

## Installation and Maintenance Instructions for Standard Hydraulic Clamp Assemblies

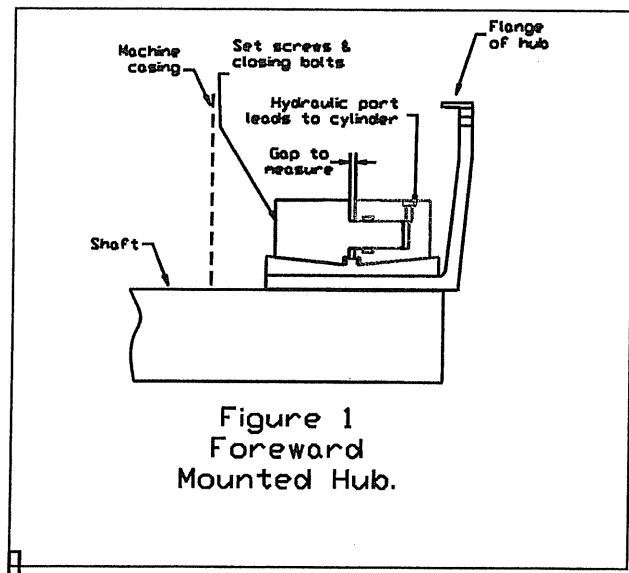
Created: 10/10/2005 - RJD

Rev: E, 8/20/07 - RJD

### 1.2 Basic Assembly Procedure

Below is an abbreviated assembly procedure. Be sure to read and understand the full procedure before starting installation. Contact Riverhawk if you need clarification.

1. Inspect the hub and shaft for proper fits.
2. Clean the shaft OD, hub bore and hub OD.
3. Slide HTC onto hub.
4. Slide hub/HTC assembly onto shaft and set the position as required by the application. Rotate HTC so that the ports are at the 6 and 12 o'clock positions.
5. Unscrew closing bolts completely but leave the retention screws (set screws).
6. Apply hydraulic pressure to HTC until hub lightly grips shaft.
7. Measure and record **initial gap**.
8. Add this to the "**gap opening after lock**" stated in Table 1 to calculate the "**total gap**".
9. Apply hydraulic pressure to HTC until the calculated **total gap** is achieved.
10. Turn all set screws in until tightly seated.
11. Release hydraulic pressure.
12. Tighten or remove closing bolts.
13. Bleed oil and plug ports.
14. Assembly is complete.



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### 1.3 Tools

The following are tools required to operate and set the HTC.

- Hydraulic pump and hose capable of 6,000 psi. (Riverhawk supplies pumps designed to simplify HTC operation)
- Port adapter, supplied with HTC
- Set of inch combination wrenches.
- Set of inch hex keys.
- Dial caliper or feeler gages.

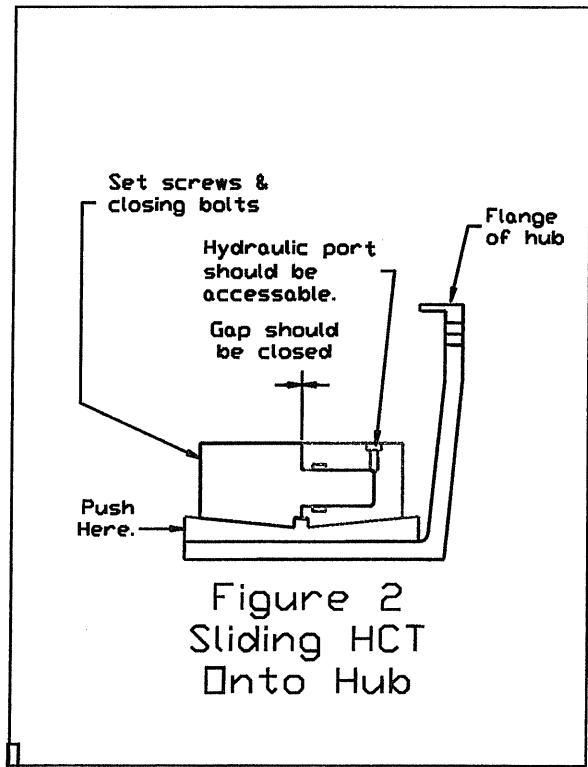
### 2.0 Inspection

Inspect the hub and shaft to assure that they have been machined to the proper tolerances. The HTC should slide onto the hub with a sliding or light press fit. The hub should fit the shaft in the same manner. Remove any burrs or proud metal that could interfere with the slip fit.

