



PIGGY BACK^z Material Handler

Mounting Installation Instructions for ST, ZM, Z, & ZRT(V) Series

Manual Part No.: 625-208
Rev. 9/2002

Notice: The information in this manual was in effect at the time of printing. Princeton Delivery Systems reserves the right to make improvements and changes in specifications or design, without notice and without incurring obligation. Please check with your Princeton dealer for possible updates or revisions.

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IMPORTANT INFORMATION

The attached information provides suggested methods of mounting a Princeton PIGGY BACK® Material Handler to a truck or trailer.

The truck manufacturer, truck body manufacturer, and/or the trailer manufacturer should be contacted for information concerning load requirements and safe installation on their products.

The mounting methods described herein supersede any previous information.

The complete mounting system must be installed to provide proper mounting and to retain full PIGGY BACK® warranty.

Contact your State Highway Patrol for information concerning local load limits, width limits, and other limitations.

All welding must be done by certified welders with qualification in accordance with AWS D1.1.

Contact Princeton for information concerning any special applications which are outside the scope of this procedure.

Contact Princeton if you have any questions about the mounting or operation of the PIGGY BACK® Material Handler.

LIMITED WARRANTY

PRINCETON DELIVERY SYSTEMS WARRANTS THAT FOR INITIAL USE THIS VEHICLE IS FREE FROM DEFECTS IN MATERIAL OR WORKMANSHIP. IF THIS VEHICLE IS DEFECTIVE UPON INITIAL USE, CONTACT YOUR AUTHORIZED PRINCETON DEALER FROM WHOM IT WAS PURCHASED AND THE VEHICLE WILL BE REPAIRED OR EXCHANGED FOR A NEW ONE. THIS WARRANTY EXCLUDES DEFECTS OR DAMAGE DUE TO MISUSE OR NEGLIGENCE.

THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS THAT VARY FROM STATE TO STATE. THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. **IN NO EVENT SHALL PRINCETON BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES WHETHER CONTRACT, TORT OR NEGLIGENCE. AS WITH ALL HEAVY MACHINERY, THE USE OF THIS VEHICLE IS POTENTIALLY DANGEROUS IF COMMON SENSE AND REASONABLE CARE ARE NOT EXERCISED BY THE OPERATOR.**

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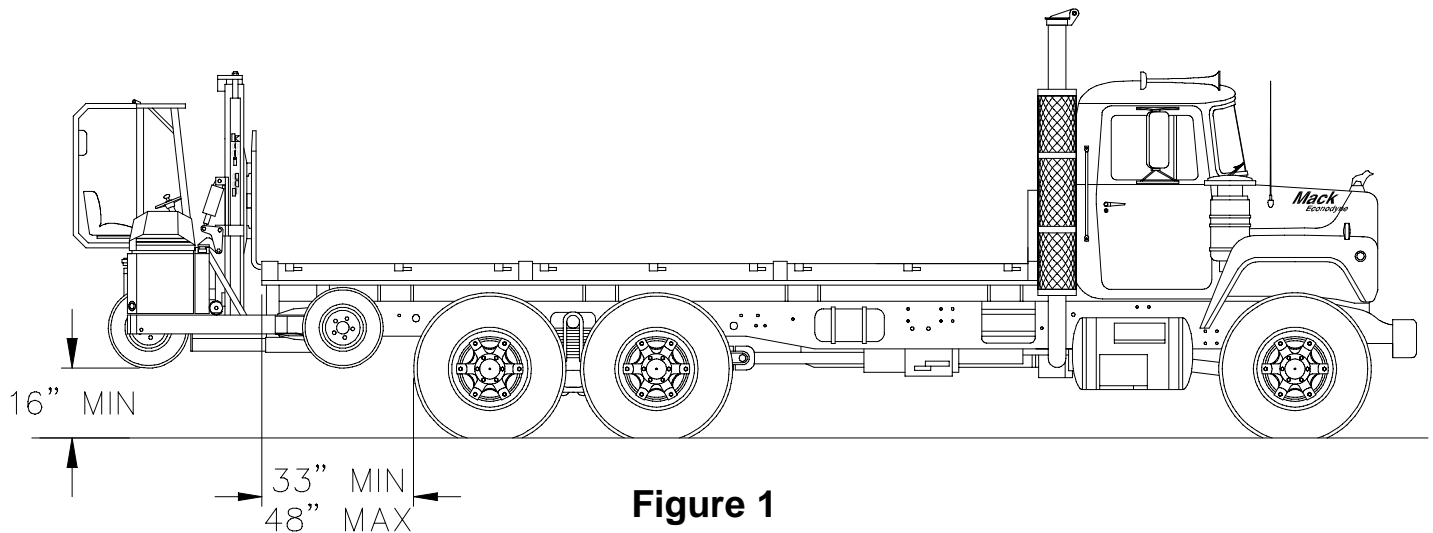
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1 General Information

These illustrations describe the factory approved methods of mounting a Princeton PIGGY BACK Material Handler to an owner's trailer.

This section covers the general setup information on the PIGGY BACK^Z and truck/trailer.

NOTE: This information is necessarily general and is based on similar applications. Contact Princeton for details concerning a specific trailer application.



Dimensions (See Figure 1)

Axle Location

Axles as far to rear a possible while leaving clearance for the PIGGY BACK^Z front tires. A minimum dimension of 33" is recommended from the rear of the tire to the rear of the bed, with a maximum dimension of 48" recommended.

Height

The PIGGY BACK^Z should be installed as high as possible to avoid contact with the ground when driving the trailer onto steep inclines, ramps, etc. Minimum recommended distance between the front tires and the ground is 16". Minimum recommended distance between the rear tires and the ground is 16".

Structural

Bed side and rear members-minimum C6 x 10.5 pounds per foot. Bed cross members-minimum S4 x 7.7 pounds per foot, 10-12" center to center.

ICC Bumper

If the trailer was manufactured after January 26, 1998, the ICC bumper will need to be replaced with a certified folding end bumper, similar to Sun Underride PN 103-114.

Electrical

Tail lights, clearance lights, and identification lights should be mounted as high as possible to allow the PIGGY BACK^Z to be raised as close to the bottom of the bed as possible to meet minimum ground clearance requirements.

License Plate

The license plate bracket and light should be mounted such that it is clearly visible when not PIGGY BACKING a forklift.

Suspension

Air-ride suspension system is recommended.

2 Installation Kit

A complete mounting kit as described below is available from Princeton Delivery Systems. It includes: Fork Supports, Outer Tubes, Tube Supports, Chain Loops, Safety Chains, and 7-pin Wiring Kit. The part number for the Mount Kit is given below.

Material Required

<u>Quantity</u>	<u>Description</u>	<u>Part No.</u>
1	Mount Kit	P90.356

Parts List

Mount Kit _____ P90.356

<u>Item</u>	<u>Description</u>	<u>Quantity</u>
P80.07B	Kit, 7 Pin Trailer Receptacle	1
P10.376C	Chain Loop	2
P90.291B	Safety Chain	2
604-127	Decal, PB Transport	1
604-143	Safety Sign, Warning	1
604-152	Safety Sign, Warning	1
604-190	Safety Sign, Patent	3
P90.922B	Fork Support Weldment	2
P90.354B	Outer Tube	2
P90.353B	Inner Tube Weldment	2
P90.447B	Plate	2
P90.350B	Hook	1
P90.321A	Tubing	4
P90.446B	Gusset	4
402-108	Lynch Pin, 3/4 x 4-3/4	2

Optional Items (Included In Kit)

<u>Item</u>	<u>Description</u>	<u>Quantity</u>
444-134	Repair Link, 3/16	4
606-227	Chain, Double Loop	1

