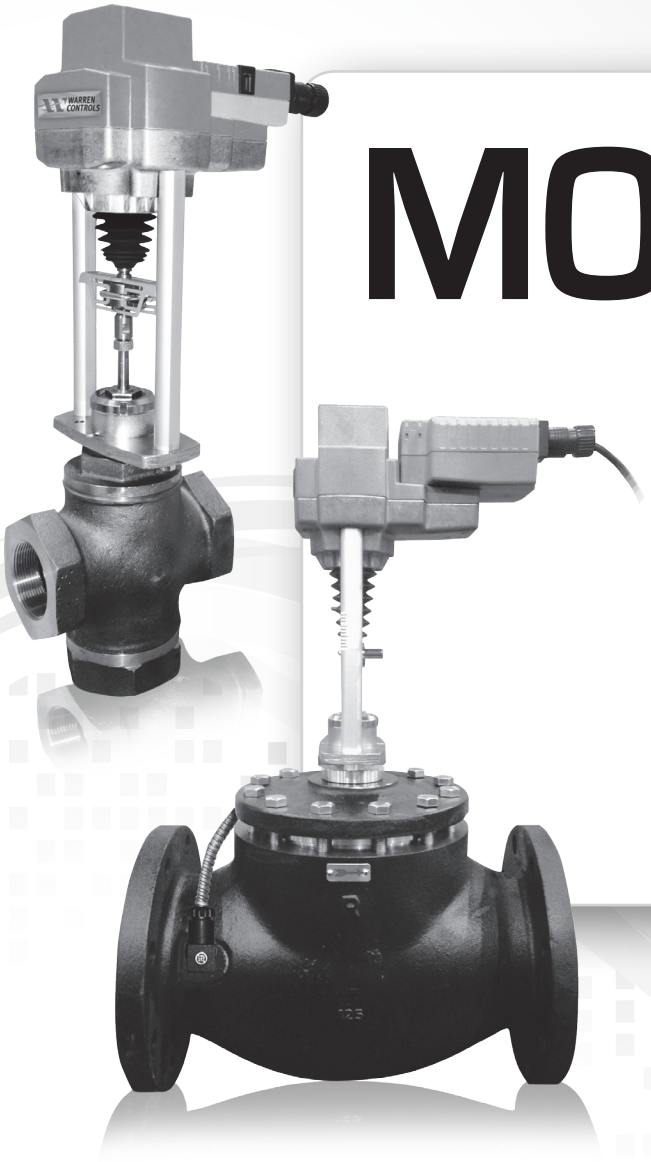
MONITROL

PRODUCT SPECIFICATION



MON-RG

SIZES: 1" – 10"
(65 MM – 250 MM)

Smart Regulating Control Valve
for Pressure & Temperature

MON-RG PS No Rev_0815

MON-RG PRODUCT SPEC

WARREN CONTROLS

2600 EMRICK BLVD • BETHLEHEM, PA 18020 • USA • 610-317-0800 • WWW.WARRENCONTROLS.COM

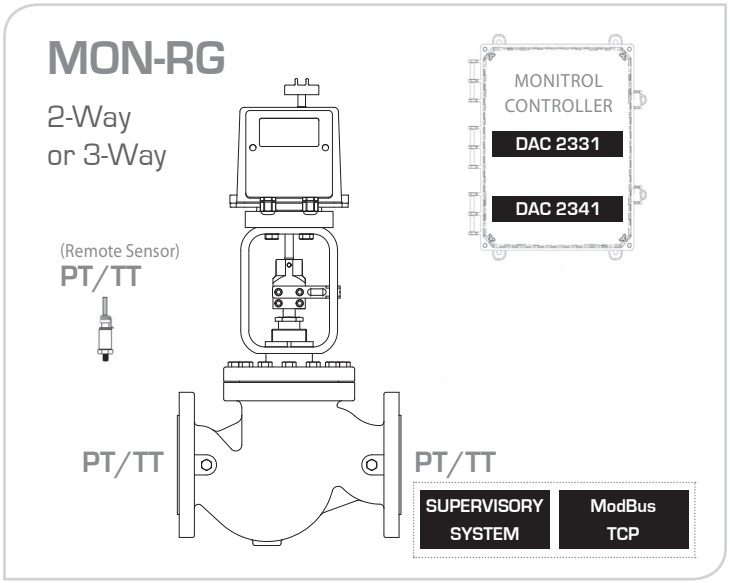
DEPENDABLE, RUGGED, PRECISION CONTROL VALVES AND ACCESSORIES

MON-RG MODEL

The **MON-RG** Series is comprised of several of our industrial control valve series from 1" to 10" is size, both 2-way and 3-way flow patterns, threaded and flanged in a variety of materials of construction. The 2-way valves have plugged pressure boundary taps at both valve inlet and outlet. The 3-way valves have plugged pressure boundary taps at both inlets. These tapped and plugged holes are to be used for the various pressure and temperature sensor the Monitrol offers.

