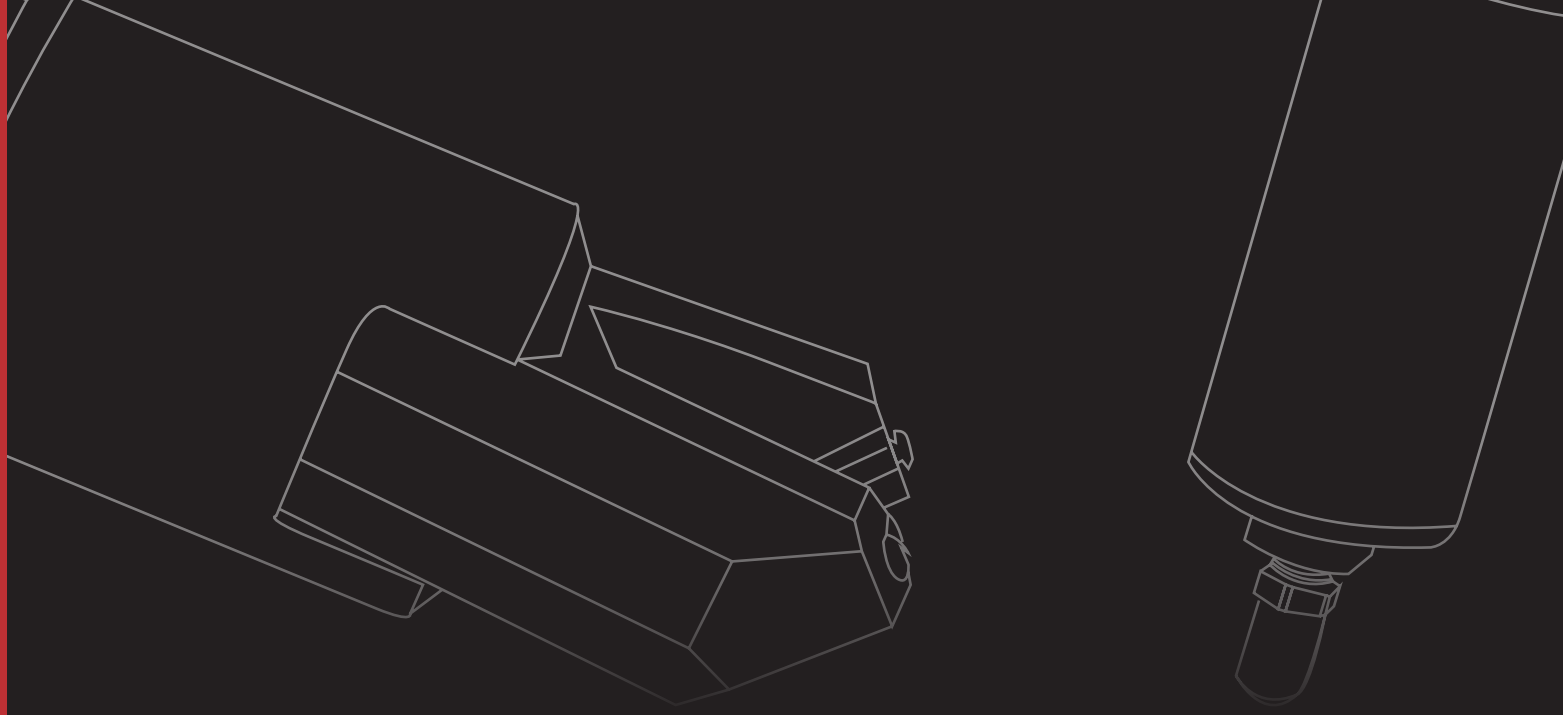
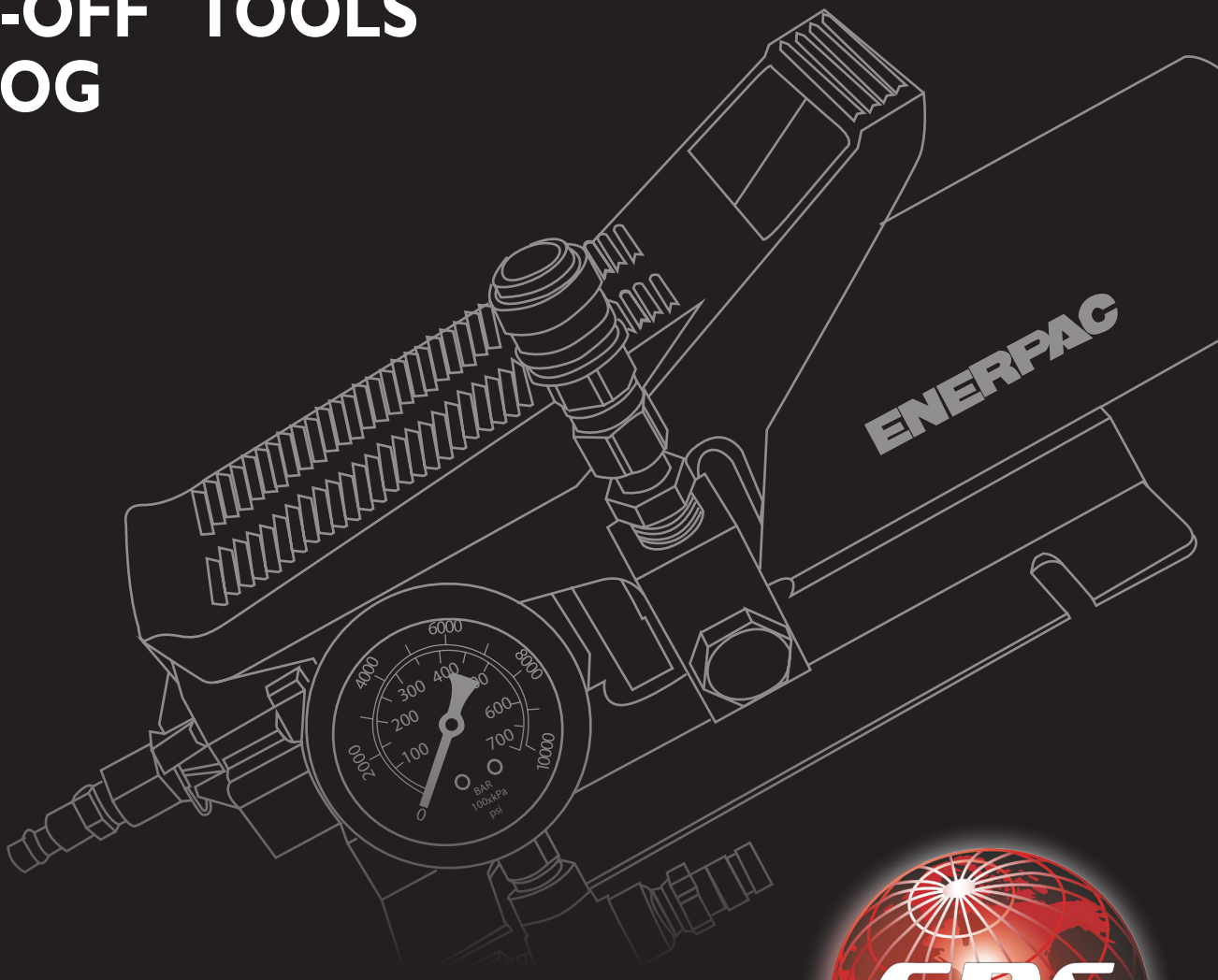