3 Major Component Photos



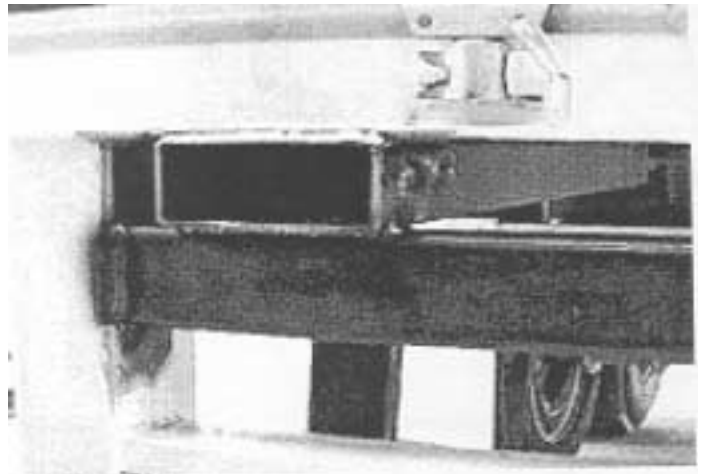
7 Pin Wiring Harness P/N P80.07B (1)



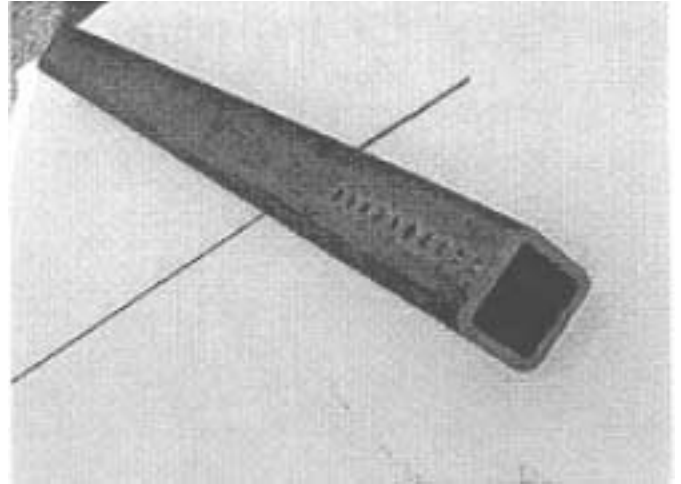
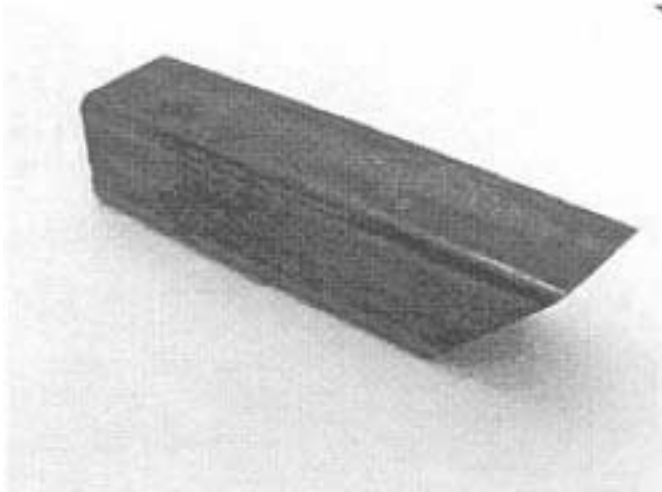
Chain Loop P/N P10.376C (2)



Safety Chain P/N P90.291B (2)



Fork Supports P/N P90.922B (2)



Outer Tube Weldment P/N P90.354B (2) Inner Tube Weldment P/N P90.353B (2)

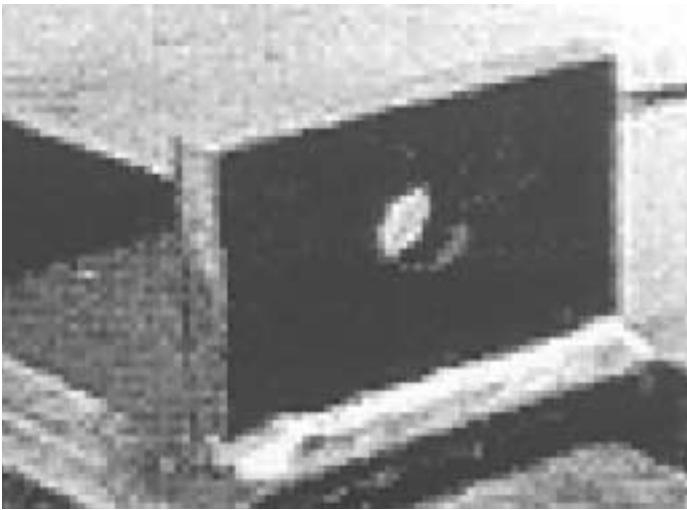
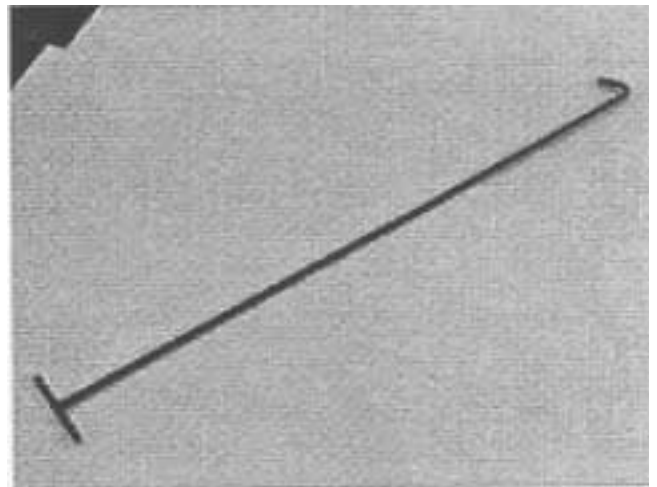
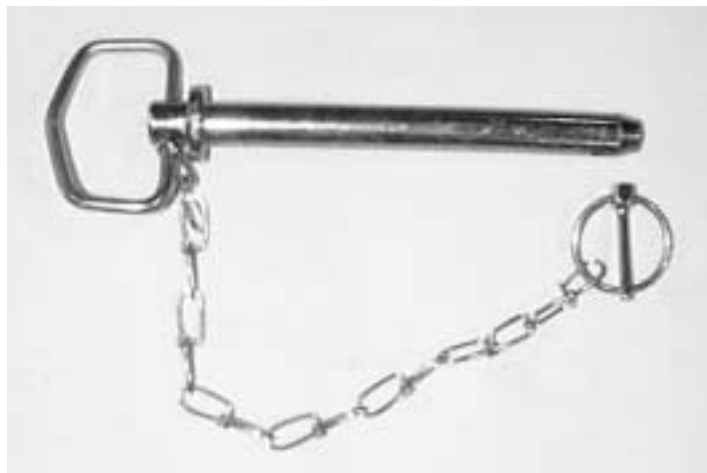


Plate P/N P90.477B (2)



Hook P/N P90.350B (1)



Lynch Pin P/N 402-108 (2)

4 Fork Supports

Fork Supports

Fork Support consist of two 2 3/4" x 7 1/2" Fork Tube Support Weldments mounted level to the ground and parallel to the front-to-rear axis of the truck/trailer.

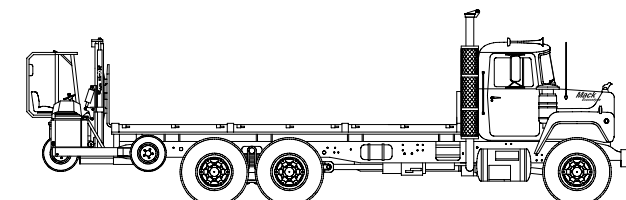
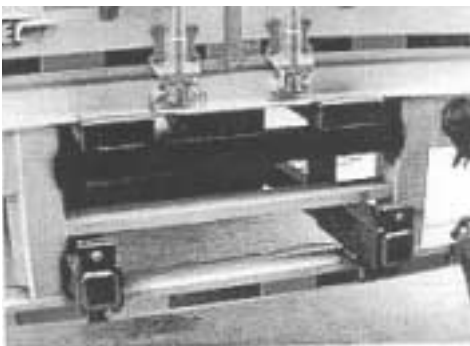
Longitudinal Mount

Material Required

<u>Quantity</u>	<u>Description</u>	<u>Princeton Part No.</u>
2	Fork Tube Support Weldments: 2 3/4" x 7 1/2" x 42" Long, ASTM A-500, Gr. B Steel	P90.922B

Installation Procedure

1. The 42" tubing can be cut down to match the length of your particular forks.
2. The Fork Supports should be installed as shown in Figure 2. Steel spacers should be welded to the bed cross members to keep the tubes level from side to side if they are to be attached to the underside of the bed channel.
3. A transverse support below the fork supports is required at the rear. 2" x 4" x 1/4" wall rectangular tubing (ASTM A-500, Gr. B Steel) or equivalent is recommended.
4. The Fork Supports should be spaced as wide as possible within the span of the frame rails, but with an outside spacing of 52", and a minimum inside to inside spacing of 24".
5. Since the operator applies upward force to the forks when installing the machine for transport, any u-bolts attaching the bed to the frame must be maintained or additional u-bolts or plate connections installed



NOTE: See Page 1 for max. and min. height dimensions.

