Kohs & Company INCORPORATED **The Finest in 'O' scale**

Union Pacific 'Challenger'

OPERATION AND MAINTENANCE INSTRUCTIONS

Your Kohs & Company Union Pacific 'Challenger' class locomotive is an exact scale replica of the original prototype, it is constructed of formed and fabricated brass and incorporates many scale operating features. Although the model is very sturdily built, the boiler, tender shell and particularly the detailing are very susceptible to damage by rough or careless handling. Please exercise great care in handling the model. The locomotive is best moved by lifting under the rear cab deck and front cylinders while centering the boiler over the cylinders.

Your locomotive model is equipped with custom designed hardware and software from Zimo Electronics that provide the control and sound during operation, it is designed to operate on either Direct Current (DC) or DCC power supplies. Any application of **AC** (Alternating Current) **WILL DESTROY THE INTERNAL ELECTRONIC COMPONENTS OF THIS MODEL**. Kohs & Company will not be responsible for damage caused by the application of AC power to the model. Further power supply recommendations are provided under the heading of 'Power Supply Requirements', please follow these recommendations.

PLEASE TAKE THE TIME TO FULLY READ THIS MANUAL, this requires a small investment of time to protect your substantial financial commitment and to prevent unnecessary disappointment and frustration.

PREPARING THE LOCOMOTIVE FOR OPERATION

Although your 'Challenger' is ready to operate, a couple preventive maintenance precautions should be observed to ensure the smooth operation and longevity of the model following delivery. First, make certain that the running gear is fully intact and straight. Secondly, the locomotive has been lightly lubricated during assembly and testing, while this will suffice for initial operation and break-in, you may wish to further lubricate the side rod assemblies by applying 1 or 2 drops of good quality fine oil to areas where metal moving parts are in contact with each other. If you are in doubt about what lubricant to use, your local hobby dealer should be able to guide you in the selection of a suitable product.

Prior to operating you new Challenger, you must make the decision whether you are going to operate using conventional DC power or if you will be using DCC technology. As configured, your model will operate in either mode, the electronics used will automatically recognize either standard DC power or DCC input. IN the DC mode of operation the lighting, sound and valve-gear mechanism will respond to the directional and speed control that you supply. In DCC mode the model has been pre-addressed using '3900' for the locomotive address and '3901' for the tender address, there are decoders located in both pieces of equipment. A unique feature of the Zimo electronics used requires that you simply input the '3900' address in your cab control to operate the loco and tender together. The '3901' address has been pre-programmed into the loco decoder so it will automatically provide direction for the tender to respond to the '3900' loco address. These two addresses can be changed at any time by following the instructions provided in the electronic copy of the manual provided to you on the computer CD included with the model.

POWER SUPPLY REQUIREMENTS

The Kohs & Company 'Challenger' is configured to operate on either a Direct Current (DC) or DCC power source, **Do not attempt to use AC power as damage will occur**. The following criteria should be used when selecting your power supply:

1) Filtered DC or DCC output depending on the mode of operation you have chosen.
2) 18-24 volts.
3) Minimum available current should be approximately 3-4 amps, 8-10 is best if lighted passenger cars will be used with the locomotive.

Should you choose to use a less expensive power supply or one which does not meet the above criteria, undesirable operating characteristics may result as well as possible damage to the electronics used in the model. If you have questions regarding your selection, do not hesitate to contact us for advise.

LOCOMOTIVE AND TENDER CONNECTIONS

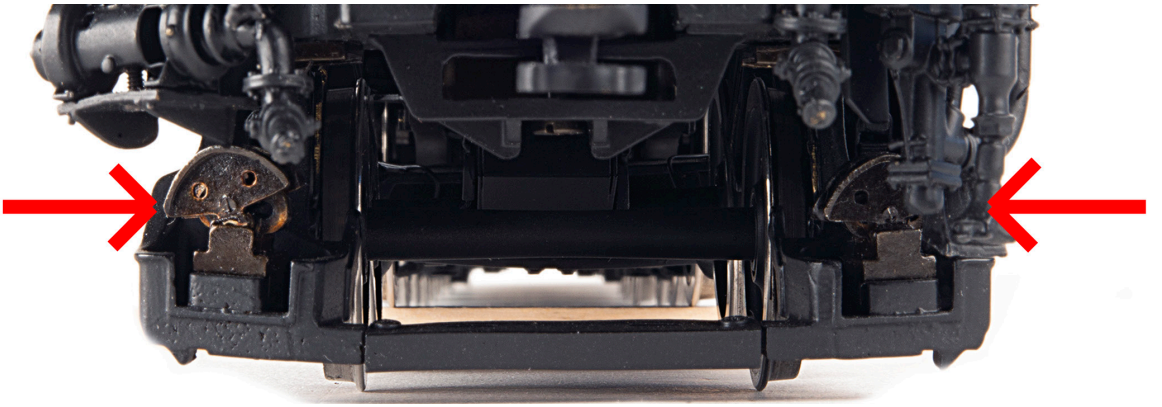
If you have a coal-fired version model, the stoker feed tube should be positioned inside the stoker feed-ramp receptacle under the cab when joining the locomotive and tender. The feed-ramp will swivel from side to side during operation to prevent binding. The rear cab deck apron should rest on the front edge of the tender deck when you are ready to operate. To connect the loco

and tender, the drawbar on the locomotive should be lined up (slightly raise) with the drawbar 'pocket' on the tender and the two units simply pushed together, the drawbar will automatically lock in place when you hear the audible click of the drawbar pin locking. To disconnect, pull down on the ring hanging from the drawbar locking pin shown in the photo below, a pair of tweezers will be required for this operation.