**Hint:** Always push on the collet when sliding HTC on hub. (see Figure 2)

### 2.1 Cleaning

The hub OD, ID and the shaft OD must be smooth and free of debris. Clean using a solvent that leaves no residue such as acetone. Cleaning of these surfaces is especially important because contamination can make the surfaces slippery and cause the surfaces to slip prematurely during operation. Take special care to remove any thick oils or waxes using a solvent.



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### 2.2 Mount HTC on Hub.

Determine the required position of the HTC relative to the hub. There are two possible configurations (see Figure 2). Accessibility of the screws and hydraulic ports should be considered now. Slide the HTC up onto the hub until stop. Be sure that the collet is completely up on the hub.

**Hint:** Always push on the collet when sliding HTC on hub. This will assure that HTC does not grip hub while sliding in place.

### 2.3 Back Off The Closing Bolts

The closing bolts are the hex head bolts or the socket head cap screws. Check to see if there is space to remove them when hub is in place on shaft. If so, remove and store them. If not, then back them out fully until assembly is complete.

**Hint:** Be sure not to rotate HTC on hub. You need to be able to get these bolts back into the holes for removal of HTC.

### 2.4 Partially Activate Clamp for Lifting

For larger assemblies, or where necessary you may partially activate the clamp for the purpose of lifting the hub/HTC assembly. Tighten the set screws evenly using hand torque. This will partially open the gap and cause the HTC to grip the hub.

### 2.5 Mount Hub/HTC Assembly on Shaft.

**Caution:** If necessary support both the hub and HTC during lifting.

Gently slide the hub onto the shaft. Position the hub to the required final position.



Document No. IM-183

## Installation and Maintenance Instructions for Standard Hydraulic Clamp Assemblies

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### 2.6 Connect Hydraulic Pressure Supply

Rotate the hub/clamp assembly so that the hydraulic ports are at the 12 and 6 o'clock positions. This will facilitate complete drainage at the end of the process.  
Plug the top port and connect and the hydraulic hose to the bottom port.

### 2.7 Setting Initial Gap

In this step the HTC is actuated just enough to take up the clearance between the hub and the shaft. Pump about 100 to 200 psi. pressure into the HTC. Confirm that the hub is beginning to grip on the shaft. Measure the gap at the OD of the HTC. Record this number as the **Initial** gap.

### 2.8 Calculate Final Gap

Refer to Table 1 at the end of this document for the "**gap opening after lock**" (**GAL**). Add this to the initial gap you measured. The total is the total required gap (**TRG**).

**Caution: DO NOT** use the "**MAX GAP**" from Table 1. Max Gap is a limit value, do Not Exceed it.

### 2.9 Check Stroke Capacity

In cases where the hub and shaft have an excessively loose fit, it is possible to over stroke the HTC. Be sure that the "total gap" that you calculate does not exceed the "max gap" stated in Table 1. If so, then there is a problem with the fits. Check the diameters of the mating parts.

### 2.10 Activate HTC

Pump oil into the HTC and monitor the gap. Stop pumping and hold the pressure when the gap matches the calculated TRG, see paragraph 2.8. Tighten all the set screws **hand tight**, high torque is not necessary. Check each set screw to assure they are **All** fully seated. Note and record the final hydraulic pressure. This step will require between 2000 and 5000 psi.



Document No. IM-183

## Installation and Maintenance Instructions for Standard Hydraulic Clamp Assemblies

Created: 10/10/2005 - RJD  
Rev: E, 8/20/07 - RJD

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Once all the set screws are seated then the hydraulic pressure can be released. Check the gap to assure that it is within 0.010" of TRG (see section 2.8).

### 2.11 Bleed Oil and Plug Ports

Remove the plug in the top and the hose at the bottom. Drain the hydraulic oil into a clean catch basin. Air pressure can be used to accelerate drainage. When the oil is completely drained then insert and tighten the plugs in both ports.

### 2.12 Closing Bolts

Remove the closing bolts and store for use during disassembly. If space does not allow closing bolts to be removed per paragraph 2.3, then tighten them now.

### 2.13 Installation Record

Future removals and reinstallations can be simplified if you record two pieces of information. Record the total gap and the final hydraulic pressure used to achieve it.

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### 3.0 Removal General

For removal you will need to gather the tools listed in paragraph 1.4. You will need the dial calipers only if reassembly is planned. It would be advisable to access the record of the previous installation. This will provide the actual pressure used to activate the HTC. You will also need the retraction screws and hydraulic port adapter. Below is an abbreviated disassembly procedure. Be sure to read and understand the full procedure before starting removal.