Figure 2

5 Safety Chains

The safety chains are designed to provide a compact, easy to use system for securing the PIGGY BACK®.

Material Required

<u>Quantity</u>	<u>Description</u>	<u>Princeton Part No.</u>
2	Chain Loop Assembly	P90.291B
2	Chain Loop	P10.376C

One P90.291B consists of the following:

1	Chain, 1/2" high test Gr. 43 Working load rating 9,200 lb.	606-108
1	Coupler, 5/8" anchor shackle w/ bolt and nut, working load rating 10,000 lb.	606-106
1	Swing Latch Hook, 7/16" clevis slip hook w/latch working load rating 7,200 lb.	606-107

NOTE: Standard chains may NOT be substituted.

Installation Procedure

1. After installing the fork mounting tubes, insert the PIGGY BACK® Material Handler forks into the tubes and raise it to its proper ride height.
2. Connect one hook to the PIGGY BACK® Material Handler and the coupler to the chain loops on the truck/trailer.
3. Position the chain loops on the truck/trailer as shown in Figure 3.
4. Weld the chain loops securely to the truck/trailer.

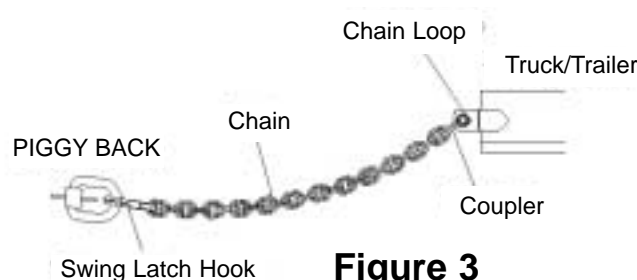


Figure 3

6 Tube Supports

Tube Supports

Tube supports consist of two square tubes sliding inside two larger tubes. Lynch Pins hold the inner tubes in position when traveling without the PIGGY BACK® attached and set the distance the tube can slide out with the PIGGY BACK® attached. The Lynch Pin can be located in different positions to accommodate different models.

Material Required

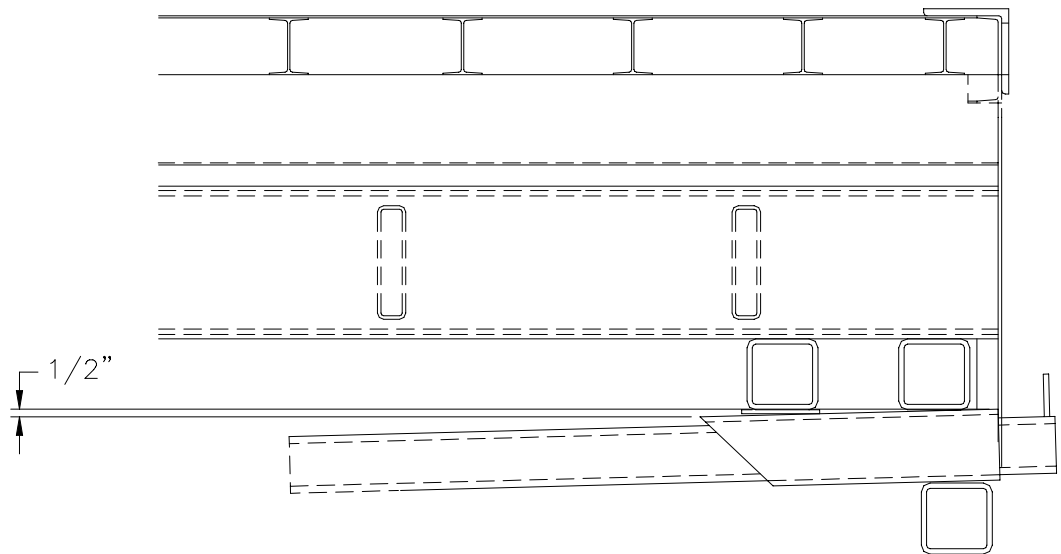
<u>Quantity</u>	<u>Description</u>	<u>Princeton Part No.</u>
2	Outer Tube Weldment, Square Tubing: 5" x 5" x 3/8" wall x 21" Long, ASTM A500, Gr. B Steel	P90.354B
2	Inner Tube Weldment, Square Tubing: 4" x 4" x 1/2" wall x 54" Long, ASTM A500, Gr. B Steel	P90.353B
2	Plate, Mounting Kit	P90.447B
2	Lynch Pin, 3/4 x 4 3/4	402-108

Installation Procedure

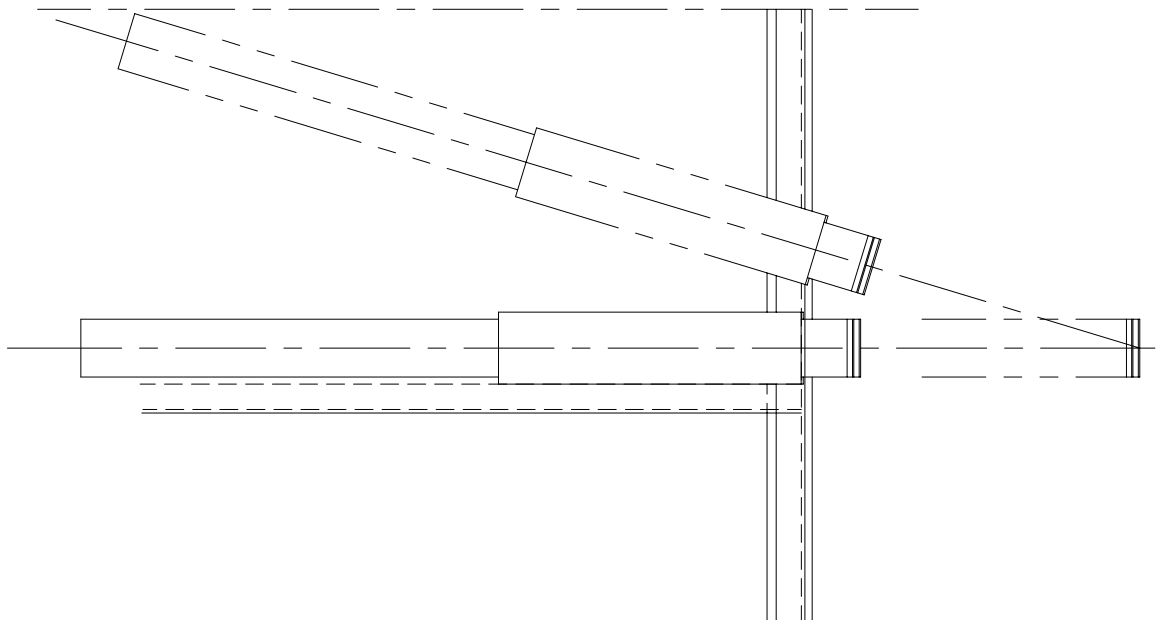
1. Insert the inner tubes in the outer tubes.
2. Install the Lynch Pins in the proper position for the model of PIGGY BACK® to set the distance the inner tubes can slide out.
3. Position the outer tube weldments as shown in Figure 4. A 1/2" drop at the front gives the tubes a slight upward slope to the rear. This slope permits the inner tube weldments to be level when extended.
4. The tubes should be as high as possible while allowing the 3" high tab on the inner tubes to pass below the frame of the PIGGY BACK®.

