HYDRA-SLIDE

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OPERATION MANUAL

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OPERATION & MAINTENANCE MANUAL

EXTREME LOW PROFILE SKIDDING SYSTEM

Model:

XLP150

Revision: October 2021

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

HYDRA-SLIDE

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HYDRA-SLIDE

ORIGINAL INSTRUCTIONS
HYDRA-SLIDE XLP150 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 XLP150 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
N1H 1G3
(519)-900-1450
info@hydra-slide.com

1.3 Machinery Description

Machinery Designation: **XLP150 Extreme Low Profile Skidding System**

Hydra-Slide's **XLP150 Extreme Low Profile Skidding System** has been designed to move loads with a maximum push capacity of 250 ton (227 tonne) and pull capacity of 150 ton (136 tonne). 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 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 1.25" (32 mm), and all components are hand-portable, the maximum component weight being 100 lbs. (45 kg).

The following main components comprise a standard system:

- (16) x Track Sections
- (32) x Track Connector Bars
- (4) x 4ft (1.2m) Slider Plates
- (2) x 2ft (0.6m) Slider Plates
- (2) x 1ft (0.3m) Slider Plates

- (2) x Push/Pull Cylinder Assemblies
- (2) x Push/Pull Heads
- (1) x Storage Box

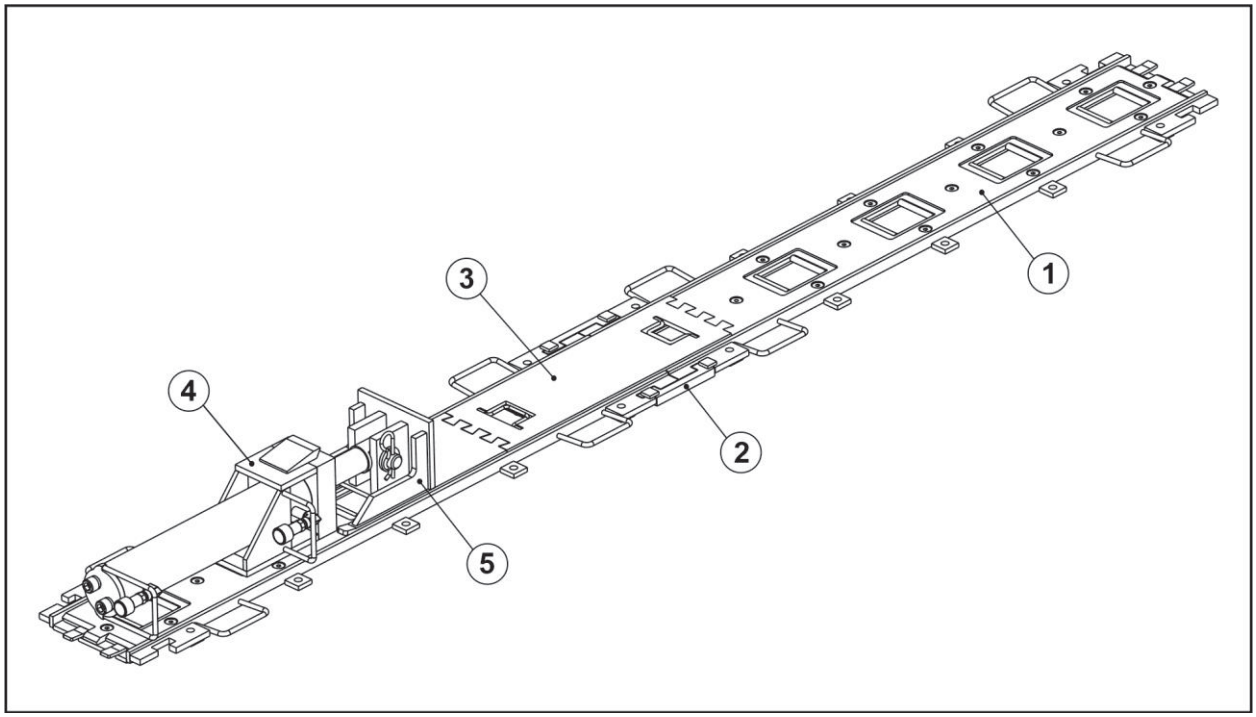

Figure 1: XLP150 Skidding System Main Components

Item No.	Part No.	Description
1	XLP150-01-5	Track Section
2	XLP150-02	Track Connector Bar
3	XLP150-05, 06, 07	Slider Plate (2' Slider Plate Shown)
4	XLP150-03	Push/Pull Cylinder Assembly
5	XLP150-04	Push/Pull Head

The **XLP150 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 **XLP150 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 **XLP150 Extreme Low Profile Skidding System** is used to move heavy loads up to 250 tons (227 tonnes) in Push Mode and 150 tons (136 tonne) in Pull Mode safely and in a controlled manner.

1.4 Safety Precautions

Set up and operate the **XLP150 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 **XLP150 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 **XLP150** has been designed and manufactured for a maximum load capacity of 250 tons (227 tonnes) in Push Mode and 150 tons (136 tonne) in 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 AS500 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 **XLP150 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 **XLP150 Extreme Low Profile Skidding System** does not produce airborne noise exceeding 70 dB(A).

1.4.6 Non-Ionizing Radiation

Operation of the **XLP150 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 XLP150 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 skidding system underneath
- Place track under load

2.1 Track Plate Connection

The track sections are bi-directional and symmetric; any two ends may be connected together.

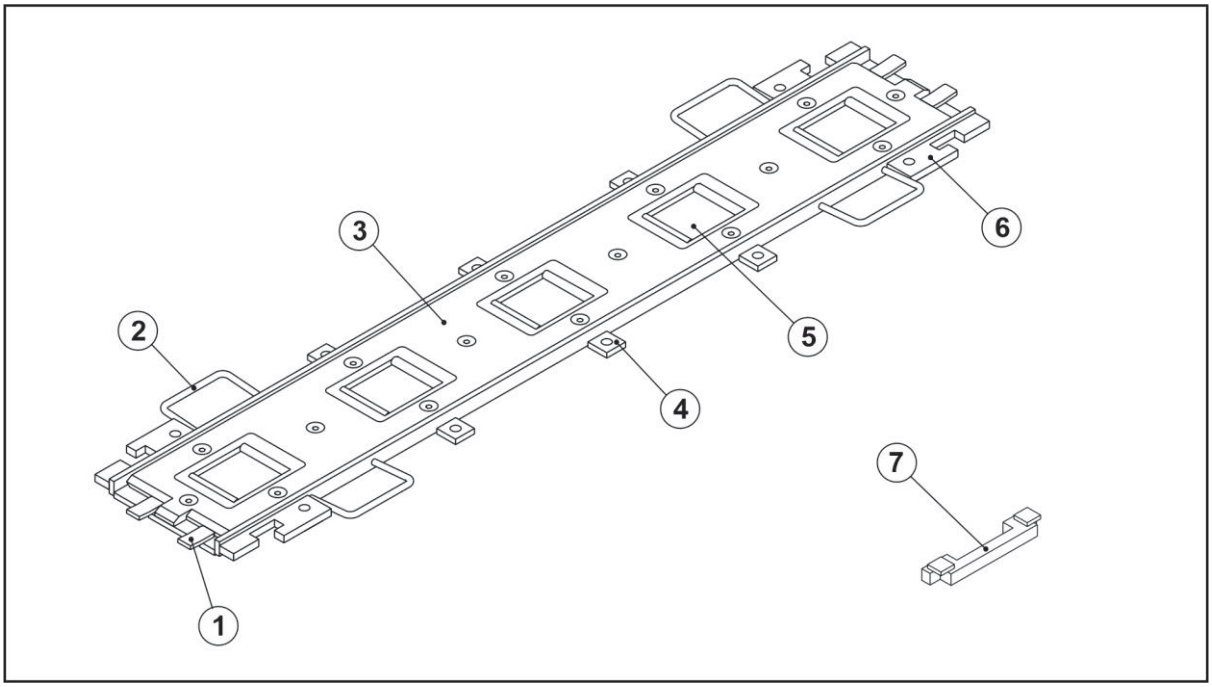

Figure 2: XLP150 Track Section with Track Connector Bar

Item No.	Description
1	Track Alignment Tabs
2	Track Handle
3	UHMW Slider Pad
4	Tie-Down Lug
5	Ratchet Slot
6	Track Connector Bar Lug
7	Track Connector Bar

- Connect the Track Sections using the Alignment Tabs on the track ends and secure together using the supplied Track Connector Bars. These should drop into place easily and require no special tools (See Figure 3).

