

Operating Instructions for:

110089	110095
110090	110096
110091	110097

SINGLE-ACTING (LOWER FLANGE) SWING / PULL CLAMP

Max. Capacity: 4,300 lbs. Clamping Force (with 2-1/2" lg. arm) at 5,000 PSI

<u>110089</u> - Left Hand	<u>110095</u> - Left Hand
<u>110090</u> - Right Hand	<u>110096</u> - Right Hand
<u>110091</u> - Straight Pull	<u>110097</u> - Straight Pull

SAFETY PRECAUTIONS



WARNING

To help avoid personal injury:

- All connections must be tightened with the proper tools before applying hydraulic pressure.
- Do not overtighten connections. Using two opposing wrenches, connections should only be tightened securely and leak-free. Overtightening can cause premature thread failure or high pressure fittings to split at pressures lower than their rated capacities.
- Avoid any conditions that could damage hoses or tubing and impair performance. Never allow the hose to kink, twist, curl or bend so tightly that oil flow within the hose is blocked or reduced. This could damage a hose and possibly result in serious injury to persons working in the immediate vicinity.
- Do not subject hoses to potential hazard such as fire, heavy impact, sharp surfaces, or extreme heat or cold, because any of these conditions can damage a hose and result in personal injury.
- Periodically inspect the hoses and tubing for signs of wear. Never use defective hoses, tubing or fittings with pressurized equipment.
- Always consult the manufacturer before painting hoses. Never paint the couplers.
- Do not exceed the rated capacity of the swing clamp.
- Clamping must take place within the specified clamping range to ensure that full force is applied to the workpiece.

SWING CLAMP OPERATION

During clamp retraction, the cylinder rod rotates 90 degrees causing the clamping arm to swing into position. Clamping then takes place as the rod continues to retract in a straight line, pulling the arm against the workpiece. Internal spring force returns the clamp to its unclamped position.

Swing Clamp Arm

The swing clamp arm is adjustable to any position in a 360° circle. Once positioned, the arm will swing 90° in the direction specified. The "live roller" swing mechanism rotates the clamping arm in one direction only. To change swing direction, order a replacement cam of the proper direction (refer to parts list #108029). When the swing is completed, .600" of downward clamping travel is provided. A cam providing no rotation is also available for applications requiring a guided straight pull. **IMPORTANT: Clamping of the workpiece must be completed within this stroke in both swing and straight pull versions.**

The type of arm used in each application will affect the clamping force generated by the clamp. There are two general types of arms used on swing clamp, single and double. Clamping arms may be modified or replaced with custom arms (see Custom Arms on sheet 3 of 3).

Single Arms

Single arms (like the Hytec #500152 and #500153 arms shown on back sheet 2 of 3) are meant to clamp one workpiece at a time. This type of arm transfers the force generated by the swing clamp to the workpiece by being rigidly mounted to the swing clamp piston rod. This design puts considerable bending stress on the piston rod and causes a certain amount of binding within the clamp. The friction due to this binding will slightly reduce the available force at the workpiece.

