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ENGINE TEST STAND ASSEMBLY

PART NUMBER: 1300101/1300102/1300111/13000112

STOP! Please read and review the entire assembly guide to assure that you understand and have all the necessary parts needed; BEFORE physical assembly!

The PRW 13000-series PRW Racing Engine Test Stand (ETS) is designed for professional engine building shops, and the serious D.I.Y. automotive enthusiast. It is durable, can be used from small displacement engines, to the largest high performance gasoline and light truck diesel engines, as well as rotary engines. PRW Racing Engine Test Stand (base unit) has a shipping weight of 150 lb. (68 kg) base unit without accessories, and is capable of supporting an engine weighing up to 1600 lb. (725 kg).

Designed to provide the user with a convenient means of testing the operating condition of an engine without installation in a dynamometer cell, the PRW ETS offers the ability to start and operate the engine, and to be wheeled into any convenient location on the shop floor.

The patented (US 7,810,799 B2) design allows the ETS to be easily collapsed for storage with a small footprint and quickly reassembled for use. The Racing Engine Test Stand is the first stand to be manufactured utilizing "standard parts," which can be replaced if needed. Basic hand tools are needed for assembly/disassembly.

What tools are needed?

You will need the following tools to assemble the PRW Racing Engine Test Stand:

- Ball peen hammer
- Drift punch
- Center punch
- Straight blade screw driver
- Phillips head screwdriver
- M6, M8, M10, & M12 Open/Closed box wrenches
- Socket wrench with M6, M8, M10, M12 sockets
- Cordless or Electric power drill with screwdriver & ¼ drive sockets/bits
- 1/2" high speed twist drill bit

Please refer to this torque specification chart for the corresponding bolt size:

THREADS	GRADE 5.8 - TORQUE SPECIFICATIONS (DRY)
M6	M6
M8	M8
M10	M10
M12	M12

What is included in the Racing Engine Test Stand?

The ETS ships with the frame folded within itself. This also how the ETS can be stored, if needed.

#1300101 ETS (Base Unit)

- ETS frame
- Battery tray
- Lower radiator support bar
- Pre-drilled anodized instrument panel on-off power toggle switch with safety cover, momentary starter switch
- H.D. polyurethane locking caster wheels
- Hardware package (shipped pre-assembled)

#1300102 ETS (Base Unit with Engine Short Block Adapter)

- ETS frame
- Battery tray
- Lower radiator support bar
- Pre-drilled anodized instrument panel on-off power toggle switch with safety cover, momentary starter switch
- H.D. polyurethane locking caster wheels
- Hardware package (shipped pre-assembled)
- Short Block Adapter Assembly Installed on Base Unit

#1300111 ETS (Ready-to-run Base Unit & Accessories)

The 1300011 ETS unit is accessorized with all of the components needed install a ready-to-run engine. Included in this system are:

- All components in the 13000101 base unit
- Aluminum specialty universal radiator
- Aluminum coolant overflow tank
- Five (5) gallon aluminum fuel cell
- 14" electric cooling fan
- Mechanical oil pressure gauge
- Coolant temperature gauge
- 0-8000 rpm tachometer
- Additional hardware

#1300112 ETS (Engine Assembly Unit, including Short Block Adapter Unit & Accessories)

The #13000112 ETS is designed to allow the engine to be assembled on the stand, prior to operation, and allow to rotate into final assembly position after the rotating assembly has been completed. This model includes all of the components found in #13000111, plus a #13000503 rear mount, rotating engine short block assembly adapter and related hardware.

ASSEMBLY of the #1300101 ETS (Base Unit)

Assembling the ETS is a very straight forward process.

Step 1 - With the ETS lying flat, with the casters on the bottom, remove the shipping straps

Step 2 - Tip the ETS onto the side

Step 3 - Loosen the bolts securing the upright structures, do not remove fasteners

Step 4 - Pull the upright structures out, away from the base

Step 5 - The widest upright is the radiator support – swing it out to 90° to the base stop, remove the bolts securing the support struts, reorient to their proper position, reinstall the strut fasteners and bolt the outer strut to the frame to stabilize the radiator support upright.

Step 6 - Attach the casters to the base of the ETS using the bolts provided. The 6” pivoting casters are attached to the radiator support end, the 8” rigid casters to the back of the frame, under the engine mount. Rotate the ETS upright.