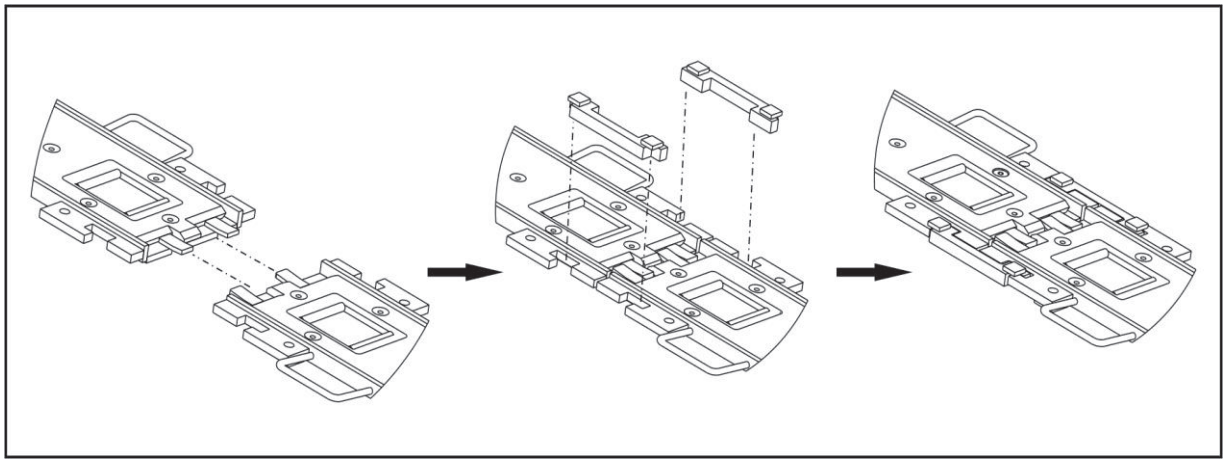

Figure 3: Connecting XLP150 Track Sections

- Ensure that the tracks are set up and kept level (± 2%) and parallel (± 0.25” or 6mm) 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 slots 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. Areas under track connection points must always be fully supported.

2.1.1 Track Tie-Down Lugs

In pull mode, the applied force of the cylinder assembly on the track can cause the unloaded track section to lift. If the system will be used in the pull configuration or if an external force is applied to the system, the track can be anchored to a rigid surface. The tracks feature tie-down lugs along both sides for this purpose.

2.2 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.

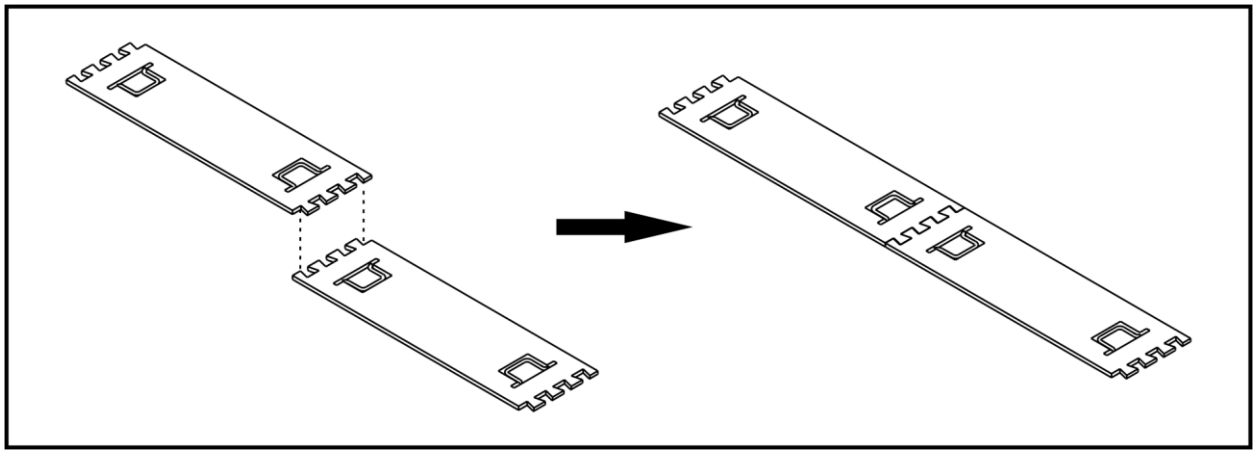

Figure 4: Connecting XLP150 Slider Plates

2.3 Slider Plate – Pusher Head Connection

- Attach the pusher heads to the desired end of the slider plates using the dovetail joints.

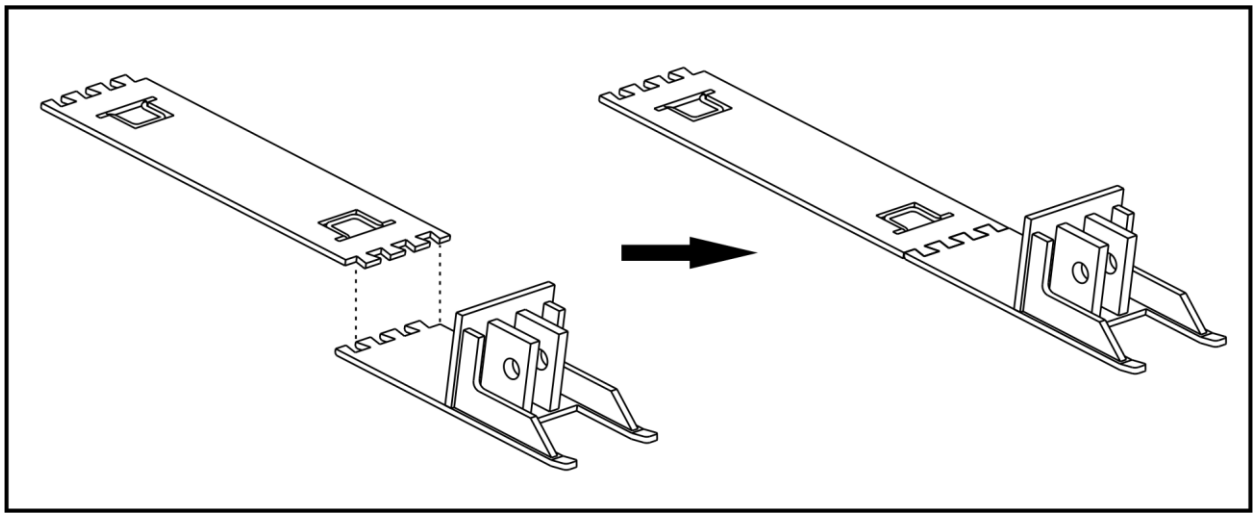

Figure 5: Connecting XLP150 Push-Pull Head to Slider Plate

- The pusher 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.

2.4 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.

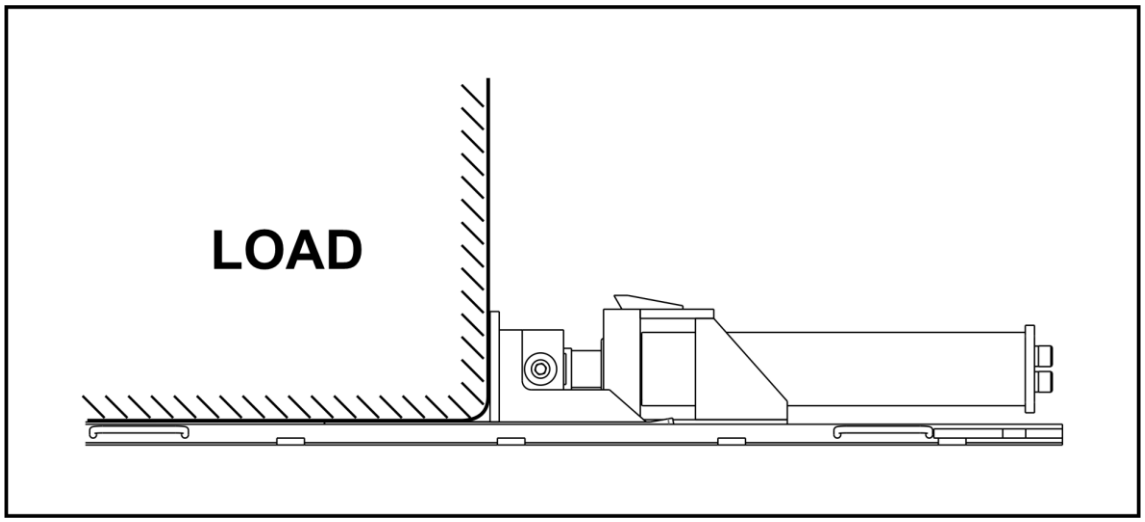

Figure 6: Load Placement on XLP150 Push-Pull Head

- 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 one final time 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.

