






## OPERATION MANUAL

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# OPERATION & MAINTENANCE MANUAL

## EXTREME LOW PROFILE SKIDDING SYSTEM

Model:

XLP30

Revision: September 2021

Hydra-Slide Ltd.  
84 Royal Road  
Guelph, ON  
Canada N1H 1G3  
[hydra-slide.com](http://hydra-slide.com)



**PLEASE READ OPERATING MANUAL BEFORE  
USING THIS EQUIPMENT AND ADHERE TO ALL  
SAFETY INSTRUCTIONS. FOR QUESTIONS,  
CONTACT HYDRA-SLIDE LTD. AT +1-519-900-1450**



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## ORIGINAL INSTRUCTIONS

### HYDRA-SLIDE XLP30 EXTREME LOW PROFILE SKIDDING SYSTEM

#### 1 - GENERAL INFORMATION

##### 1.1 Original Instructions

The English version of this manual is the Original Instructions for the **Hydra-Slide XLP30 Extreme Low Profile Skidding System**. All other language versions are translations of the Original Instructions.

##### 1.2 Manufacturer Details

Hydra-Slide Ltd.  
84 Royal Road  
Guelph, Ontario, Canada  
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(519)-900-1450  
[info@hydra-slide.com](mailto:info@hydra-slide.com)

##### 1.3 Machinery Description

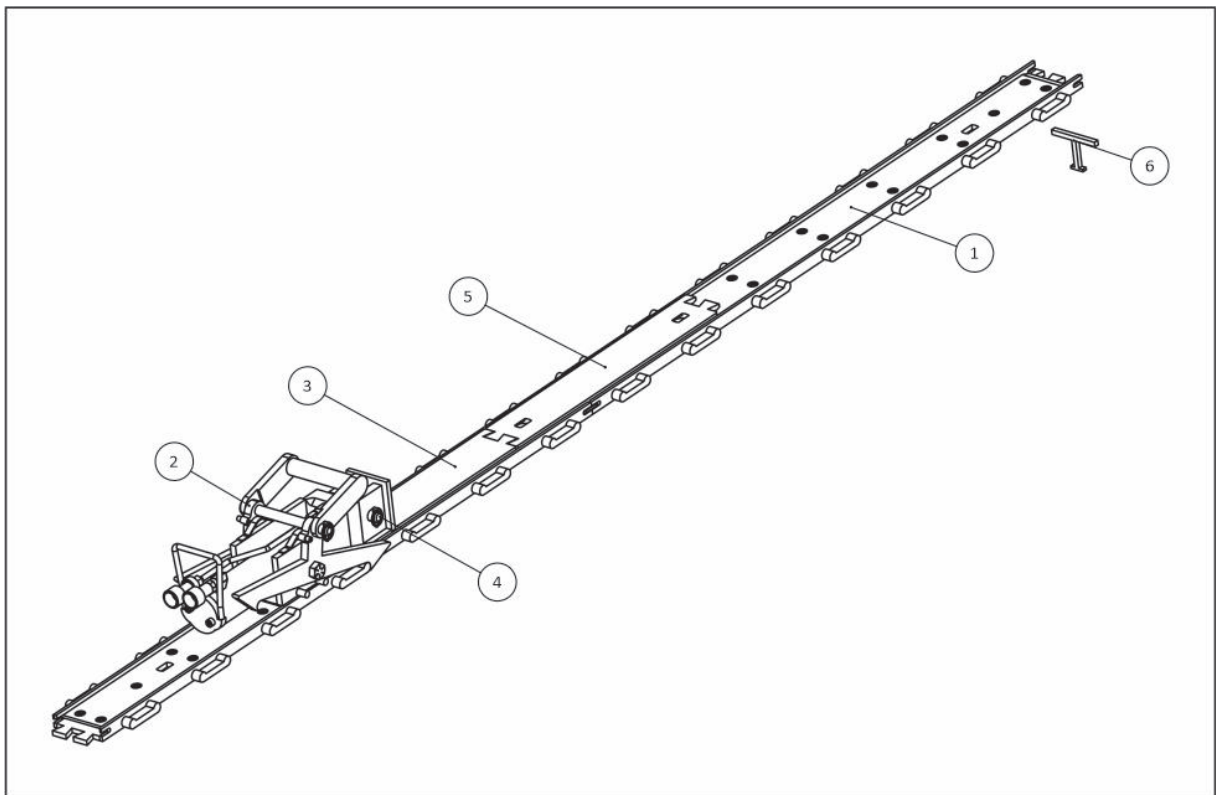
Machinery Designation: **XLP30 Extreme Low Profile Skidding System**

Hydra-Slide's **XLP30 Extreme Low Profile Skidding System** is designed to move loads with a maximum push and pull capacity of 30 tons (27 tonnes). The system uses specially designed slider plates and hydraulically operated push cylinders to move loads horizontally along guiding tracks over a friction surface. The hydraulic push cylinders are modified double acting cylinders (PowerTeam RD1010) which operate at 10,000 psi (700 bar). The friction surface is an ultra-high molecular weight polyethylene (UHMW). The height of the load support section is 1.125" (29 mm), and all components are hand-portable, the heaviest weighing 65 lbs (29.5 kg). The Push/Pull Cylinders are equipped with Enerpac CR-400 female couplers as standard.

The following main components comprise this system- please note that the below quantities are for a standard system, quantities may vary if the system is customized:

- (12) x 56" (1.4m) Track Sections
- (2) x 24" (0.6m) Slider Plates
- (4) x 48" (1.2m) Slider Plates
- (2) x Push/Pull Cylinder Assemblies

- (2) x Push/Pull Heads
- (2) x Clevis Pin Assemblies
- (4) x Handles
- (12) x Track Keeper Plates
- (1) x Spare Parts Kit [contains (1) Clevis Pin, (1) Linch Pin, (2) Handles, (2) Leaf Springs, (3) Track Keeper Plates and (30) x Tie Down Clamps]
- (1) CT-604 Coupler Bleed Tool Kit
- (1) Blue & (1) Yellow Spray Paint
- (1) x Storage Box



**Figure 1: XLP30 Skidding System Main Components**

Item No.	Part No.	Description
1	XLP30-01-56	Track Section (56", 1.4m)
2	XLP30-03-FA	Push/Pull Cylinder Assembly
3	XLP30-04	Push/Pull Head
4	XLP30-05	Clevis Pin Assembly
5	XLP30-06-24	Slider Plate (24", 610mm)
6	XLP30-01-10	Handle



The **XLP30 Extreme Low Profile Skidding System** is designed to work with most 10,000 psi (700 bar) hydraulic power units; however, it is recommended to be used with Hydra-Slide's synchronous Hydra-Pac power units. The system comes with a steel storage box to store all system components and necessary hardware to assemble and operate.

### 1.3.1 The Workstation

The **XLP30 Extreme Low Profile Skidding System** is remotely operated. It is suggested that the operator set up his/her workstation in a safe location, clear of the load to be skidded, and with as much visibility of the load and skidding system as possible.

### 1.3.2 Intended Use

The **XLP30 Extreme Low Profile Skidding System** is used to move heavy loads up to 30 tons (27 tonnes) in push mode and 30 tons (27 tonnes) in pull mode safely and in a controlled manner.

## 1.4 Safety Precautions

Set up and operate the **XLP30 Extreme Low Profile Skidding System** only under the direction and supervision of experienced and qualified personnel.

This section contains information required for the safe operation of the **XLP30 Extreme Low Profile Skidding System**. Please read and understand the instructions and safety warnings that come with the equipment. Failure to comply with these safe operating recommendations could result in property damage or personal injury. Always follow safe work practices.

The **XLP30** has been designed and manufactured for a maximum load capacity of 30 tons (27 tonnes) in both push and pull mode. The maximum operating pressure of the push cylinders is 10,000 psi (700 bar). Do not exceed these values at any time when using the system.

Use in any other manner or for any other purpose is not intended and is not recommended by the manufacturer. The operational safety of the system is only assured if used as intended.

### 1.4.1 General Safety Precautions and Potential Misuse

- Only qualified operators should install, operate, adjust, maintain, clean, repair or transport this equipment.
- Only use this equipment in accordance with its intended use and follow all instructions.



- Never exceed recommended maximum pressure and stroke ratings. Good practice recommends using only 80% of these ratings.
- Always wear appropriate Personal Protective Equipment.
- Protect all equipment from potential hazards such as fire, explosion, sharp surfaces, extreme heat/cold, corrosives, and heavy impact.
- Anticipate possible problems and take steps to avoid them. If in doubt, ask.
- Never operate any equipment without all provided guards and safety devices in place and in good working condition.
- Lift and move slowly and check often; control the load at all times.
- Double-check track connections before loading the track.
- Avoid standing in the line of force of hoses or any hydraulic components.
- Lift or move equipment and components using only the provided lift lugs or handles, etc. and only employ proper lifting equipment and techniques. Never lift by the hoses or hydraulic fittings.
- Never place any part of your body under the load unless the load is on a solid support.
- Never place any part of your body between a moving load and a solid obstacle where there is danger of crushing.
- Take steps to keep all equipment clean and free from possible damage. This is particularly important for hoses and couplers.
- Don't allow hoses to kink, twist, crush, cut or bend tightly. Bending radius should be at least 4½ inches. Inspect hoses and couplers before each use and remove from service if any signs of damage are noted. Never attempt to repair a hose.
- Never handle hoses or couplers while they are under pressure, even when wearing Personal Protective Equipment. There is risk of serious personal injury from hose leaks, faulty or improperly connected couplers.
- Use safe practices to bleed a pressurized hose or coupler; use only a specially-designed coupler bleed tool such as a CT-604 Safety Tool available through Hydra-Slide Ltd.



- Always ensure that jacks and cylinders are used parallel and in line with their axis. Never use a jack or cylinder at an angle or to “kick” or move a load sideways. Use only Hydra-Slide’s Alignment Shoes for these types of operations.
- Do not apply any external forces to the load or track other than those from proper use of the supplied hydraulic cylinder(s), i.e. do not use come-alongs, winches, etc. to push or pull the load
- If jacking a load, always use appropriate blocking or cribbing to guard against a falling or out of control load.
- Do not use any lubricants on the system other than those provided and/or specified for use.

#### 1.4.2 Operator Training

The operator should be experienced in the safe operation of high-pressure hydraulic jacking systems. The operator should also read and understand these Instructions in full prior to operating the system.

#### 1.4.3 Residual Risks and Protective Measures

Observing the safety precautions indicated in these Instructions minimizes the risks associated with using the **XLP30 Extreme Low Profile Skidding System**, however residual risks remain in the event of loss of control of the load while skidding.

#### 1.4.4 In Case of Breakdown

In case of equipment breakdown or other operational problems, cease operation immediately and take any necessary steps to secure equipment and protect surroundings and personnel. Depressurize hoses and all hydraulic components (use coupler bleed tool as required). Identify the problem. Jack up the load to remove weight from skid system and secure it with blocking or other support. Correct the problem and/or replace any broken or defective components. Jack the load down onto the skidding system and continue operations in accordance with these Instructions.

#### 1.4.5. Airborne Noise Emissions

Operation of the **XLP30 Extreme Low Profile Skidding System** does not produce airborne noise exceeding 70 dB(A).

### 1.4.6 Non-Ionizing Radiation

Operation of the **XLP30 Extreme Low Profile Skidding System** does not produce non-ionizing radiation.

## 2 - ASSEMBLY AND SETUP

Before each use, inspect the system for any signs of damage or oil leaks. If any issues are found, do not operate the XLP30 until corrective measures have been taken.

- Establish a clear path for the load to be moved.
- Raise load (using other means) to a sufficient height to place skid system under.
- Place rows of track sections under load parallel to each other.

### 2.1 Track Section Connection

The track sections are bi-directional; the preferred direction of travel is from the male end dovetails of the track to the female end dovetails.