Step 7 - If it is intended to utilize the horizontal radiator support brace for its intended use, determine the desired location and install accordingly. Additional radiator installation ideas are detailed in the fully accessorized description in the “Install the Radiator” section below.

Step 8 - Loosen the 2 bolts on the rear engine support – do not remove. Swing the rear engine support to vertical. Install the three fasteners in the vertical holes designed to stabilize the rear engine support upright.

Step 9 - Loosen the bolts securing the battery tray, and swing the tray out to a horizontal position and re-torque the bolts.

Step 10 - Install the two rear engine mount brackets to the rear engine support, using the provided mounting holes, leaving the bolts finger tight.

Step 11 - Remove the 2 bolts that are on the engine center support uprights from the adjustable center support cross member. Install both center support uprights in the vertical position to each side of the adjustable cross member. Since these uprights and cross member adjust to attach to various engines, leave the bolts finger tight so the brackets may be adjusted for fitment until the block is firmly attached.

Step 12 - Remove the Rotating Short Block Adapter Handle shipping bracket and discard. Install the supplied permanent bracket to support the handle when not being used.

Step 13 - Loosen the bolts on the adjustable center support uprights for necessary adjustments, leaving the nuts finger tight. Attach the motor mount brackets to the top of the engine center uprights, using the supplied fasteners. Note that the motor mount brackets may be installed on the 90° or 45° angled threaded holes, depending on engine application the style of motor mount being used.

Step 14 - Control Panel: The Engine Test Stand contains a red anodized control panel, with covered on-off toggle switch and a momentary starter switch. Attach the instrument panel plate to the ETS and install switches into the panel using the supplied hardware. The safety cover on the on-off power toggle switch should be installed so the cover must be lifted up to access the toggle switch. Install the gauges through the bracket face and install the retaining brackets on the back. Note there are pre-cut holes for a tachometer, mechanical oil pressure gauge and water temperature gauge. Install the tach, oil pressure gauge and water temperature gauges. These gauges are included in the 1300111 & 1300112 ETS model.

If you have purchased the 1300101 Base Unit ETS, you will need to purchase and install a radiator, fuel cell, cooling fan, and a tachometer, mechanical oil pressure gauge and water temperature gauge to make the unit ready to operate. Use the steps for the #1300111 Fully Accessorized ETS (below) to guide you through the general steps of finishing the installation.

THIS COMPLETES THE ASSEMBLY OF THE #1300101 BASE UNIT

Assembly of the #1300111 Fully Accessorized Engine Test Stand

This series of steps picks up at the point of installing the instrument panel, outlined above.

Step 1 - Insert the each gauge, and secure the rear mounting brackets, using the hardware provided.

- a. Attach the instrument panel to the top of the radiator support, using the supplied fasteners.
- b. Additional switches may be installed to control the electric fan or electric fuel pump. PRW offers p/n1305582 switches for these and other requirements. Switch face plates (p/n 1308250) can complete the installation.

Step 2 - INSTALL THE RADIATOR: If you have purchased the PRW radiator designed for the ETS, it will require a pair of 1" (2.54 cm) x 16" (40.64 cm) aluminum angle brackets to attach the radiator to the radiator upright support in the holes provided. Alternatively, you may use the threaded bungs to mount in any fashion that you desire. Below is the standard method used for mounting.

- a. Measure the distance between the attachment radiator points, and mark them on the aluminum angle brackets.
- b. Measure to determine the correct placement of the radiator. The top radiator plumbing fitting should be above the highest point of the engine's head to assure the engine's coolant system is totally full. Using that measurement, determine where the top of the radiator attachment brackets will be located.
- c. Mark the desired location of the attachment bolts on the ETS radiator support, and the aluminum radiator attachment bracket.
- d. Drill 2 holes in each aluminum bracket, and 2 holes in the ETS radiator support.
- e. Attach the radiator brackets into the radiator's mounting holes, using self-tapping bolts.
- f. Attach the radiator to the ETS frame and tighten radiator fasteners.