5. As shown in Figure 5, the outer tubes may need to be mounted at an angle to clear the truck/trailer springs, wheels, etc. The distance between the inner tubes must be 46" when fully extended.
6. Weld the outer tubes in place
7. Install the Lynch Pins to position the clamp plates (P90.477B) and tack weld the clamp plates onto the outer tubes. (See page 15).
8. Remove the Lynch Pins and finish weld the clamp plates onto the outer tubes.

**Figure 4
Side View**



**Figure 5
Top View**



7 Truck/Trailer 7-Pin Wiring Kit

Material Required

<u>Quantity</u>	<u>Description</u>	<u>Part No.</u>
1	Truck/Trailer Receptacle Kit	P80.07B

Installation

To determine the location of the receptacle, mount the PIGGY BACK® to the truck/trailer. Since the PIGGY BACK® receptacle is located in its left side, locate receptacle to the left side of the truck/trailer. The coil plug provided with the PIGGY BACK® is approximately 12 feet long at full extension for mounting location flexibility.

With the unit mounted, insert the coil plug into the receptacle on the left side.

Stretch the cable to the truck/trailer to determine a convenient and protected location for the truck/trailer receptacle.

With the receptacle location determined, lay out the mounting holes.

Drill or torch out a 2" diameter through hole for the receptacle body.

Feed the receptacle harness through the hole and mark the location of the mounting holes. Drill 2 holes, 3/16" diameter for self-tapping mounting screws. Secure the receptacle to the truck/trailer with the screws.

Wiring - Trailer

With the seven tap-in connectors provided, splice into the trailer wiring. In the package, there will be six blue and one yellow wire taps. The yellow tap is for the white wire or ground.

All wiring is required to be color coded to S.A.E. Standards. Use Table 1 to locate the proper wire for trailers that have separate turn lamps & stop lamps.

If you have taken the unit off the trailer, reload to check electrical installation. Install coil plug from your trailer to the receptacle on the left side of the forklift. The plug can go in only one way to ensure proper alignment of wires.

Wiring - Truck

With the seven tap-in connectors provided, splice into the truck wiring. In the package, there will be six blue and one yellow wire taps. The yellow tap is for the white wire or the ground.

All wiring is required to be color coded to S.A.E. Standards. Use Table 2 in to locate the proper wire for trucks which have separate turn lamps & stop lamps.

To use both lights on each side of the PIGGY BACK®, cut the red wires to the outside lamps and at the connector. On the left pair, install a jumper wire to connect to the yellow wire on the inside lamp to the red wire on the outside lamp. On the right pair, install a jumper wire to connect to the green wire on the inside lamp to the red wire on the outside lamp.

7 Truck/Trailer 7-Pin Wiring Kit (cont.)

If you have taken the unit off the truck/trailer, reload to check electrical installation.

Install coil plug from your truck/trailer to the receptacle on the left side of the forklift. The plug can go in only one way to insure proper alignment of the wires (Figure 6).

Table 1 - Wiring Circuits - Trailer with Separate Stop and Turn Lamps

<u>Conductor</u>	<u>Wire Color</u>	<u>Lamp and Signal Circuits</u>
Wht	White	Ground return to towing vehicle
Blk	Black	Clearance, side marker, and identification lamps
Yel	Yellow	Left-hand turn signal and hazard signal
Red	Red	Stop lamps and anti wheel lock devices
Grn	Green	Right-hand turn signal and hazard signal
Brn	Brown	Tail and license plate lamps
Blu	Blue	Auxiliary

Table 2 - Wiring Circuits - Truck with Single Stop and Turn Lamps

<u>Conductor</u>	<u>Wire Color</u>	<u>Lamp and Signal Circuits</u>
Wht	White	Ground return to towing vehicle
Blk	Black	Clearance, side marker, and identification lamps
Yel	Yellow	Left-hand turn signal and hazard signal
Red	Red	Stop lamps and anti wheel lock devices
Grn	Green	Right-hand turn signal and hazard signal
Brn	Brown	Tail and license plate lamps
Blu	Blue	Auxiliary

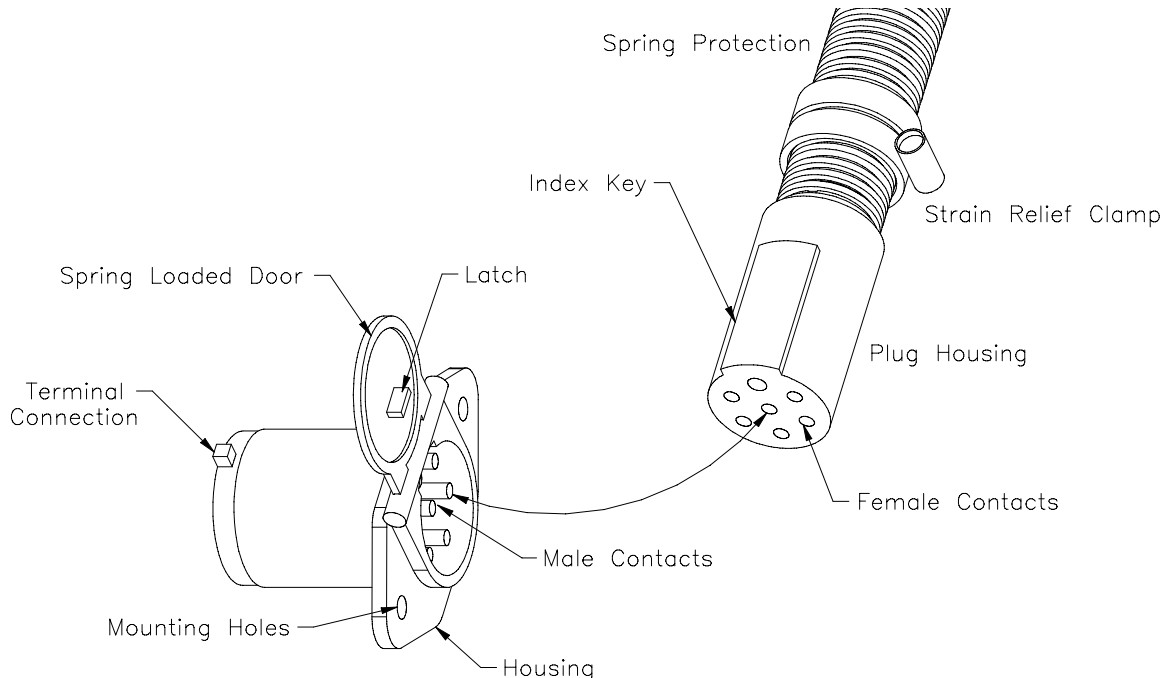
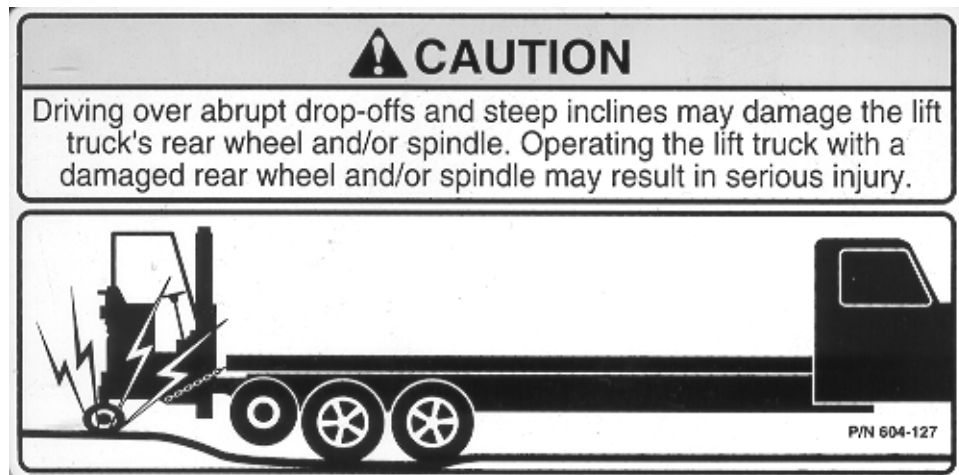