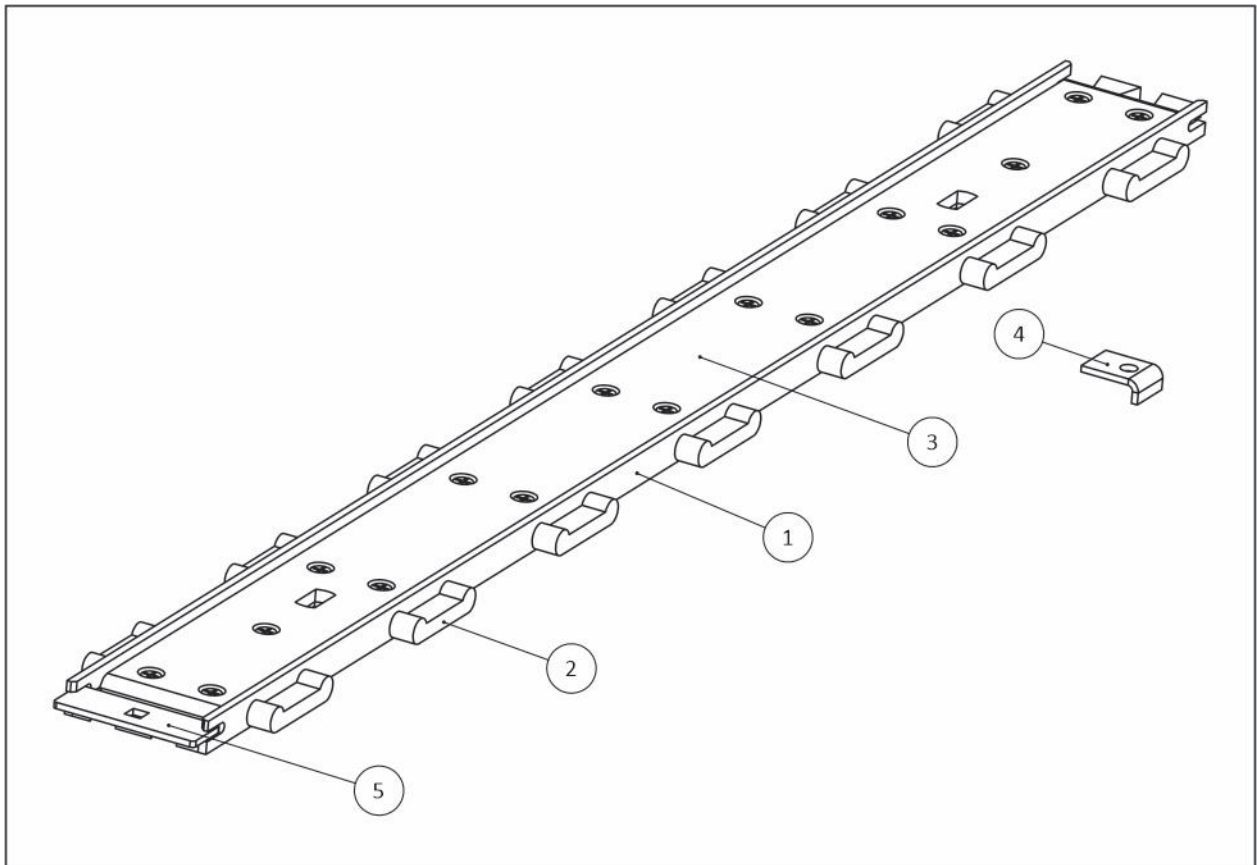
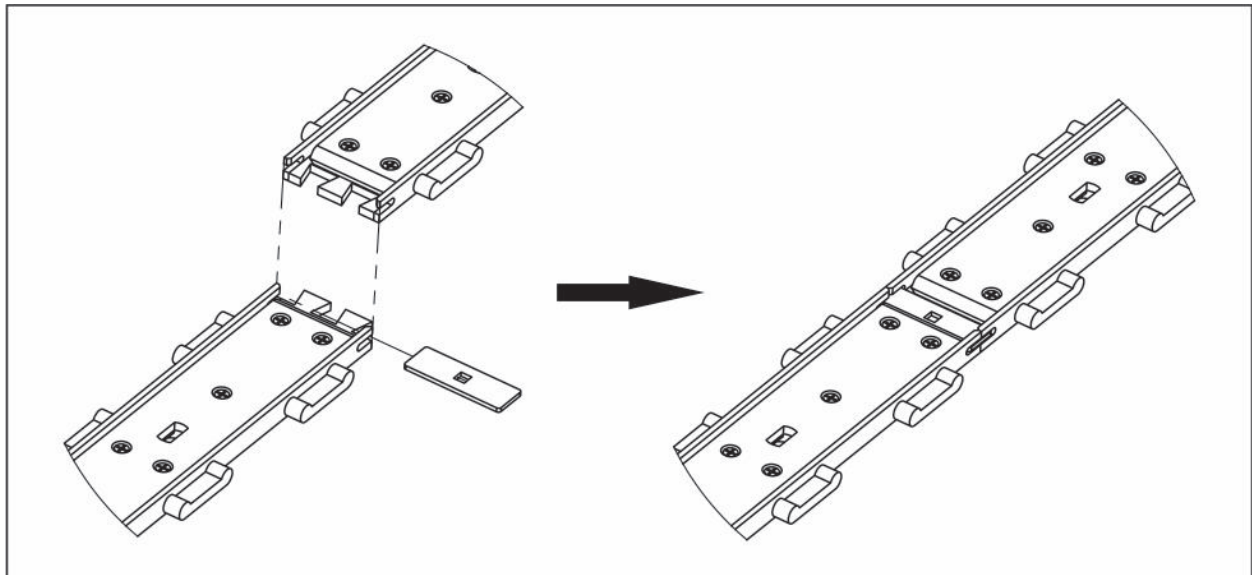


Figure 2: XLP30 Track Section with Tie-Down Clamp

Item No.	Description
1	Base Plate
2	Ratchet Tabs
3	UHMW Slider Pad
4	Tie-Down Clamp
5	Track Keeper Plates

- Attach a Track Section to another by connecting the dovetails of each track together. Ensure that the male end of the dovetail joint is resting properly under the female dovetail plate (See Figure 3). Insert Track Keeper Plate through the track slots and make sure it rests symmetrically in tracks.

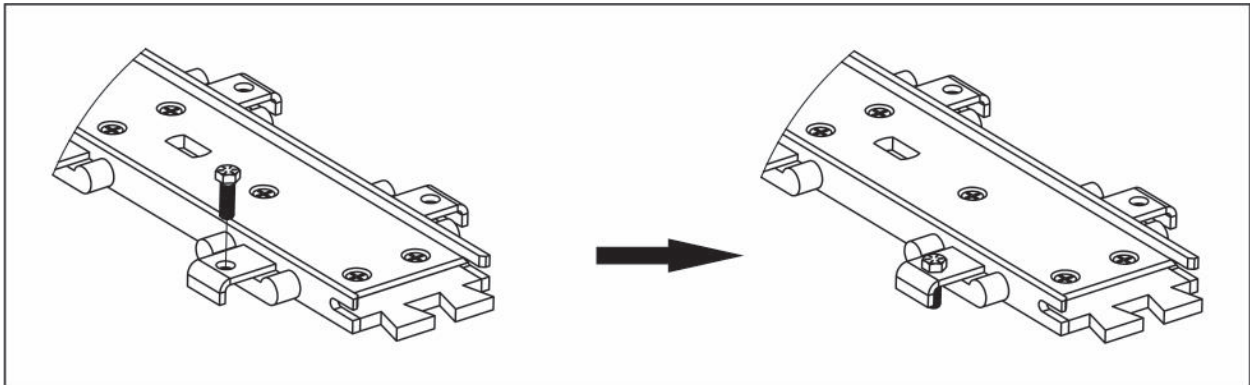


**Figure 3: Connecting XLP30 Track Sections**

- Ensure that the tracks are set up and kept level ( $\pm 2\%$ ) and parallel ( $\pm 0.25''$  or 6 mm) at all times. It may be advantageous to have a slight incline in the direction of travel; never set up or operate the system on a decline without an adequate external holdback.
- Tracks must be oriented so the load will move in a straight line to the desired location.
- Tracks must be positioned such that the ratchet tabs are equidistant from the edge of the load so the push cylinders will be able to extend and retract in synchronization.
- The track must be adequately supported over its entire length. Excess deflection can cause severe damage. Track sections must be fully supported.

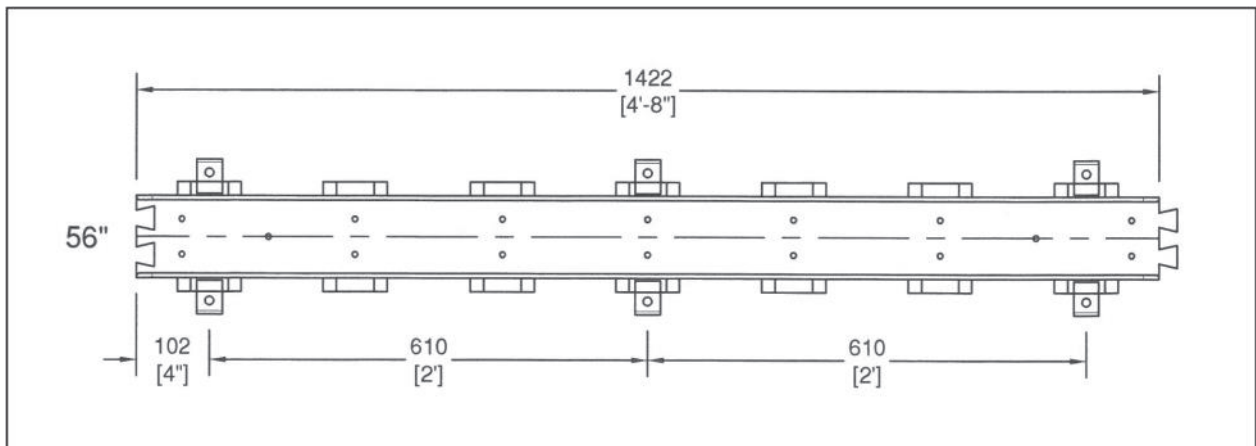
## 2.2 Using Tie-Down Clamps

- If the system will be used in the pull configuration, the track can be anchored to a rigid surface.
- In pull mode, the applied force can cause the unloaded track section to lift. To anchor track, place tie-down clamps on recessed section of ratchet tabs and bolt down to surface.
- The clearance hole for bolting down tie-down clamps is  $\frac{1}{2}$ " (12.7mm).
- Tie down clamps may be bolted down with  $\phi 7/16$ " mild (A307 or equivalent) bolts.
- Tie-down clamps are only needed on the ratchet tabs under the length of the cylinder assembly (See Figure 4).



**Figure 4: Installation of Tie-Down Clamps**

- If desired to place clamps for pulling a load, a safe placement of the clamps if is shown in Figure 5 below. Position on each end and every 24" spacing (3 ratchet spacings apart).



**Figure 5: Safe positioning of Tie-Down Clamps**

### 2.3 Slider Plate Assembly

- Insert the slider plates into the track under the load and connect the slider plates together using the dovetail joints. Ensure that the guide bars engage and that the slider plates move freely on the track.

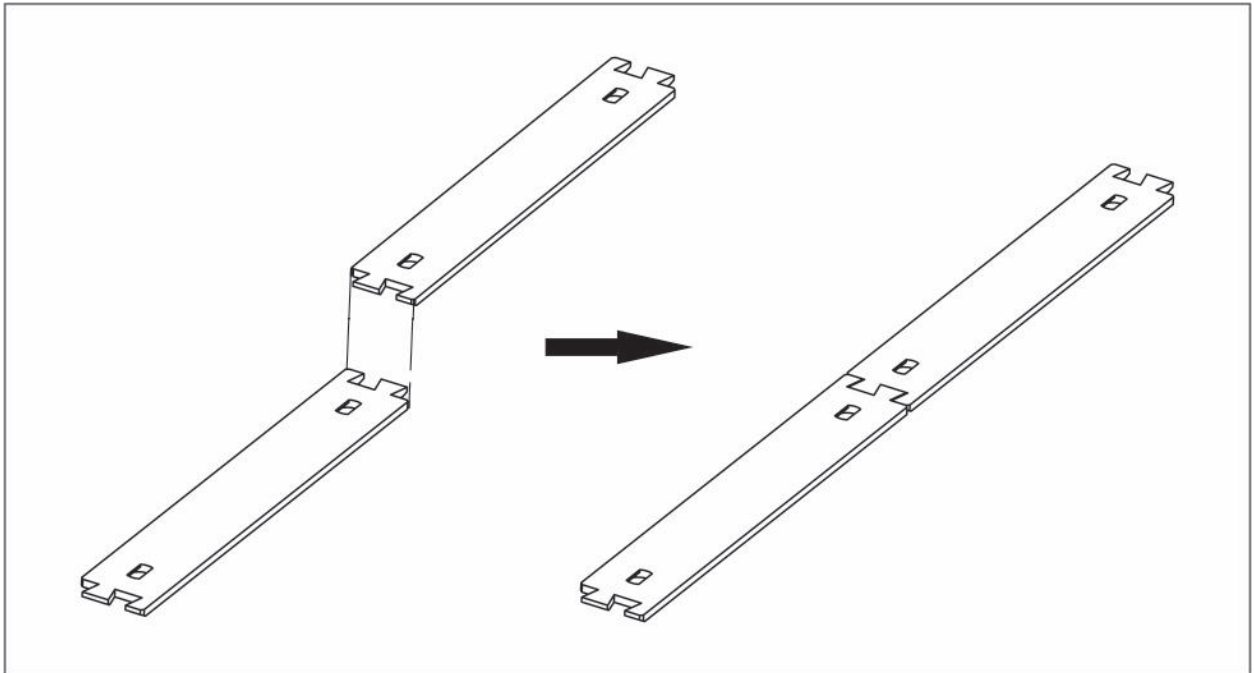
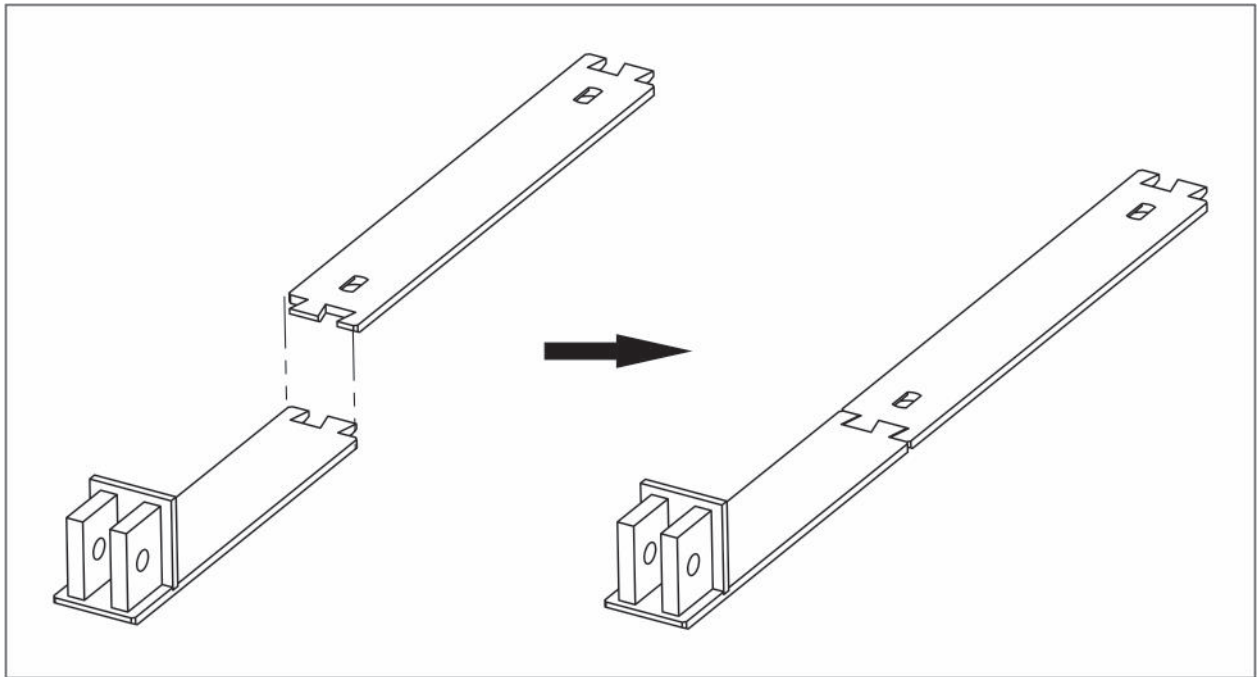


Figure 5: Connecting XLP30 Slider Plate

### 2.4 Slider Plate – Push/Pull Head Connection

- Attach the push/pull heads to the desired end of the slider plates using the dovetail joints.