The **MON-RG** is used in conjunction with our **DAC-2331** Single Loop Controller and **DAC-2341** Dual Loop Controller. These controllers use integral dedicated pressure or temperature sensors tapped directly into the MON-RG control valve assembly or remotely, elsewhere in the fluid control system using a variety of control strategies.

Unique Features of the MON-RG family of Controllers.



DAC 2331 / DAC 2341

Typically used in conjunction with the Monitrol MON-RG control valve, this combination will provide for pressure regulation, back pressure regulation or temperature regulation. The optional Feed-Forward control is utilized to account for external downstream load disturbances affecting a given process when an appropriate proportional variable is available. With feed-forward control, disturbances are measured and accounted for before they have time to significantly impact operations. Keeping with its high standards, users can select the weight of the feed-forward algorithm and hence change its impact on the command output.

TYPICAL APPLICATIONS

- Heat Transfer Control Application
- Desuperheating
- Network Pressure Control
- Simple Temperature Control
- Level Control

FEATURES:

- PID Single Loop Control ***(DAC 2331 only)***
- PID Dual Loop Control ***(DAC 2341 only)***
- Optional Input for Weighted Feed-Forward Control
- Adaptive Auto-Tune
- 6 Isolated Analog Inputs / 2 Isolated Analog Output
  - Configurable for Split and full Range
- Accepts both Voltage and Current Signals
- Dual Analog outputs for staged or load leveling control
- ModBus TCP Enabled
- Comprehensive menu of selectable Alarms with outputs
- Non-Volatile memory
- AC 100V ~ 230V or DC 24V
- Data Log Function
- On the Fly access to process parameters
- On Screen Monitoring

DAC 2331 SINGLE LOOP

PID controllers have become standard components in industry. The intuitive nature of the DAC 2331 controller coupled with the ability to access all its parameters while in operation positions it as a new breed of stand alone controller.

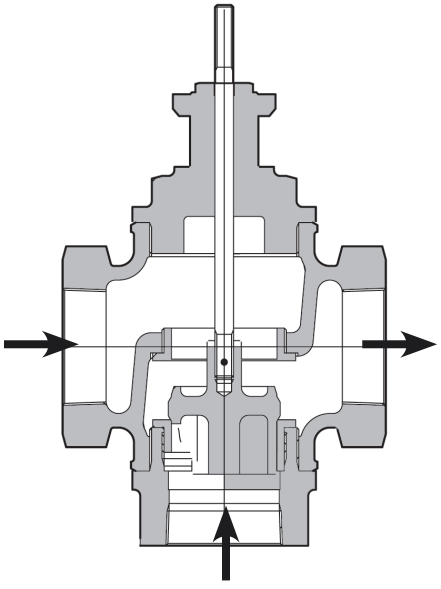
DAC 2341 DUAL LOOP

In the Dual Loop version of this controller a typical application might have temperature as the primary variable in the control loop and pressure as the influential secondary cascade loop as would be common in a steam fired shell and tube heat exchanger for water heating. Meanwhile, the absolute flow of the heated water would be an ideal feed forward variable to use indicating proportional load change.

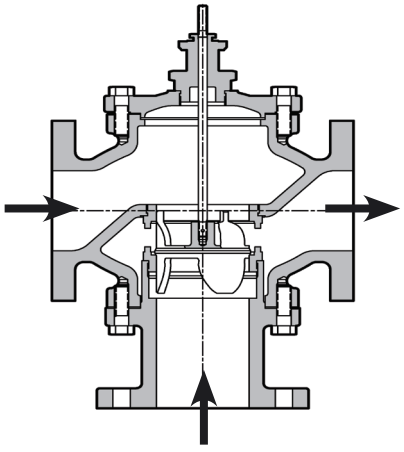
TABLE OF CONTENTS

MON-RG Model 2
DAC 2331 / 2341 2
Inside 3-Way Valves 3
Inside Valve Body Mon-RG-29N 4
Inside Valve Body Mon-RG-58H 5
Valve Body Specifications 6-7
Fluid Temperature Limits 8-10
General Specifications. 11
Valve/Actuator Close Offs 12-13
Actuator Specifications. 14-15
Monitrol Sensors 16
Controller. 17
Configurations 18-19