- Insert the push/pull cylinder assemblies into the tracks. Ensure the push/pull cylinders are installed in the proper orientation in either push or pull mode. 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 and clevis pin washers provided. Use the hex head bolt and washer (or spring cotter pin) to secure the pins in place.

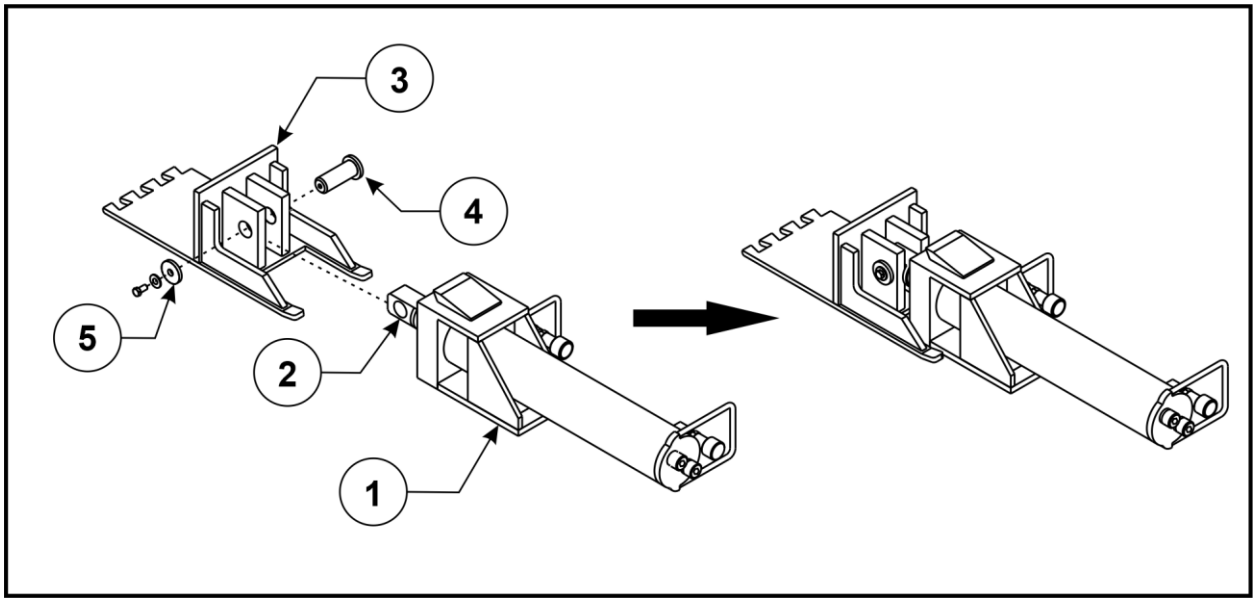

Figure 7: Cylinder Assembly Connection to Push-Pull Head

Item No.	Description
1	Push-Pull Cylinder Assembly
2	Rod End Clevis
3	Push/Pull Head
4	Clevis Pin
5	Clevis Pin Washer with Hex Bolt & Washer

- 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 cylinder support wedge plate fully engages in the track ratchet and 500-1000 psi (35-69 bar) 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 so they 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 until they and drop into the next ratchet slot in the tracks.
- 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, disconnect the pin and remove the cylinder assembly from the track. Again, do not lift the cylinder assembly using the hydraulic lines or fittings as this could damage them.
- Turn the cylinder assembly over 180 degrees and reconnect the pin. The cylinder is now configured in pull mode to move the load backwards.

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.

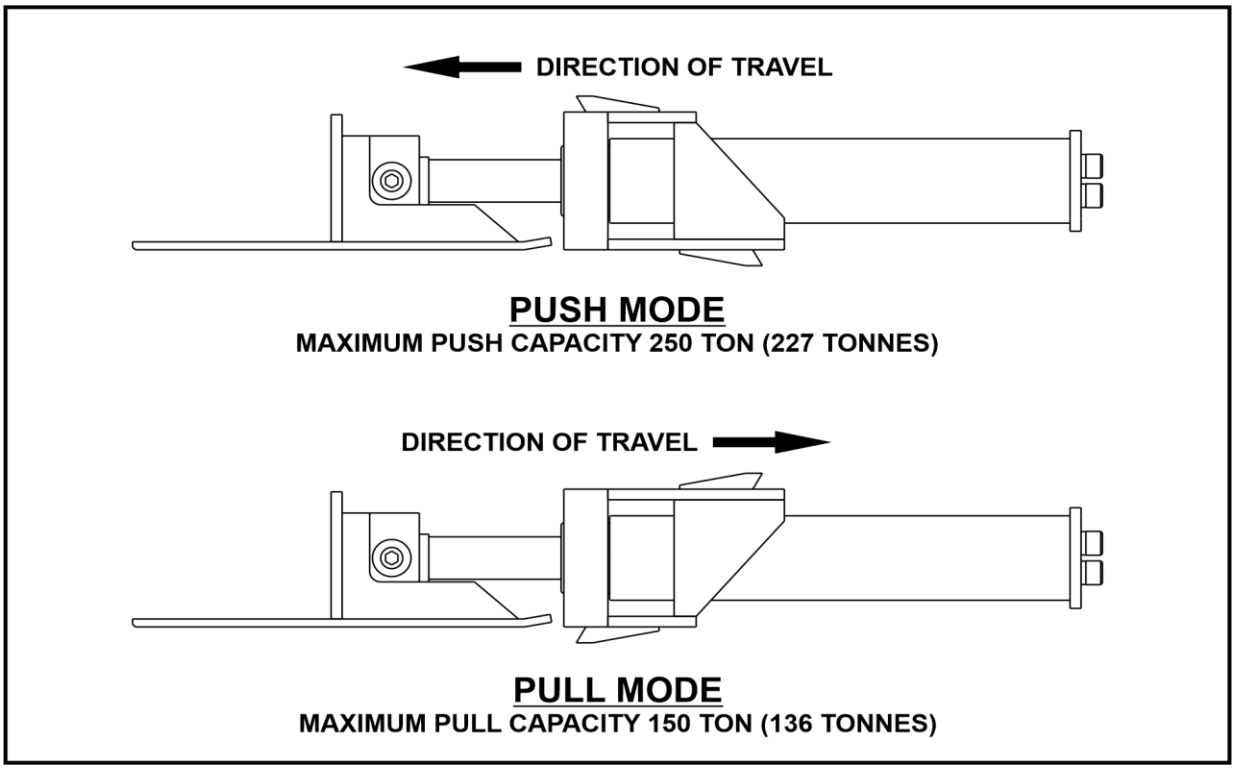

Figure 8: XLP150 Push Mode and Pull Mode Configurations

- 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.

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4 - MAINTENANCE AND ADJUSTMENTS

4.1 Preventive Maintenance

- When not in use, store all skid 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 and well-lubricated, and secure the protective dust caps on all couplers when not in use.

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 – TRACK CAPACITY AND SUPPORT

With the XLP150 and LP350 skidding systems, the tracks are constructed of thin plates that have negligible resistance to bending. Structural capacities are based on the contact pressure between the sliding surfaces. For full capacity, the load must be evenly distributed over the entire length of the skid shoe plate *and* the track must be fully supported over its entire length. For lighter loads, it may be possible to have less than full distribution of the load over the skid shoes or less than full support under the track provided that the contact pressures do not exceed certain values. It is always good practice to support under the track connections and to minimize unsupported spans as much as possible.