**Figure 6: Connecting XLP30 Slider Plate to Push/Pull Head**

- The push/pull head and cylinder assembly can be separated at the clevis pin connection for easier handling if required

**Note:** Do not lift the cylinder assembly using the hydraulic hoses or fittings; doing so could cause damage to the cylinder, hoses, or fittings. Use only the handles to lift the assembly.

- Ensure that the area on the bottom of the load where it will contact the slider plate assembly is clear and is a suitable supporting surface.

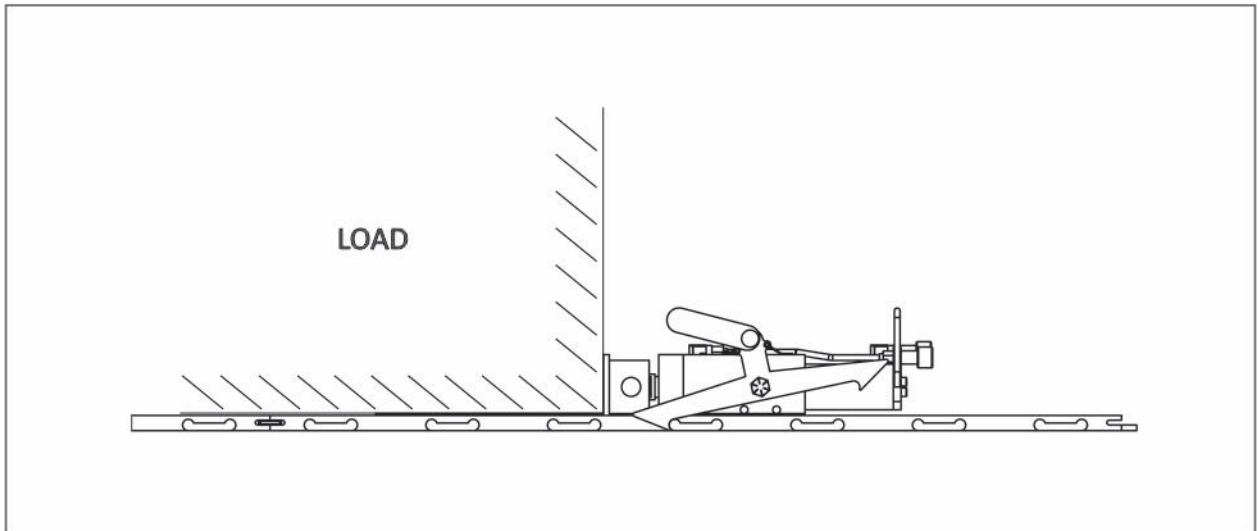
## 2.5 Load Placement

- Position the slider plate assembly under the load and ensure that the weight of the load will be distributed evenly over the surface of the slider plates. See Appendix 1 – Track Capacity & Support.

**Note:** Do not point-load the slider plates.

**Note:** It is good practice to use a friction material such as wood or rubber between the slider plate and the load.

- The push/pull heads **must** make direct contact with the load, otherwise the push/pull heads or slider plates can bend causing severe damage to the system (See Figure 7).



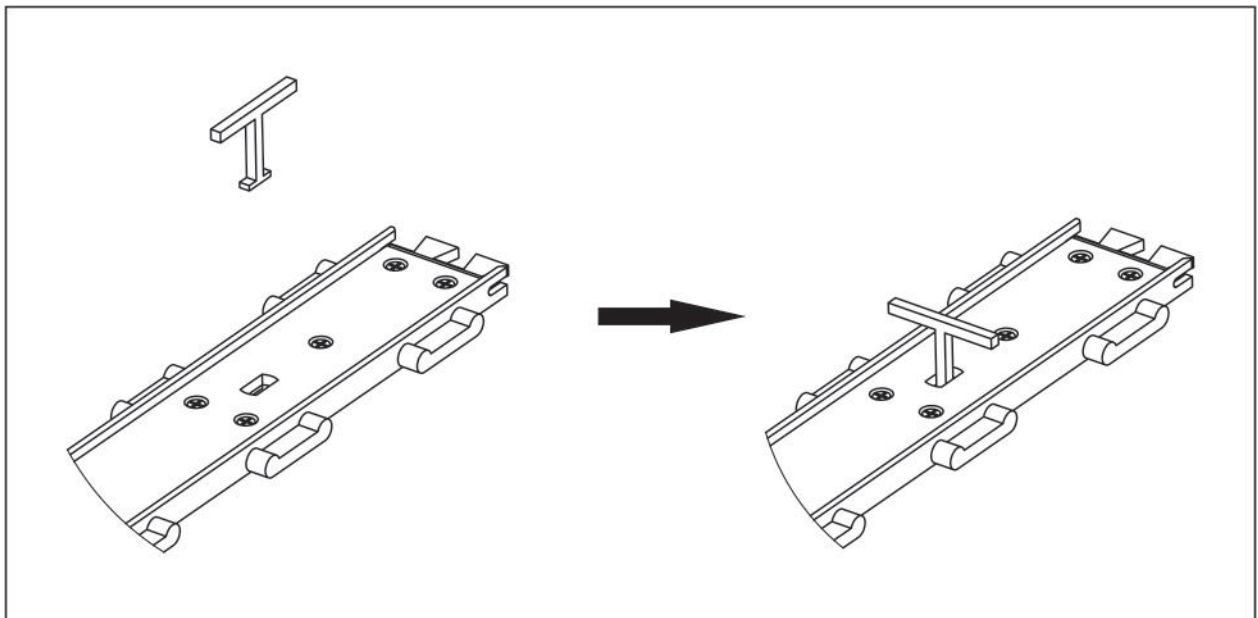
**Figure 7: Load Setup on XLP30 Skidding System**

- Check to make sure that the track has been set up properly and is adequately supported.
- Lower the load (by other means) onto the slider plates and ensure that it is evenly distributed over the slider plate surface.
- Check again to make sure that the tracks and slider plates are properly set up and adequately supported, and that nothing has shifted during placement of the load. Make any necessary corrections before operating the system.

### 3 – OPERATION

It is recommended that the cylinder rods be extended and retracted fully at least twice before connecting to the system to verify their functionality. If problems with cylinder operation are encountered, please refer to Section 4.2 Troubleshooting.

- Lift and place tracks and slider plates in desired position using the removable handles. Insert handle in slot and turn 90 degrees in order to lift track (See Figure 8).



**Figure 8: Lifting track/slider plate with removable handle**

- Place the push/pull cylinder assemblies on the tracks. Rotate directional arms forward for push mode and backward for pull mode (See Figure 9). Engage directional arms of cylinder support assembly to ratchet tabs of tracks.

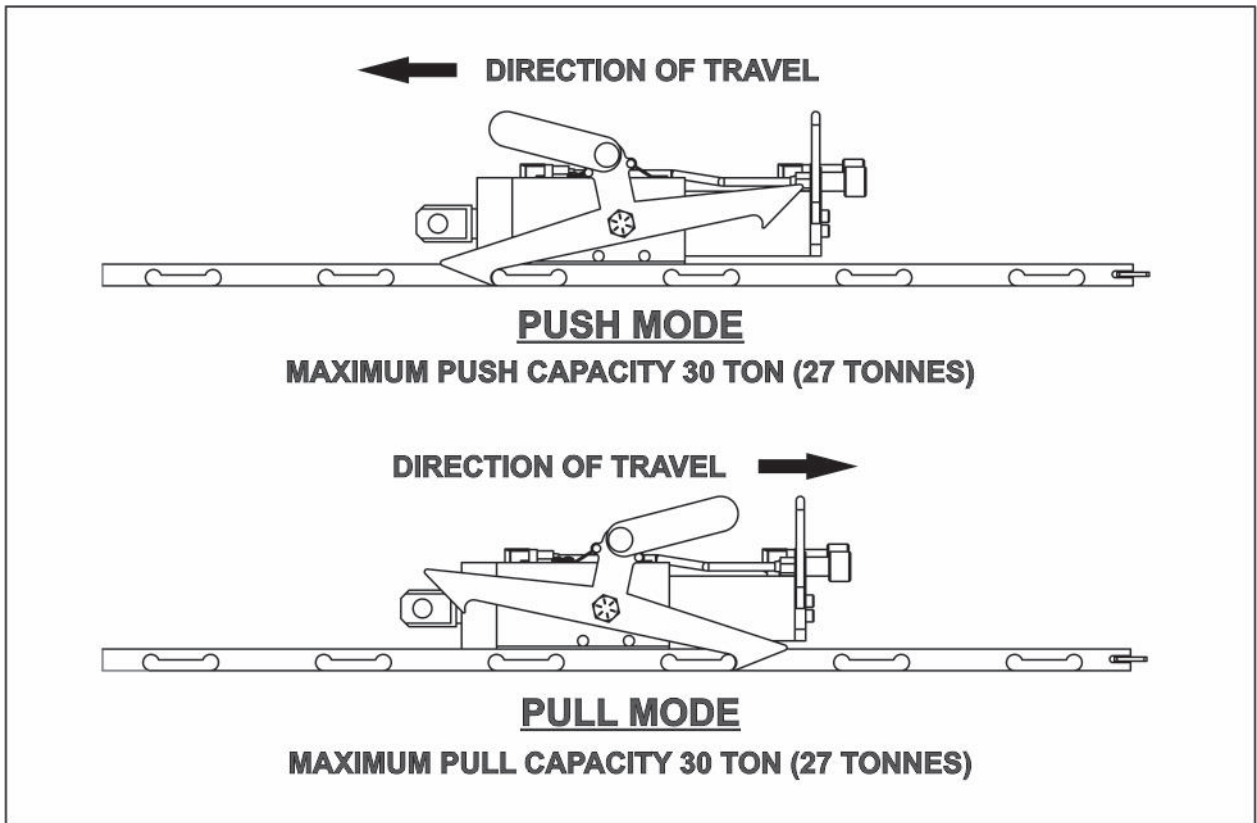


Figure 9: Push/Pull Configuration for XLP30 Cylinder Assembly

It is recommended to operate the system in push mode whenever possible.

- Connect the cylinder rod ends to the push/pull heads using the clevis pins provided. Use the linch pin to secure the clevis pin in place (See Figure 10).

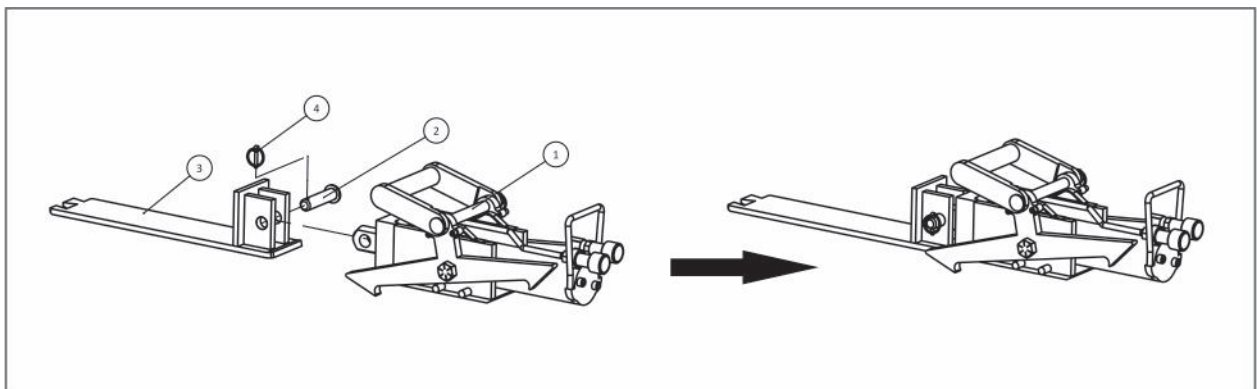


Figure 10: Connecting XLP30 Cylinder Assembly to Push/Pull Head

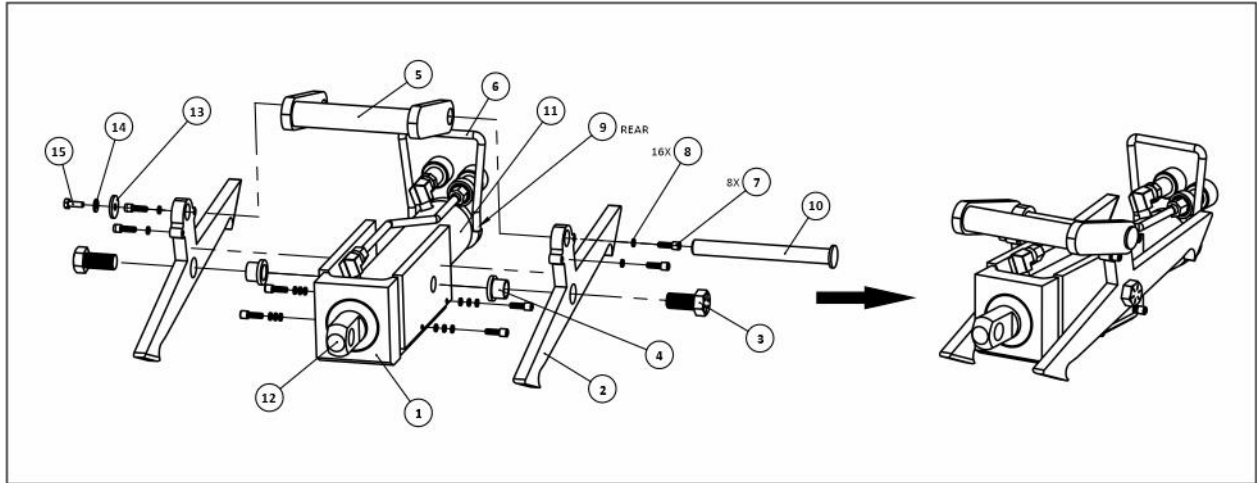
Item No.	Description
1	Push/Pull Cylinder Assembly
2	Clevis Pin
3	Push/Pull Head
4	Linch Pin