Double Arms

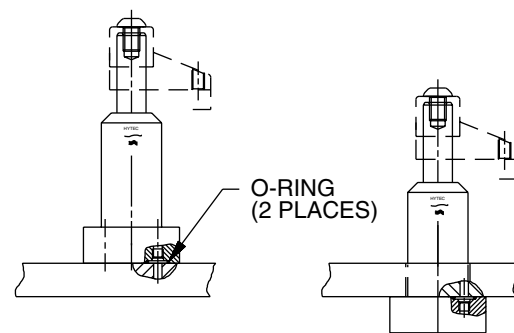
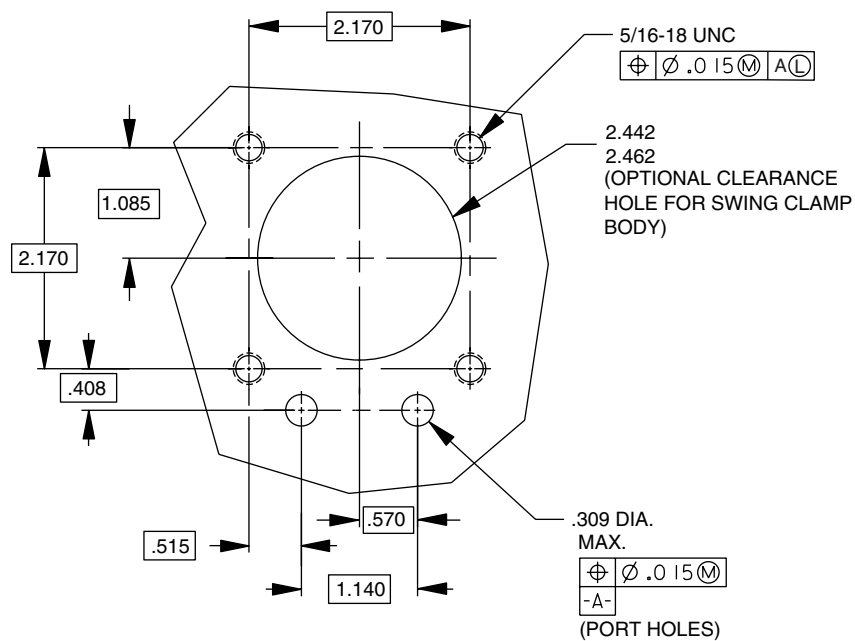
Double arms usually extend out from the clamp in opposite directions and contact two workpieces or a workpiece and a heel block. If both ends of the arm make contact at the same time, there is no bending stress to cause binding and a reduction in clamping force. It must be noted that even though the full force capability of the clamp is available at the arm, this force is being divided between the two points of contact and will always be less per contact point than when using a single arm.

If the two contact points of a double arm are not consistent in clamping height and the arm is solidly mounted to the clamp, much more (or even all) of the clamping force will be put on one of the contact points. If there is variation between the clamping heights, it is strongly recommended that a pivot mechanism be designed into the double arm to equalize the force.

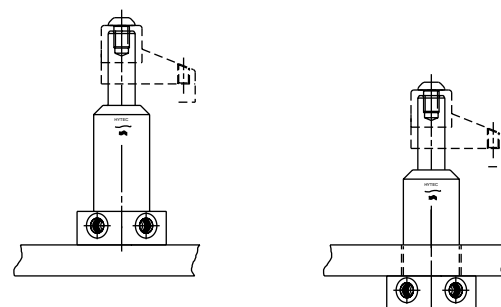
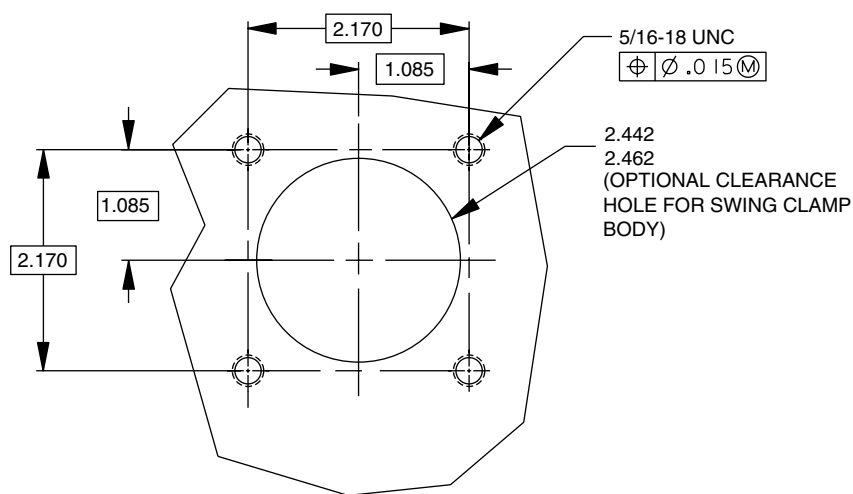
IMPORTANT: To help prevent equipment damage,