HY-SERIES HYDRAULIC PINCH-OFF TOOLS CATALOG



2018

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APPLICATION DATA

The HY-Series Hydraulic Pinch-Off Tools were developed to produce a permanent, bilateral seal in ductile metal tubing by symmetrically collapsing (cold welding) and severing tabulation with no loss of vacuum or pressure.

Conditions for these cold welds must be correct. Materials of the highest purity, surfaces thoroughly machined and thoroughly cleaned should be used. With the correct conditions, even a small amount of exerted force would bring atoms close enough together to form a metallurgical bond or cold weld.

TUBULATION SELECTION

The most commonly used metal for a pinch-off application is OFHC (ASTM B68-83, B75-84, B133-83 AND B170-82). These materials meet the specifications, chemistry and state of ductility requirements for billet-certified 99.9% pinch-off grade copper. It is important that the material be bright annealed at 650° C to 850° C for 30 minutes in a dry hydrogen atmosphere. This is required because the material will undergo a deformation of approximately 350% during pinch-off.

High purity nickel (A Nickel, N1270, N1200 or 99.4% nickel ASTM-B161) is another commonly used material. High purity nickel offers several advantages: (1) Minimal out-gassing during bake out and pinch-off, (2) minimal oxidation and (3) higher temperature bake ability. Nickel tabulation must be fully annealed at 1150o C for 30 minutes before pinch-off.