- Attach suitable 10,000 psi-rated hydraulic hoses to the cylinder quick coupler fittings. Unless otherwise specified, the advance and retract ports have standard CR-400 female couplers.
- Connect the other end of the hoses to a suitable hydraulic pump unit, ensuring that the bottom of each cylinder is connected to the advance port and the top of each cylinder is connected to the return port. These systems will function with most 10,000 psi double-acting hydraulic pumps, however we recommend use of a synchronous pump unit.
- Ensure that all couplers are fully engaged and hand-tight, otherwise the hose check valves will not open and the cylinders will not function properly.
- Ensure a clear path for the hydraulic hoses and monitor continually to make sure they will not become caught or entangled during the move.
- The pump unit should be placed in a location which gives the operator an unobstructed view of the push cylinders during operation. Personnel should be positioned at the back side or in any area of operation that is not visible to the operator and should be in continuous visual or radio contact with the operator.
- Apply hydraulic pressure and extend the push cylinders, one at a time, until the directional arms of the cylinder support fully engage in the track ratchet and 500-1000 psi (35-69 bar) of pressure is reached on the pressure gauge for each cylinder. This ensures the cylinders will move in unison when skidding operations commence.
- Check the complete system setup and ensure that the push cylinders are properly engaged and that there are no hydraulic leaks.
- Continue to extend the push cylinders to near full stroke, making sure that they extend in unison and do not jam in the track, which could damage the system. If possible, avoid fully extending the push cylinders, and avoid full pressurization when extended as this can cause serious damage to the cylinder internals.
- Retract the push cylinders – the directional arms will glide over the next ratchet before dropping and engaging.



- Continue to extend and retract the push cylinders as above until the load reaches the desired position.
- If the load has been moved too far, flip the Front handle and directional arm to pull mode. Again, do not lift the cylinder assembly using the hydraulic lines or fittings as this could damage them.
- The cylinder assemblies are now configured in Pull Mode to move load backwards.
- When the desired position is reached, raise the load (using other means) to a sufficient height to remove the skid system, and then lower the load into place.

**Note:** When the skidding system will be used to pull the load, the track should be securely anchored to a rigid surface to prevent damage due to lifting of the track (see Section 2.2 and Figure 4 for details).



**Figure 11: Exploded view of Push/Pull Cylinder Assembly Components**

<b>Item No.</b>	<b>Description</b>
1	Cylinder Support
2	Directional Arm
3	Hex Head Bolt (3/4" – 16 x 1 5/16" GR 8)
4	Sleeve
5	Front Handle
6	Rear Handle
7	Socket Head Cap Screw (1/4" – 20 x 3/4")
8	Lock Washer for 1/4" – 20 SHCS (18" THK)
9	Socket Head Cap Screw (3/8" – 16 x 1")
10	Round Bar
11	PowerTeam RD1010 Hydraulic Cylinder
12	Rod End Attachment
13	Round Bar Washer
14	Washer for 1/4" – 20 Hex Head
15	Hex Head Bolt 1/4" – 20 Hex Head

## 4 - MAINTENANCE AND ADJUSTMENTS

### 4.1 Preventive Maintenance

- When not in use, store all skidding system components in the supplied storage box, in a dry location and protected from damage. Take special care of all hydraulic components and fittings.
- Keep skidding surfaces clean and dry. Wipe the skidding surfaces occasionally using an oily rag, but do not apply excess oil, grease, or any other lubricants. A nominal friction contact surface is required for safe operation.
- Repair or replace any broken, worn, or damaged components. Contact Hydra-Slide Ltd. for replacement parts.
- Keep cylinder rods fully retracted when not in use.
- Keep coupler threads clean, well-lubricated, and secure the protective dust caps on all couplers when not in use.
- See Figure 11 for an exploded view of the push/pull cylinder assembly. This cylinder assembly is assembled by the manufacturer using Loctite Blue on the hex head bolts. If the cylinder assembly needs to be disassembled for maintenance or repair, apply heat to break the Loctite Blue seal on the threads. It is recommended to then reapply Loctite Blue on hex head bolts during reassembly.

### 4.2 Troubleshooting

Symptom	Probable Cause	Recommended Action
Push cylinder will not extend, or extends only partially	Coupler is not fully engaged Load exceeds capacity Skid shoe is jamming in track	Check and tighten all couplers Reduce load Realign track
Push cylinder will not extend and oil is coming from pressure relief valve or top of cylinder	Coupler is not fully engaged	Check and tighten all couplers
Cylinders exhibit jerky, sporadic movement when extending	Air in hydraulic system	Bleed the hydraulic system
Push cylinder will not retract	Coupler is not fully engaged	Check and tighten all couplers
Load does not move straight	Track is not set up equidistant from edge of load Cylinders are not extending in unison	Reposition track Use a synchronous pump unit or some other means to provide equal oil flow.



## 5 - TRANSPORTATION, HANDLING, AND STORAGE

- Individual components should be handled separately and with care. Weights are indicated on the nameplates of each component part.
- Lift all components using the attached handles; we recommend employing two personnel to handle track sections.
- Transport and handle in a safe manner and always ensure that parts are properly secured and prevented from unexpected movement.
- When not in use, store the skidding system in a covered, dry location, protected from damage. Take special care of all hydraulic components, hoses and fittings, etc.
- Wipe clean the inside and outside of all hose couplers using a clean, non-fibrous cloth before connecting; always replace protective caps when couplers are not in use.

## APPENDIX 1 – EC DECLARATION OF CONFORMITY

### Manufacturer

Hydra-Slide Ltd.  
84 Royal Road  
Guelph, Ontario, Canada  
N1H 1G3

We declare that the **Hydra-Slide XLP30 Low Profile Skidding System** is in accordance with the following Harmonized Standards:

<b>EN ISO 12100:2010</b>	Safety of machinery – General principles for design - Risk assessment and risk reduction
<b>EN 4413:2010</b>	Hydraulic fluid power – General rules and safety requirements for systems and their components

And in accordance with the EC Guidelines of:

**2006/42/EC –** Machinery Directive

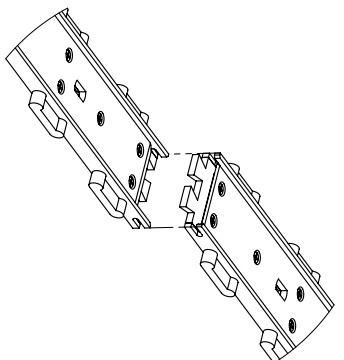
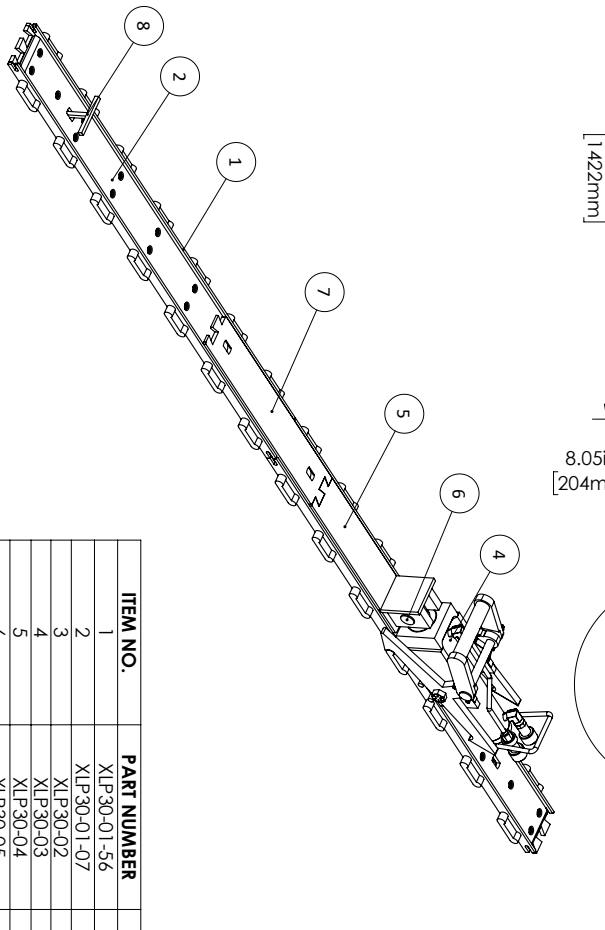
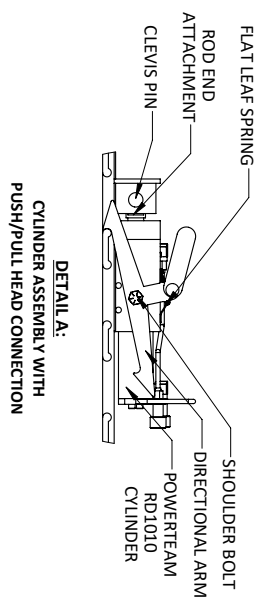
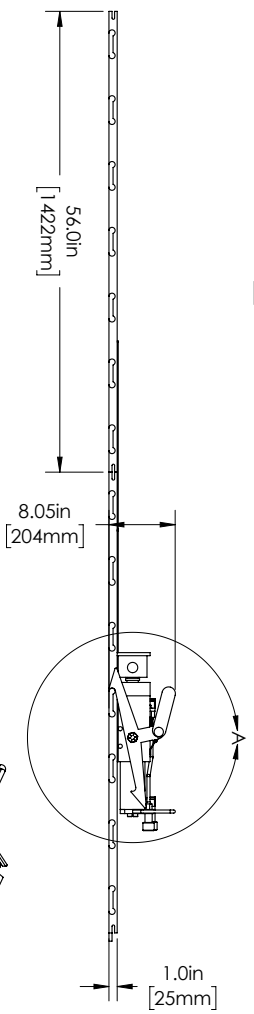
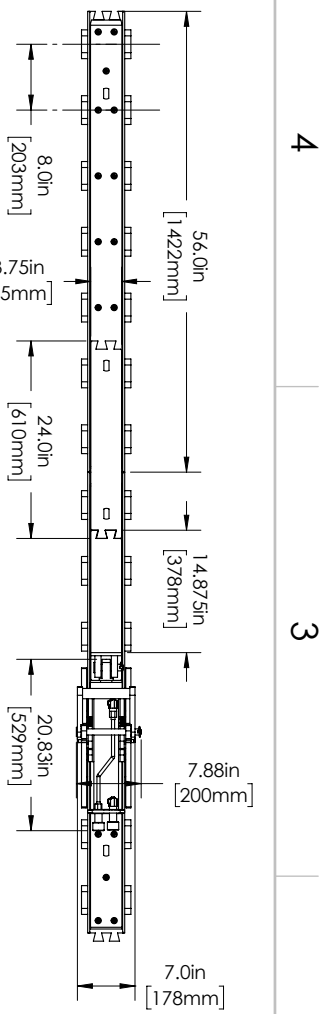
Documentation supporting this declaration is kept on file at the address listed above.

Hydra-Slide Ltd.