1. Back off the closing bolts several turns if they were not completely removed after assembly.
2. Connect hydraulic pressure supply.
3. Pump oil into the unit until load is off set screws.
4. Back off retaining set screws fully.
5. Release pressure.
6. Close unit with retracting screws.
7. Remove hub from shaft.

### 3.1 Cleaning

Clean away any material that has accumulated in the area of the gap. The gap will close fully during removal. It is advisable to remove dirt to prevent wear of sliding surfaces including the hub OD.

### 3.1 Retraction Screws

If the retraction screws are in the unit then they all must be backed off. If they are not in the unit then they were removed during the previous assembly and should have been stored with the hydraulic port adapter.

### 3.2 Hydraulic Connection

Connect the hydraulic pump and hose per the pump manufacturer's instructions.



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### 3.3 Applying Pressure

Apply pressure until the retention screws (set screws) can be turned with hand torque. Hold the pressure until all of the retention screws are backed off completely.

**Warning:** Crush hazard, Keep fingers and objects out of the gap when releasing pressure.

**Caution:** Watch three things while pumping.

- **First:** watch the gap. **Stop pumping** if it exceeds the "MAX GAP" stated in Table 1.
- **Second: Do Not** apply more than 6,000 psi.
- **Third:** retract all the set screws completely. Make sure that all set screws are fully retracted before releasing the pressure.

### 3.4 Retraction

Make sure that all retention set screws are fully removed (or backed off) before releasing the pressure. Retraction can be observed by watching the gap when the pressure is released. The unit will retract most of the way as the oil drains. Complete retraction requires turning in the socket head retraction screws until the gap is completely closed.

### 3.5 Hub Removal

At this point the hub should be free to slide off of the shaft. The HTC may also be free to slide off of the hub.

For larger assemblies, or where necessary you may partially activate the clamp for the purpose of lifting the hub/HTC assembly. Tighten the set screws evenly using hand torque. This will partially open the gap and cause the HTC to grip the hub.

**Caution:** If necessary, support both the hub and HTC during lifting.



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**TABLE 1: GAP OPENING AFTER LOCK (GAL)**

| <b>MODEL<sup>(1)</sup></b> | <b>GAL<br/>(inches)</b> | <b>MAX GAP<br/>(inches)</b> |
|----------------------------|-------------------------|-----------------------------|
| HTC020                     | 0.098                   | 0.274                       |
| HTC025                     | TBD                     | TBD                         |
| HTC030                     | 0.141                   | 0.377                       |
| HTC040                     | 0.250                   | 0.451                       |
| HTC050                     | 0.221                   | 0.645                       |
| HTC060                     | 0.270                   | 0.600                       |
| HTC075                     | TBD                     | TBD                         |
| HTC095                     | TBD                     | TBD                         |
| HTC120                     | TBD                     | TBD                         |
| HTC150                     | TBD                     | TBD                         |
|                            |                         |                             |

1. If the model number of your unit is not listed, ***you must consult the drawing provided with the unit*** for the GAL and Max Gap. Do not use the values in this table.



Document No. IM-183

## Installation and Maintenance Instructions for Standard Hydraulic Clamp Assemblies

Created: 10/10/2005 - RJD  
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### Installation Record for Hydraulic Torque Coupler

Installation Date \_\_\_\_\_ Installation Approval \_\_\_\_\_

Gap opening when hub lightly grips shaft (INITIAL) \_\_\_\_\_ in.  
Pressure \_\_\_\_\_ psi.