INSIDE 3-WAY VALVES

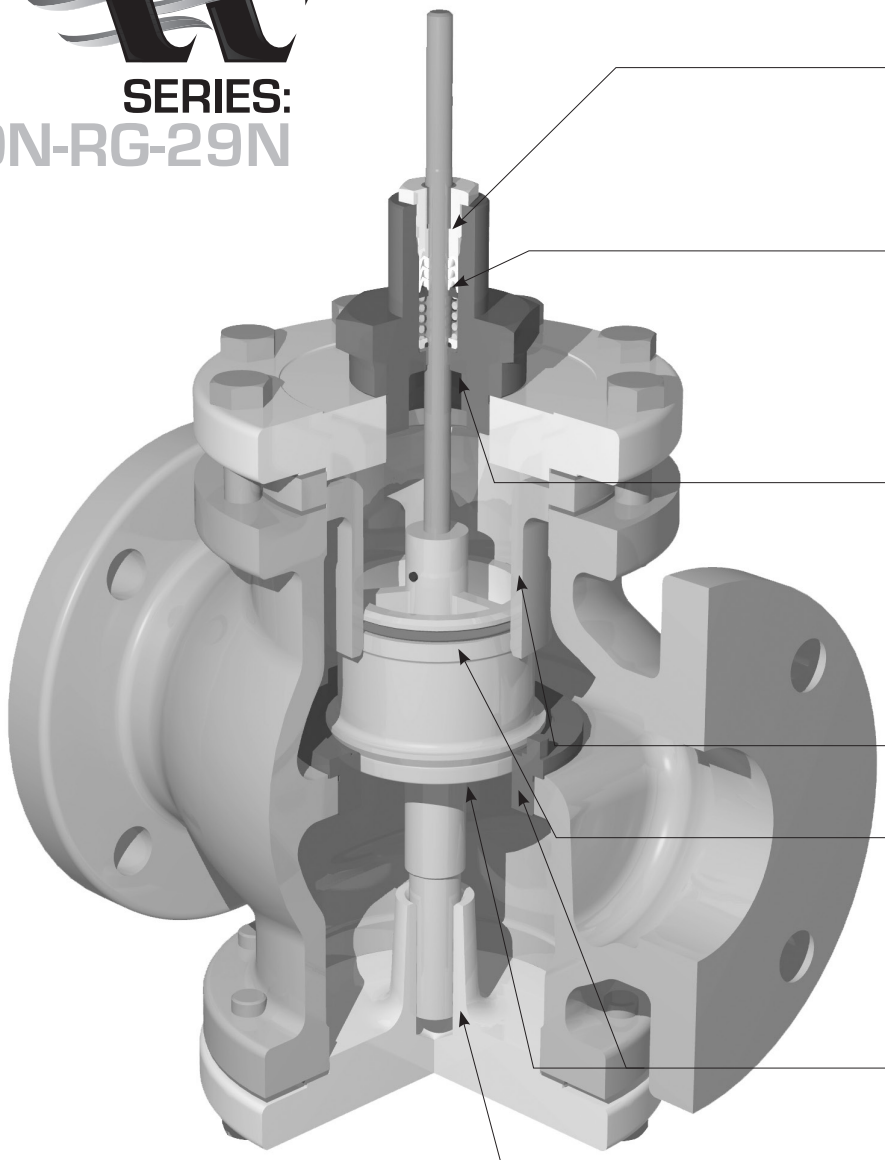


2830
Three-Way Mixing Valve



2930
Three-Way Mixing Valve

SERIES:
MON-RG-29N



Peek Bearing
for low friction provides stem guiding and protects packing box from external debris.

Robust Spring-Loaded PTFE V-Ring Packing
has low friction and is self adjusting for zero maintenance. EPDM Lip Packing is available for water service.

Peek Bearing in Lower Bonnet Assembly
provides stem guiding and protects packing box from entrained solids for longer packing life.

Thick Balancing Chamber
in bronze or 300 SS

EPDM O-Ring or Fluoraz O-Ring
(for higher temperatures) maintains pressure balance seal.

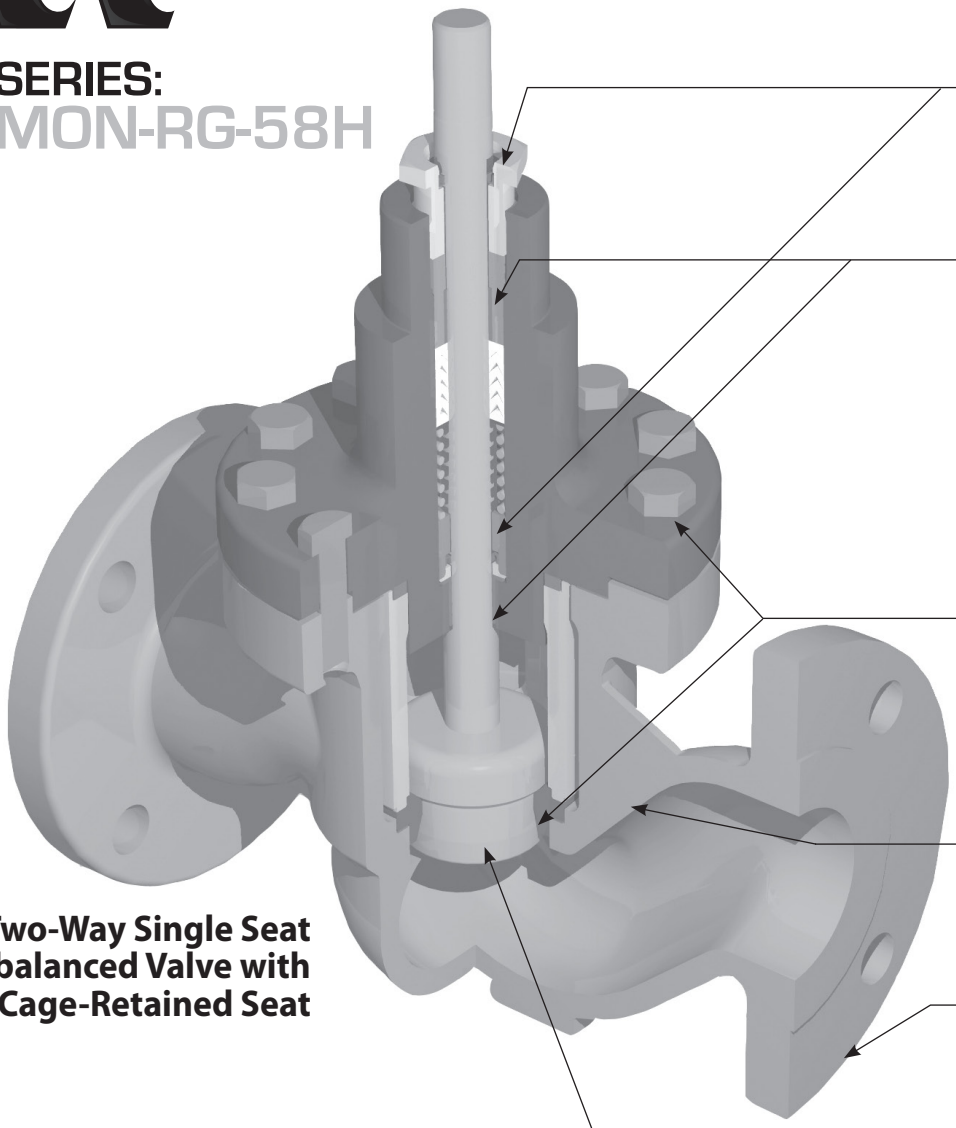
Plug and Seat
in choice of Bronze or 300 SS provide Class IV leakage rating.