September 25, 2021



Don Mahnke P. Eng  
President



ITEM NO.	PART NUMBER	DESCRIPTION	WEIGHT
1	XLP30-01-56	56" TRACK SECTION	42 LB 19 KG
2	XLP30-01-07	TRACK UHMW PAD	3 LB 1.4 KG
3	XLP30-02	TRACK CONNECTOR	1 LB 0.5 KG
4	XLP30-03	PUSH CYLINDER ASSEMBLY	65 LB 29.5 KG
5	XLP30-04	PUSH/PULL HEAD	11 LB 5 KG
6	XLP30-05	CLEVIS PIN ASSEMBLY	2 LB 1 KG
7	XLP30-06	24" SLIDER PLATE	9 LB 4.1 KG
8	XLP30-08	HANDLE	1 LB .5 KG

NOTES:

PROPRIETARY AND CONFIDENTIAL

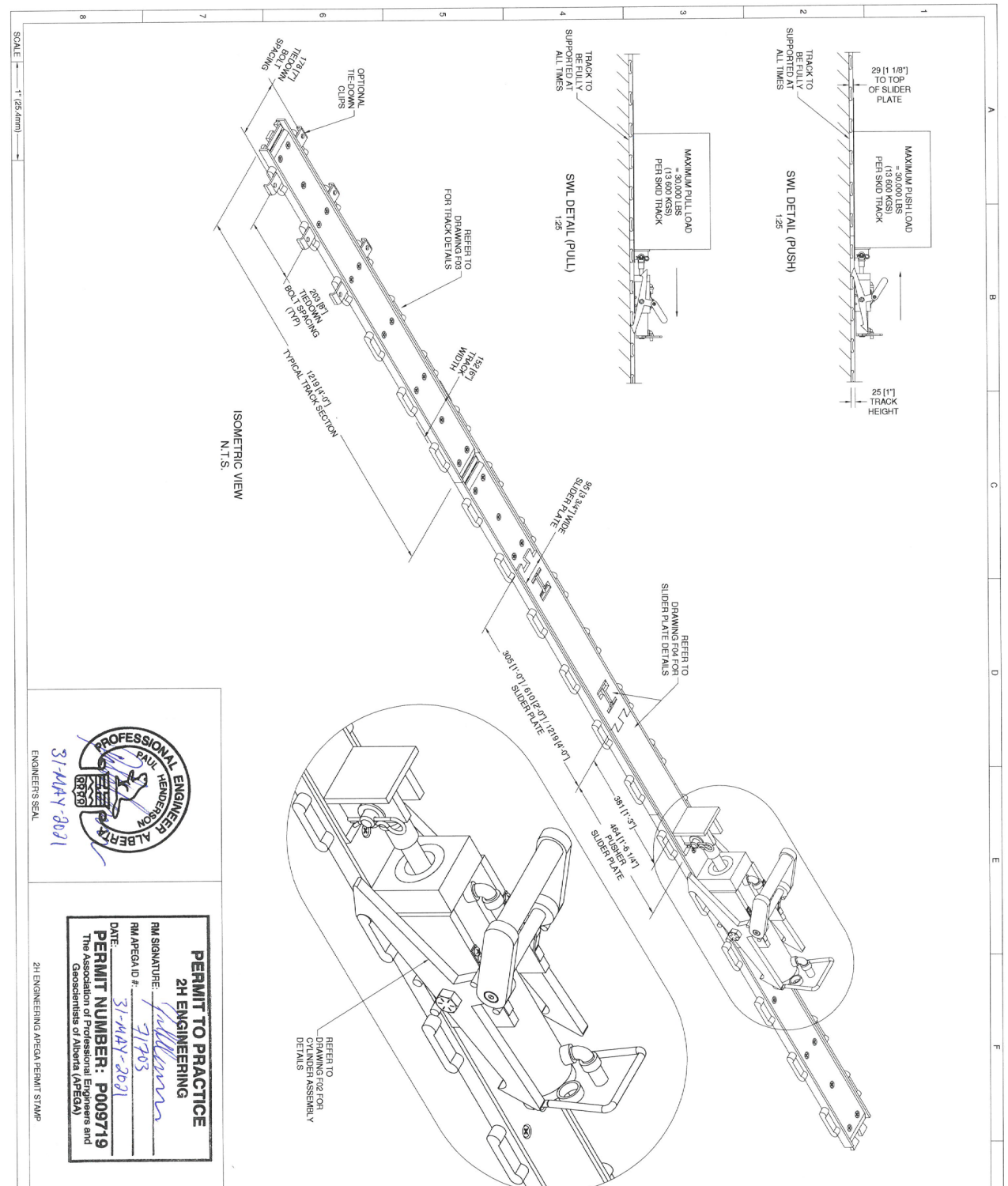
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**HYDRA-SLIDE**

TITLE: XLP30 SYSTEM GENERAL ASSEMBLY DRAWING

SIZE: DWG. NO. XLP30-GA REV 00

DRAWN BY: B.D. SHEET 1 OF 1



**PERMIT TO PRACTICE**  
**2H ENGINEERING**  
 RM AREGA ID #: 31793  
 DATE: 31-MAY-2021  
**PERMIT NUMBER: P009719**  
 The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

CLIENT:	HYDRA-SLIDE LTD
PROJECT:	XLP30 SKID SYSTEM
DRAWING TITLE:	FABRICATION DETAILS GENERAL ARRANGEMENT
PROJECT NUMBER:	20-00063
DWG NUMBER:	F01
SHEET:	1 OF 1
REV:	02

REV	DATE	DESCRIPTION	BY	CHK
02	31-05-21	REVISED PER CLIENT COMMENTS	PH	PH
01	08-02-21	ISSUED FOR CONSTRUCTION	PH	PH
00	05-01-21	PRELIMINARY RELEASE	PH	PH

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 EDMONTON, AB T6E 5V2  
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- REFERENCE DRAWINGS:**
- REFER TO DRAWING 20-00063-F02 FOR CYLINDER ASSEMBLY DETAILS.
  - REFER TO DRAWING 20-00063-F03 FOR TRACK DETAILS.
  - REFER TO DRAWING 20-00067-F04 FOR SLIDER PLATE DETAILS.
- COMPONENT WEIGHTS:**
- CYLINDER ASSEMBLY WEIGHT = 65 LBS
  - TRACK SECTION WEIGHT = 56 LBS
  - PUSHER SLIDER PLATE = 12 LBS
  - 12" SLIDER = 91 LBS
  - 24" SLIDER = 91 LBS
  - 48" SLIDER = 19 LBS

**POWER TEAM®**

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Rockford, IL 61109-3699 USA

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hytec.com

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Fax: (800) 288-7031

Form No. 102397

Operating Instructions for:



Single-acting and  
Double-acting Rams  
and Cylinders  
(Various Capacities)

**HYDRAULIC CYLINDERS**

All cylinders are marked with maximum pressure setting

**NOTE:** For a detailed parts list or to locate a Power Team Authorized Hydraulic Service Center, contact your nearest Power Team facility. A list of all Power Team facilities is located at the end of this document.

**DEFINITIONS**

**Authorized** - appointed by a duly constituted administrative or regulatory authority.

**Authorized Service Center** - independent service facility designated by the manufacturer to repair and test products.

**Cylinders, Rams, and Jacks** - used to apply force in a linear motion through the use of hydraulic fluid under pressure confined in a pressure vessel (body) with moveable pressure vessel (piston).

**Designated** - selected by the employer or employer's representative as being qualified to perform specific duties.

**Extension** - a device to increase the cylinder's, ram's or jack's retracted length.

**Load** - the total weight or force to be overcome by the cylinder, ram or jack.

**Qualified** - a person who, by possession of a recognized degree, certificate, professional standing or who by extensive knowledge, training and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter or work, or who is filled or suited for a given purpose or function. Competent.

**Operator** - a person qualified to operate or use a device or machine.

**Rated Capacity** - the maximum load for which the cylinder, ram, or jack is designed and built.

**Service, Normal** - cylinders, rams or jacks used under controlled or known consistent loads at less than 85% of rated capacity except for isolated instances.

**Service, Severe** - cylinders, rams or jacks used under conditions not rated as normal service.

**Travel** - linear extending or retracting movement of the cylinder, ram or jack.

**SAFETY EXPLANATIONS**

Two safety symbols are used to identify any action or lack of action that can cause personal injury. Your reading and understanding of these safety symbols is very important.



**DANGER** - Danger is used only when your action or lack of action will cause serious human injury or death.



**WARNING** - Warning is used to describe any action or lack of action where a serious injury can occur.

**IMPORTANT** - Important is used when action or lack of action can cause equipment failure, either immediate or over a long period of time.



**WARNING:** It is the operator's responsibility to read and understand the following safety statements,

- Only qualified operators should install, operate, adjust, maintain, clean, repair, or transport this machinery.
- These components are designed for general use in normal environments. These components are not specifically designed for lifting and moving people, agri-food machinery, certain types of mobile machinery or special work environments such as: explosive, flammable or corrosive. Only the user can decide the suitability of this machinery in these conditions or extreme environments. Power Team will supply information necessary to help make these decisions.

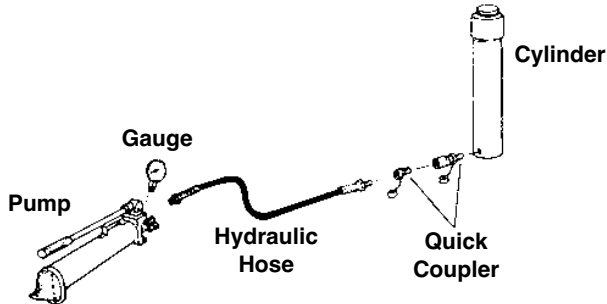
Sheet No. 1 of 5

Rev. 4 Date: 10 April 2009

## SINGLE-ACTING HYDRAULIC SYSTEMS

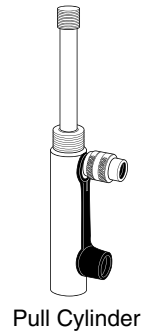
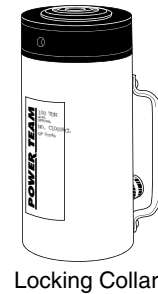
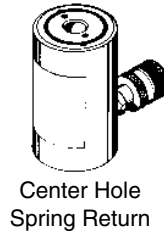
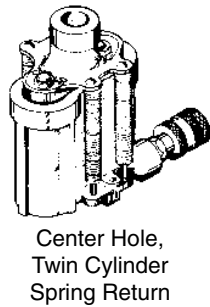
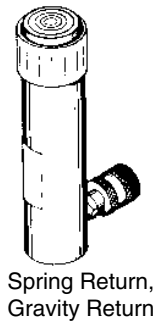
A basic single-acting hydraulic system consists of a manual or power pump that moves the hydraulic fluid, a hydraulic hose that carries the fluid, and a cylinder or ram that the fluid moves to do a job.

### TYPICAL INSTALLATION



Since the single-acting cylinders have only one hose going to the cylinder, the cylinder can only apply force to extend (pull cylinders retract) its rod. The return stroke is accomplished by gravity or spring force.

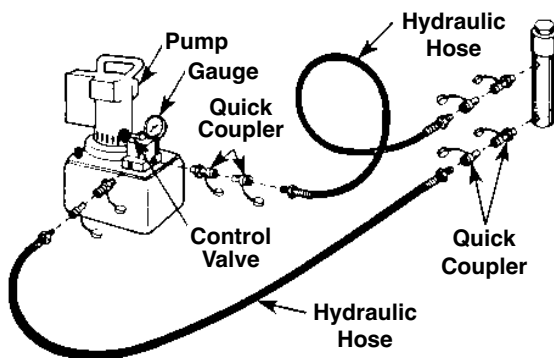
### VARIOUS TYPES OF SINGLE-ACTING CYLINDERS



## DOUBLE-ACTING HYDRAULIC SYSTEMS

A basic double-acting hydraulic system consists of a pump (which moves the hydraulic fluid), a double-acting cylinder or ram (to do the work), a hydraulic hose (which routes the fluid to the advance cylinder or ram port), a second hydraulic hose (which routes the fluid to the retract cylinder or ram port), and a control valve which can change the direction of the hydraulic fluid.

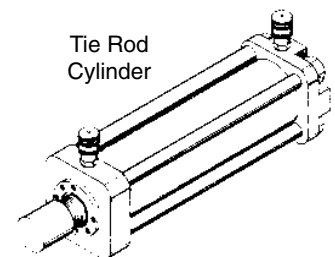
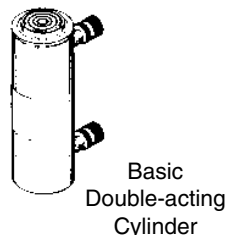
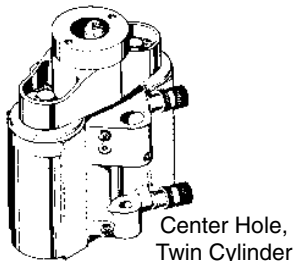
### TYPICAL INSTALLATION



A double-acting cylinder or ram can be either extended or retracted hydraulically.

Most double-acting cylinders or rams are classed as "differential cylinders" because of the different sized areas that the hydraulic fluid pushes against during the extend and retract strokes. Because of this difference, the extend stroke can exert more force than the retract stroke.

### VARIOUS TYPES OF DOUBLE-ACTING CYLINDERS

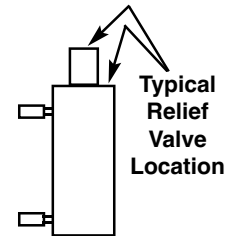


**NOTE:** The capacity of a hydraulic system is determined by the effective area of the cylinder and the system pressure.

## SAFETY PRECAUTIONS

 **DANGER**

- A double-acting cylinder or ram must have both hoses and all couplers securely connected to both ports. If one of the two ports is restricted or becomes disconnected, pressure will build and the cylinder, hose or coupler can burst, possibly causing serious injury or death.
- When extending double-acting cylinders or rams, the retract port must not be restricted. A restricted retract port will prevent pressure from being released and the cylinder can burst, possibly causing serious injury or death.
- DO NOT attempt to adjust or service the rod end relief valve on a double-acting cylinder or ram. If oil leakage is detected from this relief valve, discontinue use of the cylinder or ram immediately and contact your nearest Authorized Hydraulic Service Center. If improperly adjusted, the cylinder or ram could develop excessive pressure and cause the cylinder, hose or couplers to burst which could cause serious injury or death.



- When extending a cylinder or ram under load, always insure that the coupler(s) or port thread(s) has (have) not been damaged or do(es) not come in contact with any rigid obstruction. If this condition does occur, the coupler's attaching threads may become stripped or pulled from the cylinder or ram resulting in the instantaneous release of high pressure hydraulic fluid, flying objects, and loss of the load. All of these possible results could cause serious injury or death.
- When using a center-hole cylinder or ram, always support the base against a rigid, flat surface at least 75% as large as the cylinder or ram base. Failure to do so can damage the center standpipe resulting in the instantaneous release of high pressure hydraulic fluid and loss of load which can possibly cause serious injury or death.
- Avoid off-center loads which could damage the cylinder or ram and/or cause loss of the load, possibly causing serious injury or death.
- Control the load at all times. Do not drop the load. Especially on locking collar cylinders or rams because the threads may shear and cause loss of the load.
- Properly rated adapters must be installed and used correctly for each application.
- Cylinders with weep hole stroke limiters will expel high pressure oil through the bleed hole to the atmosphere if extended beyond the visual maximum stroke indication. If this occurs, seals must be replaced.