HARD-ROCKER SETUP

The Kohs & Company 'Challenger' is equipped with functioning 'hard-rockers' on the rear of the locomotive trailing truck to help distribute the weight load and also assist in the self-centering function (boiler in line with rails) as the locomotive operates on straight runs of track. The refined parts used on the Challenger make it very easy to affect the correct setup.

It is easiest to place the locomotive on the track when you are aligning the loco to a section of straight track, there are obviously a large number of wheelsets to be aligned with the rails. To 'set' the rockers once the loco wheels have been aligned to the rails, do the following: lift the rear of the locomotive straight up approximately 1/2" and then lower it straight down, the rockers will automatically center and align with the trailing truck. Refer to the photo below for details.



OPERATING THE LOCOMOTIVE

The tender was shipped to you with a scale 'E' type coupler installed for display and operation if your other equipment is so equipped. A Kadee unit may be substituted for the scale unit if your road uses Kadee couplers. Regardless of whether you are using standard DC power or DCC, it is recommended that you operate the locomotive at varying speeds and in both directions during a break-in period of approximately 60 minutes (this may be accomplished on a cumulative incremental basis). This will help the drive system to 'run-in' resulting in smoother running characteristics.

If you are going to be using a DCC command control system, make certain that you are familiar with the instructions and procedures for your particular system and then refer to the separate instruction sheet provided with the model for DCC operations.

For standard analog DC operation, all functions of the model will respond automatically when track power is applied and either direction or speed are altered. The headlight, upper reverse light, markers and cab lights will all respond based on power to the track and direction. The reverse-gear mechanism will also automatically position itself based on the forward or reverse direction of the model.

The sounds created by the Zimo system are played through twin speakers located in the boiler of the locomotive. When power is applied, you will hear the brake release and blowdown, followed by the independent quartered chuffing of the front and rear engines as the power is increased. The chuffing will obviously vary with the speed of the locomotive. You will hear brake squeal when the loco comes to a stop and you will also hear the dynamo and compressors randomly operating as they would on a real prototype.

LOCOMOTIVE CARE AND MAINTENANCE

Routine maintenance consists of periodic lubrication as described under the heading 'Preparing For Operation'. It is advisable to periodically check the tightness of the accessible small fasteners used to assemble the model to make certain that parts will not be lost during extended periods of operation.

SERVICE

The Kohs & Company 'Challenger' comes with a limited lifetime warranty to the original owner. We will repair any model requiring service as a result of normal use, but not abuse. All of our guidelines for operation must be followed otherwise the warranty is voided. We will not replace consumable items such as light bulbs, but will make such items available to customers on a cost basis. If you have technical questions or questions regarding service, please contact us directly:

Phone: 248-625-6396 / Fax: 248-625-7994 / e-mail: service@kohs.com

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DCC OPERATION

In addition to the information provided below, you should also have in your possession a computer CD that contains electronic versions of the instruction manuals for the Zimo 695 series decoder used in your Challenger, the Zimo 685 series decoder used in your tender and a full listing of the CV's that are used to program the decoders. Virtually any feature or function can be adjusted to suit your personal preference using the CV's

Before you attempt to operate your model using DCC, you should have a firm understanding of the technology and the operation of the 'cab' or command unit that you are using for your road. Please carefully review the owners manual for the unit you have selected.

As your model is configured, the locomotive address is '3900' and the tender address is '3901', the tender decoder has also been pre-programed to recognize the locomotive address so that when you enter '3900', the loco and tender will operate in unison and the tender will recognize all appropriate commands meant for the tender. These addresses can be changed at any time using your command unit and decoder manuals. If at some point a 'hard reset' is required to restore the correct operation of the electronics, all operations and the original addresses will be reset to the original configuration.

It should be mentioned here that the functions and features for analog DC operation can be adjusted, added, removed or fine tuned by changing specific CV values. It is recommended that if you plan to operate the model exclusively with DCC, the CV(#29) that enables the automatic recognition of analog DC should be turned off so that any extraneous DC signal that may pass through the rail will not interfere with the DCC operation and possibly create a dangerous situation for your model resulting in physical damage.

All basic functions are assigned based on the common usage that is seen within the hobby. The following is a full listing of the available mechanical, lighting and sound features that are controllable using the assigned function buttons:

FO-0 Headlight and reverse light toggle on and off based on direction

FO-1 Bell

FO-2 Whistle

FO-3 Secondary tender reverse light

FO-4 Number board lighting

FO-5 Cab interior lighting - automatic off when loco moving

-OVER-

FO-6 Exterior work and cab deck lights

FO-7 Firebox flicker

FO-8 Sound On/Off

FO-9 Low gear - extended throttle sensitivity in low speed range

FO-10 Injector sound

FO-11 Fan sound

FO-12 Tender water fill sound

FO-13 Coupler sound

FO-14 Compressors (also operate randomly)

FO-15 Safety relief valve sound

FO-16 Blow off sound (automatic with loco movement)