

UP CHALLENGER 4-6-6-4

The 4-6-6-4 class, original Challenger was designed by Otto Jabelmann of the Union Pacific and first built by Alco for UP. Approximately 230 Challengers were built nearly alike, differing only in their steam pressure, cylinders, and boilers. All Challengers had either 69" or 70" drivers and were rated at 94,400 pounds tractive effort on the Delaware Hudson to 106,900 pounds tractive effort on the Northern Pacific.

The 4-6-6-4 was often used for passenger service, but its main function was carrying heavy, fast freight. It could average speeds of up to 70 miles per hour.

The original Challengers had 21" x 32" cylinders, 69" drivers, 255 pounds steam pressure and weighed 566,000 pounds.

The original Union Pacific Challengers were numbered from 3900 to 3939 when they came from Alco, but were renumbered to 3800 to 3839 in 1944 in order to allow space for use on later engines.

Alco modified the Challenger starting in 1942 and ending in 1944, making a total of 105 new Challenger locomotives. These improved locomotives had attached front engines. Springs and equalizers took up all irregularities in the track to keep the train in equilibrium. This better balance allowed the new Challengers to reach speeds of up to 70 miles per hour or more.

Boiler pressure was increased to 280 pounds, allowing for smaller cylinders. Drivers were still 69", but the total wheelbase was made 5 1/4" longer. The engine now weighed 627,000 pounds and the tractive effort increased to 97,350 pounds.

The engines were numbered in three groups, 3950 to 3969, 3975 to 3999, and 3930 to 3949, with the overlap mentioned earlier above.

Twin stacks were used, large sandboxes were added, as well as 14-wheel bed type tenders of the centipede pattern. Elesco exhaust steam injectors were mounted on the left side of some engines, and were hidden on the inside of others. The pilot was now made of cast steel, and the boilers were made of Bethloc deoxidized steel boilers, replacing the original boilers, which were made of manganese.

Some engines that had been originally intended for the Union Pacific were diverted to the Denver and Rio Grande Western. These were numbers 3800 to 3805. They did not correspond with other Challengers made by Baldwin and were sold to Clinchfield. Clinchfield then had two types of Alco Challengers corresponding to the two types on the Union Pacific.

PROTOTYPE SPECIFICATIONS

Builder	ALCO
Class	Railroad No.'s 3900 (Union Pacific)
Tractive Force	97,350 pounds
Drivers	69"
Weight on Drivers	406,200 pounds
Weight on Front Truck	101,700 pounds
Weight on Trailing Truck	126,700 pounds
Total Engine Weight	634,500 pounds
Total Engine Wheel	Base 60' 4-1/2"
Steam Pressure	280pounds
Height from rail to top of Smokestack	16' -3"

MODEL SPECIFICATIONS

Drivers	69" Box Pok
Gear Ratio	31-1
Power	BowserDC-71 motor
Overall Length (Engine & SP-1 tender)	16", 17 1/2" w/ long haul or 14 wheel tender
Total Engine Weight	1 lb. 15 1/4 oz.
Total overall length of engine (Pilot to drawbar screw)	10.413"
Height	2.238"

ENGINE OVERHANG

(From inside of Outside Rail)	
18"Radius Curve	1.13"
20"Radius Curve	.99"
22"Radius Curve	.87"
24"Radius Curve	.83"
26"Radius Curve	.77"
28"Radius Curve	.71"
30"Radius Curve	.67"
NOTE: If curves are given the clearance as outlined in NMRA standards, no difficulty with overhang will be encountered.	

BOWSER UP CHALLENGER - KITS AND ACCESSORIES

#100300	Challenger Kit, Loco only
#100325	Superdetail Kit
#100312	Smoke Lifter Kit, Not in #100325
#100313	Exhaust Pipe Kit, Not in #100325
#100315	Spare Rivet Kit
#3020	Boiler Weight

TENDER KITS:

#150001	SP-1 Semi-vanderbilt Tender Kit
#150650	Long Haul Tender Kit
#150681	Electrical Pickup Kit for Monogram or JMC Models tender from their Big Boy



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LATEST VERSION OF UP CHALLENGER

Blind Driver:

#16539 Box Pox with gear and bearings

MOTOR WORM GEARS

WORM	51106
GEAR	51005
GEAR RATIO	31-1

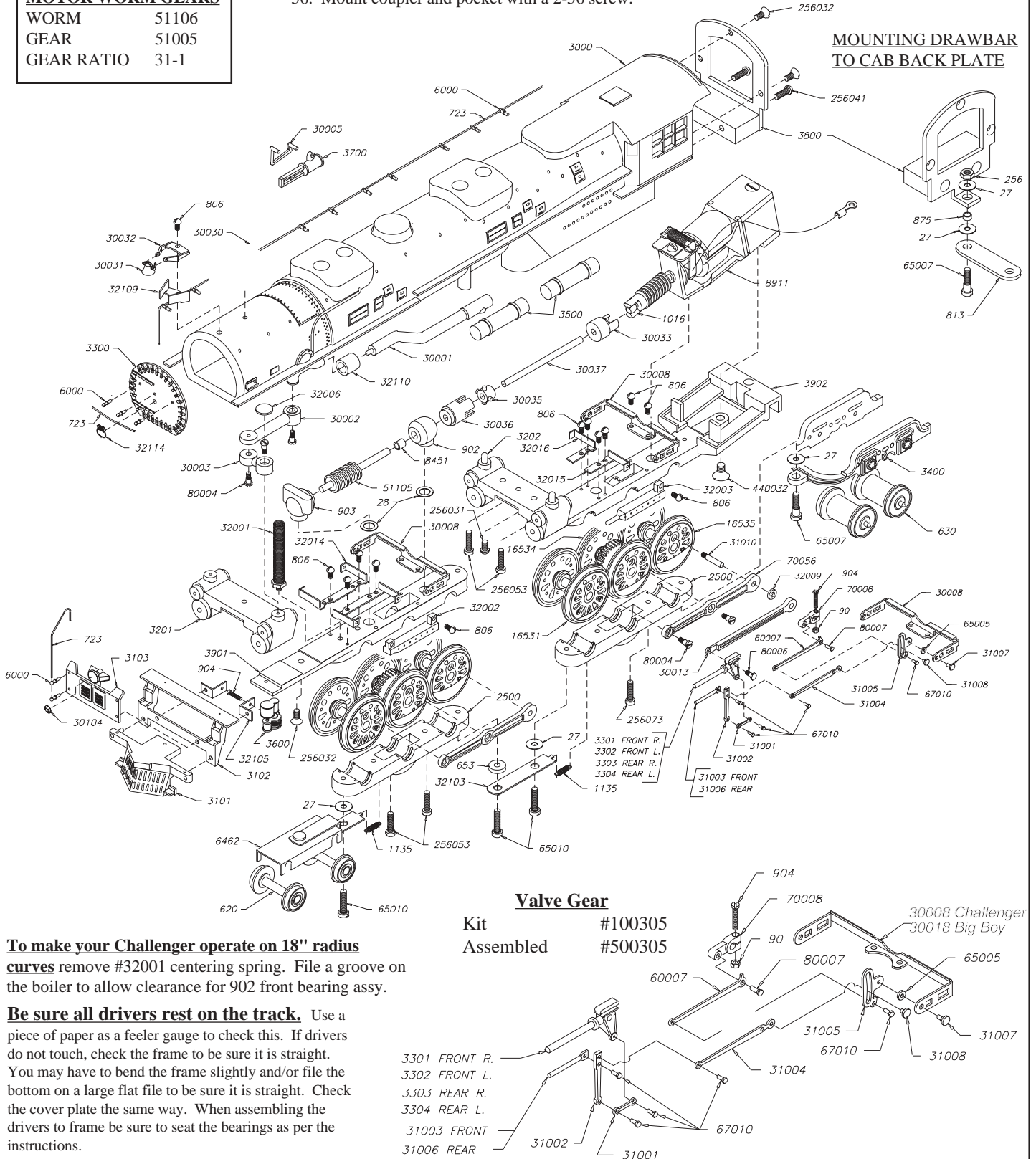
Pilot coupler:

Use KD® #5 coupler and pocket. Remove top center slat and the 2 of both sides. File smooth so the pocket fits. Hold pocket in place and locate and drill #50 hole in pilot. Tap 2-56. Mount coupler and pocket with a 2-56 screw.

Connecting 32' or Long Haul Tenders

Shorten the drawbar by drilling another hole, so that (2) holes are 5/8" apart at center, and cut-off excess. Trim width as necessary.