 **WARNING**

- All WARNING statements must be carefully observed to help prevent personal injury.

**Hydraulic Hoses and Fluid Transmission Lines**

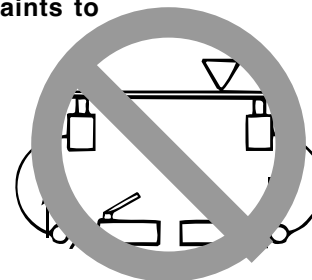
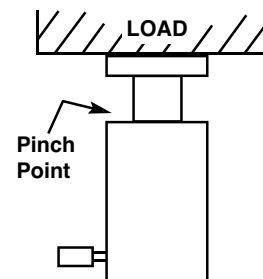
- Avoid straight line tubing connections in short runs. Straight line runs do not provide for expansion and contraction due to pressure and/or temperature changes. See diagrams in Set-up section of this form.
- Eliminate stress in the tube lines. Long tubing runs should be supported by brackets or clips. Tubes through bulkheads must have bulkhead fittings. This makes easy removal possible and helps support the tubing.
- Before operating the pump, all hose connections must be tightened with the proper tools. Do not overtighten. 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.

## SAFETY PRECAUTIONS (CONTINUED)

- Should a hydraulic hose ever rupture, burst, or need to be disconnected, immediately shut off the pump and release all pressure. Never attempt to grasp a leaking pressurized hose with your hands. The force of escaping hydraulic fluid could cause serious injury.
- Do not subject the hose to potential hazard such as fire, sharp surfaces, extreme heat or cold, or heavy impact. Do not allow the hose to kink, twist, curl, crush, cut, or bend so tightly that the fluid flow within the hose is blocked or reduced. Periodically inspect the hose for wear, because any of these conditions can damage the hose and possibly result in personal injury.
- Carefully inspect all hoses and fittings prior to use. Before each use, check entire hose for cuts, leaks, abrasion or bulging of cover, or damage or movement of couplings. If any of these conditions exist, replace the hose immediately. NEVER attempt to repair the hose.
- Do not use the hose to move attached equipment. Stress can damage the hose and possibly cause personal injury.
- Hose material and coupler seals must be compatible with the hydraulic fluid used. Hoses also must not come in contact with corrosive materials such as creosote-impregnated objects and some paints. Hose deterioration due to corrosive materials can result in personal injury. Consult the manufacturer before painting a hose. Never paint a coupler.

### Cylinder

- The user must be a qualified operator familiar with the correct operation, maintenance, and use of the cylinder(s). Lack of knowledge in any of these areas can lead to personal injury.
- Read and understand all safety and warning decals and instructions.
- Use only approved accessories and approved hydraulic fluid. Hoses, seals and all components used in a system must be compatible with the hydraulic fluid used.
- Do not exceed the rated capacities of the cylinders. Excess pressure can result in personal injury.
- Inspect each cylinder and coupler before each shift or usage to prevent unsafe conditions from developing.
- Do not use cylinders if they are damaged, altered or in poor condition.
- Do not use cylinders with bent or damaged couplers or damaged port threads.
- Under certain conditions, the use of an extension with a hydraulic cylinder may not be advisable and could present a dangerous condition.
- Avoid pinch points or crush points that can be created by the load or parts of the cylinder.
- To help prevent material fatigue if the cylinder is to be used in a continuous application, the load should not exceed 85% of the rated capacity or stroke.
- The RT1004 cylinder has an internal stroke limiting device which may be damaged by sudden movement of the piston rods. If damage is suspected, have the stroke limiting plunger and spring inspected/replaced by a qualified person.
- Cylinder must be on a stable base which is able to support the load while pushing or lifting.
- To help prevent personal injury, use shims, friction material or constraints to
- Do not create an uneven fulcrum and lever condition or overload condition where force exerted by one cylinder on a lever will intensify downward force on a pressure-checked cylinder at the other end of the lever. *For example: If straightening an axle as illustrated, when cylinder A extends, and uneven fulcrum and lever condition will intensify force downward on pressure-checked cylinder B. The pressure created in cylinder B will be increased to dangerously high levels.*
- Do not set poorly-balanced or off-center loads on a cylinder. The load can tip or the cylinder can “kick out” and cause personal injury.
- Do not use the locking collar on a threaded piston as a stop. The threads may shear resulting in loss of the load.
- If this component is used to lift or lower loads, be certain that the load is under operator control at all times and that others are clear of the load. Do not drop the load.
- As the load is lifted, use blocking and cribbing to guard against a falling load.



## SAFETY PRECAUTIONS (CONTINUED)

- To help prevent personal injury, do not allow personnel to go under or work on a load before it is properly cribbed or blocked. All personnel must be clear of the load before lowering.
- Never use extreme heat to disassemble a hydraulic cylinder or ram. Metal fatigue and/or seal damage will result and can lead to unsafe operating conditions.
- Use extreme caution when disassembling a spring return cylinder. All springs can store energy which can be released suddenly and cause personal injury. Mechanically restrain the gland nut or end cap when disassembling any compressed or extended cylinders which have an internally compressed spring. Consult the parts list to determine the type of spring loading. Observe all warnings and cautions.
- The guide cannot cover every hazard or situation so always do the job with **SAFETY FIRST**.

### IMPORTANT:

- Keep the cylinder clean at all times.
- While at a job site, when the cylinder is not in use, keep the piston rod fully retracted and upside down.
- Use an approved, high-grade pipe thread sealant to seal all hydraulic connections. Teflon tape can be used if only one layer of tape is used and it is applied carefully (two threads back) to prevent the tape from being pinched by the coupler and broken off inside the pipe end. Any loose pieces of tape could travel through the system and obstruct the flow of fluid or cause jamming of precision-fit parts.
- Always use protective covers on disconnected quick couplers.
- When mounting cylinders or rams using the internal piston rod threads, collar threads, threaded tie rods or base mounting holes, the threads must be fully engaged. Always use SAE grade 8 or better fasteners when attaching components to cylinders or rams and tighten securely.
- Limiting the stroke on spring return cylinders will prolong spring life.
- Limiting the stroke and pressure on all cylinders will prolong their life.

## INTRODUCTION

These instructions are written to help you, the user, more effectively use and maintain your single-acting or double-acting cylinders and rams. If any questions, please call your nearest Power Team facility (see listing).

**NOTE: For a detailed parts list or to locate a Power Team Authorized Hydraulic Service Center, contact your nearest Power Team facility. A list of all Power Team facilities is located at the end of this document.**

Some of the information included in these instructions was selected from A.N.S.I. B30.1 and applies to the construction, installation, operation, inspection and maintenance of hydraulic cylinders. It is strongly recommended that you read A.N.S.I. B30.1 to answer any questions not covered in these instructions. The complete A.N.S.I. B30.1 standard which contains additional information can be obtained at a nominal cost from the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th, New York, New York 10017.

An inspection checklist (Form No. 105503) is available on request from your nearest Power Team facility.

## SYSTEM EVALUATION

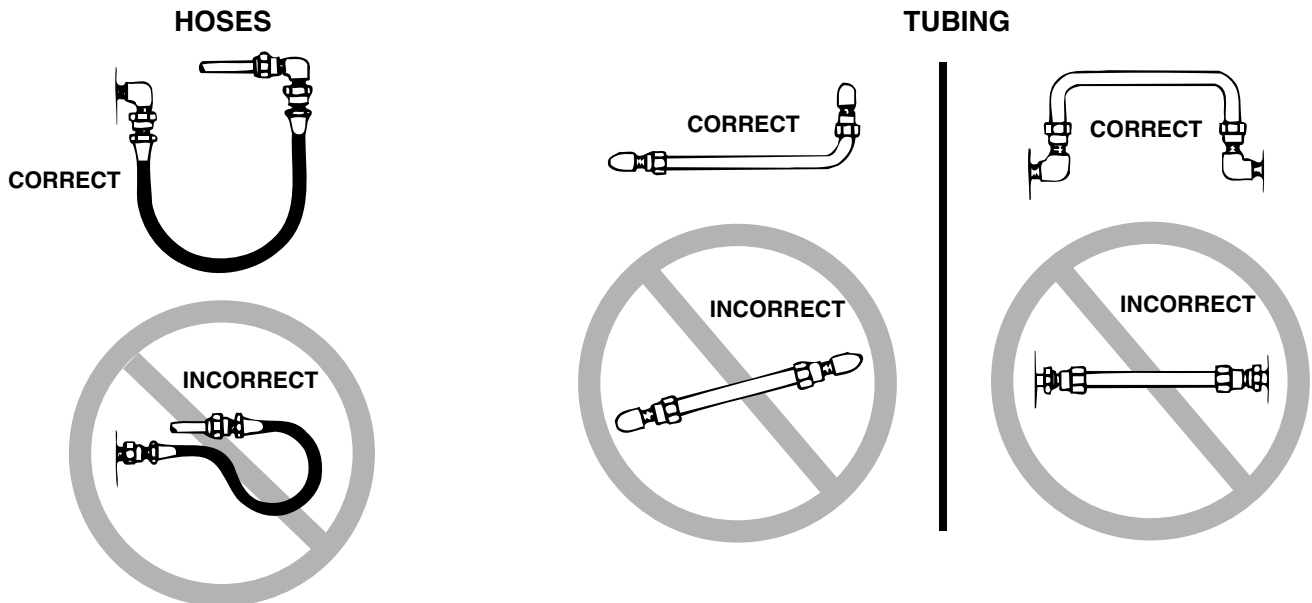
Your cylinder, hose(s), couplings and pump all must be rated for the same maximum operating pressure, correctly connected and compatible with the hydraulic fluid used. An improperly matched system can cause the system to fail and possibly cause serious injury. If you are in doubt, consult your nearest Power Team facility.

## SET-UP

### HYDRAULIC CONNECTIONS

Remove the thread protectors or dust covers from the hydraulic ports if applicable. Clean the areas around the fluid ports of the pump and cylinder. Inspect all threads and fittings for signs of wear or damage, and replace as needed. Clean all hose ends, couplers and union ends. Connect all hose assemblies to the pump and cylinder. Use an approved, high-grade pipe sealant (such as Power Team HTS50) to seal all hydraulic connections. Tighten securely and leak-free but do not overtighten.

Hydraulic lines and fittings can act as restrictors as the cylinder or ram retracts. The restricting or slowing of the fluid flow causes back pressure that slows the cylinder's or ram's return. Return speed also varies because of the application, condition of the cylinder or ram, inside diameter of hose or fitting, length of the hose, and the temperature and viscosity of the hydraulic fluid.

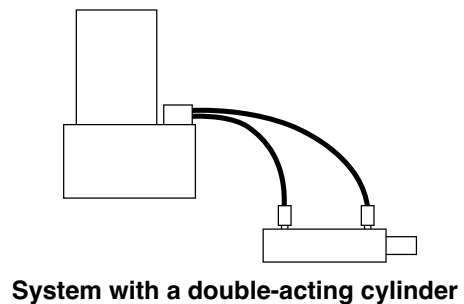
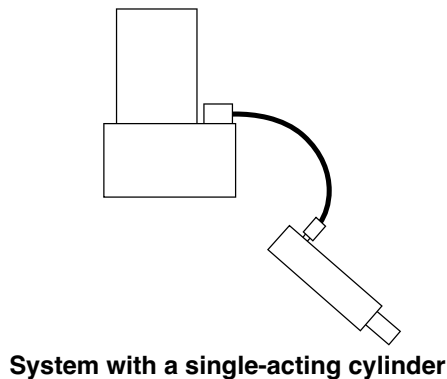


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### BLEEDING THE SYSTEM

After all connections are made, the hydraulic system must be bled of any trapped air. Refer to the diagrams below.

With no load on the system and the pump vented and positioned higher than the cylinder or ram, cycle the system several times. If you are in doubt about venting your pump, read the operating instructions for your pump. Check the reservoir for possible low fluid level and fill to proper level with approved, compatible hydraulic fluid as necessary.



**IMPORTANT:** Some spring return cylinders or rams have a cavity in the rod which forms an air pocket. This type of cylinder or ram should be bled when positioned upside down or lying on its side with the port facing upward.

## SET-UP (CONTINUED)

### INSPECTION

Before each use, visually inspect for the following items:

1. Cracked or damaged cylinder
2. Excessive wear, bending, damage, or insufficient thread engagement
3. Leaking hydraulic fluid
4. Scored or damaged piston rod
5. Improperly functioning swivel heads and caps
6. Loose bolts
7. Damaged or improperly assembled accessory equipment
8. Modified, welded, or altered equipment
9. Bent or damaged couplers or port threads

**Preventive Maintenance** (yearly or sooner, if the cylinder or ram condition suggests damage) - Visual examination by the operator or other designated personnel with a dated and signed equipment record.

## RAM AND CYLINDER MAINTENANCE

- Always use clean, approved hydraulic fluid and change as needed.
- Any exposed threads (male or female) must be cleaned and lubricated regularly, and protected from damage.
- If a cylinder or ram has been exposed to rain, snow, sand, grit-laden air, or any corrosive environment it must be cleaned, lubricated, and protected immediately after exposure.

### PERIODIC CLEANING

A routine should be established to keep the hydraulic system as free from dirt as possible. All unused couplers must be sealed with dust covers. All hose connections must be free of dirt and grime. Any equipment attached to the cylinder must be kept clean. Use only Power Team hydraulic fluid and change as recommended or sooner if the fluid becomes contaminated (never exceed 300 hours).

### STORAGE

#### Single-acting and Center Hole Cylinders

Single-acting and center hole cylinders and rams should be stored in a vertical position with the rod end down in a **dry**, well-protected area where they will not be exposed to corrosive vapors, dust or other harmful elements.