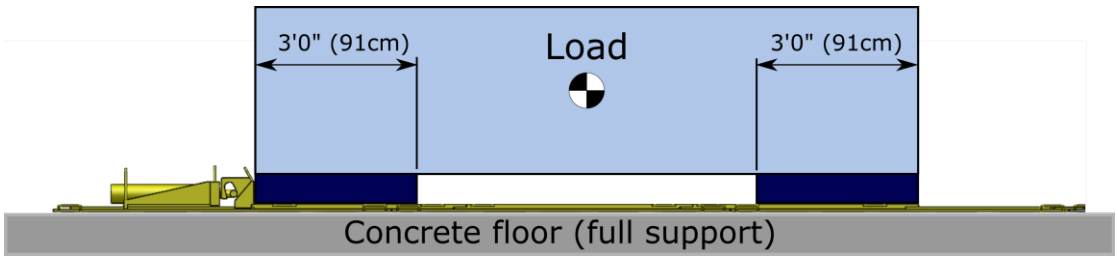
The recommended maximum contact pressures are given below:

LP350 – 15 tons per foot of length (44.7 tonne per meter of length)

XLP150 – 10 tons per foot of length (29.8 tonne per meter of length)

Note: The contact length is determined by the minimum distance where the track and slider plates are sandwiched between a rigid load contact area and the track support area. Contact pressures may be affected by an offset center of gravity of the load.

Example A – LP350: The load is supported on two 3’0” sections with full support under the track:

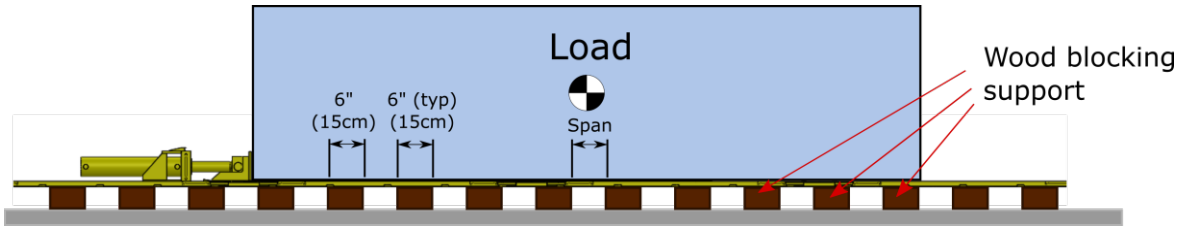


Contact length	= 2 x 3’0”	= 6’0” per track = 12’0” for two tracks	Contact length	= 2 x 91cm	= 1.83m per track = 3.66m for two tracks
Max. allowed contact pressure		= 15 ton/ft.	Max. allowed contact pressure		= 44.7 tonne/m
Max. load weight		= 12’0” x 15 ton/ft. = **180 ton**	Max. load weight		= 3.66m x 44.7 tonne/m = **164 tonne**

Example B – XLP150: The load is in full contact with the slide plates, the track is partially supported by timbers with spans between them (there are 10 timbers under the load itself):

Note:

1. The maximum blocking span must be no greater than 1/3 the length of the load length.
2. The load is assumed to be sufficiently rigid to support itself over the blocking span.



Contact length = 6” x 10 timbers		= 5’0” per track = 10’0” for two tracks	Contact length = 15cm x 10 timbers		= 1.52m per track = 3.05m for two tracks
Max. allowed contact pressure		= 10 ton/ft.	Max. allowed contact pressure		= 29.8 tonne/m
Max. load weight		= 10’0” x 10 ton/ft. = **100 ton**	Max. load weight		= 3.05m x 29.8 tonne/m = 91 **tonne**

APPENDIX 2 – EC DECLARATION OF CONFORMITY

Manufacturer

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

We declare that the **Hydra-Slide XLP150 Extreme Low Profile Skidding System** is in accordance with the following Harmonized Standards:

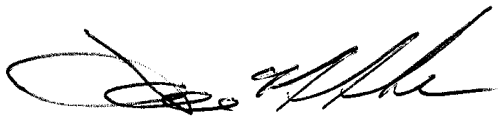
EN ISO 12100:2010	Safety of machinery – General principles for design - Risk assessment and risk reduction
EN 4413:2010	Hydraulic fluid power – General rules and safety requirements for systems and their components

And in accordance with the EC Guidelines of:

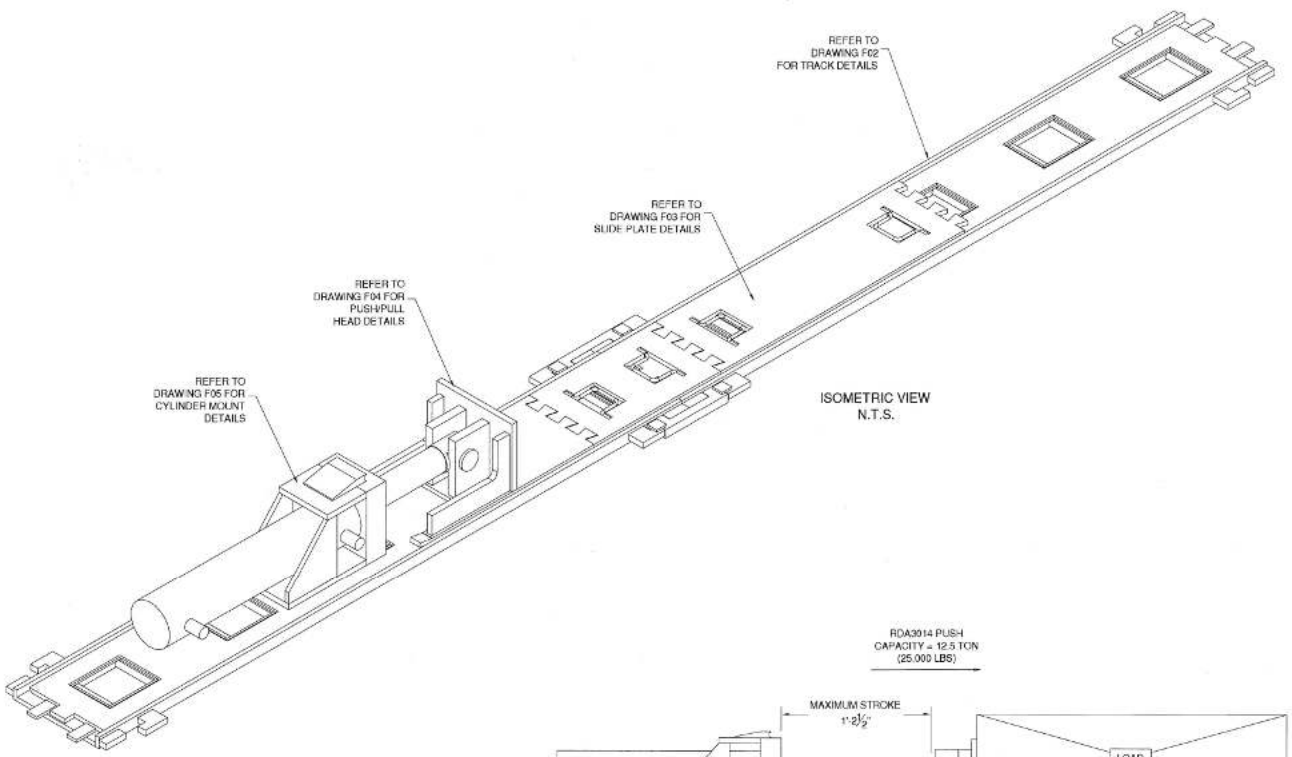
2006/42/EC –	Machinery Directive

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

Hydra-Slide Ltd. February 18, 2017

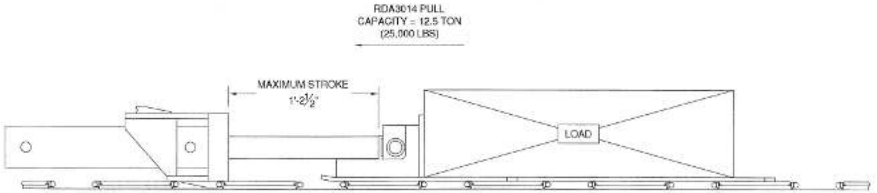


Don Mahnke P. Eng
President



ISOMETRIC VIEW
N.T.S.