MOUNTING DRAWBAR TO CAB BACK PLATE



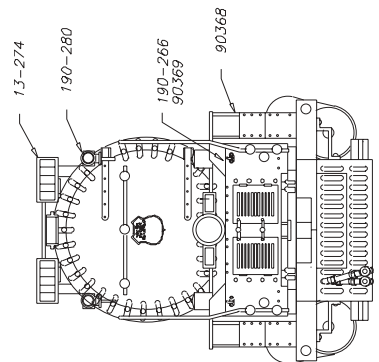
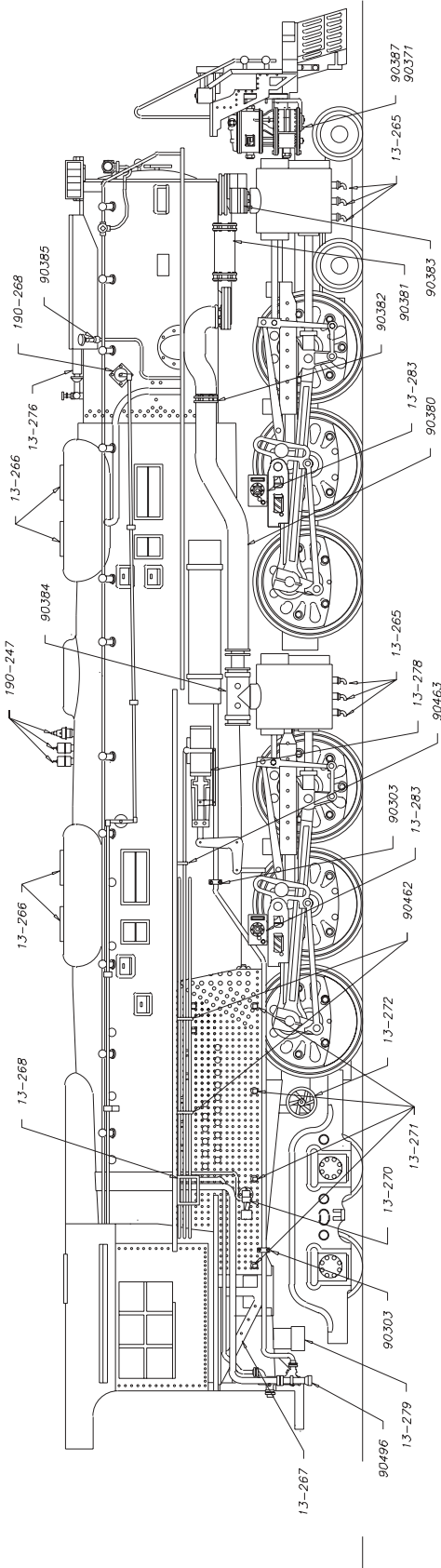
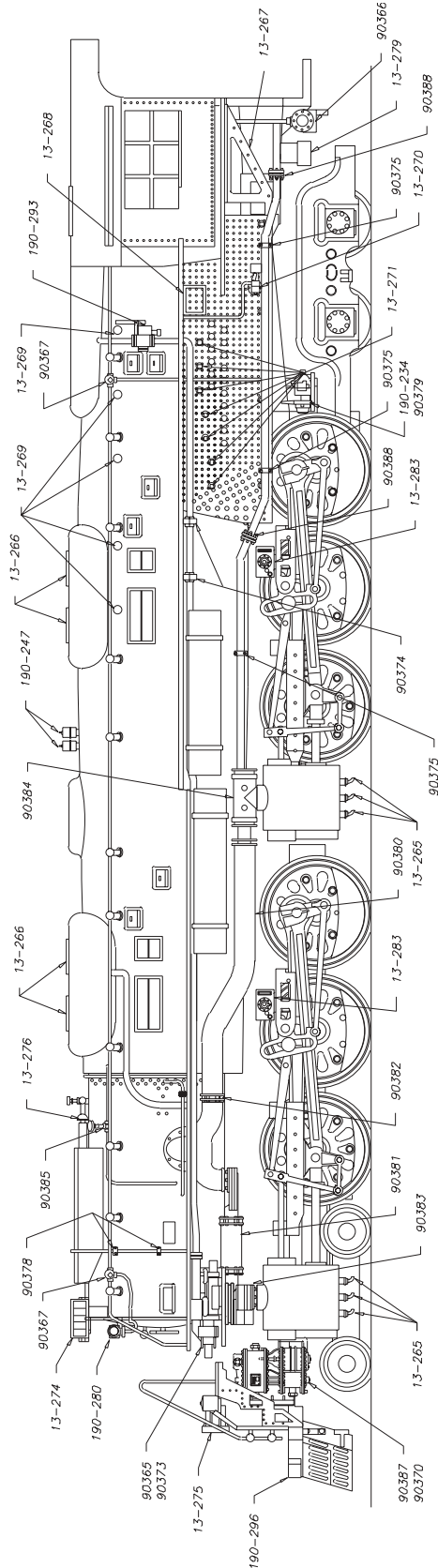
To make your Challenger operate on 18" radius curves remove #32001 centering spring. File a groove on the boiler to allow clearance for 902 front bearing assy.