Good results can also be obtained using aluminum (annealed 3003 H14, 98% classified non-heat treatable), pure iron, gold, platinum, silver and columbium. The cold welded area will be work hardened during the pinch-off. The size and length of the cold welded area will depend on material, type of annealing, cleanliness, wall thickness and radius of the pinch-off anvil inserts (rollers) on the tool.

Oxygen Free High Conductivity Copper

Nickel

Aluminum

Iron

Gold

Silver

PINCH-OFF PREPARATION

The tubular material being used must be totally free of contamination at the weld point. Mechanical or sonic cleaning, rather than chemical cleaning, just prior to pinch-off yields the best cold welds.

The O.D. of the tubing should be polished with 320 grit emery cloth to remove oxide crystals.

The tungsten carbide inserts on the pinch jaws must be cleaned before each pinch-off. Any contamination pressed into the metal at the weld point can injure the cold weld seal. The pinch-off is a cold extrusion and a lubricant can be used to aid the material flow. Clean #10 machine oil works well on most metals. If an oil based lubricant cannot be used due to the nature of your specific application, then it is recommended that water be used for this purpose prior to each pinch cycle.

During the pinch-off process, pressure must be applied evenly until the tubing servers suddenly. Any interruption of this process while the material is in a plastic state will result in an incomplete cold weld. Leaks are apt to occur if the pinch-off phase is incomplete and the tubing needs to be "wiggled" to accomplish tubular separation. The HY-Series hydraulic tools will provide a reliable cold welded joint if all the processes listed above are followed.

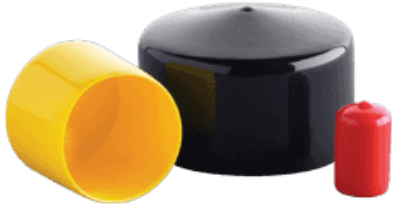
AFTER PINCH-OFF

There are a few methods for checking the finished crimp for leakage. Vacuum insulation time rates and electric resistance measurements can be avoided if a sample tube is carried through the entire process, then subjected to a helium test or microscopic examination, using the sample for comparative analysis. Process procedures should be duplicated precisely. Changes as subtle as bending a piece of copper tubing will change its grain structure and work-harden the piece considerably. There also will be significant changes in grain size, crystal structure and ductility occurring during any thermal process such as brazing, bake-out, soldering or welding. Therefore, the cold welded joint achieved through the cold weld process should NOT be subjected to any process that involves heating the joint.

The cold welded section of the tubing should be permanently protected with a plastic cap, epoxy, silicone, etc. after the pinch-off is completed, as it is a delicate seal and very sharp.

320 Grit Emery Cloth

#10 Machine Oil



Plastic Caps

HY-SERIES HYDRAULIC PUMP SYSTEMS

Electric/ Pneumatic Hydraulic Pump

Electric/ Pneumatic Hydraulic Pump

- Equipped with "remote" footswitch.
- Standard voltage: 120 V.
- European voltage available.

Remote Footswitch - Pneumatic Hydraulic Pump

Standard Pneumatic Hydraulic Pump

- Footswitch mounted on top of pump body.
- Air Actuated Hydraulic Pump.
- Source Air Pressure Required: 90-110 p.s.i.
- Water Filter & Lubricator required on air source.

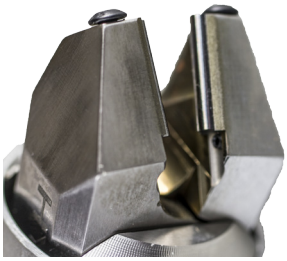
Standard Hydraulic/ Pneumatic Pump

Remote Footswitch - Pneumatic Hydraulic Pump (Image on the left)

- Air Actuated Hydraulic Pump with remote footswitch.
- Source Air Pressure Required: 90-110 p.s.i.
- Water Filter & Lubricator required on air source.