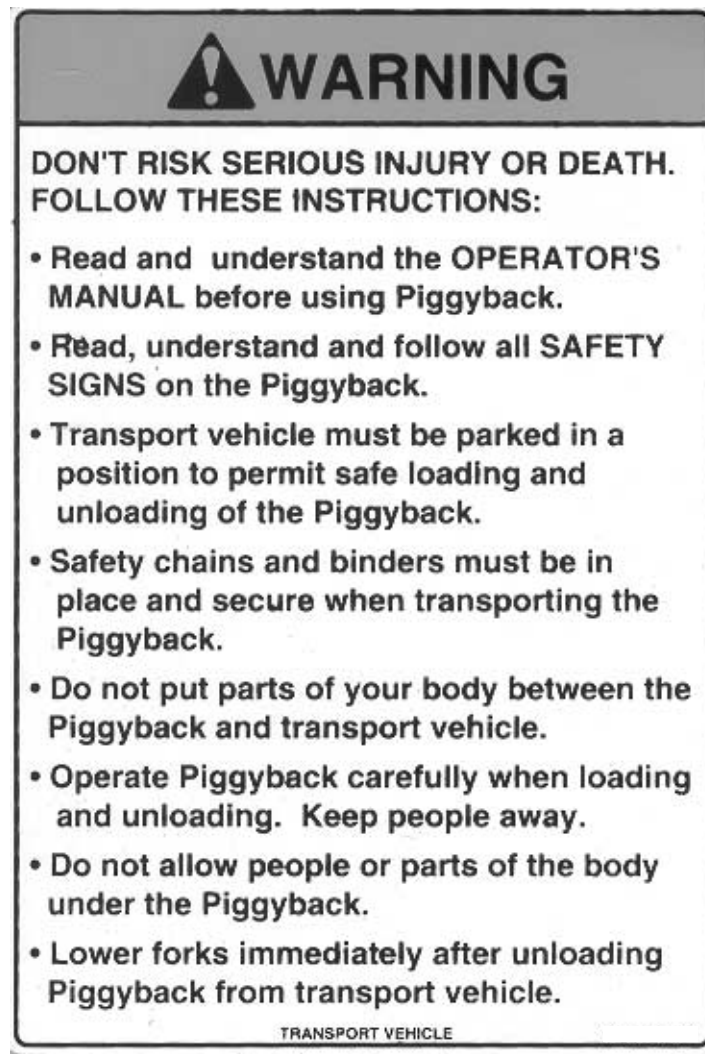
Figure 6

8 Safety Signs

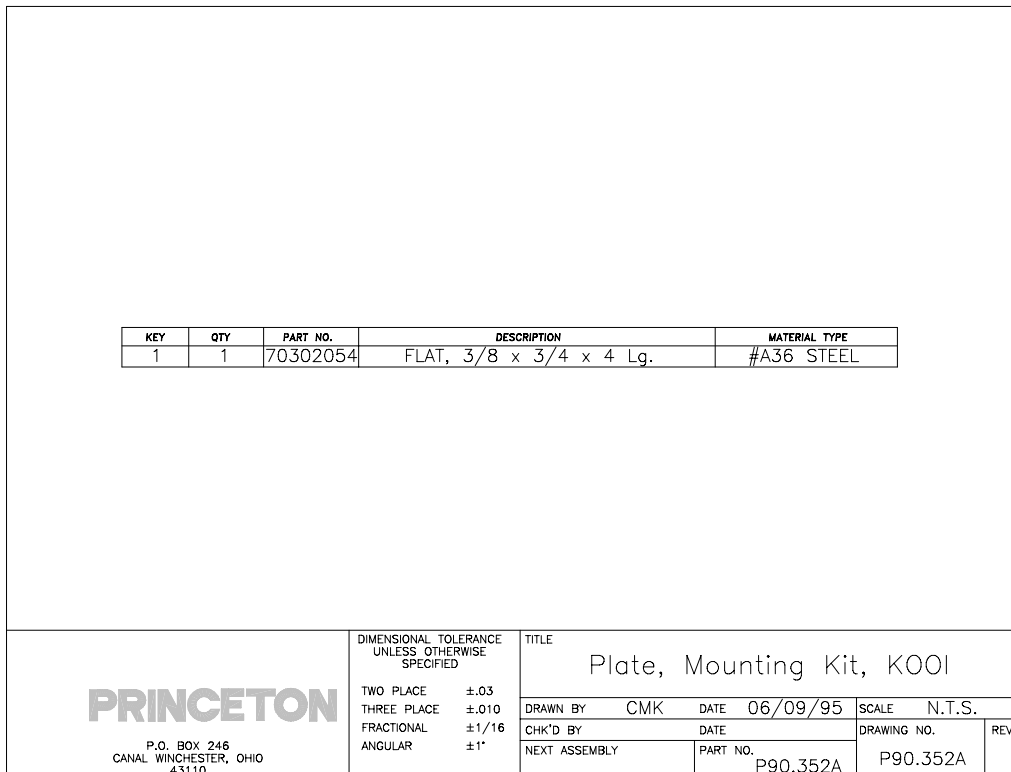
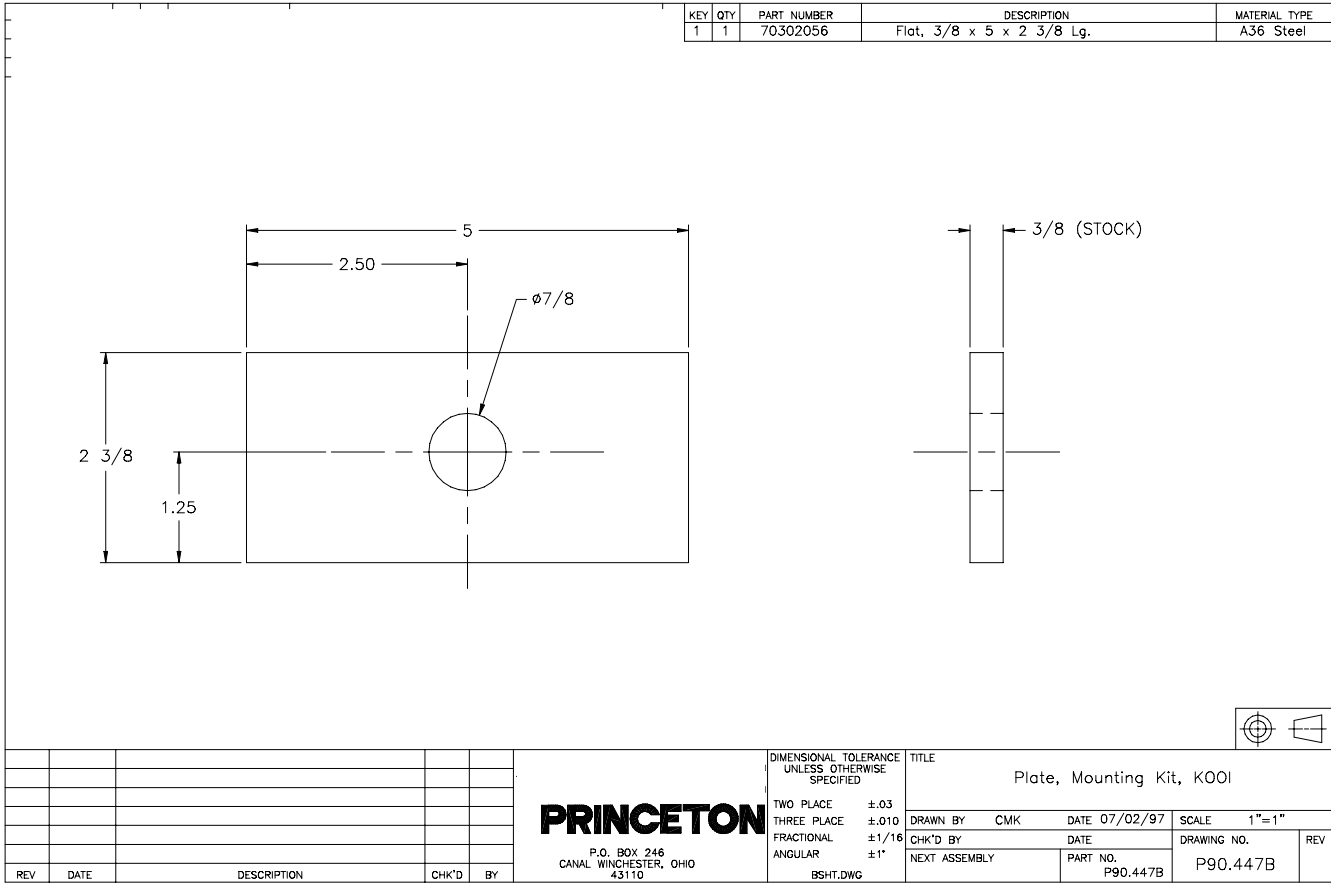
Install safety sign 604-127 (shown below) on the truck dashboard or other prominent area.



