

USER GUIDE

KURZ SERIES 7500 MASS FLOW CONTROL SYSTEMS

Written By: Tom Ramey

Release 1.20
June 18, 1984
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Monterey, CA 93940
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(800) 4-AIRFLO

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I M P O R T A N T N O T I C E

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Section 1 - SYSTEM OVERVIEW

The KURZ Series 7500 Mass Flow Control Systems are state of the art mass flow controllers for use in the most demanding process requirements. KURZ Mass Flow Controllers are composed of three basic subsystems. First, a fast response linear thermal mass flow meter provides a 0-5 Vdc signal linearly proportional to flow. This is commonly a Kurz Series 505 flowmeter. Secondly, a Kurz Series 710 Electric Valve P.I.D. Controller takes the abovementioned 0-5 Vdc input signal, compares it to setpoint and sends an error signal that either opens or closes the control valve until the setpoint is reached. The third major component, or subsystem, is the Kurz 730 Electric Rotary Ramp Metering Valve. This valve has been designed for use in flow control. The Series 7500 name is used to refer to an integrated KURZ Mass Flow Control System in general. In fact, both in specifying and in ordering, a KURZ Mass Flow Control System is assembled by specifying model numbers for each of the three major subsystems, i.e. a 505 Series flowmeter, a 710 Series controller and a 730 Series valve. Similarly, the cost of a complete mass flow control system is found by adding up the cost of each individual subsystem along with any options selected. A brief description of each subsystem follows:

SERIES 505 LINEAR FAST RESPONSE MASS FLOW METERS

The Series 505 are rugged, industrial grade extended life solid state flowmeters which feature type 304 stainless steel construction standard. Series 505 flowmeters allow cable runs to over 1,000 ft. by virtue of their two-wire current mode transmitters. Accuracy is 2% of reading + 1/2% at full scale. Repeatability is 0.25%. All models feature a linear 0-5Vdc output signal. NBS(National Bureau of Standards) Traceable calibration is standard and is included in the price for Air at <50 psig. Calibration data and Certificate are provided. Flow bodies include male National Pipe Thread fittings. All KURZ thermal mass flowmeters feature very low pressure drops, typically only a few inches of water column pressure a full scale flow. Additionally, KURZ mass flowmeters automatically correct for changes in gas temperature and density, thus readings are automatically referenced to standard conditions without any tedious manual calculations. Thus flow is usually scaled in SCFM or SLPM or (our preference) lbs/hr.

SERIES 710 ELECTRIC VALVE P.I.D. CONTROLLER

The KURZ Series 710 is an electric P.I.D. (Proportional Integral plus Derivative) Controller designed for use with KURZ valve products or any other electric valve using a DC error signal DC motor driven flow control valve. Versions of the Series 710 are available to accept input signals of 0-5 Vdc, 0-2Vdc, 1-5 Vdc and 4-20 ma. The 710 Controller is commonly paired with a Kurz Series 505 mass flow meter and a Kurz Series 730 or 731 electric valve to make a complete mass flow control system. The Series 710 Controllers can accept common process variable inputs from a variety of sensors and control such things as pressure, temperature and humidity. See Specification sheets for further details on the Series 710 Controllers. Further details are also included in this manual.

