS(R)xxx POSITION SENSING

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 DIMENSION	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	.397	10.1
SW6	.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

-P S 3 D 9

HOUSING OPTION
P - Positional Sensing

SENSING OPTION
S - Standard
R - Reversed

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

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)

-A switch only available as A1 (example PxxA1)

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

REPLACEMENT KIT NUMBERS IF ORDERED SEPARATELY

ACCESSORY	KIT DESCRIPTION	KIT NUMBER
PS(R)xNx	Housing w/o switch kit	73120-01
PS(R)xA1	Housing w/5-pin AC/DC (Turck) switch kit	73120-02
PS(R)xDx	Housing w/4-pin DC (P+F) switch kit	73120-03
PS(R)xEx	Housing w/4-pin DC (Turck) switch kit	73120-04
PS(R)xFx	Housing w/4-pin DC (Efector) switch kit	73120-05
PS(R)xHx	Housing w/4-pin DC (P+F) switch kit	73120-06
PS(R)xJx	Housing w/4-pin DC (Turck) switch kit	73120-07

Kit Includes: Switch Housing, Target, Target Driver, Dowel Pins, Mounting Screws, and Switch (When Specified)

MATCHING CORDSETS 2 METERS LONG

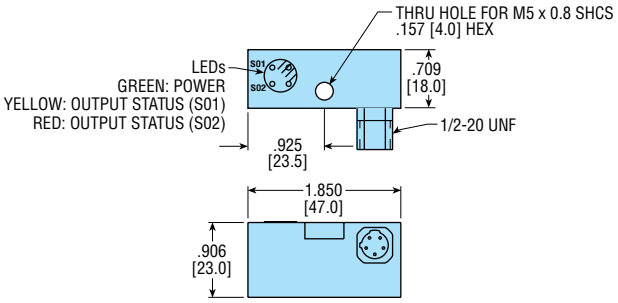
SWITCH OPTION	PHD PART NUMBER	CORDSET PART NUMBER
A	73317-00-02	KB 5T-2
D	65440-001-02	V1-G-YE2M-PVC
E	78039-00-02	RK 4.4T-2
F	65440-001-02	V1-G-YE2M-PVC
H	65440-001-02	V1-G-YE2M-PVC
J	78039-00-02	RK 4.4T-2

REPLACEMENT SWITCH KIT NUMBERS IF ORDERED SEPARATELY

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

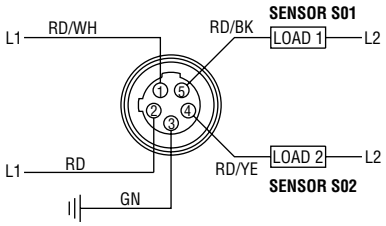
OPTIONS & KITS: SERIES PFC CLAMPS

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

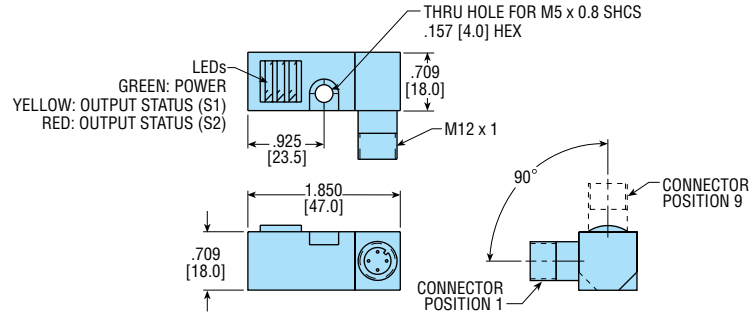


OPTION CODE	SATELLITE UNCLAMPED	SATELLITE CLAMPED	QUICK DISCONNECT PIN NUMBER
PSxA1	S02	S01	S01 = PIN 5
PRxA1	S01	S02	S02 = PIN 4

4-WIRE AC/DC

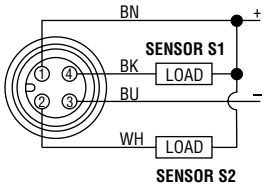


SWITCH OPTION D P + F Part #: NBN2-F581-160S6-E8-V1 (PNP)
SWITCH OPTION H P + F Part #: NBN2-F581-160S6-E10-V1 (NPN)