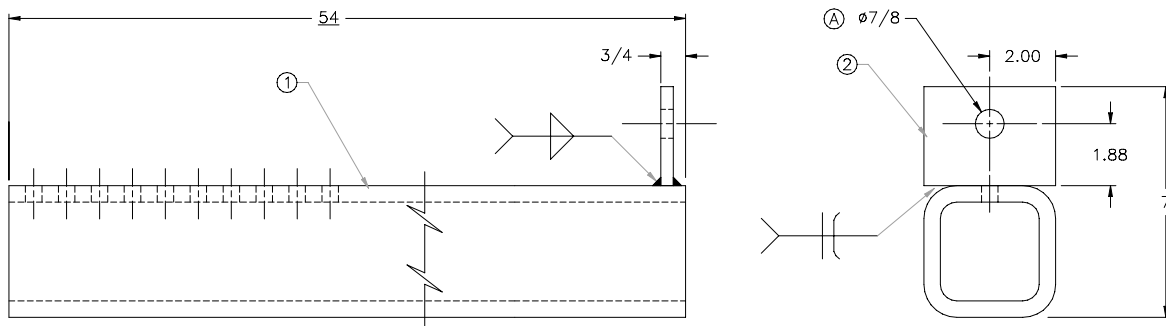
Install safety signs 604-123 (shown below) at the rear of the truck/trailer.



9 Detail Drawings

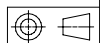
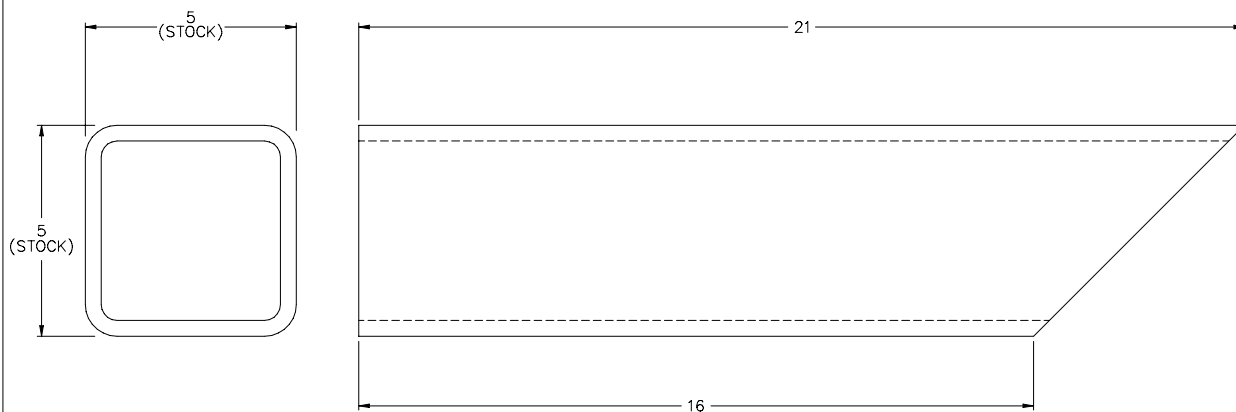


KEY	QTY	PART NUMBER	DESCRIPTION	MATERIAL TYPE
1	1	P90.365B	Inner Tube, Mounting Kit	
2	1	P90.366A	Plate, Mounting Kit	

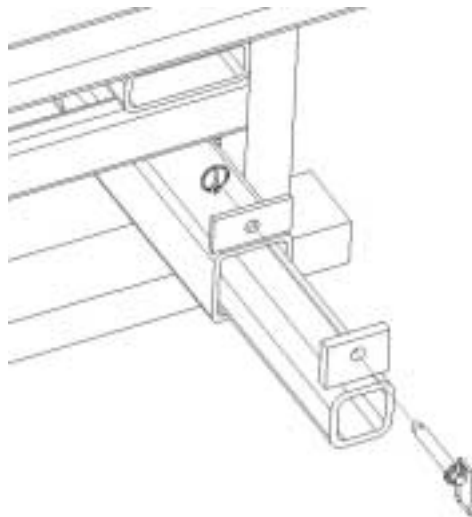
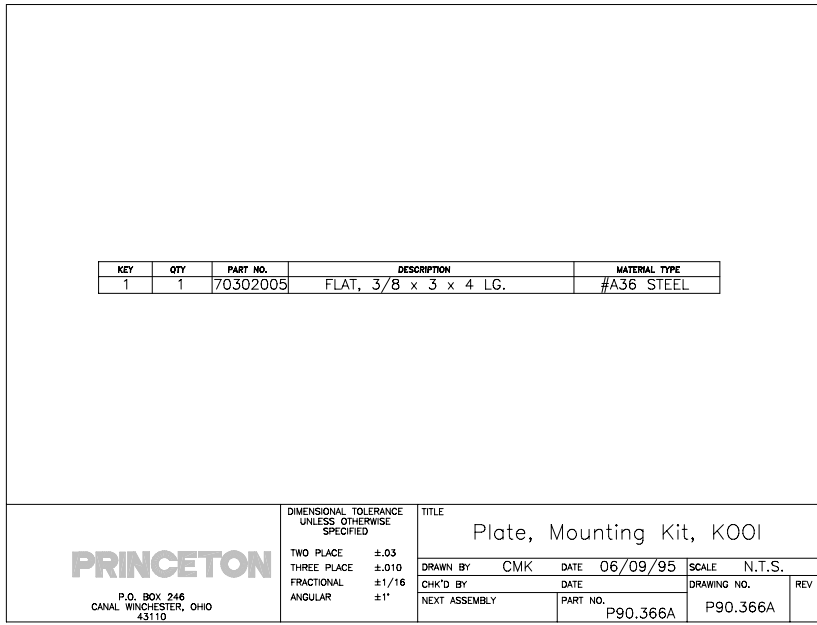
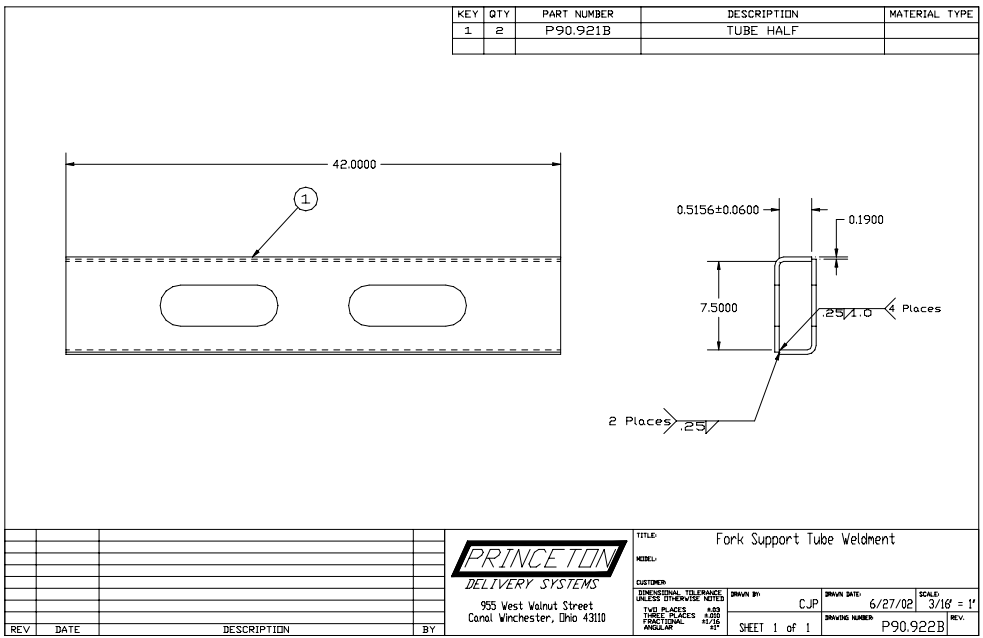


