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USERGUIDE

Model RVO Ratio Valve
and
Remote Ratio Control Instructions

⚠ **WARNING - Reliance on this Manual Could Result in Severe Bodily Injury or Death!**

This manual is out-of-date and is provided only for its technical information, data and capacities. Portions of this manual detailing procedures or precautions in the operation, inspection, maintenance and repair of the product forming the subject matter of this manual may be inadequate, inaccurate, and/or incomplete and cannot be used, followed, or relied upon. Contact Conair at info@conairgroup.com or 1-800-654-6661 for more current information, warnings, and materials about more recent product manuals containing warnings, information, precautions, and procedures that may be more adequate than those contained in this out-of-date manual.

Introduction

Conair manufactures a complete range of dual-inlet, single-outlet material valves that allow the loading of regrind materials to be alternated with virgin material during a single loading cycle. These valves can also serve other purposes like 3 way air valves or material selection valves, depending upon how they are applied.

The RV0 (Ratio Valve, Size Zero) is the latest member of that family of valves and is designed to be compact and fit onto smaller Conair loading products (like the Tube Loader family) better than other, larger models. Due to its compact size, the RV0 is constructed in a unique manner and requires these unique instructions.

Part One: The RV0 Ratio Valve

In addition, a popular option for the RV0 is a compact, Remote Ratio Control package that allows the RV0 to operate as a ratio valve with virtually any standard vacuum loader control (Conair or other). This control may not be included with your valve.

Part Two: The Remote Ratio Control

These instructions contain two sections:
Part One: Information on the RV0 itself and
Part Two: Information on the Remote Ratio Control box.

Part 1

Model RV0 Ratio Valve Instructions

Description:

The RV0 valve is constructed from an aluminum casting and consists of twin cylinders connected to dual plungers that interface with two material inlets. The cylinders can be controlled to allow the two inlets to open for adjustable time periods during vacuum loading, to create a course mixing of loaded materials (usually virgin and regrind). The RV0 includes a small integrated electrical junction box and a miniature 4-way solenoid valve that directs air to the cylinders so that they alternate in the opening and closing of the dual inlets. The outlet portion of the cast housing incorporates an O ring seal to allow the valve to fit readily over a mating diameter tube stub (like a loader material inlet). The inlet tube stubs are sized to allow the connection of mating flex hose (with hose clamps) and are incorporated into the lid of the valve body.

Installation

Installing the Valve Itself:
The RV0 can be installed over the 1.5" OD inlet tube of a loader by simply inserting the outlet of the valve over the inlet stub of the loader and securing the valve with the locking screw located on the top surface of the cast outlet housing, between the air cylinders. This screw may need to be unscrewed slightly to allow the loader tube to be firmly seated and then should be tightened only snugly, to assure that the valve does not come off the tube. Over-tightening should be avoided as it may crush the loader inlet tube. On Conair Tube Loaders, the RV0 fits snugly on the loader and completely covers the inlet tube when installed properly. The outlet casting of the valve is scalloped to form-fit slightly around the loader body to assist in optimum positioninig of the valve.

The RV0 may also be installed away from the loading device by installing the outlet onto 1.5" OD tubing that leads to the vacuum loading device. If the installation will use mostly flex hose, the outlet will have to be equipped with a short stub of 1.5" OD tubing that can accept the flex hose.

Installing the Inlet Hoses:
The RV0 inlets are designed to be plumbed only with flex hose to allow the access lid of the valve to be removed. 1.5" ID flex may be installed over each of the inlets and routed to their respective material sources. Material flow may be observed through the flex hose in operation.

The valve opens up for cleaning by release of the dual inlet lid section of the valve with twist clamps, provided on either side of the valve body. When released, the lid section with its connected hoses separates from the rest of the valve body. Care should be taken that the attached flex hoses do not create a strain on the valve lid that will make it difficult to replace the lid following cleaning or service. Check this fit as hoses are installed and if necessary, provide more or less hose at greater or lesser angles to prevent unworkable tension of the valve lid. Note that the ratio valve is equipped with a special "lid catch" below the inlet tubes that is designed to

discourage the lid from falling by the weight of flex hoses when the lid is released, if hoses are plumbed from below the loader.
This feature is not needed if hoses come from above, since the hoses will adequately keep the lid from falling.

Note: If compressed air is already plumbed to the ratio valve, the air must be disconnected to allow the valve lid to be opened and closed. This can be easily done by simply releasing the clear hose from its connector by pushing back the ringed tip of the connector. The supplied connector is the type that will shut off supply air when the hose is removed.