Bottom Post Guide
for additional stability, allowing higher pressure drop.

Two-Way Cylinder Balanced Valve

Description: Warren Controls MON-DP-29N High Capacity General Purpose Globe Control Valves feature rugged iron bodies with a variety of trim materials. The equal percentage plugs in the 2-way valves provide excellent modulating control of a wide variety of fluids. The MON-DP-29N is ideally suited where value and long life are important objectives.

SERIES:
MON-RG-58H



Two-Way Single Seat Unbalanced Valve with Cage-Retained Seat

Stem Wipers
provide outstanding packing protection and stem stability.

Dual Point PEEK Bearing Plug Guiding
provides both stability and low friction, resulting in lowest hysteresis and precision control. Graphalloy Bearings are available for added durability in high temperature applications.

Bolted Bonnet and Cage-Retained Seat
make the 5800 ideal for easy access, maintenance, and trim inspection.

Rugged Body
with a selection of port reductions.

Low Profile Design
offers footprint minimizing valuable space consumption, yet conforms to ANSI/ISA standards for NPT, Flanged and Socket Weld ends.

Trim Choices Available
include 316SS.

Description: Warren Controls MON-DP-58H Compact Globe Control Valves feature rugged high efficiency bodies of steel or stainless steel, with cage-retained seats for ease of maintenance, and a variety of trim materials and port sizes. The equal percentage, linear and modified linear plugs provide excellent modulating control of a wide variety of fluids. The MON-DP-58H ideally suited where value and long life are important objectives.

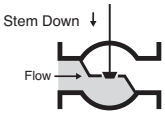
VALVE BODY SPECIFICATIONS

2-Way Valves (Control of Liquids, Gases, and Steam)

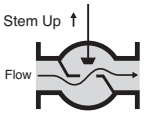
29N20 2-Way Single Seat Unbalanced Valve

The most commonly applied solution for sizes 3" and under with ANSI Class IV leakage rating. ***See Table on page 8 for Fluid Temperature Limits.***

Sizes:	2-1/2 & 3 inch (DN 65 & 80)
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange
Trim:	EQ%, Bronze or 300 Series Stainless Steel
Packing:	Long-Life Multi-Stack, EPDM Lip Packing (EPDM Lip Packing is not suitable for use with oils, ydrocarbons, or acids.) Guided Low-Friction TFE V-Ring, Spring Loaded Packing.
Rangeability:	50:1



The valve closes

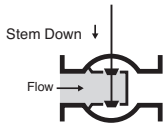


The valve opens

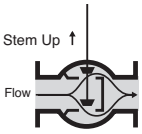
29N22 2-Way Double Seat Balanced Valve

A balanced valve that is an effective solution for sizes over 3" and for higher pressures. Its double seat design allows for dirtier fluids and requires less force to operate than unbalanced valves so smaller actuators can be used. It is limited to ANSI Class III leakage rating. ***See Table on page 8 for Fluid Temperature Limits***

Sizes:	8, 10 & 12 inch (DN 200, 250 & 300)
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange
Trim:	EQ%, Bronze or 300 Series Stainless Steel
Packing:	Long-Life Multi-Stack, EPDM Lip Packing (EPDM lip packing is not suitable for use with oils, hydrocarbons, or acids) Guided Low-Friction TFE V-Ring, Spring Loaded Packing
Rangeability:	50:1