REV	DATE	DESCRIPTION	CHK'D	BY	DIMENSIONAL TOLERANCE UNLESS OTHERWISE SPECIFIED	TITLE	SCALE	DRAWING NO.	REV
A	07/02/97	Added $\phi 7/8$ Hole.		CMK	TWO PLACE $\pm .03$ THREE PLACE $\pm .010$ FRACTIONAL $\pm 1/16$ ANGULAR $\pm 1^\circ$	Weldment, Inner Tube, KOOI Mounting Kit	3/8"=1"	P90.353B	A
					PRINCETON P.O. BOX 246 CANAL WINCHESTER, OHIO 43110	DRAWN BY CMK DATE 06/21/96 CHK'D BY DATE NEXT ASSEMBLY PART NO. P90.353B			

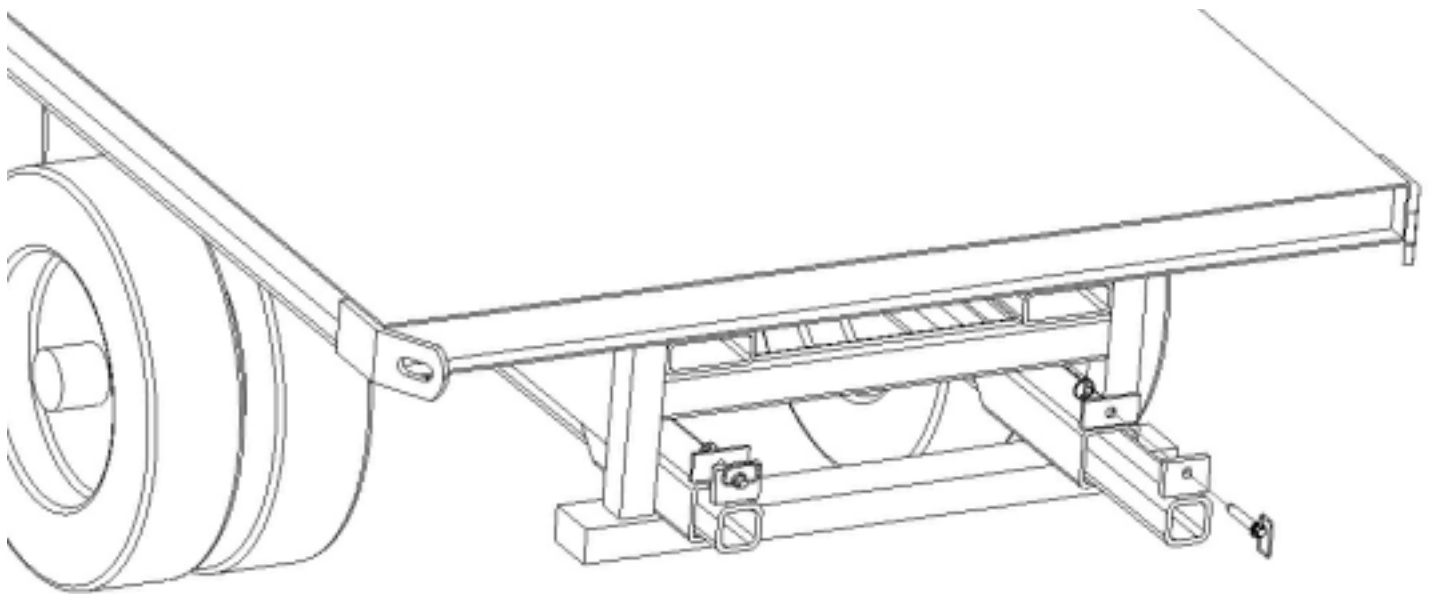
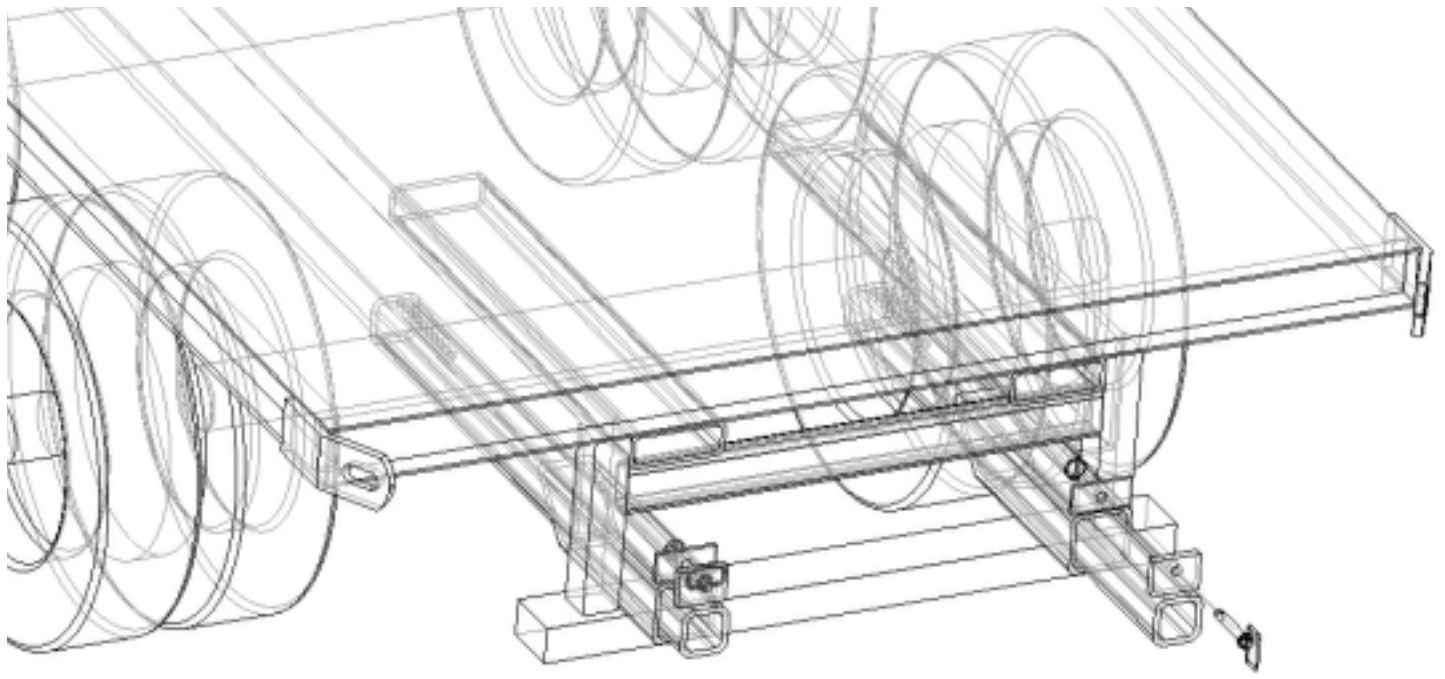
KEY	QTY	PART NUMBER	DESCRIPTION	MATERIAL TYPE
1	1	70906066	Square Tubing, 5 x 5 x 3/8 x 21 Lg.	#A500 Gr. B