Compressed air Installation:
The RV0 is supplied with a length of 1/8" ID compressed air tubing along with a miniature, 1/8" NPT compressed air fitting that must be connected to a clean, dry supply of compressed air. Many Conair loaders provide a port for this compressed air connection on an existing compressed air line, filter or manifold and the air line may be cut to length to facilitate a neat installation. Note that the supplied fitting is the type that will shut off supply air when the hose is removed and will be used frequently when cleaning or otherwise opening the RV0 lid. The fitting should be located to allow users easy access as needed.

Electrical Installation:
The RV0 is pre-wired as ordered for one of a variety of applications, but must be wired to the control system that will operate it. Use the accompanying instructions to provide the proper electrical signal to your ratio valve. Before installing however, check to be sure that the voltage of your RV0 matches the control system that will drive its operation. Check the label of the valve or the label of the valve solenoid (bolted to the valve body) to confirm a voltage that matches the output of your loading control system. Choices are 120, 220 or 24 Volts AC, 50/60 Hz or 24 Volts DC.

Electrical Installation of a Ratio Valve with a Remote Ratio Control
This arrangement is designed to operate from a "hot" and "load" signal of the loading device. The RV0 will be equipped with the Remote Ratio Control in this arrangment to allow the user to program virgin and regrind settings right at the ratio valve.

Connection to the the Load signal can be a motor start signal, a sequencing valve open signal or any type of "load" signal that occurs while vacuum to the loader is on. If this signal comes from a Conair loader equipped with a "Universal Terminal Box" (UTB), then a plug marked "Load" is provided on the RV0 lead that may simply be plugged into a mating receptacle on the UTB. Make sure to use the receptacle labeled "Load" (Do not use the "Ratio" receptacle). If the only Load receptacle(s) available are already consumed by other plugs, then a "Y" cord adaptor (available from Conair) may be used to split the output signal into two. Newer UTB's from Conair (packaged in an aluminum enclosure) allow un-used receptacles on the right hand side to be "re-programmed" for an additional load output through simple rewiring inside the UTB. Complete instructions are provided inside the lid of the UTB.

In addition to the "Load" signal, the Remote Ratio Control requires a "hot" or "power" signal to allow visibility and programming of the control when the loader is not loading. If the RV0/Ratio Control will be used with a Conair loader equipped with a newer, aluminum UTB, then the UTB will have to be "reprogrammed" inside through some simple wire changes to provide a "Hot" signal to one of the unused receptacles on the right side of the UTB. Separate instructions, packaged with the valve/control, when supplied for this configuration show the steps required to provide this Hot signal to a UTB receptacle on aluminum UTB's.

If the loading device is <u>not</u> equipped with a Conair UTB with receptacles (Conair TLM loader with MLC2 controls, older Conair loaders, non-Conair loaders), then the load and hot signal connections can be made by simply cutting off the green plug of the RV0 cable and splicing the lead from the RV0 into the 'load' and 'hot' signal of the loading device control or terminal box. These electrical connections should be performed by a qualified electrician using accepted wiring practices. Voltages should be double-checked to assure that they match the listed voltage of the RV0. Conair TLM loaders that use the MLC2 control are prepared to receive the color-coded connections of the RV0 lead according to the following:

Black…Hot Signal
White…Neutral
Green…Ground
Red…Load Signal

Spade lugs, provided to make these connections easy at the factory, may need to be modified or removed to allow field wiring using wire nuts or other available types of terminations.

See additional instructions later in this manual regarding the mounting and use of the Remote Ratio Control box.

<u>Electrical Installation of a Ratio Valve Alone</u>

This arrangement is designed to add a ratio valve to a loading device that already has some form of ratio control logic available. No control accompanies this arrangement and it is assumed that the ratio control logic of the loading control system will match the expectations of the RV0's operation. In this arrangement, the control system will be providing a "Ratio' signal. . If this signal comes from a Conair loader equipped with a "Universal Terminal Box" (UTB), then a plug is provided on the RV0 lead that may simply be plugged into a mating receptacle on the UTB. Use the receptacle labeled "Ratio".

If the loading device is <u>not</u> equipped with a Conair UTB (older Conair loaders, non-Conair loaders), then the ratio signal connection can be made by splicing the lead from the RV0 into the 'ratio' signal of the loading device. These electrical connections should be performed by a qualified electrician using accepted wiring practices. Voltages should be double-checked to assure that they match the listed voltage of the RV0.