The valve closes

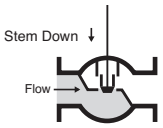


The valve opens

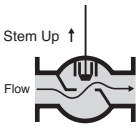
29N23 2-Way Cylinder Balanced Valve

A balanced valve that is an effective solution for sizes over 3" and for higher pressures. It requires less force to operate than unbalanced valves so smaller actuators can be used. Its single seat o-ring seal design facilitates ANSI Class IV leakage rating. It is limited to cleaner fluids. ***See Table on page 8 for Fluid Temperature Limits.***

Sizes:	2-1/2, 3, 4, 5, 6 & 8 inch (DN 65, 80, 100, 125, 150 & 200)
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange Ductile Iron ANSI B16.42 Class 150 FLG or EN1092-2 PN16 400-18 FLG (5 thru 8, DN125 thru 200)
Trim:	EQ% [Bronze, (2-1/2 thru 6, DN 65 thru 150); 300 Series Stainless Steel (2-1/2 thru 8, DN 65 thru 200)], Linear [300 Series Stainless Steel, (2-1/2 thru 8, DN 65 thru 200)]
Packing:	Long-Life Multi-Stack, EPDM Lip Packing (EPDM lip packing is not suitable for use with oils, hydrocarbons, or acids.) Guided Low-Friction TFE V-Ring, Spring Loaded Packing
O-Ring:	EPDM (BRZ Trim); *Fluoraz 797 (300 SSTrim)
Rangeability:	50:1



The valve closes



The valve opens

Note: Fluoraz o-ring in Type 2923 is not compatible with the following solvents: acetates, acetone, benzene, carbon tetrachloride, ethers, Freons, ketones, lacquers, methyl ethyl ketone, and toluene - Consult Factory with service conditions for alternate o-ring selection.

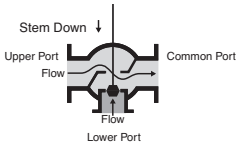
3-Way Valves (Control of Liquids)

28N30 3-Way Mixing Valve

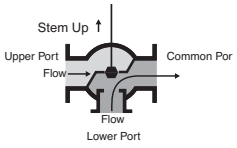
This valve has two inlets and one outlet, and is the simplest solution for mixing or bypass applications with an ANSI Class IV leakage rate. In normal applications the inlet pressures are near equal and control is possible from 5% to 95% of travel with inlet pressures up to 100 PSI.

See Table on page 20 for Fluid Temperature Limits

Sizes:	1/2, 3/4, 1, 1-1/4, 1-1/2, 2 inch
Body:	ANSI B16.15 Bronze 250LB Threaded (NPT), or 316 Stainless Steel 300LB Threaded (NPT), or 316 Stainless Steel 300LB SCH 40 Buttweld (BWE) Stainless Steel body valves contain Fluoraz 797 O-Ring upper and lower body seals.*
Trim:	Linear, 316 Stainless Steel
Packing:	Long-Life Multi-Stack EPDM Lip Packing (EPDM Lip Packing is not suitable for use with oils, hydrocarbons, or acids.) Guided Low-Friction TFE V-Ring, Spring Loaded Adjustable Graphite Packing
Rangeability:	50:1



The upper port opens and the lower port closes

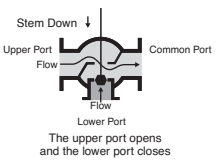


The upper port closes and the lower port opens

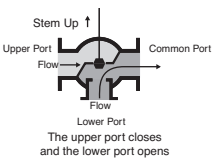
29N30 3-Way Mixing Valve

This valve has two inlets and one outlet, and is the simplest solution for mixing or bypass applications with an ANSI Class IV leakage rating. In normal applications the inlet pressures are near equal and control is possible from 5% to 95% of travel with inlet pressures up to 100 PSI. ***See Table on page 24 for Fluid Temperature Limits.***

Sizes:	2-1/2, 3, 4, 5, 6 inch
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange
Trim:	Linear, Bronze (2-1/2 thru 6) or 300 Series Stainless Steel (2-1/2 thru 6)
Packing:	Long-Life Multi-Stack, EPDM Lip Packing, (EPDM lip packing is not suitable for use with oils, hydrocarbons, or acids.) Guided Low-Friction TFE V-Ring, Spring Loaded, Adjustable Graphite Packing
Rangeability:	50:1



The upper port opens and the lower port closes



The upper port closes and the lower port opens

58H40 2-Way Single Seat Unbalanced Valve with Cage Retained Seat

The 5840 Valve is particularly effective for the control of liquids, gases, and steam. It is a suitable solution for applications with dirty fluids and high pressure drops. ANSI Class IV leakage rating standard. ***See Table on page 8 for Fluid Temperature Limits***

Sizes:	2-1/2 & 3 inch (DN 65 & 80)
Body:	WCB Steel 150LB Flange
Trim:	EQ% or Linear: 316 Stainless Steel
Leakage Ratings:	ANSI Class IV (Stainless Steel Trim)
Packing Type & Bonnet Construction:	EPDM Lip w/ PEEK Bearings TFE V-Ring, Spring Loaded, w/ PEEK Bearings
Rangeability:	50:1