- **Do not restrict the arm swing.**
- **Clamping of the workpiece must be completed within the final straight stroke, not in the swing stroke.**
- **IMPORTANT: Seal all external pipe connections with a high-quality, nonhardening thread sealant. Teflon tape can be used to seal hydraulic connections if only one layer of tape is used. Apply the tape carefully, two threads back, to prevent it from being pinched by the coupler and broken off inside the system. Any loose pieces of tape could travel through the system and obstruct the flow of oil or cause jamming of precision-fit parts.**
- **Do not overtighten any set screw or clamp used to lock the cylinder body in place. It could deform the cylinder and cause the rod to bind.**

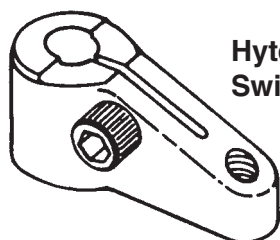
MOUNTING HOLE PATTERN for 110089, 110090 & 110091



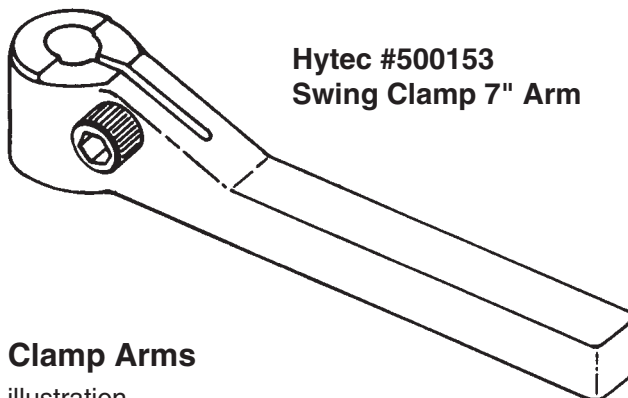
MOUNTING HOLE PATTERN for 110095, 110096 & 110097



SWING CLAMP ARMS



Hytec #500152
Swing Clamp 2-1/2" Arm



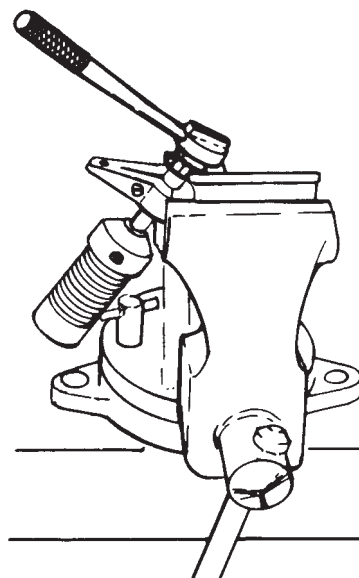
Hytec #500153
Swing Clamp 7" Arm

Attaching the Hytec #500152 and #500153 Swing Clamp Arms

1. Loosen the cap screw located on the side of the arm. See illustration above.
2. Remove the swing clamp bolt, and position the arm on the piston rod as desired. Place the arm in a vise and torque the side cap screw to 150/170 ft. lbs.
3. Replace swing clamp bolt and torque to 50/70 ft. lbs.

Changing the Position of the Hytec #500152 and #500153 Swing Clamp Arms

1. Place the arm of the swing clamp in a vise. Loosen the swing clamp bolt. See illustration at right.
2. Loosen the cap screw located on the side of the arm. Adjust the position of the arm as desired. Torque side cap screw to 150/170 ft. lbs.
3. Torque the swing clamp bolt to 50/70 ft. lbs.



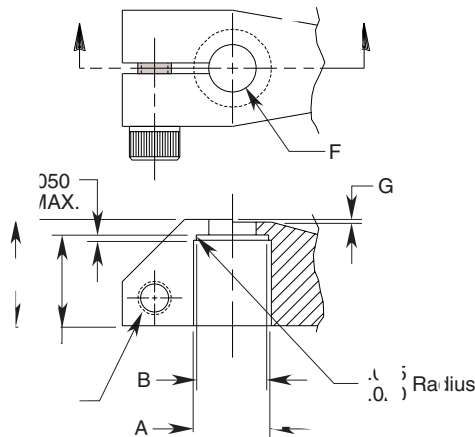
IMPORTANT: Do not attempt to torque the swing clamp bolt without firmly holding the swing clamp arm. Internal clamp damage can result.