Use the following color code for wiring when the control of the loader has ratio capability:

Black…Not used
White…Neutral
Green…Ground
Red…Regrind Signal

Operation

The RV0 valve is a dual inlet, one outlet valve package designed to be installed on the inlet line of a vacuum loader. As vacuum air conveys material to the loader, through the ratio valve, the ratio valve's operation determines which inlet is opened to material flow while the other inlet is closed. The ratio valve responds to ratio control signals from the loading control system, or its own Remote Ratio Control, only while loading is underway. At rest, the virgin side is closed and the regrind side is open.

Inside the valve, dual plungers open and close against silicone rubber seals as directed by the control. The seals are located around the perimeter of the inlets, to minimize wear. The on-board solenoid takes electrical signals from the control to make the appropriate cylinder (virgin or regrind) extend or retract.

Note: Even though the RV0 ratio valve is capable of responding very quickly to timing changes, the valve in no way can be held resonsible for accurate blending of materials. The flow of materials in a vacuum system is dependent upon many factors including bulk density, flow charateristics, length of conveying line, type of material pickup device, etc. The RV0 is designed to simply manipulate the opening and closing of two material flow paths. It cannot meter material, nor assure that material is flowing within the lines that it is connected to. It should be used only for the coursest of two-material loading applications, like the simple consumption of available regrind, in addition to virgin material loading.

Part 2

Remote Ratio Control Instructions

Description:

The Remote Ratio Control is a virgin/regrind control package that, along with the ratio valve it controls, may be readily added to loading systems in order to provide regrind loading capability, to accompany the loader's existing virgin loading. This package may also be provided along with new systems as a cost-effective means to provide "local" ratio control to loaders so that changes to ratio settings can be made right at the loader, not at a central loading control, some distance away. The Remote Ratio Control can also save the expense and labor of adding ratio loading logic programming to a control system. The Remote Ratio Control must be used with a Ratio Valve and these instructions are specific to the use of the control with the RV0 ratio valve.

The Remote Ratio Control is hard-wired with a 15 foot cable to the RV0 valve via the RV0 junction box, integrated into the valve body. A lead from the same junction box connects the RV0 and control package to a load and hot signal at the loading control being empoyed or an associated junction box, like Conair's UTB. See the above instructions on details of connecting this lead to the loader.

Installation:

The Remote Ratio Control enclosure may be mounted anywhere within the cable length provided. Two mounting holes are provided on the left flange of the enclosure, designed to accept ¼" bolts. It may be mounted onto a firm wall, frame, processing machine housing, or any flat, non-vibrating surface. The cable leading back to the RV0 should be routed to avoid hot or moving surfaces, be out of the way of personnel and secured against motion. Good visibility and easy access to the operator interface should be considered. Be sure to avoid close proximity to material conveying lines that can generate static, fouling operation or even damaging the control.

Tip: If the Remote Ratio Control and RV0 valve will be used on a Conair TLM loader, along with the TLM's optional remote on/off switch option, the same mounting holes may be used for these matching controls, and cables may be routed together.

Note that the Remote Ratio Control should not require any wiring itself, as long as it was shipped with a Conair valve. The valve and the control are pre-wired at the factory and electrical power for the valve and control are provided by the RV0 connection to the loader being converted to ratio. Instructions for connecting the RV0 valve to the loader being converted are included in the first half of this instruction manual.

Operation

The Ratio Remote Control will show no visible signs of operation until the valve is triggered to operate by the loading sequence, or when it is in the programming/viewing mode as selected by the user. In this way, the user can actually see not only when the valve is operating, but when the loader driving it is operating. When the vacuum signal for the loader turns on, the numerical LED lights on the Remote Ratio Control face will illuminate and show the time settings in seconds of each valve inlet plus green indicator lights for each inlet (virgin or regrind).

The Remote Ratio Control splits the load signal sent to it from the loading control into user-prescribed virgin and regrind time sequences. As each time sequence ends, starting with regrind, the cycle starts over, until the load time ends.

Note: It is common that the valve experiences an incomplete cycle when the loading time ends, terminating the ratio operation. This is normal.

In order to gain more cycles, for more layering of the loaded materials, time settings can be shortened, to allow more cycles to take place during each load. Alternately, to decrease cycles, for less layering and longer individual material transfer sequences, the time settings can be lengthened.

<u>Operating Mode:</u>

1. When the loader control is turned on, but not loading, the ratio control will remain “dark”.
2. As loading begins, the ratio control receives a load signal from loader control, the ratio control will “light up” and begin its sequence.
3. If seconds have been set for “regrind” a regrind output is sent to the valve and the digital readout showing the number of regrind seconds, and a green regrind LED light will illuminate. Once the regrind seconds have elapsed, the control will end the regrind signal and go to “virgin” seconds (if seconds have been programmed in), lighting the green virgin LED and displaying the virgin seconds on the digital readout.
4. Once virgin seconds expire, the ratio control will revert back to regrind and so on until the load signal (as set on the loading control) ends, and the Remote Ratio Control once again goes dark.
5. If zero seconds are set for regrind, but seconds have been programmed in for “virgin” then the control will provide a virgin output, light the virgin LED and stay that way (disregarding the number of seconds set for virgin), until the load signal ends.
6. If seconds have been set for regrind, but not for virgin, then the control will stay in the regrind mode (regardless of seconds set) until the load signal terminates.