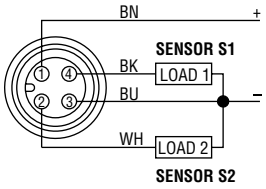


OPTION CODE	SATELLITE UNCLAMPED	SATELLITE CLAMPED	QUICK DISCONNECT PIN NUMBER
PSxxx	S2	S1	S1 = PIN 4
PRxxx	S1	S2	S2 = PIN 2

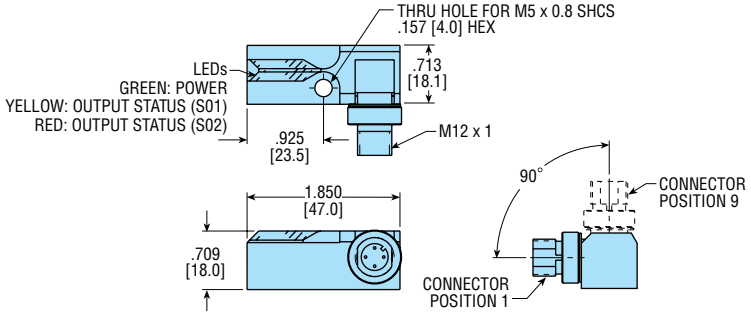
4-WIRE DC (V1 TYPE)
NPN DUAL NORMALLY OPEN



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

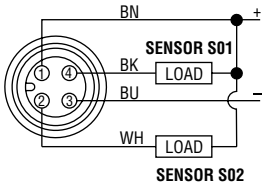


SWITCH OPTION E Turck Part #: Ni 2-Q6.5-0.16-BDS-2AP6X3-H1141/S34 (PNP)
SWITCH OPTION J Turck Part #: Ni-2-Q6.5-AN6-0.16-FS 4.4X3/S304 (NPN)

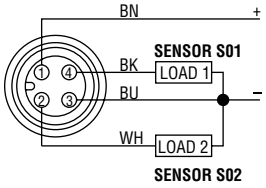


OPTION CODE	SATELLITE UNCLAMPED	SATELLITE CLAMPED	QUICK DISCONNECT PIN NUMBER
PSxxx	S02	S01	S01 = PIN 4
PRxxx	S01	S02	S02 = PIN 2

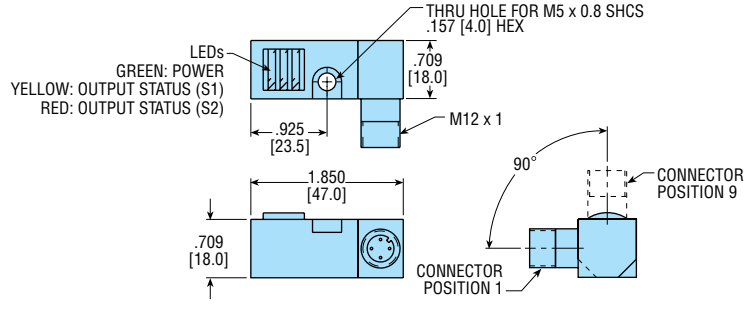
4-WIRE DC (V1 TYPE)
NPN DUAL NORMALLY OPEN



4-WIRE DC
PNP DUAL NORMALLY OPEN

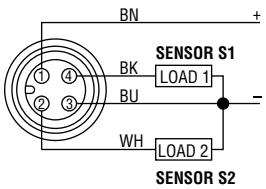


SWITCH OPTION F Efector Part #: IN 5375 (PNP)



OPTION CODE	SATELLITE UNCLAMPED	SATELLITE CLAMPED	QUICK DISCONNECT PIN NUMBER
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.

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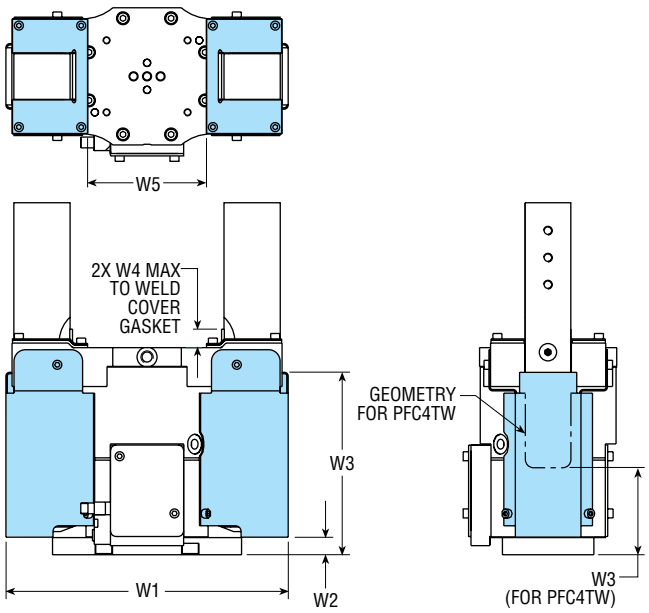
WC1 WELD COVER