Shown with Model #HY-750

HAND HELD HYDRAULIC HAND SETS


HY-250


HY-500


HY-750


HY-1.0

SPECIFICATIONS

MODEL NUMBER	PUMP STYLE	HANDSET WT./LENGTH/DIA.	TUBING DIA. SIZE
HY-250	Standard	1.5 lbs. / 5-1/4" / 1-1/4"	0.187" - 0.250"
HY-250-F	Remote	1.5 lbs. / 5-1/4" / 1-1/4"	0.187" - 0.250"
HY-250-E	Electric	1.5 lbs. / 5-1/4" / 1-1/4"	0.187" - 0.250"
HY-500	Standard	4.5 lbs. / 8-1/4" / 1-3/4"	0.250" - 0.500"
HY-500-F	Remote	4.5 lbs. / 8-1/4" / 1-3/4"	0.250" - 0.500"
HY-500-E	Electric	4.5 lbs. / 8-1/4" / 1-3/4"	0.250" - 0.500"
HY-750	Standard	12.5 lbs. / 12-1/2" / 2-1/2"	0.500" - 0.750"
HY-750-F	Remote	12.5 lbs. / 12-1/2" / 2-1/2"	0.500" - 0.750"
HY-1.0	Standard	25 lbs. / 13.27" / 4.92"	0.750" - 1.00"
HY-1.0-F	Remote	25 lbs. / 13.27" / 4.92"	0.750" - 1.00"

All standard jaw angles are set at 45 degrees.

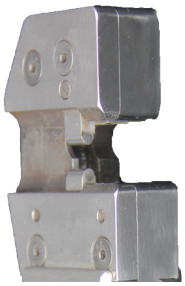
TYPICAL TUBE DEFORMATION

MODEL NUMBER	TUBING DIA. (X .035" Wall)	ELONGATION (Per Side)	FLARE (Razor Edge)	DISTORTION (Min. Stub Length)
HY-250	1/4"	0.050"(1/8")	0.350"	0.250"
HY-500	1/2"	0.055"(3/16")	0.750"	0.500"
HY-750	3/4"	0.075"(3/8")	1.150"	0.750"
HY-1.0	1"	1.00"(1")	1.50"	1.00"

Quotations for custom tool sizes & configurations available

Can't find the hand set your looking for we can have it customized to fit your needs.

Custom made HYX-111



Custom made HYX-112 C-Style

Custom made HYX-120

Custom made HYX-122

HY-1.0

HY-750

HY-500

HY-250

For use with OFHC Copper, High Purity Nickel or Aluminum Tubing.
Models available for pinching off tubes ranging from 0.063" through 1.0" diameter.
Jaws utilize precision carbide rollers for creating a hermetic seal.
Hand-guided, 1-step crimp, pinch-off & seal.
Standard jaws are set at 45 degree angle. Other angles available as custom order.
Eliminates the necessity for a secondary solder or braze sealing operation.

PREVENTATIVE MAINTENANCE RECOMMENDATIONS

Preventative maintenance on these tools is important to insure long term performance and unscheduled down time. These tools will perform well for many years if normal wear components are checked and / or replaced on a periodic time schedule.

Initial Setup

- The handset is fully assembled and ready to connect to the hydraulic hose (provided).
- Install the hydraulic pressure gauge by simply connecting the "T" assembly to the quick-disconnect fitting on the pump. Install the hydraulic hose to the other end of the "T" fitting. Install the handset to the quick-disconnect fitting on the hydraulic hose.
- If you supplied us with samples of your tubes being processed with this tool prior to shipment, the pump pressure has been adjusted properly and no further adjustments should be necessary. If you have a problem with the tube pinch-off process, contact our technical support before changing the pump settings.
- Connect your air source hose to the quick disconnect air fitting supplied with the pump. You may change this fitting if it does not match your standard air fitting.
- Install a filter / regulator / lubricator to your air source line within 10-15 ft. from the hydraulic pump. This will remove moisture from your compressed air and will supply air tool oil to the internal air motor inside the hydraulic pump for proper lubrication.
- Set your input air pressure to 100 – 120 psi.
- The system is now ready to use.
- Install supplied air hose to the power pack. Wrap hose fitting threads with Teflon sealant.