PUSH DETAIL



PULL DETAIL

REFERENCE DRAWINGS:

1) REFER TO DRAWING 12-00140-F02 FOR TRACK SECTION DETAILS.
2) REFER TO DRAWING 12-00140-F03 FOR SLIDE PLATE DETAILS.
3) REFER TO DRAWING 12-00140-F04 FOR PUSH/PULL HEAD DETAILS.
4) REFER TO DRAWING 12-00140-F05 FOR CYLINDER MOUNT DETAILS.

PROFESSIONAL ENGINEER ALBERTA
PAUL HENDERSON

02-APR-2013

2H ENGINEERING APEGA PERMIT #P06719

REV	DD-MM-YY	DESCRIPTION	BY	CHK
02	02-04-13	ISSUED FOR CONSTRUCTION	PH	
01	05-02-13	REV ISO VIEW/PUSH CAPACITY	PH	
00	11-01-13	PRELIMINARY RELEASE	PH	

2H ENGINEERING
9143 - 39 AVENUE
EDMONTON, AB T6E 5Y2
(780) 988-6060

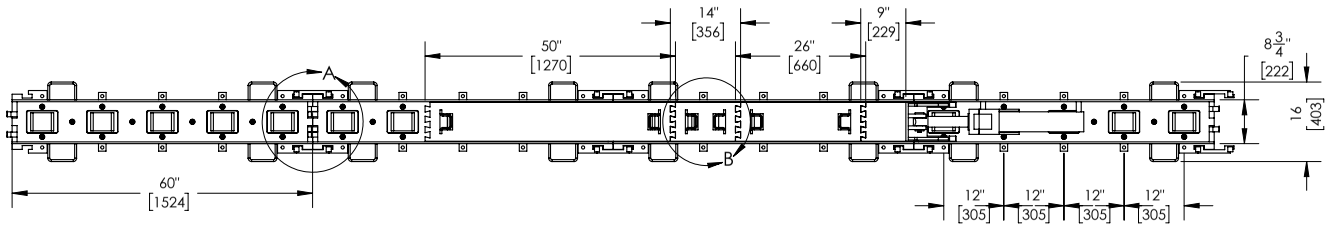
CLIENT: HYDRA-SLIDE LTD

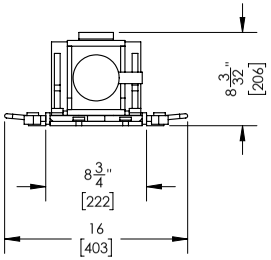
PROJECT: LP150 SKID SYSTEM

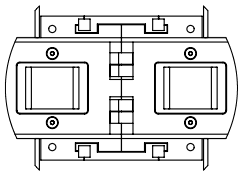
DRAWING TITLE:
FABRICATION DETAILS
LP150 SKID SYSTEM
GENERAL ARRANGEMENT

PROJECT NUMBER:	DWG NUMBER:	SHEET:	REV:
12-00140	- F01	- 1 OF 1	02

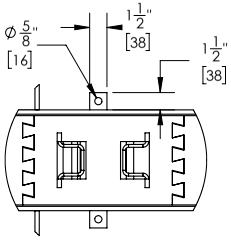
SCALE 1" (25.4mm)



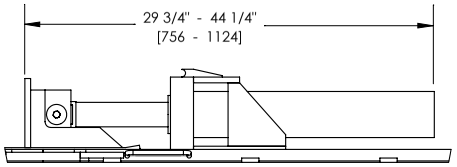




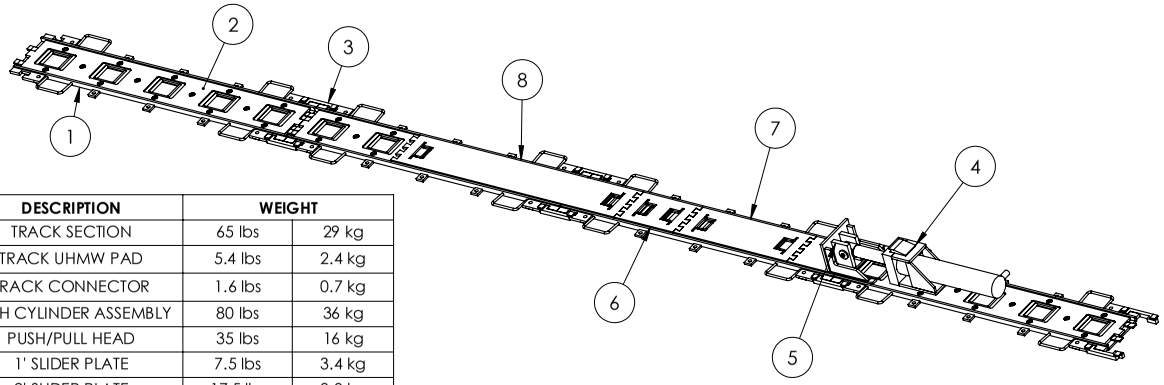
DETAIL A



DETAIL B



DETAIL C



ITEM NO.	PART NUMBER	DESCRIPTION	WEIGHT	
1	XLP150-01	TRACK SECTION	65 lbs	29 kg
2	XLP150-01-07	TRACK UHMW PAD	5.4 lbs	2.4 kg
3	XLP150-02	TRACK CONNECTOR	1.6 lbs	0.7 kg
4	XLP150-03	PUSH CYLINDER ASSEMBLY	80 lbs	36 kg
5	XLP150-04	PUSH/PULL HEAD	35 lbs	16 kg
6	XLP150-05	1' SLIDER PLATE	7.5 lbs	3.4 kg
7	XLP150-06	2' SLIDER PLATE	17.5 lbs	8.0 kg
8	XLP150-07	4' SLIDER PLATE	40 lbs	18 kg

HYDRA-SLIDE
SKIDDING | RIGGING | HYDRAULICS

TITLE:
XLP150 SYSTEM GENERAL ASSEMBLY DRAWING

SIZE	DWG. NO.	REV
B	XLP150-GA	02

DRAWN BY:	D.M.	SHEET 1 OF 1

HS3014 HYDRAULIC CYLINDER OPERATING INSTRUCTIONS

1 - Manufacturer Details

Hydra-Slide Ltd.
84 Royal Road
Guelph, ON N1H 1G3
Canada
info@hydra-slide.com

2 - General Instructions

This manual provides instructions on the safety, installation, operation, maintenance, and troubleshooting for Hydra-Slide's **HS3014 Hydraulic Cylinders**. Before any operation involving the use or maintenance of the cylinders, please read this Manual carefully.

It is recommended that service work on the **HS3014 Cylinders** be provided by qualified technicians only. It is advised that only spare parts recommended by Hydra-Slide Ltd. be used for repair. Hydra-Slide does not accept responsibility for damages caused by the use of unsuitable spare parts.

Please contact Hydra-Slide if any problems occur during the operation of the **HS3014 Cylinders** or if any spare parts are required for repair.

3 - Receiving Instructions

Components should be visually inspected after receiving to ensure no damage to the equipment during shipping. If any damage is present, please contact Hydra-Slide immediately.

4- Product Description

The Hydra-Slide **HS3014 Cylinder** is a 30 ton (27.2 tonne) capacity, double acting hydraulic cylinder.

- Maximum Operating Pressure: 10,000 psi (700 bar)
- Maximum Stroke Length: 14.5 inches (370 mm)
- Collapsed Height: 22.7 inches (575 mm)
- Cylinder Diameter: 4 inches (100 mm)

- Cylinder effective area:
  - Push: 6.488 in^2 ($4185\ mm^2$)
  - Pull: 2.514 in^2 ($1620\ mm^2$)
- Cylinder max force @ 10,000 psi:
  - Push: 64,000 lbs (29030 kg)
  - Pull: 25,000 lbs (11340 kg)

5 - Safety

Always read and understand instructions and safety warnings that come with the equipment and always follow safe work practices. Failure to comply with these safe operating recommendations could result in property damage or personal injury.