RADIATOR INSTALLATION SPECIAL NOTES: If you are installing the radiator below the height of the intake manifold or thermostat, it may be necessary to utilize an inline filler to assure that no air pockets will impede the coolant flow. PRW offers both manifold fillers and inline fillers to accommodate your needs. Always be certain to assure no air pockets exist by checking the coolant flow at the radiator or inline filler to assure no cylinder head or engine hot spots exist that may cause damage after initial startup and during warm-up.

EXTREME CAUTION should be exercised before opening a radiator filler cap, inline filler or coolant tank once the engine is approaching or at operating temperature!

Step 3 - INSTALL THE ELECTRIC RADIATOR FAN to the radiator.

- a. Attach the mounting ears (4 included) to the outer shell of the fan.
- b. Position the fan on the inside of the radiator
- c. Once in the desired location, thread the "pull-ties" (4 included) through the radiator core, attach the locking ends and pull snugly to secure the fan to the radiator core. **DO NOT** overtighten the pull ties.

Step 4 - INSTALL THE COOLANT OVERFLOW TANK: This step is similar to the installation of the radiator. The Assembler may choose to install in the best or most convenient location and method, depending upon personal preference.

- a. Use the same 1" aluminum angle material as a bracket – approximately 6" (15.25 cm) long, and using same process, attach the aluminum angle bracket to the overflow tank and the ETS radiator bracket.
- b. The pressure cap should be mounted even with the top of the radiator.
- c. Install an overflow line between the radiator's fitting and the fitting on the overflow tank.

Step 5 - INSTALL THE FUEL CELL - This is also similar to installation of the radiator and overflow tank. The fuel cell has aluminum brackets attached to mount the cell to the back of the ETS. It is designed to be installed in front, between, or behind the rear engine support uprights. Personal preference and safety guidelines are most important considerations.

- a. Locate the fuel cell to assure the fuel line is above the fuel pump to assure a gravity flow.
- b. Mark the location of the mounting holes on the ETS frame, drill 4 holes.
- c. Secure to the frame with 4 self-tapping screws or thru-bolts with grommets to avoid stress on the fuel cell mounting flanges.

- d. If the engines are fuel injected, or carbureted with a diaphragm bypass, a fitting for a return line needs to be installed on top of the fuel tank, following the instructions for the electronic fuel injection system manufacturer or the bypass manufacturer. This is often 3/8" or 7/16" diameter (or) -6 AN or -8 AN.
- e. There is a 7/16" NPT bung in the top of the fuel cell for a vent. It is advisable to fabricate a reverse "J" tube with a small breather filter to keep dirt from entering the fuel cell.
- f. Fuel Pump – The fuel pump and fuel lines are not supplied with the ETS unit.
 - A fuel filter should be mounted between the fuel cell and the fuel pump
 - If using an electric fuel pump, the pump should be mounted securely to the ETS frame.
 - Follow the manufacturer's instructions for installation
 - Fuel lines should follow the accepted practices for installation in a vehicle, and should be secured to the frame and engine.
- g. **NOTE:** If using the rear mount, Rotating Short Block Engine Adapter with the Head Unit installed, remove the Fuel Cell and reinstall when ready to "run" the engine.
 - Use rubber grommets between the mounting surface and the fuel cell mounting flanges to minimize vibration and possible damage (and/or resultant leaks) that may stem from such vibration.
 - The end unit assembler may wish to install a fuel cell ball valve at the fuel line bung, so fuel may be cut-off to the fuel pump as a safety measure and/or to minimize fuel loss during subsequent fuel cell removal, maintenance, or relocation.

Step 6 - Wire the instrument panel (This is the final step)

- a. If you are using the base #1300101/#1300102 ETS units, you will need to review the instructions for the tachometer, oil pressure and water temperature gauge manufacturers you have selected for their recommendations.
- b. #1300111/#1300112 ETS – Install the proper wiring harnesses to the gauges and switches
- c. Use an automotive grade wiring conduit between the instrument panel and the engine. This will protect the wiring from chaffing or damage during mounting/demounting the engine from the ETS.
- d. Allow for slack in the wiring harness and the open wiring ends to allow for various engines.

Assembly of the 1300102/1300112 Engine Test Stand with rotating short block engine assembly adapter (ALSO— installing the optional #1300503 rotating short block engine assembly adapter to a previously assembled ETS)

SPECIAL NOTE: The ETS rotating short block engine assembly adapter provides the same features and functionality that is utilized for installation of the crankshaft rotating assembly and other components assembled using a traditional engine stand.