58H43 2-Way Single Seat Caged Balanced Valve with Cage Retained Seat

The 5843 is a balanced valve that is an effective solution for the control of liquids, gases, and steam at higher pressures. It requires less force to operate than unbalanced valves so smaller actuators can be used. Its single seat o-ring seal design facilitates ANSI Class IV leakage rating standard. It is limited to cleaner fluids. ***See Table on page 8 for Fluid Temperature Limits***

Sizes:	4 inch (DN 100)
Body:	WCB Steel 150LB Flange
Trim:	EQ% or Linear: 400 Stainless Steel
Leakage Ratings:	ANSI Class IV (Fluoraz Seal)
Packing Type & Bonnet Construction:	EPDM Lip w/ PEEK Bearings and Fluoraz Seal TFE V-Ring, Spring Loaded, w/ PEEK Bearings and Fluoraz Seal
Rangeability:	50:1

Note: Fluoraz Seal in Type 5843 is not compatible with the following solvents: acetates, acetone, benzene, carbon tetrachloride, ethers, Freons, ketones, lacquers, methyl ethyl ketone, and toluene - Consult Factory with service conditions for alternate seal selection.

BODY PRESSURE-TEMPERATURE RATINGS (PSIG) ANSI B16.1 IRON		
TEMP (°F)	125 FLG & PN16	250 FLG
-20 to 150	175	400
200	165	370
250	150	340
300	140	310
350	125	280
400	--	250

BODY PRESSURE-TEMPERATURE RATINGS (PSIG) WCB STEEL	
TEMP (°F)	150 FLG
-20 to 100	285
150	272
200	260
250	245
300	230
350	215
400	200
450	185

BODY PRESSURE-TEMPERATURE RATINGS (PSIG) ANSI B16.42 DUCTILE IRON	
TEMP (°F)	150 FLG
-20 to 100	250
150	242
200	235
250	225
300	215
350	207
400	200
450	185

BODY PRESSURE-TEMPERATURE RATINGS (BAR) EN 1092-2 DUCTILE IRON	
Temp (°C)	PN16 400-18 FLG
-10 to 120	16
150	15.5
200	14.7
232	14.1

Trim Materials	Flowing Differential Pressure Limit
Bronze	50 PSID
300 Series Stainless Steel	100 PSID
316 Stainless Steel	100 PSiD
400 Stainless Steel	200 PSID

Body Pressure — Temperature Ratings conform to ANSI or EN based on body/flange rating and body material. As the fluid temperature increases, the maximum allowable internal pressure decreases. Verify maximum pressures and temperatures prior to selecting body material and body/flange rating.

28N20 Flow Coefficients (Cv) 2-Way Single Seat Unbalanced Valve

VALVE SIZE (IN)	TRIM STYLE	TRIM SIZE	PORT SIZE	%TRAVEL									
				100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
1"	EQ%	1.126	Full	10.00	9.70	6.52	4.40	2.82	2.04	1.36	0.81	0.55	0.30
		0.876	1SR	8.60	8.38	6.09	3.64	2.58	1.74	1.25	0.89	0.52	0.27
		0.876	2SR	6.00	5.79	3.88	2.70	1.97	1.22	0.96	0.70	0.43	0.17
		0.876	3SR	3.40	3.41	2.38	1.64	1.20	0.75	0.51	0.39	0.26	0.13
		0.626	4SR	1.50	1.46	0.97	0.73	0.53	0.42	0.31	0.21	0.10	0.06
	Linear	1.126	Full	10.00	9.00	8.00	7.00	6.00	5.00	4.00	3.00	2.00	1.00
1 1/2"	EQ%	1.676	Full	24.00	22.50	19.70	15.10	10.30	7.30	4.90	3.20	1.90	0.90
		1.438	1SR	16.00	15.50	10.40	7.04	4.51	3.26	2.18	1.30	0.88	0.48
		1.126	2SR	10.00	9.70	6.52	4.40	2.82	2.04	1.36	0.81	0.55	0.30
		0.876	3SR	8.60	8.38	6.09	3.64	2.58	1.74	1.25	0.89	0.52	0.27
		0.876	4SR	6.00	5.79	3.88	2.70	1.97	1.22	0.96	0.70	0.43	0.17
	Linear	1.676	Full	18.00	16.20	14.40	12.60	10.80	9.00	7.20	5.40	3.60	1.80
2"	EQ%	2.126	Full	40.00	37.10	33.10	27.30	19.80	13.20	8.50	5.30	2.80	1.10
		1.676	1SR	24.00	22.50	19.70	15.10	10.30	7.30	4.90	3.20	1.90	0.90
		1.438	2SR	16.00	15.50	10.40	7.04	4.51	3.26	2.18	1.30	0.88	0.48
		1.126	3SR	10.00	9.70	6.52	4.40	2.82	2.04	1.36	0.81	0.55	0.30
		0.876	4SR	8.60	8.38	6.09	3.64	2.58	1.74	1.25	0.89	0.52	0.27
	Linear	2.126	Full	37.00	33.30	29.60	25.90	22.20	18.50	14.80	11.10	7.40	3.70