Be sure all drivers rest on the track. Use a piece of paper as a feeler gauge to check this. If drivers do not touch, check the frame to be sure it is straight. You may have to bend the frame slightly and/or file the bottom on a large flat file to be sure it is straight. Check the cover plate the same way. When assembling the drivers to frame be sure to seat the bearings as per the instructions.

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SUPER DETAIL KIT #100325

PART	PIECES	DESCRIPTION
723		.020 WIRE PIPING
744		.032 WIRE PIPING
6000	4 PCS.	HANDRAIL STANCHIONS
7550	6 PCS.	MARKER LIGHT JEWELS
90303	2 PCS.	SQUARE PIPE BRACKETS
90365	1 PC.	FEED WATER PUMP
90366	1 PC.	COLD WATER PUMP
90367	3 PCS.	ROUND JUNCTION BOXES
90368	1 PC.	PILOT STEPS
90369	1 PC.	RADIATOR
90370	1 PC.	LEFT "L" SHAPED BRACKET
90371	1 PC.	Rt "L" SHAPED BRACKET
90373	1 PC.	WATER PUMP BRACKET
90374	2 PCS.	PIPE UNION
90375	3 PCS.	PIPE HANGER
90376	1 PC.	PIPE UNION
90377	1 PC.	PIPE UNION
90378	2 PCS.	PIPE HANGER
90379	1 PC.	GENERATOR BRACKET
90380	2 PCS.	LARGE STEAM PIPE
90381	2 PCS.	SMALL STEAM PIPE
90382	2 PCS.	RND STEAM PIPE FITTING
90383	2 PCS.	SMALL STEAM PIPE ELBOW FLANGE
90384	2 PCS.	LG STEAM PIPE CONNECTOR
90385	2 PCS.	GLOBE VALVE
90386	2 PCS.	SMALL STEAM PIPE CAP
90387	2 PCS.	AIR PUMP & AIR TANK
90388	2 PCS.	PIPE UNION
13-265	12 PCS.	PRIME CYLINDER COCKS
13-266	8 PCS.	DOME COVERS
13-267	2 PCS.	CAB BRACE
13-268	2 PCS.	WALK STIRRUP STEPS
13-269	10 PCS.	INSPECTION PLUG
13-270	2 PCS.	FOAM SPREADER
13-271	24 PCS.	WASH OUT PLUGS
13-272	1 PC.	VALVE WHEEL
13-276	1 PC.	WHISTLE W/ VALVE
13-279	1 PC.	TRAILING TRUCK BEAM
13-274	1 ASSY.	BELL & NUMBER BOARDS
13-275	1 PC.	HEADLIGHT
13-278	1 PC.	POWER REVERSE
13-279	1 PC.	TRAILING TRUCK BEAM
13-283	4 PCS.	LUBRICATOR W/ BR20
100321	2 PCS.	ENGINEER & FIREMAN
190-247	5 PCS.	POP VALVES
190-258	1 PC.	FRONT END THROTTLE
190-262	1 PC.	NATHAN INJECTOR
190-280	2 PCS.	MARKER LIGHTS
190-293	1 PC.	STARTER VALVE
190-296	1 SET	PILOT SET
190-324	1 PC.	GENERATOR
		.045 WIRE PIPING
		.046 WIRE PIPING

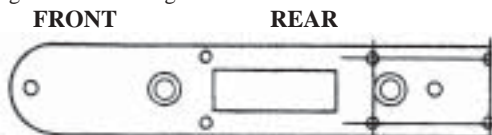


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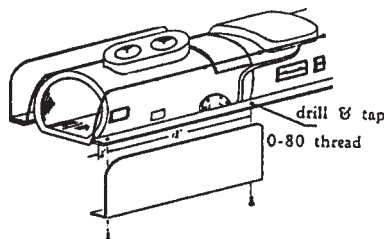
To convert to brass crosshead guide hangers, remove the old cast-on hangers from frame. Use template below to locate and drill holes with #56 drill, then tap 0-80. Remove solder from crosshead guide & using brass hangers, locate & drill #52 holes to clear 0-80 screws (806). Underframes with soldered crosshead guides are no longer available.