- 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 or 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/move slowly and check often. Control the load at all times.
- 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 4 ½ inch. 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.
- Never use unsafe 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 specially designed alignment devices such as an AS-500 Alignment Shoe available from Hydra-Slide Ltd.
- If jacking a load, always use appropriate blocking or cribbing to guard against a falling or out of control load.

6 - Installation

Before each use, always inspect the cylinder for any signs of damage or leaking. If any issues are found, do not operate the cylinder and notify Hydra-Slide.

1. Remove the coupler protectors and using a clean rag, wipe the hose ends and cylinder couplers.
2. Connect the hoses from the hydraulic pump with a 4-way valve to the appropriate couplers on the HS3014 cylinder. Ensure the couplers are fully engaged and hand tighten only.

Do not attempt to operate the cylinder with only one hose connected.

7 - Bleeding the System

Prior to initial use, and at any time the cylinder appears to function erratically or improperly, the system must be bled of any trapped air.

To bleed air from the cylinder, place it on its side with the ports facing upward. Without any load, extend and retract the cylinder at least three times or until operation is smooth.

8 - Operation

Using a properly rated hydraulic pump, operate the 4-way valve to extend and retract the cylinder.

It is recommended that the cylinder rod be extended and retracted at least three times before any load is applied to ensure proper operation.

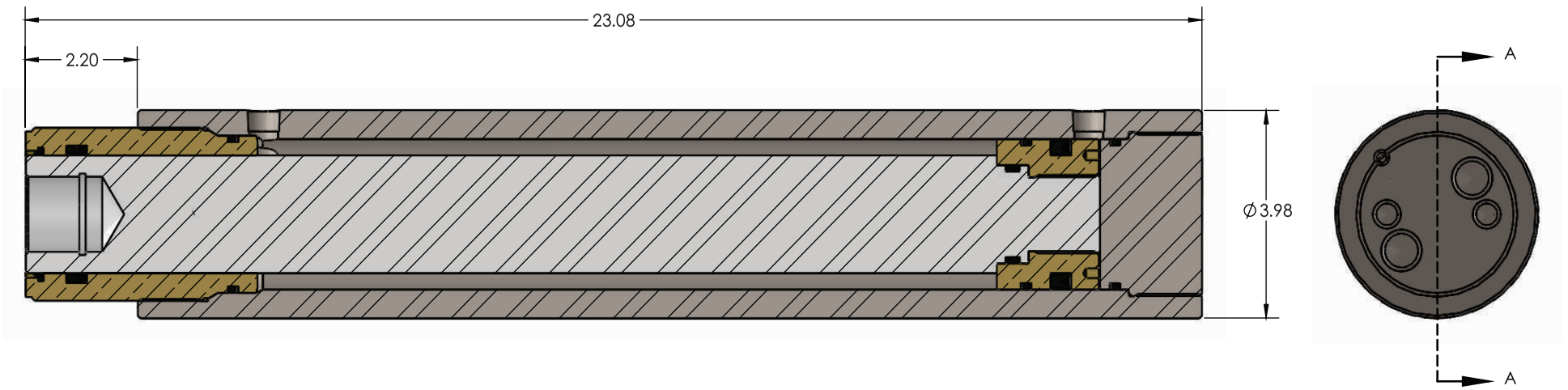
9 - Maintenance

- Always use clean, approved hydraulic fluid and replace as needed. Hydra-Slide Ltd. recommends using only ATF D3M or compatible oil.
- Keep cylinder rod fully retracted when not in use.
- Coupler threads and surfaces must be kept clean and lubricated.
- Replace protective dust caps to cylinder couplers when not in use.

HYDRA-SLIDE

10 - Troubleshooting

Symptom	Probable Cause	Recommended Action
Cylinder(s) advance part way	A coupler is not fully engaged Oil level in pump is low Cylinder rod is binding	Check and tighten all couplers Add oil to reservoir Check for oil contamination, bent, misaligned or worn parts.
Cylinder(s) will not extend	A coupler is not fully engaged Load exceeds cylinder capacity Oil level in pump is low Cylinder seals leaking	Check and tighten all couplers Reduce load Add oil to reservoir Repair/replace cylinder
Cylinder(s) advance in spurts	Air in hydraulic system	Bleed hydraulic system
A cylinder will not retract	Coupler is not fully engaged	Check and tighten all couplers
Push cylinder will not extend and oil is coming from pressure relief valve or top of cylinder	Coupler on return line is not fully engaged	Check and tighten all couplers
Cylinder leaks oil	Loose Connections Damaged or worn seals Internal cylinder damage	Check and tighten all couplers Repair/replace cylinder Repair/replace cylinder



SECTION A-A
SCALE 1 : 2

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:
FRACTIONAL: ±1/32
ANGULAR: MACH ±.5° BEND: ±.5°
X.X: ±.015
X.XX: ±.005
X.XXX: ±.001

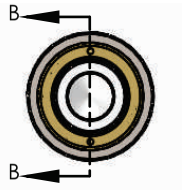
	NAME	DATE
DRAWN	D.L	14/10/15
CHECKED	R.L	14/10/15
ENG APPR.	P.J.	14/10/15
MFG APPR.	P.J.	14/10/15
Q.A.	R.L	14/10/15

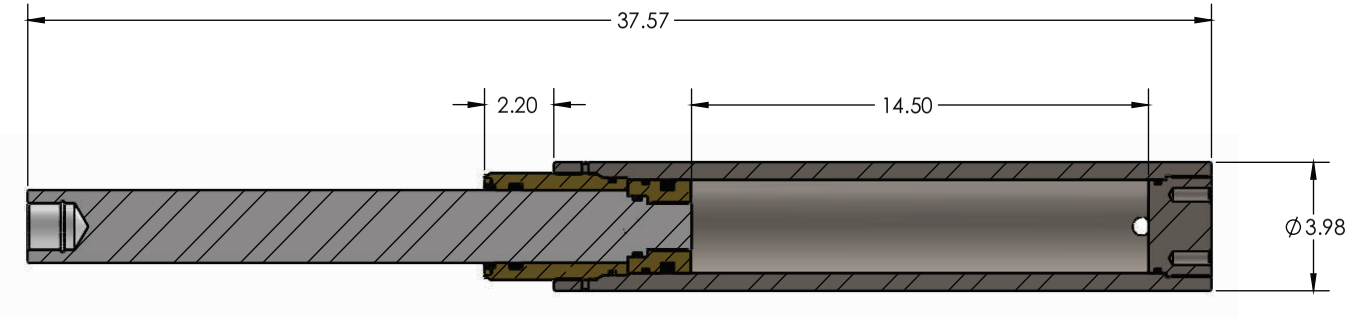
MATERIAL
N/A
FINISH
N/A
DO NOT SCALE DRAWING

CYLINDER RETRACTED

SIZE:	DWG. NO.:	REV:
A	HS3014.000	

SCALE: 1:2 | WEIGHT: 65.3LBS | SHEET 1 OF 5





SECTION B-B
SCALE 1 : 4

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:
FRACTIONAL ±1/32
ANGULAR: MACH ±.5° BEND ±.5°
X.X ±.015
X.XX ±.005
X.XXX ±.001