29N20 Flow Coefficients (Cv) 2-Way Single Seat Unbalanced Valve

VALVE SIZE (IN)	TRIM STYLE	PORT SIZE	%TRAVEL									
			100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
2 - 1/2	EQ%	Full	65	55.6	43.8	29.8	15.4	8.07	5.67	4.11	2.81	1.49
	Linear	Full	65	58.5	52.0	45.5	39.0	32.5	26.0	19.5	13.0	6.50
3	EQ%	Full	90	83.6	75.1	63.8	49.2	31.6	12.9	4.75	3.37	1.99
	EQ%	1SR	75	64.4	50.4	34.0	18.0	11.3	7.42	3.51	2.32	1.32
	Linear	Full	90	81.0	72.0	63.0	54.0	45.0	36.0	27.0	18.0	9.00

29N20

VALVE SIZE (IN)	TRIM STYLE	PORT SIZE	%TRAVEL									
			100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
2 - 1/2	EQ%	Full	65	55.6	43.8	29.8	15.4	8.07	5.67	4.11	2.81	1.49
	Linear	Full	65	58.5	52.0	45.5	39.0	32.5	26.0	19.5	13.0	6.50
3	EQ%	Full	90	83.6	75.1	63.8	49.2	31.6	12.9	4.75	3.37	1.99
	EQ%	1SR	75	64.4	50.4	34.0	18.0	11.3	7.42	3.51	2.32	1.32
	Linear	Full	90	81.0	72.0	63.0	54.0	45.0	36.0	27.0	18.0	9.00
4	EQ%	Full	170	159	143	122	95.1	62.9	31.3	15.6	9.89	4.11
	EQ%	1SR	144	124	96.5	65.2	35.7	21.8	14.4	7.01	4.20	2.61
	EQ%	2SR	117	90.8	60.5	35.2	25.0	16.6	8.00	5.79	4.20	2.61
	Linear	Full	170	153	136	119	102	85.0	68.0	51.0	34.0	17.0
5	EQ%	Full	280	258	230	194	150	102	54.7	23.1	14.0	6.40
	EQ%	1SR	237	206	170	128	83.0	42.2	23.8	11.2	6.66	4.17
	EQ%	2SR	203	168	127	83.2	45.6	29.9	17.9	9.13	6.66	4.17
	Linear	Full	280	252	224	196	168	140	112	84.0	56.0	28.0
6	EQ%	XTEND	420	399	370	330	276	206	123	45.9	21.4	7.64
	EQ%	Full	360	333	298	255	203	144	83.6	34.1	14.6	7.10
	EQ%	1SR	315	280	238	190	138	84.4	42.0	23.7	10.4	6.86
	EQ%	2SR	275	236	189	138	87.6	50.8	36.0	22.0	10.4	6.86
	Linear	Full	360	324	288	252	216	180	144	108	72.0	36.0
8	EQ%	Full	680	651	612	560	490	395	275	132	21.0	12.0

NOTE: -20 ºF T MIN temperature limit is for indoor applications with low humidity where ice will not form on the valve stem.

29N22 Flow Coefficients (Cv) 2-Way Double Seat Balanced Valve

VALVE SIZE (IN)	TRIM STYLE	PORT SIZE	%TRAVEL									
			100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
8	EQ%	Full	680	619	557	475	370	246	118	43.9	29.0	14.2
	EQ%	1SR*	595	542	487	416	324	215	103	38.4	25.4	12.4
	EQ%	2SR*	520	473	426	363	283	188	90.2	33.6	22.2	10.9
10	EQ%	Full	960	886	796	689	574	474	383	285	181	72.3
	EQ%	1SR*	840	775	697	603	502	415	335	249	158	63.3
	EQ%	2SR*	735	678	609	528	439	363	293	218	139	55.4

NOTE: *Estimated incremental Cv values. Contact factory for final values.

58N40 Flow Coefficients (Cv) 2-Way Single Seat Unbalanced Valve with Cage-Retained Seat