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 DIMENSION	PFC4TL in	PFC4TL mm	PFC4TW in	PFC4TW mm
W1	12.346	313.6	12.346	313.6
W2	.768	19.5	.768	19.5
W3	7.978	202.6	3.668	93.2
W4 MAX	.906	23.0	.906	23.0
W5	5.120	130.0	5.120	130.0
KIT NUMBER	73121-01		73121-02	

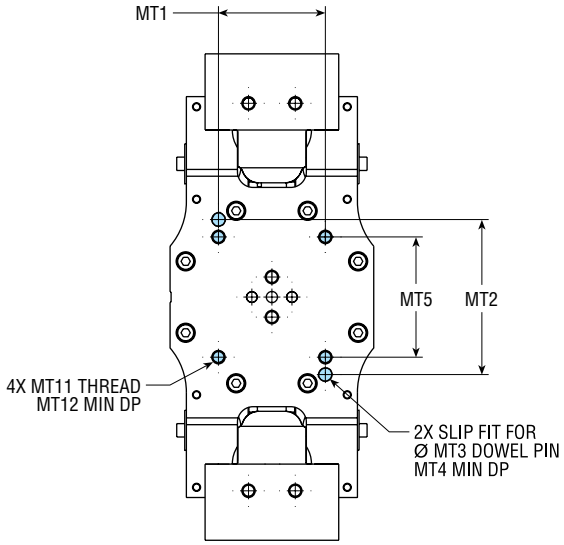
KIT INCLUDES: 2 WELD COVERS
2 WELD COVER PLATES
2 WELD COVER GASKETS
MOUNTING SCREWS