When a single-acting cylinder or ram has not been used for a period of three (3) months it should be connected to a pump and be fully extended and then retracted. This cycle will lubricate the cylinder walls thereby reducing the potential for rust formation on the cylinder walls.

#### Double-acting Cylinders

Double-acting cylinders and rams should be stored in a vertical position with the rod end down in a **dry**, well-protected area where they will not be exposed to corrosive vapors, dust or other harmful elements.

If a double-acting cylinder or ram has been stored for a year or more, it must be thoroughly inspected before it is used.

## TROUBLE-SHOOTING GUIDE

**IMPORTANT:**

- The following trouble-shooting and repair procedures should be performed by qualified personnel familiar with this equipment. Use the proper equipment when trouble-shooting!

**NOTE:**

- All the following statements may not apply to your particular model of cylinder or ram. Use the guide as a general reference for trouble-shooting.

PROBLEM	CAUSE	SOLUTION
<b>Erratic action</b>	<ol style="list-style-type: none"> <li>1. Air in system or pump cavitation</li> <li>2. Internal leakage in double-acting cylinders or external leakage in single-acting cylinders</li> <li>3. Cylinder sticking or binding</li> </ol>	<ol style="list-style-type: none"> <li>1. Add fluid, bleed air and check for leaks</li> <li>2. Replace worn packings. Check for excessive contamination or wear. Replace contaminated fluid as necessary.</li> <li>3. Check for dirt or leaks. Check for bent, misaligned, worn parts or defective packings.</li> </ol>
<b>Cylinder/Ram does not move</b>	<ol style="list-style-type: none"> <li>1. Loose couplers</li> <li>2. Faulty coupler</li> <li>3. Improper valve position</li> <li>4. Low or no hydraulic fluid in pump reservoir</li> <li>5. Air-locked pump</li> <li>6. Pump not operating</li> <li>7. Load is above the capacity of the system</li> <li>8. Fluid leaks out of rod end relief valve (double-acting cylinders only)</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten couplers</li> <li>2. Verify that female coupler is not locked up (ball wedged into seat). Replace both female and male couplers.</li> <li>3. Close release valve or shift to new position</li> <li>4. Fill and bleed the system</li> <li>5. Prime pump per pump operating instructions</li> <li>6. Check pump's operating instructions</li> <li>7. Use the correct equipment</li> <li>8. Make sure all couplers are fully coupled. Contact your nearest Authorized Hydraulic Service Center.</li> </ol>
<b>Cylinder/Ram extends only partially</b>	<ol style="list-style-type: none"> <li>1. Pump reservoir is low on hydraulic fluid</li> <li>2. Load is above the capacity of the system</li> <li>3. Cylinder piston rod binding</li> </ol>	<ol style="list-style-type: none"> <li>1. Fill and bleed the system</li> <li>2. Use the correct equipment</li> <li>3. Check for dirt or leaks. Check for bent, misaligned, worn parts or defective packings.</li> </ol>
<b>Cylinder/Ram moves slower than normal</b>	<ol style="list-style-type: none"> <li>1. Loose connection or coupler</li> <li>2. Restricted hydraulic line or fitting</li> <li>3. Pump not working correctly</li> <li>4. Cylinder seals leaking</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten</li> <li>2. Clean and replace if damaged</li> <li>3. Check pump operating instructions</li> <li>4. Replace worn seals. Check for excessive contamination or wear</li> </ol>

**TROUBLE-SHOOTING GUIDE (CONTINUED)**

<b>PROBLEM</b>	<b>CAUSE</b>	<b>SOLUTION</b>
<b>Cylinder/Ram moves but does not maintain pressure</b>	<ol style="list-style-type: none"> <li>1. Leaky connection</li> <li>2. Cylinder seals leaking</li> <li>3. Pump or valve malfunctioning</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean, reseal with thread sealant and tighten connection</li> <li>2. Replace worn seals. Check for excessive contamination or wear. Replace contaminated fluid as necessary.</li> <li>3. Check pump or valve operating instructions</li> </ol>
<b>Cylinder/Ram leaks hydraulic fluid</b>	<ol style="list-style-type: none"> <li>1. Worn or damaged seals</li> <li>2. Loose connections</li> <li>3. Rod end relief valve has activated (double-acting cylinders only)</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace worn seals. Check for excessive contamination or wear. Replace contaminated fluid as necessary.</li> <li>2. Clean, reseal with thread sealant and tighten connection</li> <li>3. Make sure all couplers are fully coupled.                             <ol style="list-style-type: none"> <li>a. <i>If relief valve is still leaking, do not attempt to service this component. Contact your nearest Authorized Hydraulic Service Center.</i></li> </ol> </li> </ol>
<b>Cylinder/Ram will not retract or retracts slower than normal</b>	<ol style="list-style-type: none"> <li>1. Pump release valve closed</li> <li>2. Loose couplers</li> <li>3. Blocked hydraulic lines</li> <li>4. Weak or broken retraction springs</li> <li>5. Cylinder damaged internally</li> <li>6. Pump reservoir too full</li> </ol>	<ol style="list-style-type: none"> <li>1. Open pump release valve</li> <li>2. Tighten couplers</li> <li>3. Clean and flush</li> <li>4. Send to service center for repair</li> <li>5. Send to service center for repair</li> <li>6. Drain hydraulic fluid to correct level</li> </ol>

**POWER TEAM / HYTEC FACILITIES**

**POWER TEAM®**

**HYTEC®**



**UNITED STATES**

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info@powerteam.com*

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**EUROPE**

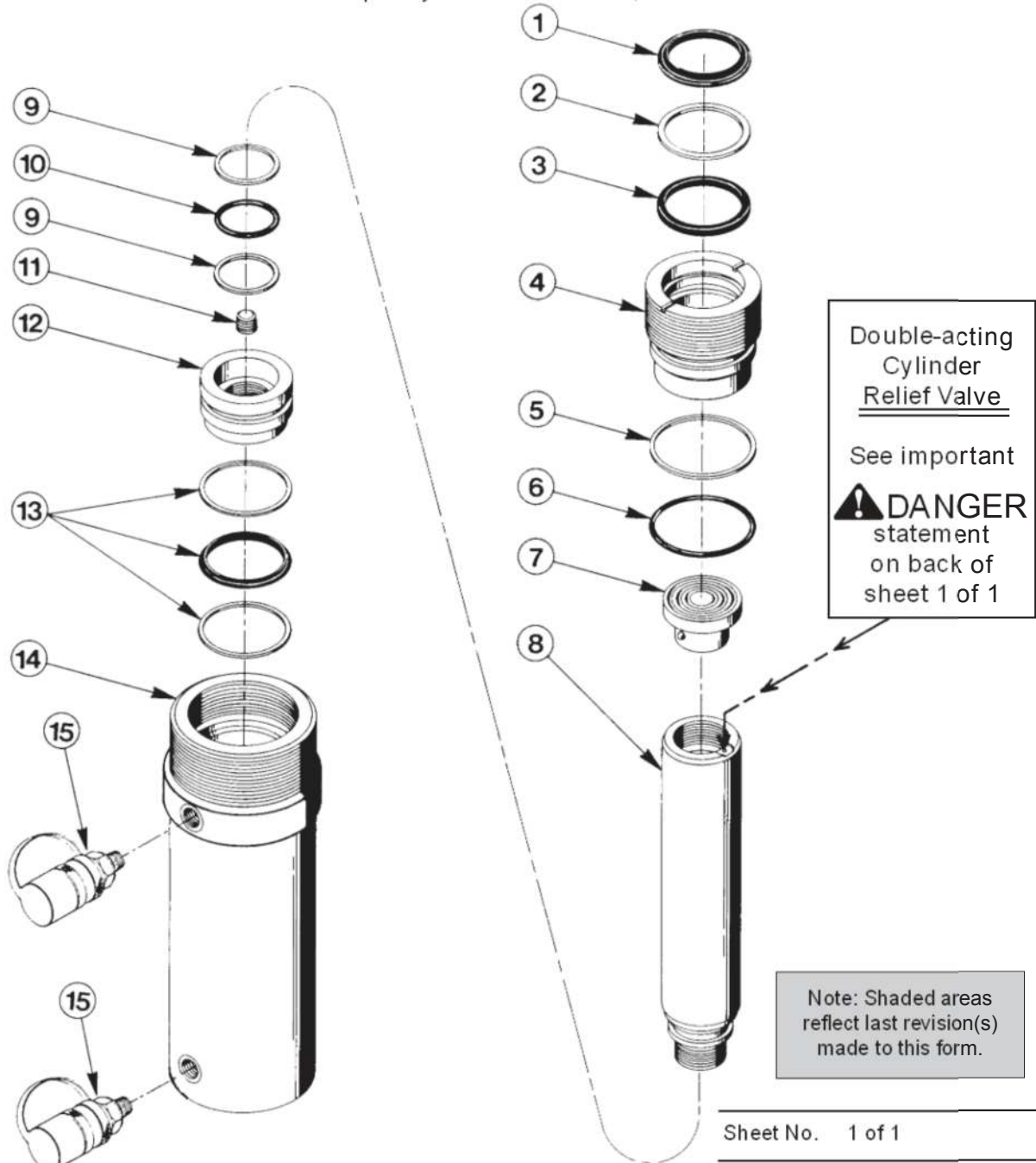
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E-mail  
infoeurope@powerteam.com*

For more information, Internet address: <http://www.powerteam.com> (or) <http://www.hytec.com>

Parts List for:

7RD1010  
RD1010  
RD1010-PFAFF

DOUBLE-ACTING  
HYDRAULIC CYLINDER  
Max. Capacity: 11.2 Tons at 10,000 PSI



Double-acting  
Cylinder  
Relief Valve  
See important  
**⚠ DANGER**  
statement  
on back of  
sheet 1 of 1

Note: Shaded areas  
reflect last revision(s)  
made to this form.



**DANGER:** To help avoid possible serious personal injury or death,

- In the event that the cylinder retract port is ever restricted or plugged, a double-acting cylinder relief valve will help prevent excessive pressure from building in the cylinder. **DO NOT** attempt to adjust or service this relief valve! If oil leakage is detected from this relief valve, discontinue use of the cylinder immediately and contact Power Team Technical Services. Only Power Team Authorized Hydraulic Service Centers should service this relief valve.

Item No.	Part No.	No. Req'd	Description
1	*19578	1	Rod Wiper
2	*19583	1	Backup Washer (1-9/16 X 1-5/16 X .048)
3	*19577	1	U-cup
4	43393	1	Retainer Nut (Torque to 100 ft. lbs.)
5	*19136	1	Backup Washer (1-5/16 X 1-3/4 X .048)
6	*10535	1	O-ring (1-5/16 X 1-3/4 X .093)
7	201362	1	Thread Adapter Assembly
8	51391	1	Piston Rod
9	*19131	2	Backup Washer (1" X 13/16 X .048)
10	*10658	1	O-ring (1" X 13/16 X 3/32)
11	14972	1	Pipe Plug (1/4 PTF)
12	43392	1	Piston Head (Torque to 200 ft. lbs.)
13	*19757	1	T-Seal & Backup Rings (Smooth side of Backup Ring must be against seal)
14	51390	1	Cylinder Body
15	9796	2	Quick Coupler (For RD1010 & RD1010-PFAFF)
	210916	2	Quick Coupler (For 7RD1010)

**PARTS INCLUDED BUT NOT SHOWN**

*203908	1	Warning Decal
420893	1	Full Coverage Decal (For RD1010)
210850	1	Trade Name Decal (For 7RD1010)
306249	1	Thread Protector (For RD1010 & RD1010-PFAFF)
203908-CE	1	Warning Decal (For RD1010-PFAFF)
252183	1	Trade Name Decal (For RD1010-PFAFF)

Part numbers marked with an (\*) asterisk are contained in Repair Kit No. 300017.

Refer to any operating instructions included with this product for detailed information about operation, testing, disassembly, reassembly, and preventive maintenance.

Items found in this parts list have been carefully tested and selected. Therefore: Use only genuine Power Team replacement parts!

Additional questions can be directed to our Technical Services Department.