Calculation of Final Gap

INITIAL, from above \_\_\_\_\_

GAL, from Table 1 (or drawing) \_\_\_\_\_ / \_\_\_\_\_

Total Required Gap (TRG) = Initial + GAL

\_\_\_\_\_ / \_\_\_\_\_ = \_\_\_\_\_ + \_\_\_\_\_ / \_\_\_\_\_

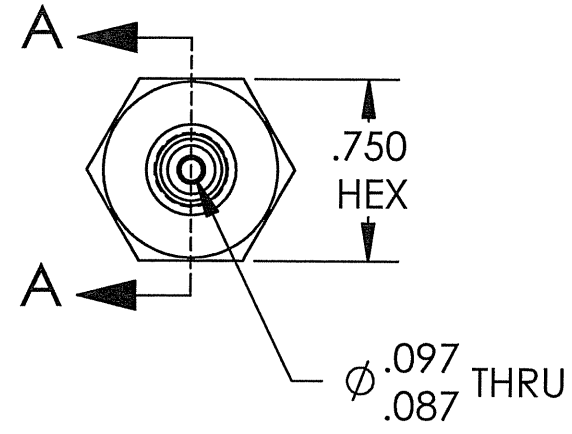
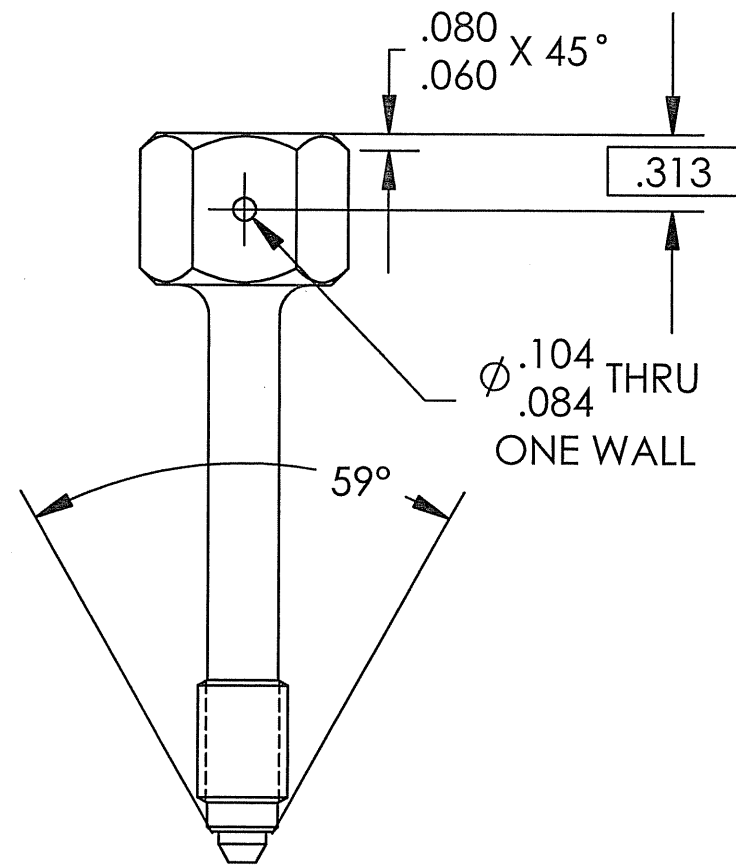
Final gap as installed \_\_\_\_\_ in ,  
Final Pressure \_\_\_\_\_ psi