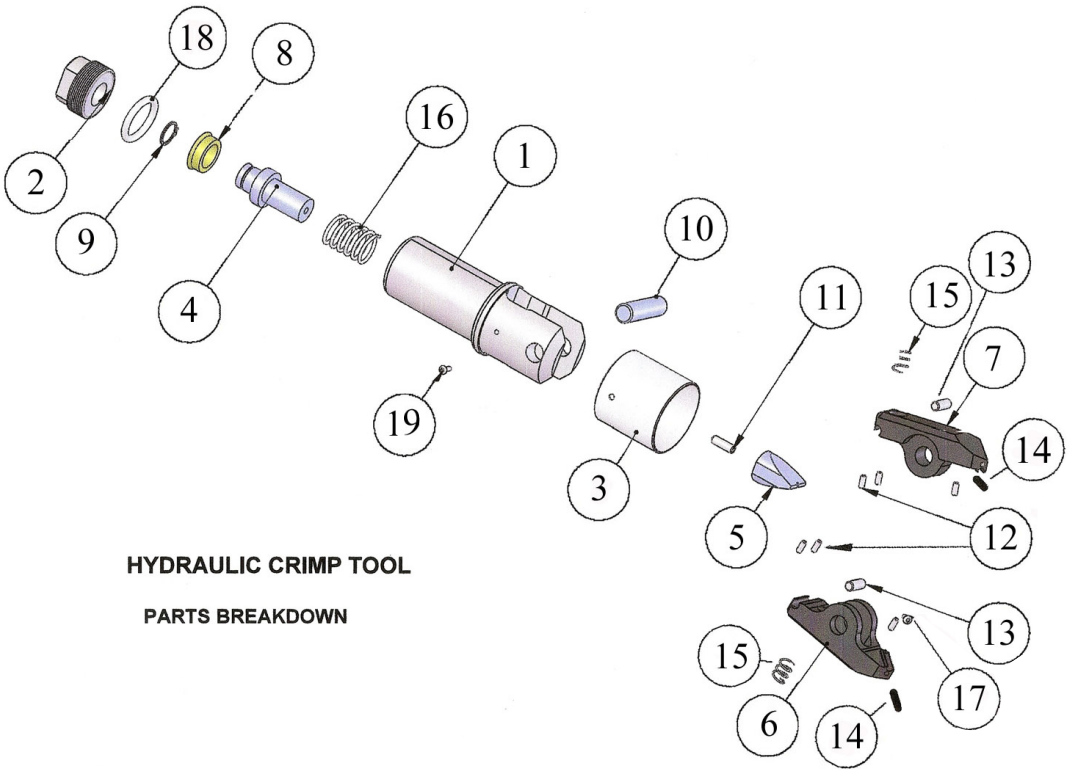
Weekly Maintenance

(Reference exploded view drawing on next page)

- Using a light machine oil, place a couple of drops on the jaw rollers (#13 back end of jaws) and also apply to the carbide pinch-off rollers.
- Clean and remove any copper transfer contamination on the carbide rollers (#14) with alcohol or very fine emery cloth.
- Light machine oil can be used to lubricate any metal-to-metal surfaces in the jaw area.
- Make certain the FRL is injecting oil into the power pack. Very little oil is required to keep the internal O-rings lubricated. If oil is expelling through the trigger valve, you can reduce the amount of oil being injected.

3-6 Month Maintenance (or 20,000 + cycles)

- Periodically, remove the carbide rollers (#14) from the jaws to clean the machined channel and lubricate with light oil. This will insure the carbide rollers move freely in the channel.
- The carbide rollers only need to be replaced if they are chipped or show signs of a flat, worn area. These rollers are rarely replaced.
- Replace Jaw Rollers (if your tubes are NOT sealing) and lubricate with light machine oil.
- Replace both internal jaw springs (#15). Refer to our website for the proper technique when replacing these springs. They can be damaged if installed improperly which may restrict proper jaw closure.



HYDRAULIC CRIMP TOOL

PARTS BREAKDOWN

Component Parts for ALL HY-Series Hydraulic Pinch-Off Tool Handsets

Items shown in RED should be replaced as recommended in the body of this document

DRG#	HY-250	HY-500	HY-750	HY-1.0	DESCRIPTION	QTY
1	HYP-6	HYP-6-500	HYP-6-750	HYP-6-100	Housing	1
2	HYP-7	HYP-7-500	HYP-7-750	HYP-7-100	Plug	1
3	HYP-8	HYP-8-500	HYP-8-750	HYP-8-100	Jaw Guard	1
4	HYP-9	HYP-9-500	HYP-9-750	HYP-9-100	Piston Shaft	1
5	HYP-28	HYP-10-500	HYP-10-750	HYP-10-100	Cam	1
6	HYP-2	HYP-2-500	HYP-2-750	HYP-2-100	Right Side Jaw	1
7	HYP-1	HYP-1-500	HYP-1-750	HYP-1-100	Left Side Jaw	1
8	HYP-13	HYP-13-500	HYP-13-750	HYP-13-100	Piston Cup	1
9	HYP-14	HYP-14-500	HYP-14-750	HYP-14-100	Snap Ring	1
10	HYP-16	HYP-16-500	HYP-16-750	HYP-16-100	Pivot Pin	1
11	30-01	22-CLP	20-CLP-2000	20-CLP-2000	Piston Shaft Screw	1
12	HYP-18	HYP-18-500	HYP-18-750	HYP-18-100	Roller Stop	4
13	HYP-17	HYP-17-500	HYP-17-750	HYP-17-100	Roll Pin	2
14	HYP-4	HYP-4-500	HYP-4-750	HYP-4-100	Carbide Inserts	2
15	HYP-12-K2	HYP-12-K2	HYP-12-047E	HYP-12-0473E	Jaw Springs	2
16	HYP-11	HYP-11-500	HYP-11-750	HYP-11-100	Piston Spring	1
17	HYP-25	HYP-25-500	HYP-25-750	HYP-25-100	Mounting Screw	2
18	18-MSP	15A-01	15A-003	15A-003	Housing O-Ring	1
19	HYP-25	28-01-K10	32-01	32-01	Screw	3