Diagram of the old style mechanism

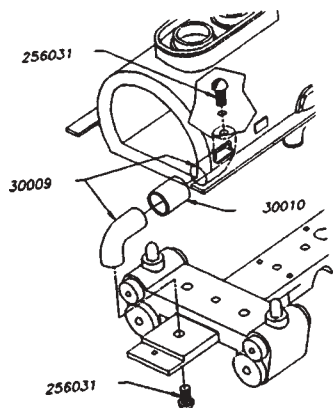


When ordering parts to replace the old soldered-on crosshead guides, include the following parts:

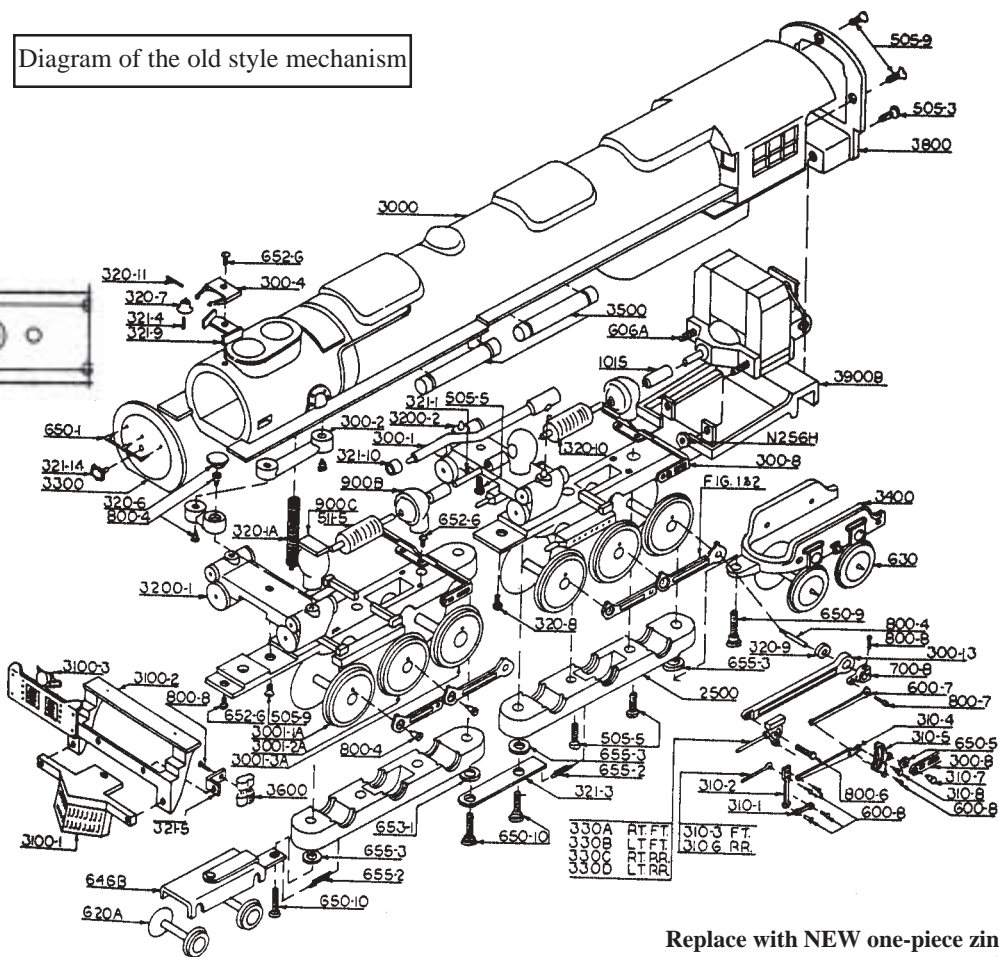
#3900B Rear		#3900A Front	
pcs.	Part#	pcs.	Part#
6	806	8	806
1	3902	1	3901
1	32015	2	32002
1	32016	2	32014
2	32003		



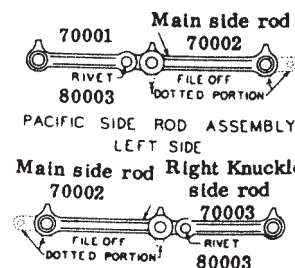
SMOKE LIFTER KIT #100312



EXHAUST PIPE KIT #100313



Replace with **NEW** one-piece zinc die-cast tapered side rod #70056



RETAIL CUSTOMERS

The latest Challenger kit now includes our new Box Pok drivers instead of the Scullen drivers originally furnished with the kit. We will replace your Scullen drivers with our Box Pok drivers at ONE-HALF total list per set (plus shipping charges and tax where necessary).

AVAILABLE DIRECT FROM THE MANUFACTURER ONLY

REPLACEMENT DRIVERS

Scullen	Box Pok	
30111	16531	Light drivers w/ bearing #15011
30112	16534	Medium drivers w/ gear #51005 and bearing #15011
30113	16535	Heavy drivers w/ bearing #15011