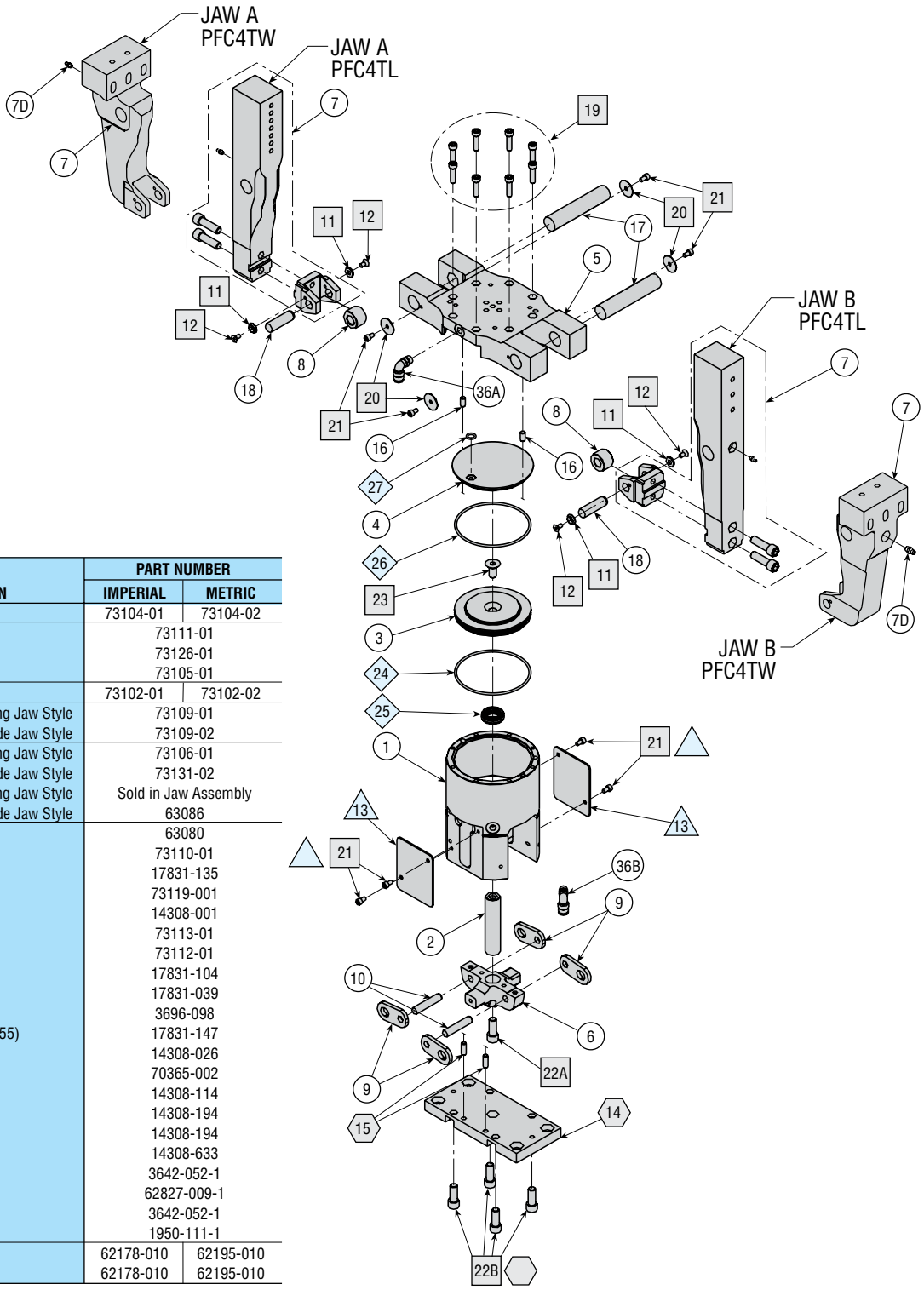
B001 BUSHING BLOCK

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

LETTER DIMENSION	PFCxxx in	PFCxxx mm
MT1	3.150	80.0
MT2	4.567	116.0
MT3	.394	10.0
MT4	.591	15.0
MT5	3.543	90.0
MT11	M10 x 1.5	
MT12	.669	17.0



EXPLODED VIEW & PARTS LIST: SERIES PFC CLAMPS



KEY	DESCRIPTION		PART NUMBER IMPERIAL	METRIC
1	Body		73104-01	73104-02
2	Piston Rod		73111-01	
3	Piston		73126-01	
4	Bore Plug		73105-01	
5	Bushing Block		73102-01	73102-02
6	16° Rotation Cam	Long Jaw Style	73109-01	
		Wide Jaw Style	73109-02	
7	Jaw Assembly	Long Jaw Style	73106-01	
		Wide Jaw Style	73131-02	
7D	Grease Zerk	Long Jaw Style	Sold in Jaw Assembly	
		Wide Jaw Style	63086	
8	Roller Bearing		63080	
9	Link		73110-01	
10	Dowel Pin (12 x 60)		17831-135	
11	Counter Sink Washer		73119-001	
12	SFHCS (M6 x 12)		14308-001	
13	Cover Plate		73113-01	
14	Mounting Plate		73112-01	
15	Dowel Pin (8 x 24)		17831-104	
16	Dowel Pin (8 x 16)		17831-039	
17	Pivot Pin (1 x 5)		3696-098	
18	Roller Bearing Pin (16 x 55)		17831-147	
19	SHCS (M8 x 30)		14308-026	
20	Washer		70365-002	
21	SHCS (M6 x 10)		14308-114	
22A	SHCS (M12 x 30)		14308-194	
22B	SHCS (M12 x 30)		14308-194	
23	SFHCS (M12 x 25)		14308-633	
24	Piston Seal		3642-052-1	
25	Rod Seal		62827-009-1	
26	Bore Plug Seal		3642-052-1	
27	Manifold Seal		1950-111-1	
36A	Port Fitting, LAA		62178-010	62195-010
36B	Port Fitting, LAA		62178-010	62195-010

KITS

KIT DESCRIPTION	KIT NO.
Seal Kit	73123-01
Fastener Kit	73124-01
Cover Plate Kit	73122-01
Mounting Plate Kit	73125-01

NOTES:

1) Items shown in □ are included in fastener kit
2) Items shown in ◇ are included in seal kit
3) Items shown in ⬡ are included in mounting plate kit
4) Items shown in △ are included in cover plate kit

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