Location of hub relative to shaft end \_\_\_\_\_ in

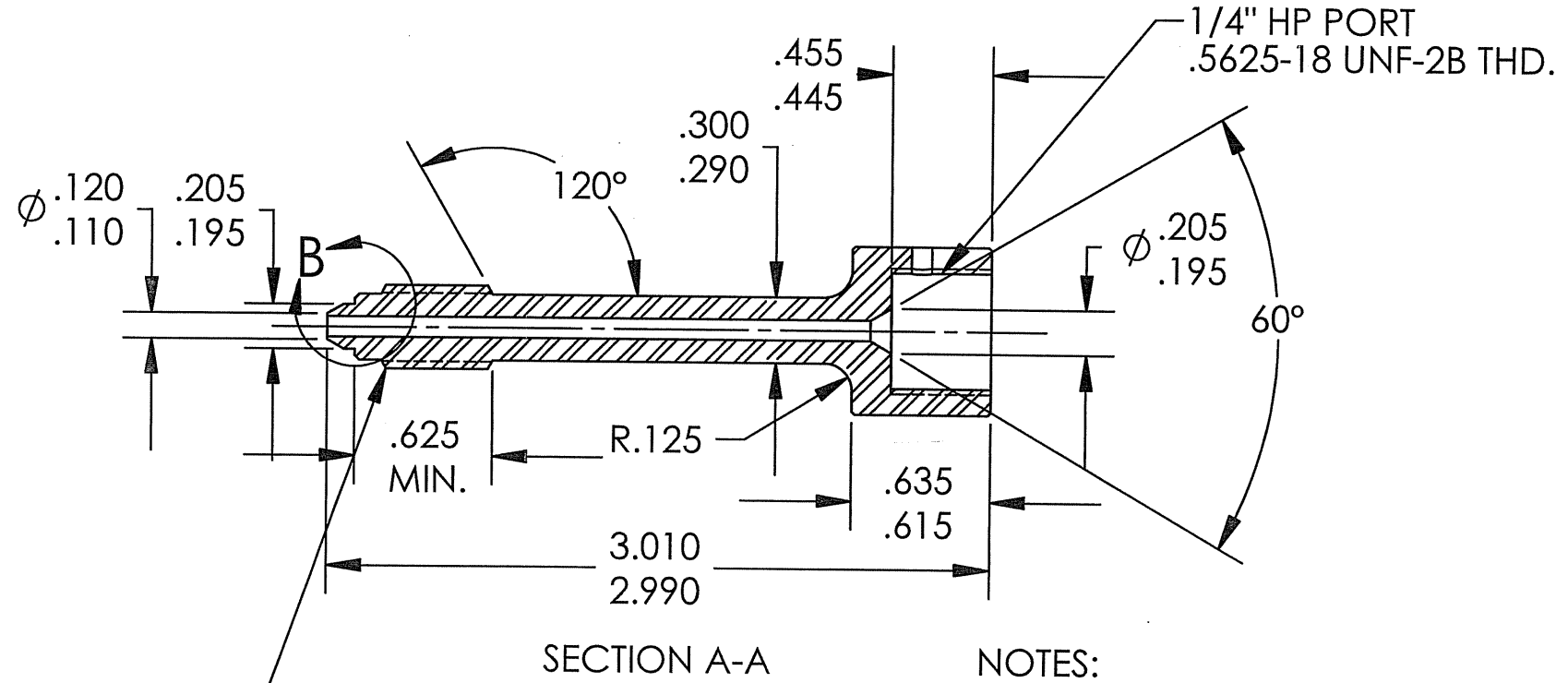
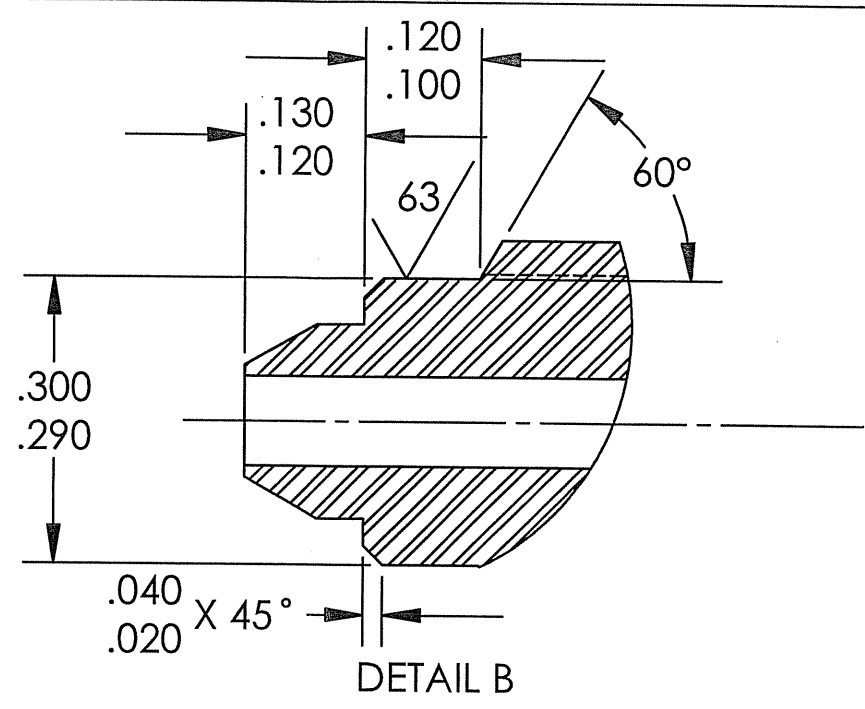
General

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

| REVISIONS |      |             |      |          |
|-----------|------|-------------|------|----------|
| ECN       | REV. | DESCRIPTION | DATE | APPROVED |
|           |      |             |      |          |



3/8"-24 UNF-2A THREAD  
 MAJOR DIAMETER MUST NOT EXCEED .3739  
 DEBURR FIRST AND LAST THREAD  
 GO GAGE MUST PAST ENTIRE THREAD



- NOTES:
- 100% INSPECTION ON ALL THREADS
  - TOLERANCES AND PRACTICES PER ESI 99013

MATERIAL:  
 TYPE 316 STAINLESS  
 STEEL PER ASTM A276  
 CONDITION A (NON-  
 MAGNETIC)