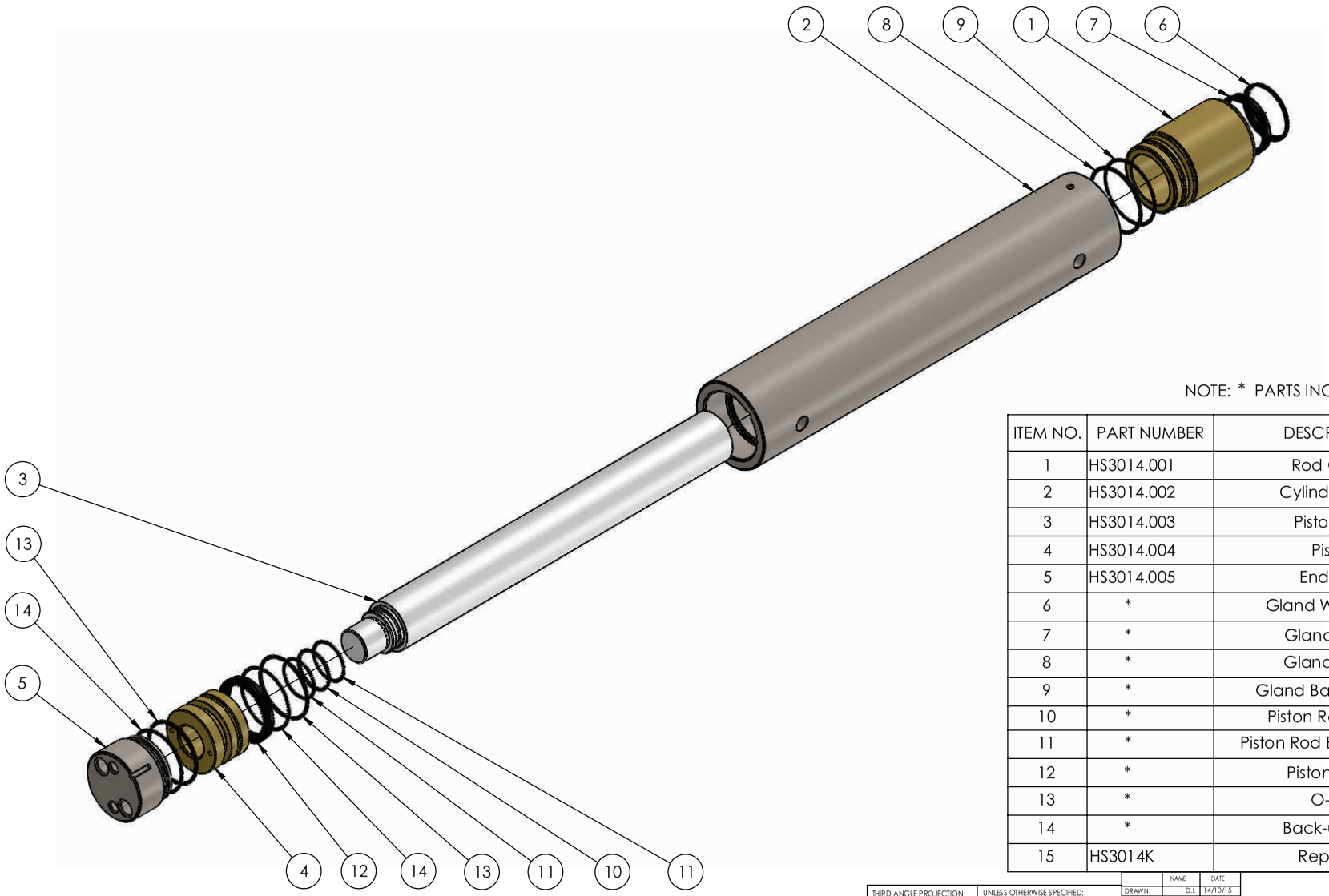
	NAME	DATE
DRAWN	D.L	14/10/15
CHECKED	R.L	14/10/15
ENG APPR.	P.J.	14/10/15
MFG APPR.	P.J.	14/10/15
Q.A.	R.L	14/10/15

MATERIAL
N/A
FINISH
N/A
DO NOT SCALE DRAWING

Hydra Power Inc.

CYLINDER EXTENDED

SIZE: A | DWG. NO.: HS3014.000 | REV:
SCALE: 1:4 | WEIGHT: 65.3LBS | SHEET 2 OF 5



NOTE: * PARTS INCLUDED IN HS3014K KIT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	HS3014.001	Rod Gland	1
2	HS3014.002	Cylinder Body	1
3	HS3014.003	Piston Rod	1
4	HS3014.004	Piston	1
5	HS3014.005	End Cap	1
6	*	Gland Wiper Ring	1
7	*	Gland U-seal	1
8	*	Gland O-ring	1
9	*	Gland Back-up Ring	1
10	*	Piston Rod O-ring	1
11	*	Piston Rod Back-up Ring	2
12	*	Piston U-seal	1
13	*	O-ring	2
14	*	Back-up Ring	2
15	HS3014K	Repair Kit	1

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:
FRACTIONAL ±1/32
ANGULAR: MACH ±.5° BEND ±.5°
X.X ±.015
X.XX ±.005
X.XXX ±.001

	NAME	DATE
DRAWN	D.L	14/10/15
CHECKED	R.L	14/10/15
ENG APPR	P.L	14/10/15
MFG APPR	P.L	14/10/15
Q.A	R.L	14/10/15

MATERIAL
N/A

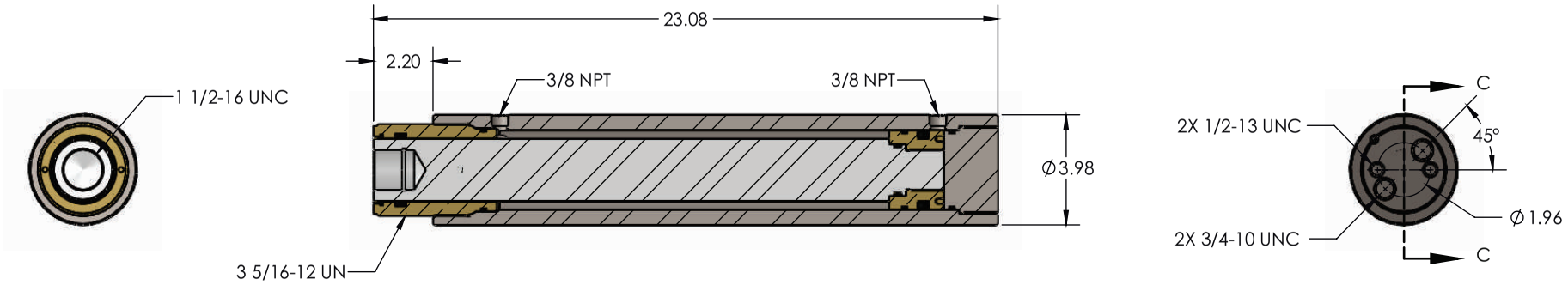
FINISH
N/A

DO NOT SCALE DRAWING

CYLINDER EXPLODED VIEW

SIZE: A | DWG. NO.: HS3014.000 | REV:

SCALE: 1:4 | WEIGHT: 65.3LBS | SHEET 3 OF 5



SECTION C-C
SCALE 1 : 4

THIRD ANGLE PROJECTION	UNLESS OTHERWISE SPECIFIED: FRACTIONAL ±1/32 ANGULAR: MACH ±.5° BEND ±.5° X.X ±.015 X.XX ±.005 X.XXX ±.001	
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF HYDRAULIC POWER INC.. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF HYDRAULIC POWER INC. IS PROHIBITED.		

	NAME	DATE
DRAWN	D.J.	14/10/15
CHECKED	R.J.	14/10/15
ENG APPR.	P.J.	14/10/15
MFG APPR.	P.J.	14/10/15
Q.A.	R.J.	14/10/15

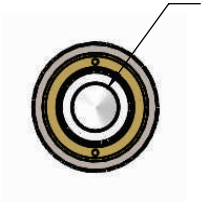
MATERIAL: N/A
FINISH: N/A
DO NOT SCALE DRAWING

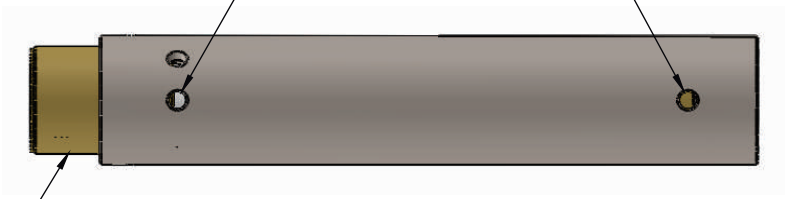
Hydra Power Inc.