Step 1 – Remove the rear engine mount brackets (if previously installed).

Step 2 – If the Rear Engine Support Upright is NOT pre-drilled for installation of the Rotating Short Block Adapter Assembly (pre-2010 Early Model Year ETS), or if you wish to reposition the installed height of the Short Block Adapter Frame, measure from the bottom of the rear engine support member on both uprights. Locate the middle of the upright and using a center punch, mark to drill a thru-hole. From the first marks, measure up and repeat.

Step 3 – Drill 1/2" (5 cm) holes at each point for early model Rear Engine Support Upright.

Step 4 – Make certain that the frame of the Short Block Adapter is properly positioned. The longer side of the steel tube (that supports the Rotating Head of the Short Block Adapter) is extended towards the engine block. The extended neck of the steel tube should be parallel to the Rear Engine Support Brackets and the Rotating Head should turn a full 360°, when installed correctly.

Step 5 – Insert the frame for the Short Block Adapter between the uprights of the Rear Engine Support Upright, and secure with 4 bolts, washers, lock washers and nuts, using the supplied lock washers. Lubricate the center tube that accommodates the rotating head with a light coat of engine oil or assembly lube.

Step 6 – Install the Short Block Adapter Rotating Head onto the engine assembly adapter frame, and secure with the loop locking pin. Apply a light coat of engine oil or assembly lube to the neck of the Rotating Head so it turns more easily when rotating the engine after the short block is completed.

Step 7 – Attach engine mounting brackets to the rotating head, tightening bolts finger tight.

**Short Block Adapter Rotating Head Handle Storage Bracket (included) &
Example of Radiator Mounting Brackets (not included)**



Converting From Engine Assembly To An Engine Test Stand

When using the ETS with the engine assembly adapter, once the engine is assembled, the engine must be removed from the engine assembly adapter. Use an engine hoist to support the engine assembly, keeping slight tension on the assembly.

Adjust the middle support brackets on the middle cross member under the front engine mounts, and after loosening the two adjustable outer support uprights, position the assembly under the engine mounts. Retighten the bolts on the front engine mount supports.

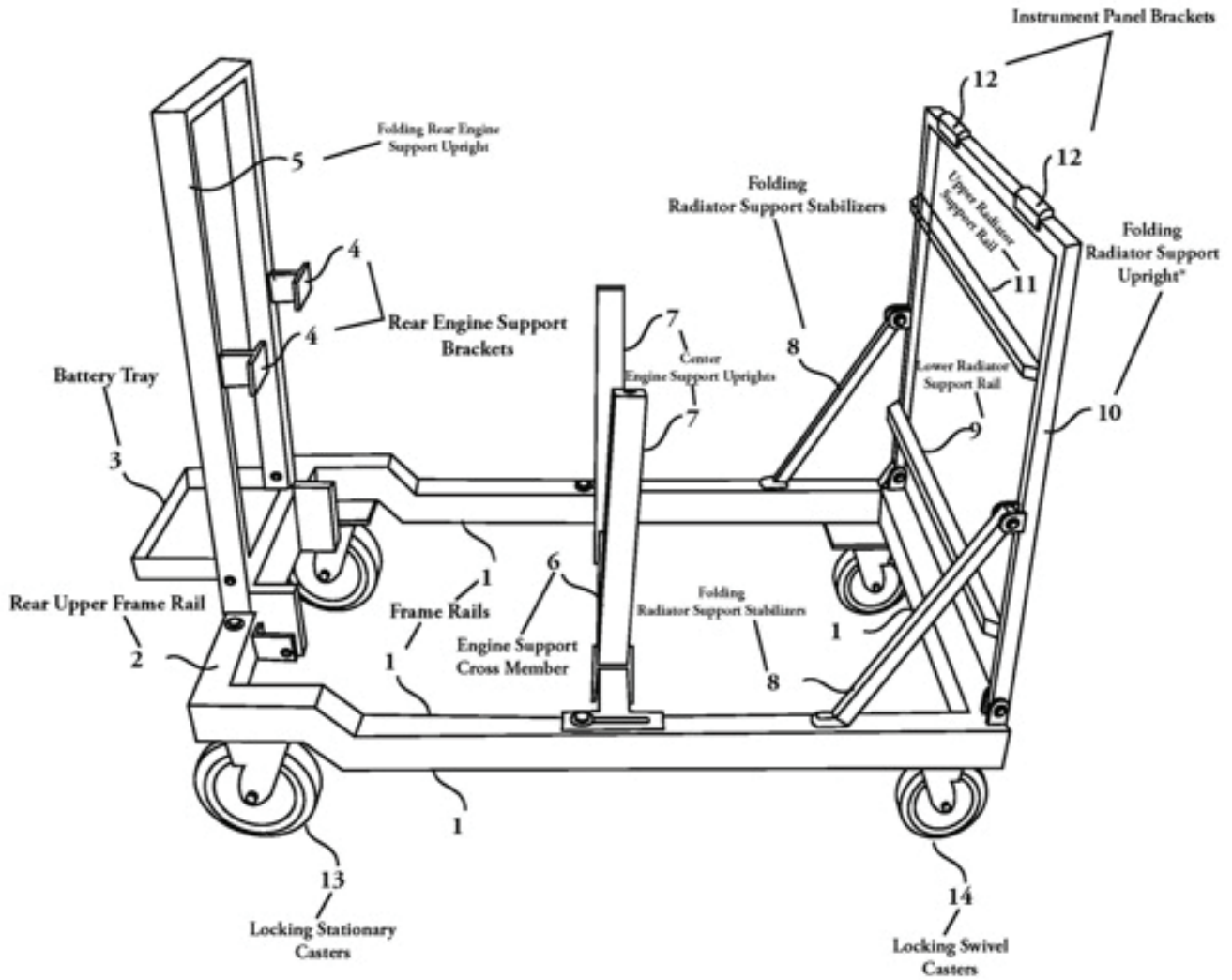
Attach the mount plates to the top of the front engine support uprights to the engine's mounting points. Tighten the fasteners. Further tighten all mounting bolts on the upright brackets and the ETS middle cross member.