HY-SERIES PUMP & TOOL OPERATION

The HY-Series Hydraulic / Pneumatic pinch-off tools are shipped assembled and ready to install. The hydraulic pressure setting on the pumps will be present by CPS based upon your specific application.

DO NOT alter the hydraulic pressure settings on these pumps, or the warranty on the handsets / jaws may be voided if breakage occurs. CPS will set and calibrate the pumps before they are shipped.

- Customer needs to install a quick-disconnect nipple in the "Source Air Input" port on the pump.
- The "Standard" HY-xxx pump Air Input is located at the end of the pump.
- The "Remote-Actuated" HY-xxx-F pump Air Input is located on the end of the handle.

IMPORTANT: These hydraulic / pneumatic pumps utilize an internal air motor which MUST be kept lubricated to prevent premature wear or damage. Install a water filter and lubricator (FRL) to your source air line, within 15-20 ft. from the pump. Air entering the pump MUST be free of moisture, and light air tool oil MUST be injected into the air input side of the pump. If you need an FRL with this tool, please advise and CPS can provide the proper unit.

- Once the source air is connected to the pump, connect the hydraulic hose to the handset.
- Install the pressure gauge to the hydraulic "output" quick coupler on the pump.
- Connect the hydraulic hose to the quick-coupler on the pressure gauge.

The pumps will be preset and calibrated before shipping. Hydraulic pressure should read between 2500-3500 p.s.i. If pump pressure gauge reads pressure in excess of 3500 p.s.i., Contact CPS before proceeding.

- The Tool is ready to use.
- To activate the "Standard" HY-xxx pump, rock the foot peddle forward to engage the hydraulic valve.
- For -F style pumps, the remote footswitch will engage the pump.
- The pump will pulsate while it builds pressure and the jaws will close (3-5 seconds).
- Rocking the foot peddle to back position will release the pressure and the jaws will open.
- If the jaws fail to close when the pump is activated, it's likely due to air trapped in the pump or hydraulic line.
- To expel the air from the system, place the pump on your workbench. Hold the handset at a position "lower" than pump and cycle the pump several times.

PROCESS FOR PINCHING TUBES

- The best quality pinch-off will be accomplished by locating the tubing near the "center" of the jaw.
- When jaws close, the carbide rollers will meet at the tip before they meet at the throat of the jaw.
- For best results, lubricate the pinch rollers with light oil. If oil can't be used, lubricate with water.
- Activate the pump to close the pinch jaws. Maintain pressure until tubing is pinched off.

  Cycle time to close jaws & pinch-off tubing: 3-5 seconds. Cycle time to open jaws: 1-2 seconds.
- Excess tubing will separate completely and be expelled from the jaws.
- Move foot peddle to the "back" position (or release footswitch) to relieve hydraulic pressure and open jaws.

Maximum hydraulic pump pressure should not exceed 3500 p.s.i. Contact CPS if pump pressure exceeds that level. (Jaw breakage can occur with excessive hydraulic pump pressure)

HANDSET AND PINCH JAW WARRANTY

The handset and pinch jaws are warranted against defects in material or workmanship for a period of 1 year. Jaws are NOT warranted against breakage, as CPS can not control actual usage of the tool by the customer.

HYDRAULIC PUMP WARRANTY

The Hydraulic pumps are warranted by the manufacturer.

Any pump repair / evaluation must be handled by an Enerpac service center to maintain the warranty.