CUSTOM ARMS

The Hytec #500152 or #500153 may be modified as necessary for your application or a custom designed arm may be used in its place. When using modified or custom arms, maximum hydraulic pressure and/or clamping speed may need to be reduced (refer to the Hytec catalog for clamp ratings). Custom arms must clamp to the swing clamp piston rod in a manner similar to the Hytec #500152 arm or some de-rating of the clamp will be necessary. Refer to the following dimensional data when modifying or designing custom arms. The design feature allowing the arm to be clamped to the piston rod is recommended for all applications of single and double arms. In applications where there is no bending stress being transferred to the piston rod (like push/pull linkages and double arms with equalizing pivots), this design feature may be eliminated. In these applications, the clamp's full capacity (referred to as "straight pull" capacity) is available. **IMPORTANT: Any clamp using a modified or custom arm which is longer or heavier than Hytec's 2-1/2 inch arm (25 ozs.) must have its flow restricted to prevent internal damage. Contact Hytec if further design assistance is required.**

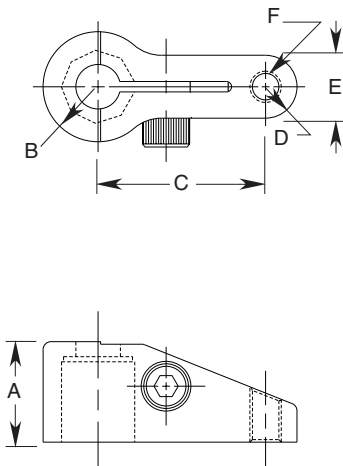
RECOMMENDED CUSTOM ARM DIMENSIONS

Arm Mounting Dimensions for 4,300 and 4,500 Lbs. Swing Pull Clamps.

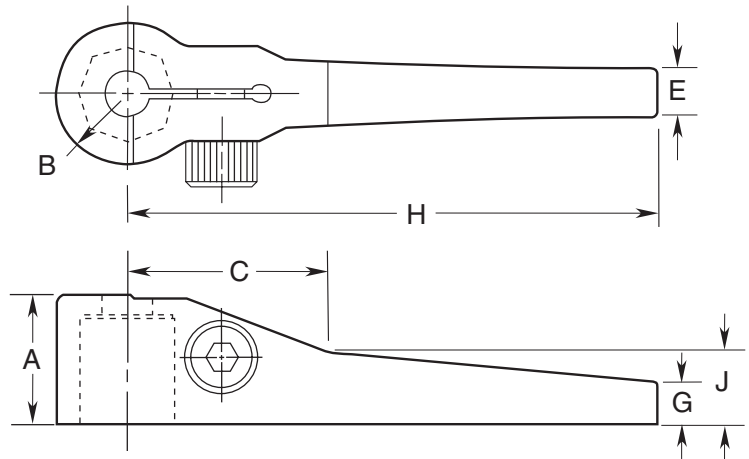


ARM CUSTOM DESIGN DIMENSIONS								
Clamp Capacity Lbs. Single-Acting Double-Acting	Dimensions (In Inches)							
	Standard Arm Cat. No.	A Dia.	B Dia.	C	D Thread Size	E	F Dia.	G
4,300	500152	1.250	1.228	1.420	5/8-18	1.700	0.659	.050
4,500	500153	1.253	1.253	1.440	UNF			

500152



500153



SWING/PULL CLAMP ARMS											
Cat. No.	Dimensions (In Inches)										
	Use With Cat. No.	Weight ozs.	A	B	C	D	E	F	G	H	J
500152	110089	25.52	1.700	.930	2.500	.625	1.250	1/2-13 UNC	-	-	-
	110090										
	110091										
	110095										
500153	110096	34.32	1.700	.930	2.527	-	.650	-	.551	7.000	.983
	110097										