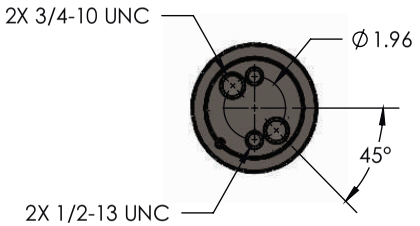
CYLINDER RETRACTED

SIZE:	DWG. NO.:	REV:
A	HS3014.000	

SCALE: 1:4 | WEIGHT: 65.3LBS | SHEET 4 OF 5







THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:
FRACTIONAL ±1/32
ANGULAR: MACH ±.5° BEND ±.5°
X.X ±.015
X.XX ±.005
X.XXX ±.001

	NAME	DATE
DRAWN		5/6/16
CHECKED		5/6/16
ENG APPR.		5/6/16
MFG APPR.		5/6/16
Q.A.		5/6/16
MATERIAL		
FINISH		

DO NOT SCALE DRAWING

CYLINDER CONNECTIONS

SIZE: A | DWG. NO.: HS3014.000 | REV:

SCALE: 1:10 | WEIGHT: | SHEET 5 OF 5

QUADRANT

ENGINEERED PLASTIC PRODUCTS

Subcategory: Polyethylene;Polymer;Thermoplastic

Physical Properties	Metric	English	Comments
SpecificGravity	0.93g/cc	0.0336lb/in³	ASTMD792
WaterAbsorption	Max0.01%	Max0.01%	Immersion,24hr;ASTMD570(2)
WaterAbsorptionatSaturation	Max0.01%	Max0.01%	Immersion;ASTMD570(2)
Mechanical Properties			
Hardness,ShoreD	66	66	ASTMD2240
TensileStrength,Ultimate	40MPa	5800psi	ASTMD638
ElongationatBreak	300%	300%	ASTMD638
TensileModulus	0.689GPa	100ksi	ASTMD638
FlexuralModulus	0.758GPa	110ksi	ASTMD790
FlexuralYieldStrength	24.1MPa	3500psi	ASTMD790
CompressiveStrength	20.7MPa	3000psi	10%Def.,73°F;ASTMD695
CompressiveModulus	0.552GPa	80ksi	ASTMD695
ShearStrength	33.1MPa	4800psi	ASTMD732
CoefficientofFriction	0.12	0.12	Dryvs.Steel;QTM55007
LimitingPressureVelocity	0.0701MPa Bm/sec	2000psiBft/min	4:1safetyfactor;QTM55007
IzodImpact,Notched	NB	NB	ASTMD256TypeA
Electrical Properties			
SurfaceResistivityperSquare	Min1e+015ohm	Min1e+015ohm	ASTMD257
DielectricConstant	2.3	2.3	(1MHz);ASTMD150
DielectricStrength	90.6kV/mm	2300V/mil	ShortTerm;ASTMD149
DissipationFactor	0.0005	0.0005	(1MHz);ASTMD150
Thermal Properties			
CTE,linear68°F	216 Fm/mB°C	120Fin/inB°F	(B40°Fto300°F);ASTME831
ThermalConductivity	0.409W/m BK	2.84BTUBin/hrBft²B°F	
MeltingPoint	135°C	275°F	Crystalline,Peak;ASTMD3418
MaximumServiceTemperature,Air	82.2°C	180°F	LongTerm
DeflectionTemperatureat1.8MPa(264psi)	46.7°C	116°F	ASTMD648
Flammability,UL94(EstimatedRating)	HB	HB	1/8inch
Qualitative Processing Properties			
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

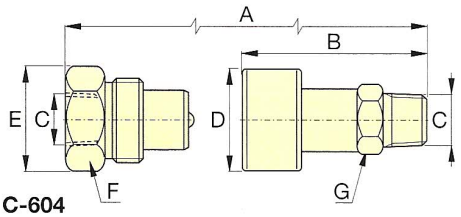
Steel dust caps are available for the C-604 series couplers.
Order model number:
CD-411M for female half
CD-415M for male half

A C F Series

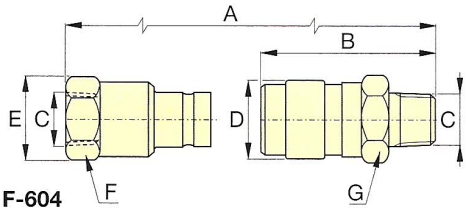
Maximum Flow Capacity:
2,500 in³/min.

Thread:
¼" and ⅜" NPTF

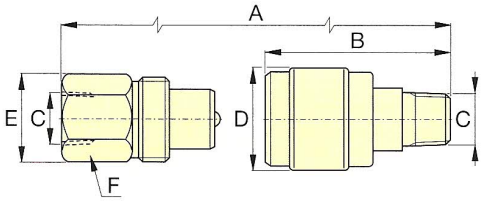
Maximum Operating Pressure:
10,000 psi



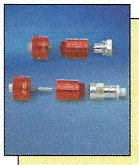
C-604



F-604



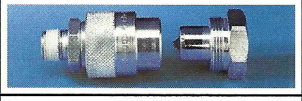
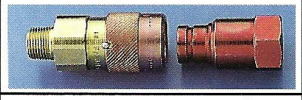
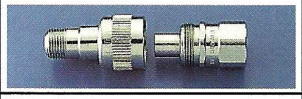
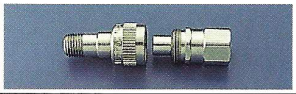
A-604, A-630



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 (in³/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	⅜" 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	⅜" NPTF	1.23	1.23	1.06	1.12	–
462	**Regular Spee-D-Coupler®** 	A-604	AR-400	AH-604	3.09	2.53	⅜" NPTF	1.12	.94	.94	.73	Z-410 female only Included
462	**Regular Coupler** 	A-630	AR-630	AH-630	2.61	1.72	¼" NPTF	.87	.81	.75	.57	Z-640 female only Included

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

ENERPAC

English Metric

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

ENERPAC
POWERFUL SOLUTIONS. GLOBAL FORCE.

Instruction Sheet

CT-604 Hydraulic Coupler Bleed Tool

L2755 Rev. C 02/11

Index:

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.

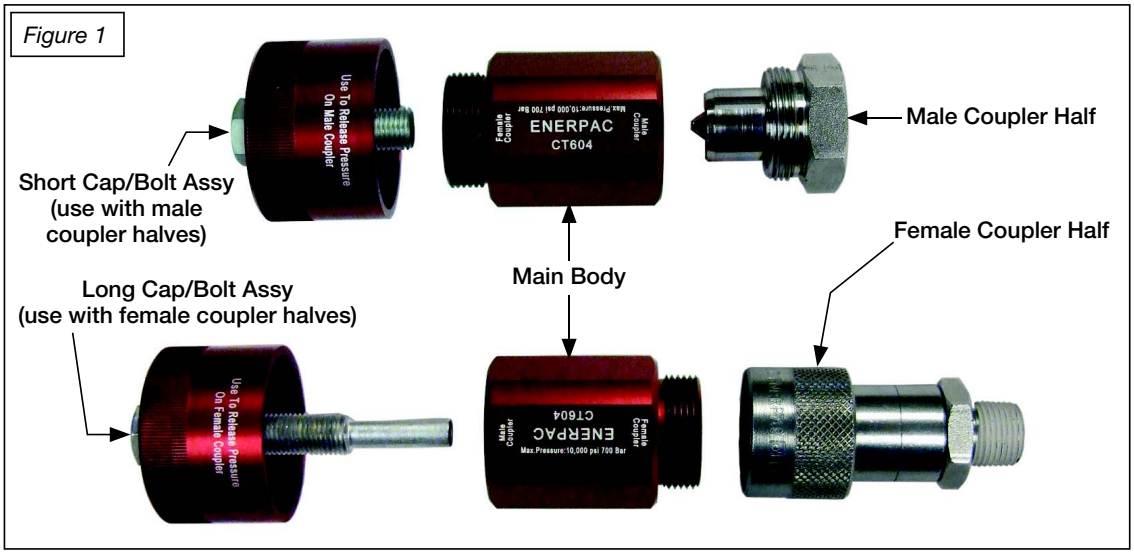
7. Thread the cap/bolt assembly into the bleed tool main body. Slowly turn the cap/bolt assembly clockwise until the coupler check ball opens and hydraulic pressure is relieved. If necessary, use an adjustable wrench on the bolt.

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!

Figure 1



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