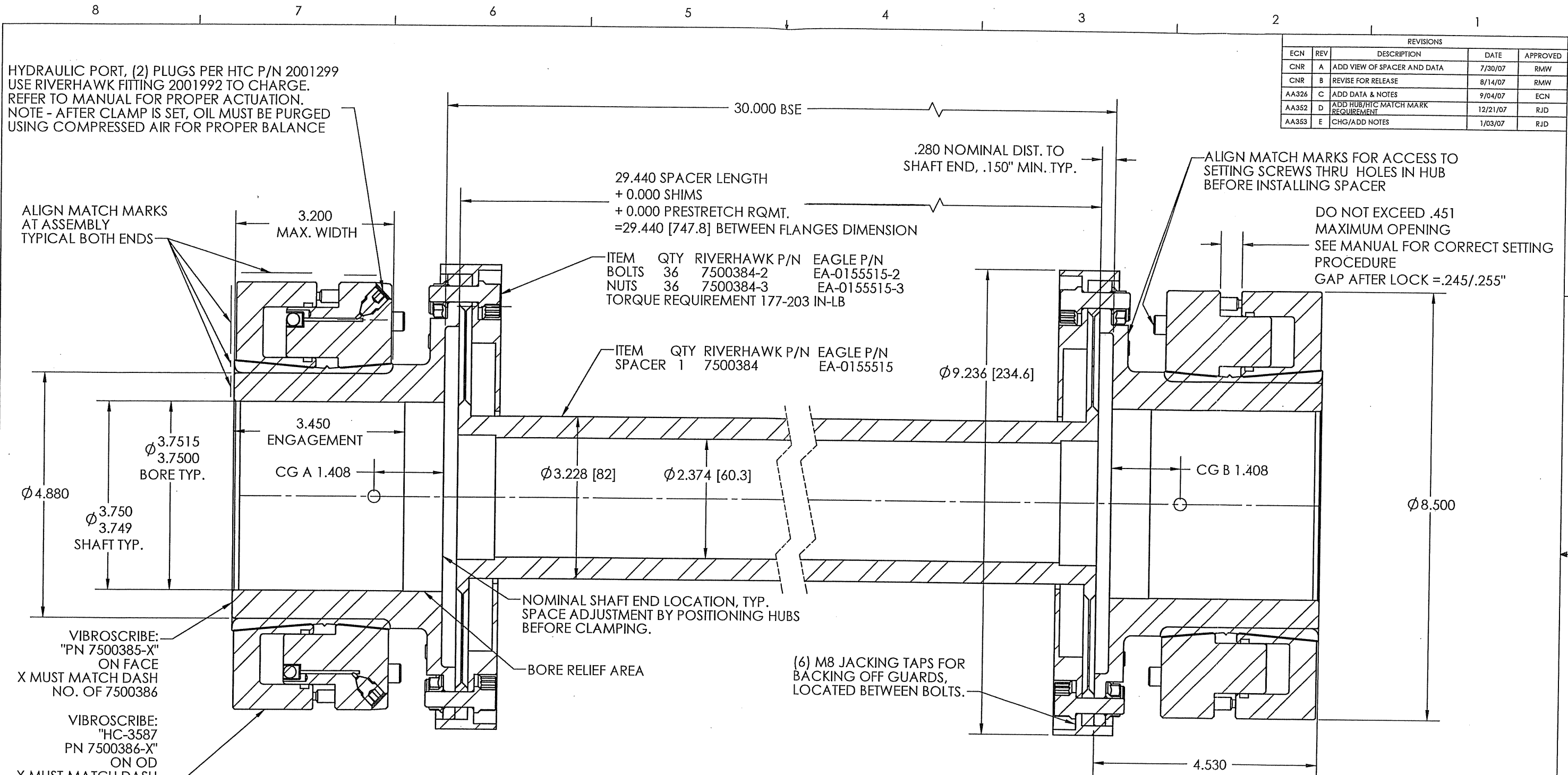
**Riverhawk Company**  
 215 Clinton Road  
 New Hartford, New York 13413

**3/8-24 ADAPTER FITTING**

DRAWN RJD 11-14-06  
 ENG APPR RJD 11-14-06

SIZE A DWG NO. 2001992 REV  
 HTC-3356 SHEET 1 OF 1

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| REVISIONS |     |                                    |          |          |
|-----------|-----|------------------------------------|----------|----------|
| ECN       | REV | DESCRIPTION                        | DATE     | APPROVED |
| CNR       | A   | ADD VIEW OF SPACER AND DATA        | 7/30/07  | RMW      |
| CNR       | B   | REVISE FOR RELEASE                 | 8/14/07  | RMW      |
| AA326     | C   | ADD DATA & NOTES                   | 9/04/07  | ECN      |
| AA352     | D   | ADD HUB/HIC MATCH MARK REQUIREMENT | 12/21/07 | RJD      |
| AA353     | E   | CHG/ADD NOTES                      | 1/03/07  | RJD      |