<u>Programming/Viewing Mode:</u>

Whenever the ratio control has power (the loader control is turned on), but the ratio control is ‘dark’, the user can view and/or program the number of seconds desired for regrind and/or virgin.

1. Pressing the regrind button momentarily will put the control into the “viewing“ mode and will illuminate the digital display, showing the number of seconds currently programmed for regrind. This is accompanied by the green LED light for regrind being illuminated. The display will remain lit for 2 seconds if the user removes their finger from the button immediately. The control will then return to the dark mode, waiting to operate.

2. Pressing the virgin button momentarily will put the control into the "viewing" mode and will illuminate the digital display, showing the number of seconds currently programmed for virgin. This is accompanied by the green LED light for virgin being illuminated. The display will remain lit for 2 seconds if the user removes their finger from the button immediately. The control will then return to the dark mode, waiting to operate.
3. If the user holds down the regrind button for 3 seconds, the digital display will begin to flash indicating that the control is now in the "programming" mode. The regrind LED light will also flash. The user may let go of the button and the readout and LED light will remain flashing in the programming mode for 5 seconds before it reverts back to the dark mode, unless the user begins to make changes or otherwise interacts with the control.
4. While the lights are flashing, the user can increase (+) or decrease (-) the seconds setting with the use of the regrind and virgin buttons, which in the programming mode now operate as increase and decrease buttons. Regrind = decrease (-), Virgin = increase (+). Changes may be made in one second increments, up or down.
5. While the user programs in new settings, the digital display will stop flashing, but the green LED lite continues flashing throughout the programming mode. The user must press the increase or decrease buttons once for each second of time change, or holding the buttons down (one at a time) will accelerate how quickly the seconds will change. Maximum time range for both virgin and regrind is 30 seconds.
6. Once regrind time changes have been made, the user can switch over to virgin time programming by pressing both the virgin/increase(+) and regrind/decrease(-) buttons at the same time. This will save the regrind setting and switch the control to the virgin programming mode, identical to the regrind progamming mode.
7. The programming function can be terminated or changed in either of two ways: 1. Inactivity…the control will revert back to dark if untouched for 5 seconds and retain the last setting(s), or 2. "Double-pressing"…if both buttons are pressed at the same time, the control will switch from whatever programming mode it is in (virgin or regrind), retain the last setting, and go immediately to the other (regrind or virgin) programming mode, and allow changes to be made there.
8. If double-pressing occurs twice within one programming session, the second double-press will terminate the programming function and return the control to dark, retaining the last settings entered.

Note: If the loader starts to load while programming changes or viewing are underway, the Remote Ratio Control will allow viewing and changes to be made while continuing to operate the ratio valve according to previous settings. Changes to the timing will not be enacted until the programming mode is exited. If the Remote Ratio Control is operating and the user attempts to make changes, the ratio valve will continue to operate according to existing settings, but the control will show the changes being made by the user. Changes to the timing will not be enacted until the programming mode is exited.

Tips on Ratio Settings

Time settings (in seconds) determine how long each inlet of your ratio valve will stay open during loading. In order to avoid problems, these settings should be reasonable, considering the material distance, loader capacity, flow characteristics, etc. For instance, 1 second settings are not likely to allow material to even enter the loader before the valve switches and attempts to load the other material. Very high settings are not likely to allow the second material to even begin to load, if the first material consumes all the load time. Use trial and error settings while observing the flow of material through the flex hose to find the best settings for your operation.

Not a Blender:

Even though the Remote Ratio Control and RV0 valve are capable of responding to one second timing changes, this ratio valve system should in no way be held responsible for accurate blending of materials. The flow of materials in a vacuum system is dependent upon many factors including bulk density, flow charateristics, length of conveying line, type of material pickup device, etc. The RV0 is designed to simply manipulate the opening and closing of two material flow paths. It cannot meter material, nor assure that material is flowing within the lines that it is connected to. It should be used only for the coursest of two-material loading applications, like the simple consumption of available regrind, in addition to virgin material loading. The Remote Ratio Control can only provide programmed time changes of the ratio valve plungers as directed by the user. The actual flow of material can only be approximated.