# QUADRANT

## ENGINEERED PLASTIC PRODUCTS

Subcategory: Polyethylene;Polymer;Thermoplastic

Physical Properties	Metric	English	Comments
SpecificGravity	<a href="#">0.93g/cc</a>	0.0336lb/in <sup>3</sup>	ASTMD792
WaterAbsorption	<a href="#">Max0.01%</a>	Max0.01%	Immersion,24hr;ASTMD570(2)
WaterAbsorptionatSaturation	<a href="#">Max0.01%</a>	Max0.01%	Immersion;ASTMD570(2)
<b>Mechanical Properties</b>			
Hardness,ShoreD	66	66	ASTMD2240
TensileStrength,Ultimate	<a href="#">40MPa</a>	5800psi	ASTMD638
ElongationatBreak	<a href="#">300%</a>	300%	ASTMD638
TensileModulus	<a href="#">0.689GPa</a>	100ksi	ASTMD638
FlexuralModulus	<a href="#">0.758GPa</a>	110ksi	ASTMD790
FlexuralYieldStrength	<a href="#">24.1MPa</a>	3500psi	ASTMD790
CompressiveStrength	<a href="#">20.7MPa</a>	3000psi	10%Def.,73°F;ASTMD695
CompressiveModulus	<a href="#">0.552GPa</a>	80ksi	ASTMD695
ShearStrength	<a href="#">33.1MPa</a>	4800psi	ASTMD732
CoefficientofFriction	0.12	0.12	Dryvs.Steel;QTM55007
LimitingPressureVelocity	<a href="#">0.0701MPa Bm/sec</a>	2000psiBft/min	4:1safetyfactor;QTM55007
IzodImpact,Notched	NB	NB	ASTMD256TypeA
<b>Electrical Properties</b>			
SurfaceResistivityperSquare	Min1e+015ohm	Min1e+015ohm	ASTMD257
DielectricConstant	2.3	2.3	(1MHz);ASTMD150
DielectricStrength	<a href="#">90.6kV/mm</a>	2300V/mil	ShortTerm;ASTMD149
DissipationFactor	0.0005	0.0005	(1MHz);ASTMD150
<b>Thermal Properties</b>			
CTE,linear68°F	<a href="#">216 Fm/mB°C</a>	120Fin/inB°F	(B40°Fto300°F);ASTME831
ThermalConductivity	<a href="#">0.409W/m BK</a>	2.84BTUBin/hrBft <sup>2</sup> B°F	
MeltingPoint	<a href="#">135°C</a>	275°F	Crystalline,Peak;ASTMD3418
MaximumServiceTemperature,Air	<a href="#">82.2°C</a>	180°F	LongTerm
DeflectionTemperatureat1.8MPa(264psi)	<a href="#">46.7°C</a>	116°F	ASTMD648
Flammability,UL94(EstimatedRating)	HB	HB	1/8inch
<b>Qualitative Processing Properties</b>			
ComplianceBFDA	Compliant		
Machinability	3		1B10,1=EasiertoMachine
ServiceinAlcohols	Acceptable		
ServiceinAliphaticHydrocarbons	Acceptable		
ServiceinAromaticHydrocarbons	Unacceptable		
ServiceinChlorinatedSolvents	Acceptable		
ServiceinEthers	Limited		
ServiceinKetones	Limited		
ServiceinStrongAcids	Limited		
ServiceinStrongAlkalies	Acceptable		
ServiceinSunlight	Limited		
ServiceinWeakAcids	Acceptable		
ServiceinWeakAlkalies	Acceptable		

# Hydraulic Couplers



## F-Series

Flush-faced couplers provide reduced pressure drop verses other types and are preferred in dirty, grimy construction and mining environments due to easy clean, non-dirt trapping faces.



## Metal Dust Caps

Steel dust caps are available for the C-604 series couplers. Order model number: **CD-411M** for female half **CD-415M** for male half

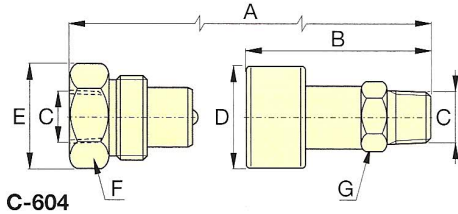
## A C F Series



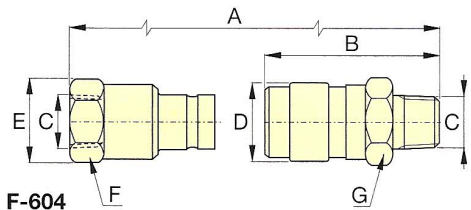
Maximum Flow Capacity:  
**2,500 in<sup>3</sup>/min.**

Thread:  
**1/4" and 3/8" NPTF**

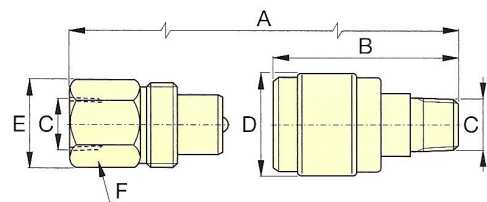
Maximum Operating Pressure:  
**10,000 psi**



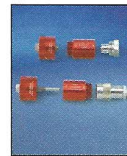
C-604



F-604



A-604, A-630

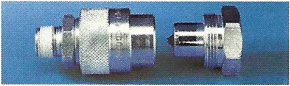

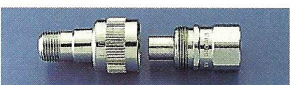



## CT-604 Safety Tool

Use the Enerpac CT-604 to relieve hydraulic back pressure by safely bleeding the hydraulic coupler.

Minimize injuries from projectile parts and under-skin hydraulic fluid injections by eliminating unsafe coupler bleeding practices. The CT-604 is Enerpac-engineering safe for use at 10,000 psi (700 bar).

NOTE: C-Series only.

Maximum Flow Capacity (in <sup>3</sup> /min)	Coupler Type	Model Numbers			Dimensions (in)							Dust Cap(s)
		Complete Set	Female Half	Male Half	A*	B	C	D	E	F	G	
2,500	High Flow Coupler 	C-604	CR-400	CH-604	3.26	2.87	3/8" NPTF	1.38	1.38	1.25	1.00	(2x) CD-411 Included
2,500	Flush-face coupler 	F-604	FR-400	FH-604	4.36	2.85	3/8" NPTF	1.23	1.23	1.06	1.12	-
462	Regular Spee-D-Coupler® 	A-604	AR-400	AH-604	3.09	2.53	3/8" NPTF	1.12	.94	.94	.73	Z-410 female only Included
462	Regular Coupler 	A-630	AR-630	AH-630	2.61	1.72	1/4" NPTF	.87	.81	.75	.57	Z-640 female only Included

\* Value A is total length when male and female halves are connected.

## CT-604 Safety Tool



- Enerpac coupler bleed tool eliminates unsafe pressure relieving and bleeding activities such as:  
 using a hammer and punch to unseat check balls, cones & poppets using a wrench to 'loosen' a coupler.
- Designed to connect to Enerpac C604, CH604 and CR400 High Flow couplers (male & female halves).
- Coupler Bleed Tool will also work with competitive equivalents.
- Comes in a convenient storage box that keeps the parts together.
- Enerpac engineered safe for use at 10,000 psi (700bar).

Coupler Bleed Tool Model Number	Fits on High Flow Couplers		Maximum Operating Pressure	
	Female Half	Male Half	psi	bar
CT-604	CR-400	CH-604	10000	700

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**1.0 IMPORTANT RECEIVING INSTRUCTIONS**

Visually inspect all components for shipping damage. Shipping damage is not covered by warranty. If shipping damage is found, notify carrier at once. The carrier is responsible for all repair and replacement costs resulting from damage in shipment.

**2.0 INTENDED USE**

The Enerpac CT-604 coupler bleed tool is designed to safely relieve pressure from hydraulically locked high-flow hydraulic couplers. Enerpac coupler models CH-604 (male half), CR-400 (female half) and C-604 (male and female set).

**3.0 SAFETY ISSUES**



Read all instructions, warnings and cautions carefully. Follow all safety precautions to avoid personal injury or property damage during system operation. Enerpac cannot be responsible for damage or injury resulting from unsafe product use, lack of maintenance or incorrect product and/or system operation. Contact Enerpac when in doubt as to the safety precautions and operations. If you have never been trained on high-pressure hydraulic safety, consult your distribution or service center for a free Enerpac Hydraulic safety course.

Failure to comply with the following cautions and warnings could cause equipment damage and personal injury.

A **CAUTION** is used to indicate correct operating or maintenance procedures and practices to prevent damage to, or destruction of equipment or other property.

A **WARNING** indicates a potential danger that requires correct procedures or practices to avoid personal injury.

A **DANGER** is only used when your action or lack of action may cause serious injury or even death.



**WARNING:** Wear proper personal protective gear when operating hydraulic equipment.



**Never** set the relief valve to a higher pressure than the maximum rated pressure of the pump. Higher settings may result in equipment damage and/or personal injury.



**WARNING:** The system operating pressure must not exceed the pressure rating of the lowest rated component in the system. Install pressure gauges in the system to monitor operating pressure. It is your window to what is happening in the system.



**CAUTION:** Avoid damaging hydraulic hose. Avoid sharp bends and kinks when routing hydraulic hoses. Using a bent or kinked hose will cause severe back-pressure. Sharp bends and kinks will internally damage the hose leading to premature hose failure.



Do not drop heavy objects on hose. A sharp impact may cause internal damage to hose wire strands. Applying pressure to a damaged hose may cause it to rupture.



**DANGER:** Do not handle pressurized hoses. Escaping oil under pressure can penetrate the skin, causing serious injury. If oil is injected under the skin, see a doctor immediately.



**IMPORTANT:** Hydraulic equipment must only be serviced by a qualified hydraulic technician. For repair service, contact the Authorized ENERPAC Service Center in your area. To protect your warranty, use only ENERPAC oil.



**WARNING:** Immediately replace worn or damaged parts with genuine ENERPAC parts. Standard grade parts will break causing personal injury and property damage. ENERPAC parts are designed to fit properly and withstand high loads.

## 4.0 INSTRUCTIONS



**DANGER:** Never attempt to relieve hydraulic pressure by loosening a coupler. Trapped hydraulic pressure can cause a loosened coupler to dislodge unexpectedly with great force. Serious personal injury or death will result if the coupler becomes a projectile and strikes persons working in the area.



**WARNING!** Loosening a coupler may result in an escape of high pressure oil that can penetrate the skin. Serious personal injury or death can result. Always use coupler bleed tool to safely depressurize and remove couplers.



**WARNING!** Be sure that loads are supported with blocking and cribbing before using bleed tool. Actuator movement may occur when hydraulic pressure is relieved. Serious personal injury or death could occur if load shifts or drops.



**WARNING!** The CT-604 coupler bleed tool is designed for a maximum hydraulic pressure of 10,000 psi [700 bar]. Do not use the tool on systems and components operating at higher pressures.

Depressurize a hydraulically-locked coupler as described in the following steps:

1. If the hydraulic device is supporting a load, block and crib the load as required, so that the load will not shift or drop when hydraulic pressure is relieved.
2. Check that the threads on the coupler half to be depressurized are clean and in good condition. Do not attempt to bleed a coupler if threads are damaged.
3. Check that all threads on the bleed tool main body and cap/bolt assemblies are clean and in good condition. Do not use bleed tool if threads are damaged.

**Note:** Hand-tighten the bleed tool main body onto the coupler half as described in steps 4 and 5. See Figure 1, below.

**Note:** The bleed tool main body is marked “male coupler” on one end and “female coupler” on the other. Be sure to use the proper end.

4. If bleeding a male coupler half: Thread the bleed tool main body onto the male coupler half and tighten it hand-tight.
5. If bleeding a female coupler half: Thread the bleed tool main body into the retaining collar of the female coupler half. Tighten the retaining collar hand-tight.
6. The bleed tool includes two cap/bolt assemblies as shown in Figure 1, below. Be sure to use the correct one:

- For MALE coupler halves, use the cap/bolt assembly with the SHORT bolt.
- For FEMALE coupler halves, use the cap/bolt assembly with the LONG bolt.

**Note:** Before proceeding, ensure that the cap is tight on the bolt.

7. Thread the cap/bolt assembly into the bleed tool main body. Slowly turn the cap/bolt assembly clockwise until the coupler check ball opens and hydraulic pressure is relieved. If necessary, use an adjustable wrench on the bolt.

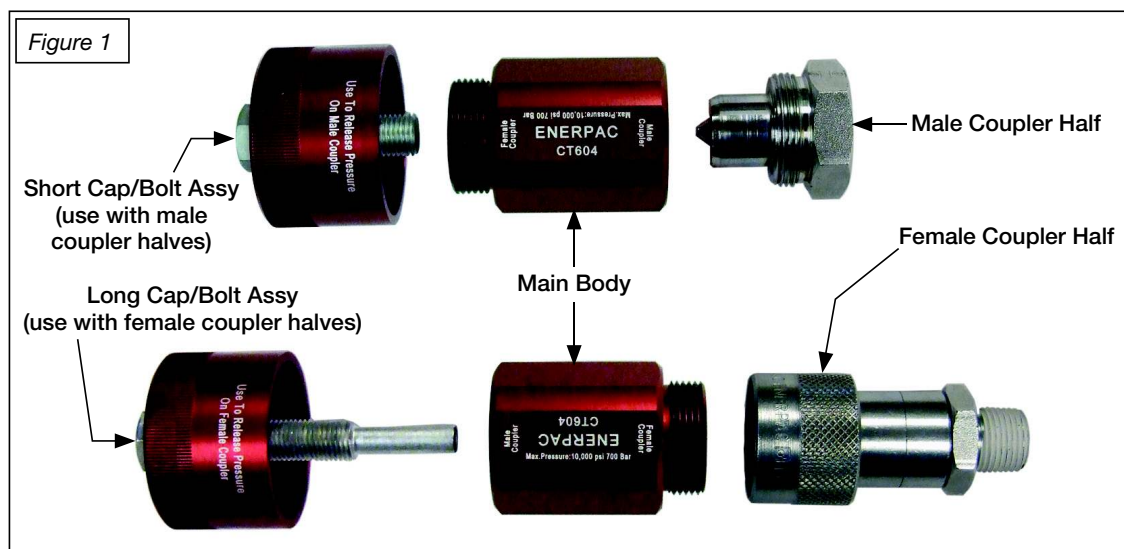
**Note:** When the cap/bolt assembly is tightened, pressurized hydraulic oil will flow through the bleed tool main body and into the cap. Allow any excess oil to drain into a suitable container.

8. Remove coupler half, main body and cap/bolt assembly from the hydraulic device (manifold, cylinder, etc.) as a complete unit. **Important:** Keep bleed tool parts installed on coupler while it is being loosened and removed.

9. Disassemble bleed tool components from the coupler half. Clean bleed tool components and store in provided container.



**CAUTION:** Discard the coupler half removed in the previous steps. Never attempt to repair or reuse a worn or damaged coupler!



## Contact Us

### For Technical Documentation:

Log in to the client portal at [hydra-slide.com](https://hydra-slide.com)  
using the password **HYD123**

### For Technical Support & Troubleshooting:

Call us at **+1 (519) 900-1450** and select **option 2**  
*or*  
email Robert Young - [robert@hydra-slide.com](mailto:robert@hydra-slide.com)

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Call us at **+1 (519) 900-1450** and select **option 1**  
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