With the hoist continuing to supply slight tension to the engine, remove the bolts attaching the engine block to the engine assembly adapter. Remove the bolts attaching the engine assembly adapter to the ETS.

Attach the two rear engine mount brackets to the rear engine support, lightly tighten the nuts and bolts.

Attach the four rear engine mounts to the engine, lightly tightening the bolts. Before fully tightening the bolts, use a 24 or 36" level to assure the assembly is level. Use the adjusting slots to assure the assembly is level. The engine hoist can be used to safely lift/lower the engine

COMPONENTS	PART NUMBER
ETS Instrumental Panel, Red, Pre-Drilled for Instrumentation	1300313
ETS Center Uprights, Engine Support, Short Fixed, Pair, 16.0"	1300322
ETS Center Uprights, Engine Support, Adjustable, Pair, 15.0" to 17.75"	1300323
ETS Center Brackets, Engine Mount, Pair, 1.5" Elev to 3.50" Drop	1300332
ETS Rear Brackets, Adjustable Engine Support, Stainless Steel, Set of 4	1300404
ETS Fuel Cell, Fabricated Aluminum, Includes Fuel Cap	1300500
ETS Rear Adapter, Rotating Short Block Bolt-on Accessory, Complete	1300503
ETS Fuel Cap, Racing Engine Test Stand, Locking	1300517
ETS Switch, On-Off Toggle	1305582
ETS Switch Plate, On-Off Toggle	1308250
ETS Fan, 14" Universal Electric Fan, Includes Mounting Kit	1311014
ETS Overflow Tank, Coolant - 3" X 8", Stainless Steel	1326071
ETS Gauge, Tachometer, 3 3/8" White, Back Lit, Aluminum Bezel, 0-8000 RPM	1338068
ETS Gauge, Water Temp, Mech, 2 5/8" White, Back-Lit, Aluminum Bezel, 130-280°	1338442
ETS Gauge, Oil Pressure, Mech, 2 5/8" White, Back-Lit, Silver Bezel, 0-100 lbs.	1338444
ETS Switch Guard, On-Off Toggle	1382468
ETS Switch, Momentary Starter	1390030



*Folding Radiator Support Upright comes reversed for shipping purposes. Remove bolts from the bottom of the radiator support upright, turn it around, replace upright support bolts, and lock the support stabilizers in place with the supplied fasteners.