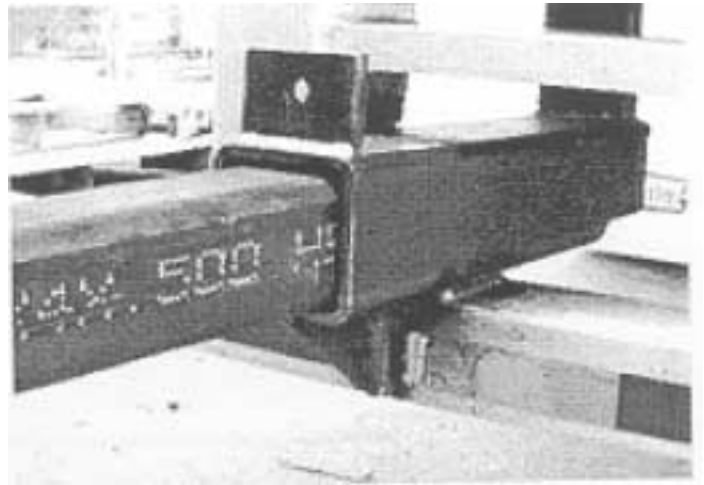
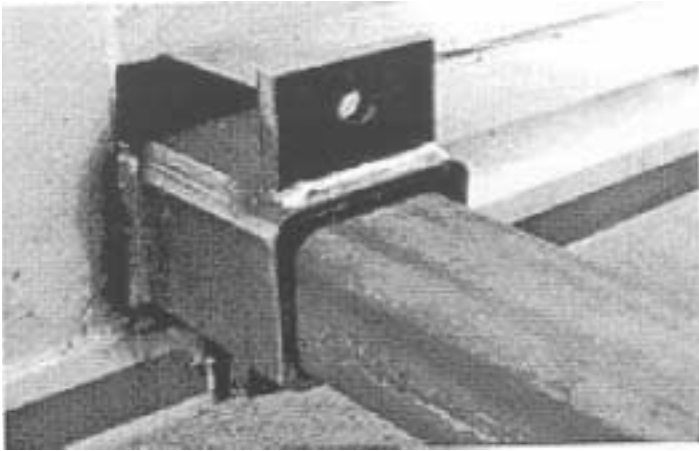
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					TWO PLACE $\pm .03$ THREE PLACE $\pm .010$ FRACTIONAL $\pm 1/16$ ANGULAR $\pm 1^\circ$	Outer Tube, Mounting Kit, KOOI	1/2"=1"	P90.354B	
					PRINCETON P.O. BOX 246 CANAL WINCHESTER, OHIO 43110	DRAWN BY CMK DATE 06/08/95 CHK'D BY DATE NEXT ASSEMBLY PART NO. P90.354B			



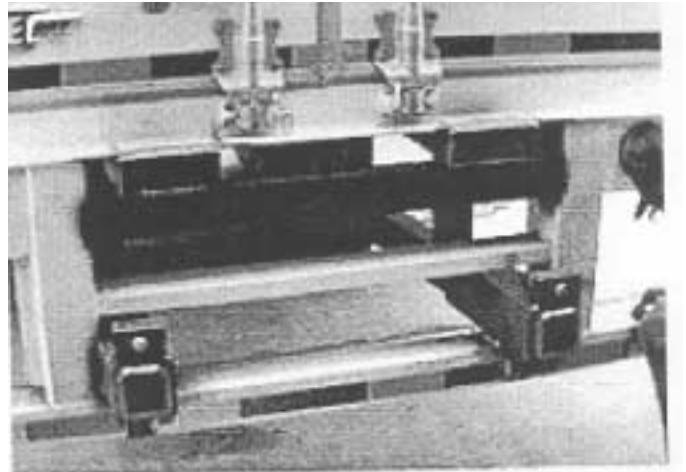
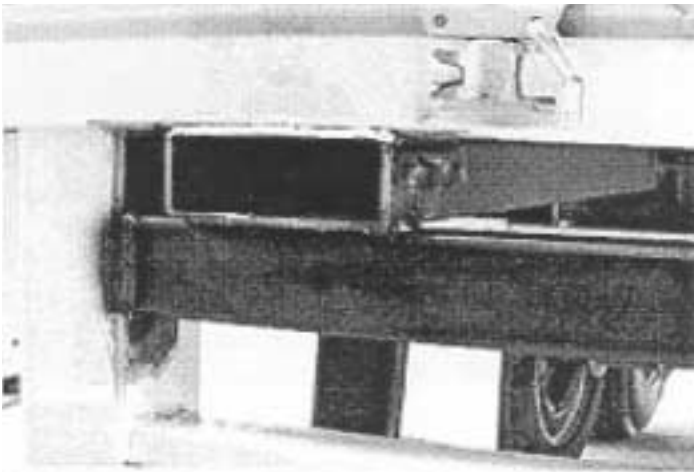
3D Views



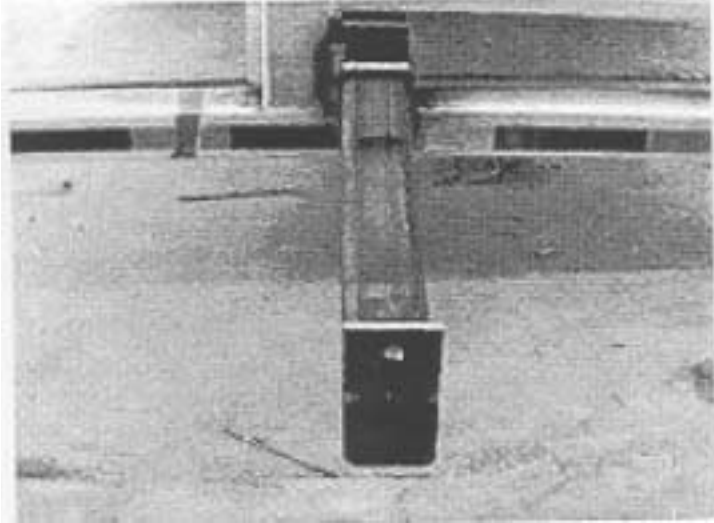
10 Example Photos



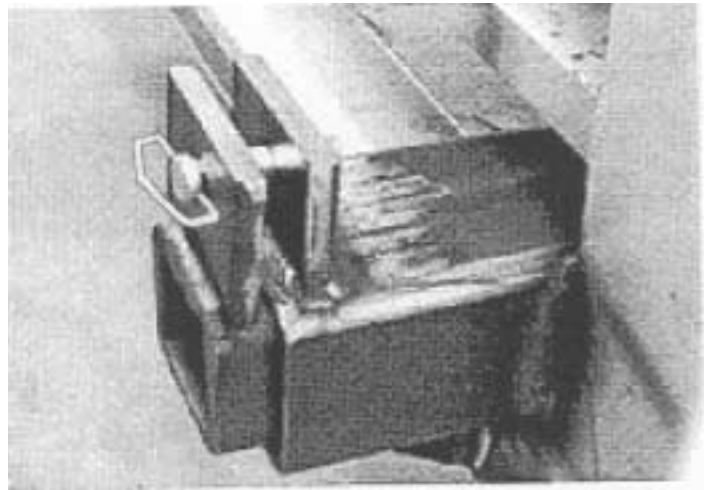
**P90.354B (OUTER TUBE) & P90.353B (INNER TUBE WELDMENT)
With P90.477B (CLAMP PLATE) ATTACHED.**



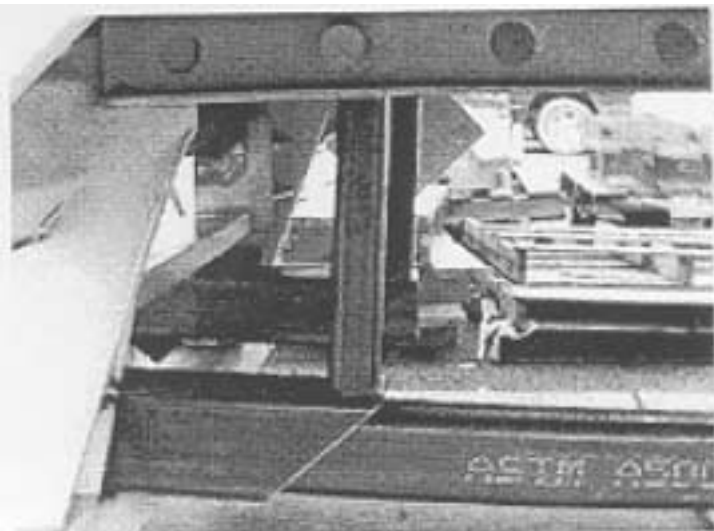
P90.922B (FORK SUPPORT WELDMENTS)



OUTER TUBE



MANUAL PIN LATCH



**BOTTOM ANGLE SUPPORT FOR
OUTER TUBE "NOT STANDARD IN KIT"**



**BRACE FOR THE OUTER TUBE
"NOT STANDARD IN KIT"**