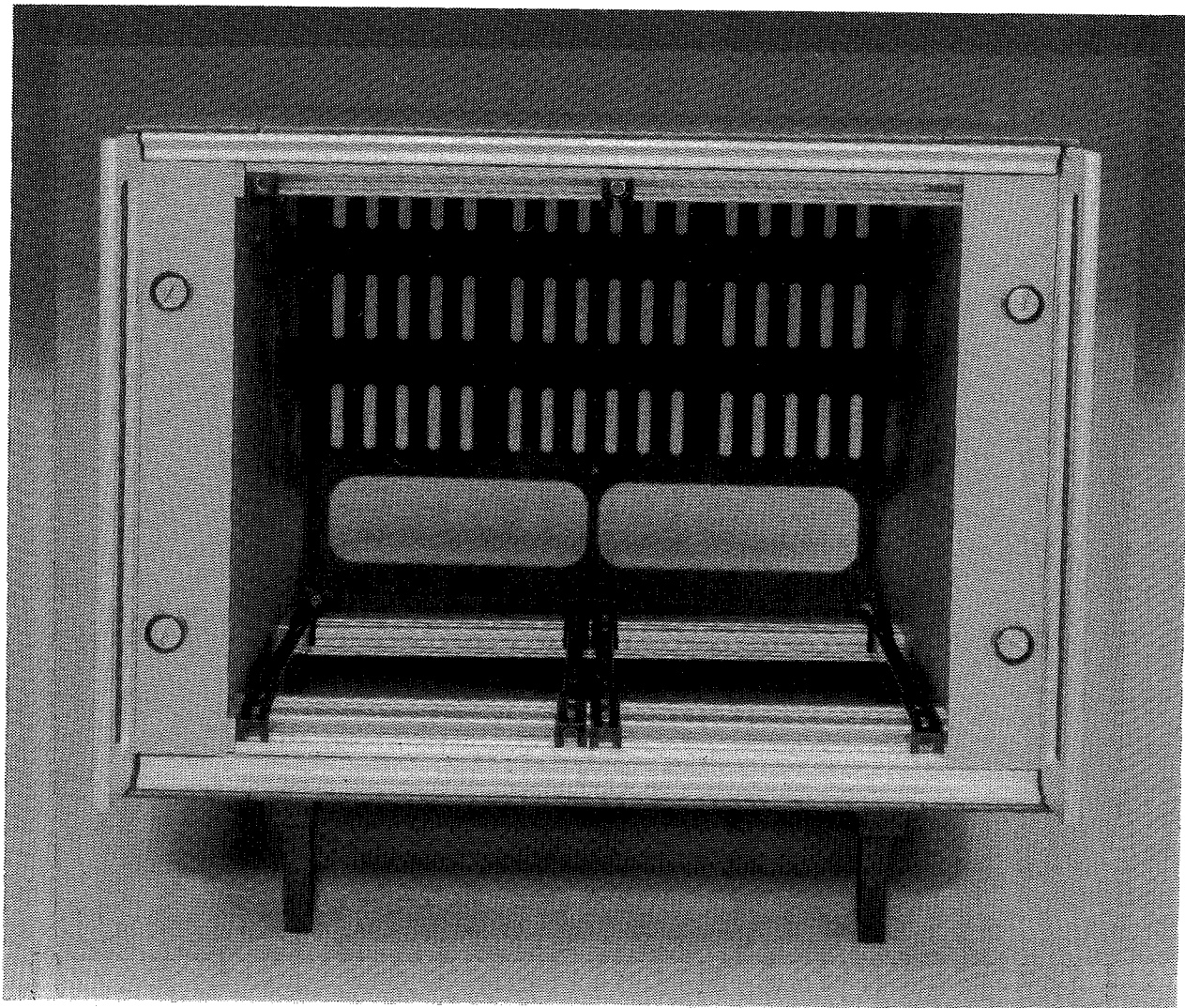
SERIES 730 ELECTRIC ROTARY RAMP METERING VALVES

The Series 730 Electric Rotary Ramp Metering Valves represent a new concept in electrically actuated metering valves. Unlike competitive electrical metering valves, the Series 730 combines the electric drive motor, the valve body and limit switches into a well designed integrated package. The flow coefficient (Cv) is linear over a wide range due to its nearly 300 degree rotation between shutoff and full open. A remarkable feature of the 730 is that it incorporates a complete flow shutoff feature not found in other fine metering valves. In addition, the orifice size is unaffected by changes in system pressure and the valve remains in its last position during constant flow or during power shutoff. The standard valve incorporates a high torque DC gear motor designed to be operated by error signals from the Series 710 Controller. Series 730 valves may also be ordered with reversible 24 VAC or a 115 VAC/60 Hz drive motor. Each valve is constructed of type 304 stainless steel and includes an O-Ring sealed motor cover with a 1/2" FNPT conduit fitting. Only two wires are required to operate the standard Series 730 valve for ease of installation. The standard full open to full close time is 30 seconds, but other valve speeds can be specified. The Series 730 valves may be used with most fluids, including steam and liquids. Special materials of construction may be specified for hostile fluids or environments.

This photo shows a typical 7500 System with the system electronics in a 1/2 rack bench enclosure. This package is popular with users who plan on using their 7500 System in a lab or test bench type setting.



This photo shows the 1/2 rack bench enclosure without any electronic modules installed. Note that the bench enclosure includes the 1/2 rack chassis with guides for the slide-in rack modules preinstalled. Also note the cutouts on the back of the bench enclosure for feedthru of power, signal and valve control lines.



Section 2 - UNPACKING AND INSTALLATION

Normally no special precautions need to be observed during unpacking of your flow control system. Of course, any external damage to the package should be reported to the carrier. Usually, the mass flow meter and the flow control valve are shipped already mated or piped together. Depending upon the number of systems or components, the Series 710 Electric Valve P.I.D. Controller may or may not be shipped in the same physical box as the mass flowmeter and the flow control valve. Indeed, for larger flowmeters the mass flow meter and the flow control valve may be separately boxed. Really the only delicate component that might sustain damage in shipping would be the liquid crystal display (LCD) on the Series 710 Controller. We recommend plugging in the Series 710 Controller immediately after unpacking, turning the unit on, and verifying that some indication is present on the digital display. The Series 710 Controller may be turned on and used for this purpose without any connections being made to the mass flow meter or the flow control valve. If no indication is present be sure the display is at something approaching room temperature. As anyone who has ever owned a LCD digital display wristwatch knows, liquid crystal displays will not work when too cold or too hot. If no indications are present report damage to your freight carrier. By the way, all displays are tested prior to shipping to be sure all segments work.

Further details concerning hookup and installation are covered in following sections of this manual. Briefly though, the flowmeter is installed upstream of the flow control valve. If the flowmeter is boxed separately, the longer section of pipe represents the upstream side of the sensor. The mounting orientation (vertical, horizontal, etc.) is immaterial.