|   |                         |
|---|-------------------------|
| <b>COUPLING SPACER DATA:</b>                          |                         |
| SPACER MANUFACTURER                                   | EAGLE INDUSTRY CO.,LTD. |
| CONTINUOUS TORQUE RATING                              | 97,360 IN-LB            |
| SERVICE FACTOR  | 1.5                     |
| PEAK TORQUE **  | 220,380 IN-LB           |
| AXIAL DEFLECTION CAPACITY                             | +/- .067 IN             |
| FORCE @ .067 IN.                                      | 1,290 LBF               |
| ANGULAR CAPACITY PER ELEMENT                          | 1/6 DEG                 |
| EQUIVALENT PARALLEL OFFSET @ 29.197 IN. BETWEEN CTRS. | .067 IN.                |
| BENDING MOMENT @ 1/6 DEG                              | 745 IN-LB               |
| AXIAL NATURAL FREQUENCY @ 0.0"                        | 8,587 CPM               |
| @ 0.067"  | 10,305 CPM              |
| LATERAL NATURAL FREQUENCY BASED ON RIGID SUPPORTS     |                         |
|   | 22,394 CPM              |

|                                   |                          |
|-----------------------------------|--------------------------|
| <b>CLAMP DATA:</b>                |                          |
| SLIP TORQUE AT SPEED **           | 200,700 IN-LB            |
| <b>OVERALL MASS ELASTIC DATA:</b> |                          |
| TOTAL WEIGHT                      | 126.92 LB                |
| DRIVE HALF WEIGHT                 | 63.46 LB @ CGA           |
| LOAD HALF WEIGHT                  | 63.46 LB @ CGB           |
| INERTIA                           | 1,094 LB-IN <sup>2</sup> |
| TORSIONAL STIFFNESS               | 2.461X10E6 IN-LB/RAD     |

|                          |              |  |
|--------------------------|--------------|--|
| <b>APPLICATION DATA:</b> |              |  |
| GEAR TO COMPRESSOR       |              |  |
| POWER                    | 7,500 HP     |  |
| SPEED                    | 7,267 RPM    |  |
| CONTINUOUS TORQUE        | 65,046 IN-LB |  |
| MINIMUM SERVICE FACTOR   | 1.5          |  |

YORK P/N: 029-25211-000

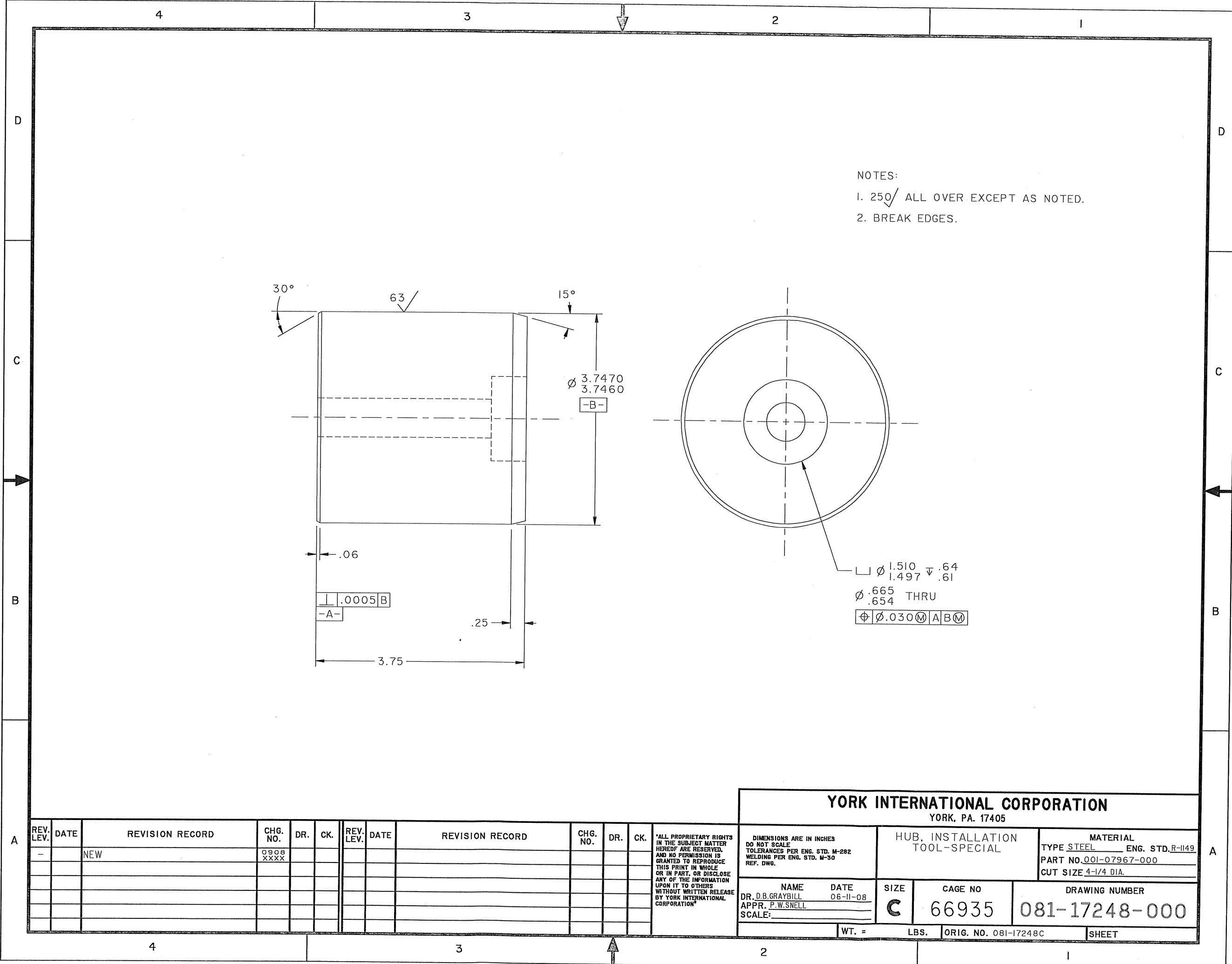
INSTALLATION AND MAINTENANCE:  
RIVERHAWK MANUAL IM-183 REF. HTC040  
EAGLE MANUAL IAM-0006R00