STANDARD PUMP SPECIFICATIONS

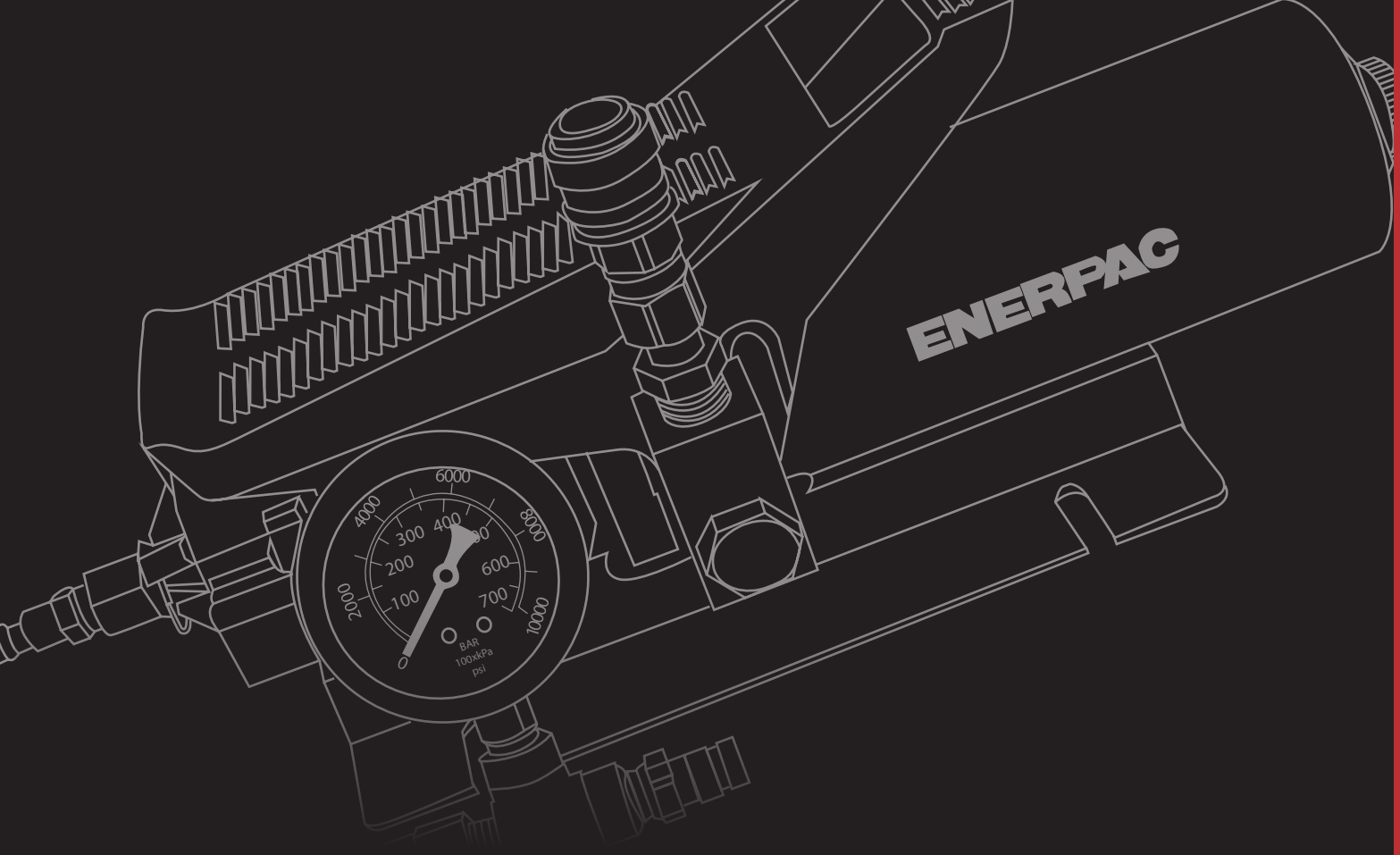
Maximum Operating Pressure (psi)	5,000
Cylinder Compatability	Single-acting
Reservoir Capacity (in^3)	37
Usable Oil Capacity (in^3)	36.6
Maximum Flow at Rated Pressure	60 in^3/min
Output Flow Rate (in^3/min) at 0 psi	60
Valve Function	Advance / Retract
Valve Operation	Manual
Air Pressure Range (psi)	60 - 100
Air Consumption (scfm)	12
Weight (lbs)	14.3