If more precision is required, contact Conair to discuss the use of a Conair gravimetric blender or volumetric Feeder to accomplish your accuracy goals.

Layers:

Layers are generally considered a simple way to encourage materials to “mix” with the loading process. As each material is loaded, it layers above the other material so they may mix as they flow from the loader into the process. You may wish to obtain as many layers as possible in the interest of good “mixing” or you may wish to minimize layers in the interest of fewer loading cycles per load.

The RV0 ratio valve and the Remote Ratio Control create an alternating flow of material to the loader being equipped with ratio capability. The load time or vacuum-on time from the loader determines the overall amount of time the ratio function will operate. The user can decide how many valve cycles (layers) will take place within that load time by increasing or decreasing the number of seconds dedicated to virgin and regrind loading. Ie: More seconds = fewer cycles per load; Fewer seconds = more cycles per load.

Adjust the amount of over all load time set (on the loading control) with the time settings set for virgin and regrind to obtain your desired number of layers. A greater number of layers is likely to require more load time to allow for the time to start and stop material flow for virgin and regrind. Alternatively, if virgin and regrind times are increased, the loader may fill with material very quickly and its overall load time may have to be reduced.

Quick Instructions

for Remote Ratio Control Operation:

1. Press the virgin *or* regrind buttons briefly to view their time settings (shown in seconds).

2. Press and hold virgin *or* regrind button for 5 seconds to make time changes.

3. Make changes with increase (+) or decrease (-) buttons while light flashes.

4. Switch to virgin *or* regrind programming by pressing both buttons.

5. Exit programming by pressing both buttons a second time.

We're Here to Help

Conair has made the largest investment in customer support in the plastics industry. Our service experts are available to help with any problem you might have installing and operating your equipment. Your Conair sales representative also can help analyze the nature of your problem, assuring that it did not result from misapplication or improper use.

How to Contact Customer Service

To contact Customer Service personnel, call:

From outside the United States, call: 814-437-6861

You can commission Conair service personnel to provide on-site service by contacting the Customer Service Department. Standard rates include an on-site hourly rate, with a one-day minimum plus expenses.

Before You Call ...

If you do have a problem, please complete the following checklist before calling Conair:

- ❒ Make sure you have all model, serial and parts list numbers for your particular equipment. Service personnel will need this information to assist you.
- ❒ Make sure power is supplied to the equipment.
- ❒ Make sure that all connectors and wires within and between loading control and related components have been installed correctly.
- ❒ Check the troubleshooting guide of this manual for a solution.
- ❒ Thoroughly examine the instruction manual(s) for associated equipment, especially controls. Each manual may have its own troubleshooting guide to help you.
- ❒ Check that the equipment has been operated as described in this manual.
- ❒ Check accompanying schematic drawings for information on special considerations.

Additional manuals and prints for your Conair equipment may be ordered through the Customer Service or Parts Departments for a nominal fee.

EQUIPMENT GUARANTEE

Conair guarantees the machinery and equipment on this order, for a period as defined in the quotation from date of shipment, against defects in material and workmanship under the normal use and service for which it was recommended (except for parts that are typically replaced after normal usage, such as filters, liner plates, etc.). Conair's guarantee is limited to replacing, at our option, the part or parts determined by us to be defective after examination. The customer assumes the cost of transportation of the part or parts to and from the factory.

PERFORMANCE WARRANTY

Conair warrants that this equipment will perform at or above the ratings stated in specific quotations covering the equipment or as detailed in engineering specifications, provided the equipment is applied, installed, operated and maintained in the recommended manner as outlined in our quotation or specifications.

Should performance not meet warranted levels, Conair at its discretion will exercise one of the following options:

- Inspect the equipment and perform alterations or adjustments to satisfy performance claims. (Charges for such inspections and corrections will be waived unless failure to meet warranty is due to misapplication, improper installation, poor maintenance practices or improper operation.)
- Replace the original equipment with other Conair equipment that will meet original performance claims at no extra cost to the customer.
- Refund the invoiced cost to the customer. Credit is subject to prior notice by the customer at which time a Return Goods Authorization Number (RGA) will be issued by Conair's Service Department. Returned equipment must be well crated and in proper operating condition, including all parts. Returns must be prepaid.

Purchaser must notify Conair in writing of any claim and provide a customer receipt and other evidence that a claim is being made.

WARRANTY LIMITATIONS

Except for the Equipment Guarantee and Performance Warranty stated above, Conair disclaims all other warranties with respect to the equipment, express or implied, arising by operation of law, course of dealing, usage of trade or otherwise, including but not limited to the implied warranties of merchantability and fitness for a particular purpose.