**BALANCE:** ALL SEPARABLE COMPONENTS BALANCED TO U=10W/N HUB (7500385-X) AND HYDRAULIC CLAMP(7500386-X) ARE MATCHED AT BALANCE WHERE X IS THE SERIAL NUMBER. SERIAL NUMBERS OF MATING HUB AND HYDRAULIC CLAMP MUST MATCH AT ASSEMBLY. REFERENCE BALANCE DRAWING 7500389

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|                                   |         |  |  |
|-----------------------------------|---------|--|--|
| MATERIALS:                        |         | <br><b>Riverhawk Company</b><br>215 Clinton Road<br>New Hartford, New York 13413 |  |
| <b>FLEXIBLE COUPLING ASSEMBLY</b> |         | SIZE DWG. NO. <b>HC-3587</b>   |  |
| DRAWN                             | DATE    | REV  |  |
| RMW                               | 7/14/07 | B  |  |
| ENG APPR                          | DATE    |  |  |
| RMW                               | 8/14/07 |  |  |

SHEET 1 OF 1



- NOTES:
1. 250/ ALL OVER EXCEPT AS NOTED.
  2. BREAK EDGES.

|  |      |                 |              |                                   |     |           |      |  |          |     |     |                                       |          |                      |          |                |
|--|------|-----------------|--------------|-----------------------------------|-----|-----------|------|--|----------|-----|-----|---------------------------------------|----------|----------------------|----------|----------------|
| <b>YORK INTERNATIONAL CORPORATION</b><br>YORK, PA. 17405   |      |                 |              |                                   |     |           |      |  |          |     |     |                                       |          |                      |          |                |
| DIMENSIONS ARE IN INCHES<br>DO NOT SCALE<br>TOLERANCES PER ENG. STD. M-282<br>WELDING PER ENG. STD. M-30<br>REF. DWG.  |      |                 |              | HUB, INSTALLATION<br>TOOL-SPECIAL |     |           |      | MATERIAL<br>TYPE STEEL ENG. STD. R-II49<br>PART NO. 001-07967-000<br>CUT SIZE 4-1/4 DIA. |          |     |     |                                       |          |                      |          |                |
| REV. LEV.  | DATE | REVISION RECORD | CHG. NO.     | DR.                               | CK. | REV. LEV. | DATE | REVISION RECORD  | CHG. NO. | DR. | CK. | NAME                                  | DATE     | SIZE                 | CAGE NO. | DRAWING NUMBER |
| -  | NEW  |                 | 0908<br>XXXX |                                   |     |           |      |  |          |     |     | DR. D.B. GRAYBILL<br>APPR. P.W. SNELL | 06-11-08 | C                    | 66935    | 081-17248-000  |
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