REMOTE FOOTSWITCH PUMP SPECIFICATIONS

Maximum Operating Pressure (psi)	10,000
Cylinder Compatability	Single-acting
Reservoir Capacity (in^3)	127
Usable Oil Capacity (in^3)	127
Maximum Flow at Rated Pressure	10 in^3/min
Valve Function	Advance/Hold /Retract
Valve Type	3-way, 3-position
Pump Control	Footswitch
Weight (lbs)	22

ELECTRIC PUMP SPECIFICATIONS

Description	Base model pump with 1/4 hp motor
Cylinder Compatability	Single-acting
Reservoir Capacity (in^3)	60
Valve Type	2 Way/ Auto. Dump
Valve Function	Advance Return (Auto.)
Valve Operation	Manual
Valve Number	9561
Control Switch	Rocker Type off, Momentary on
Motor	1/4 hp, 110/115V 50/60 Hz, Single Phase



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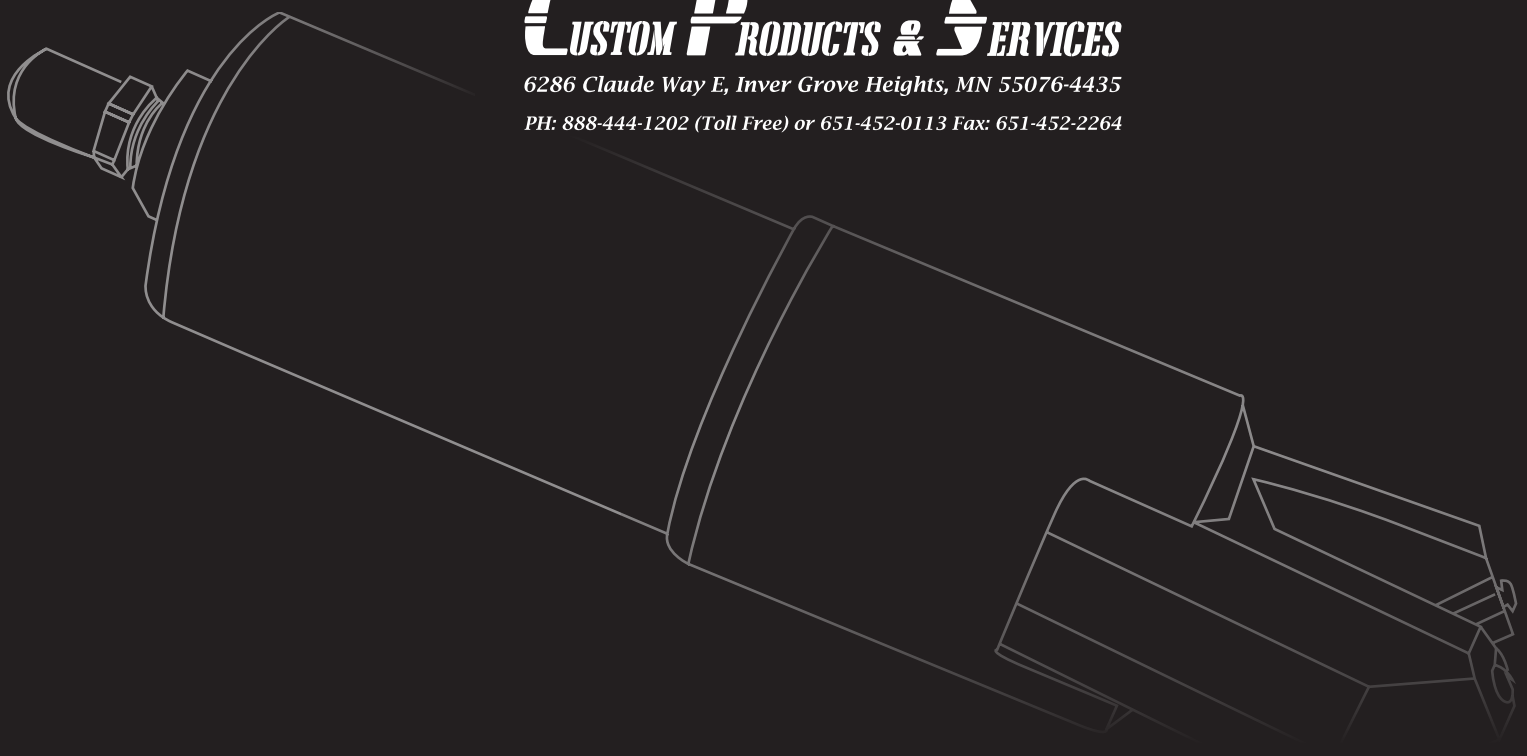

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