VALVE SIZE (IN)	TRIM STYLE	TRIM SIZE	PORT SIZE	%TRAVEL									
				100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
1"	EQ%	0.876	Full	12.00	10.80	8.88	6.20	3.18	1.91	1.31	0.94	0.65	0.35
	Linear		Full	12.00	10.80	9.60	8.40	7.20	6.00	4.80	3.60	2.40	1.20
	EQ%	0.501	1SR	5.00	4.48	3.70	2.59	1.33	0.80	0.55	0.39	0.27	0.15
	Linear		1SR	5.00	4.50	4.00	3.50	3.00	2.50	2.00	1.50	1.00	0.50
	EQ%	0.376	2SR	2.50	2.24	1.85	1.29	0.66	0.40	0.27	0.20	0.14	0.07
	Linear		2SR	2.50	2.25	2.00	1.75	1.50	1.25	1.00	0.75	0.50	0.25
	EQ%	0.251	3SR	1.25	1.12	0.93	0.65	0.33	0.20	0.14	0.10	0.07	0.04
	Linear		3SR	1.25	1.13	1.00	0.88	0.75	0.63	0.50	0.38	0.25	0.13
1 1/2"	EQ%	1.251	Full	24.00	21.50	17.80	12.40	6.36	3.82	2.62	1.87	1.30	0.70
	Linear		Full	24.00	21.60	19.20	16.80	14.40	12.00	9.60	7.20	4.80	2.40
	EQ%	0.876	1SR	12.00	10.80	8.88	6.20	3.18	1.91	1.31	0.94	0.65	0.35
	Linear		1SR	12.00	10.80	9.60	8.40	7.20	6.00	4.80	3.60	2.40	1.20
	EQ%	0.501	2SR	5.00	4.48	3.70	2.59	1.33	0.80	0.55	0.39	0.27	0.15
	Linear		2SR	5.00	4.50	4.00	3.50	3.00	2.50	2.00	1.50	1.00	0.50
2"	EQ%	1.688	Full	43.00	38.50	31.80	22.20	11.40	6.84	4.69	3.35	2.32	1.25
	Linear		Full	43.00	38.70	34.40	30.10	25.80	21.50	17.20	12.90	8.60	4.30
	EQ%	1.251	1SR	24.00	21.50	17.80	12.40	6.36	3.82	2.62	1.87	1.30	0.70
	Linear		1SR	24.00	21.60	19.20	16.80	14.40	12.00	9.60	7.20	4.80	2.40
	EQ%	0.876	2SR	12.00	10.80	8.88	6.20	3.18	1.91	1.31	0.94	0.65	0.35
	Linear		2SR	12.00	10.80	9.60	8.40	7.20	6.00	4.80	3.60	2.40	1.20

58H40 Flow Coefficients (Cv) 2-Way Single Seat Unbalanced Valve with Cage-Retained Seat

VALVE SIZE (IN)	TRIM STYLE	TRIM SIZE	PORT SIZE	%TRAVEL									
				100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
2 1/2"	EQ%	2.126	Full	65.00	58.20	48.10	33.60	17.20	10.30	7.09	5.07	3.51	1.89
	Linear		Full	65.00	58.50	52.00	45.50	39.00	32.50	26.00	19.50	13.00	6.50
	EQ%	1.688	1SR	43.00	38.50	31.80	22.20	11.40	6.84	4.69	3.35	2.32	1.25
	Linear		1SR	43.00	38.70	34.40	30.10	25.80	21.50	17.20	12.90	8.60	4.30
3"	EQ%	2.501	Full	100.00	89.60	74.00	51.70	26.50	15.90	10.90	7.80	5.40	2.90
	Linear		Full	100.00	90.00	80.00	70.00	60.00	50.00	40.00	30.00	20.00	10.00
	EQ%	2.126	1SR	65.00	58.20	48.10	33.60	17.20	10.30	7.09	5.07	3.51	1.89
	Linear		1SR	65.00	58.50	52.00	45.50	39.00	32.50	26.00	19.50	13.00	6.50

58N43 Flow Coefficients (Cv) 2-Way Single Seat Caged Balanced Valve with Cage-Retained Seat

VALVE SIZE (IN)	TRIM STYLE	TRIM SIZE	PORT SIZE	%TRAVEL									
				100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
4"	EQ%	3.376	Full	170.00	152.00	126.00	87.90	45.10	27.00	18.50	13.30	9.18	4.93
	Linear		Full	170.00	153.00	136.00	119.00	102.00	85.00	68.00	51.00	34.00	17.00
	EQ%		1SR	100.00	89.60	74.00	51.70	26.50	15.90	10.90	7.80	5.40	2.90

28N30 Flow Coefficients (Cv) 3-Way Mixing Valve

VALVE SIZE (IN)	TRIM STYLE	TRIM SIZE	PORT SIZE	%TRAVEL									
				100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
1"	Liinear	1.126	Full	10.00	9.00	8.00	7.00	6.00	5.00	4.00	3.00	2.00	1.00
		0.876	1SR	4.00	3.60	3.20	2.80	2.40	2.00	1.60	1.20	0.80	0.40
		0.626	2SR	2.00	1.80	1.60	1.40	1.20	1.00	0.80	0.60	0.40	0.20
		0.626	3SR	1.00	0.90	0.80	0.70	0.60	0.50	0.40	0.30	0.20	0.10
1 1/2"	Linear	1.676	Full	20.00	18.00	16.00	14.00	12.00	10.00	8.00	6.00	4.00	2.00
		1.438	1SR	10.00	9.00	8.00	7.00	6.00	5.00	4.00	3.00	2.00	1.00
2"	Linear	2.126	Full	40.00	36.00	32.00	28.00	24.00	20.00	16.00	12.00	8.00	4.00
		1.676	1SR	20.00	18.00	16.00	14.00	12.00	10.00	8.00	6.00	4.00	2.00

29N30 Flow Coefficients (Cv) 3-Way Mixing Valve

VALVE SIZE (IN)	TRIM STYLE	PORT SIZE	%TRAVEL									
			100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
2 - 1/2	Linear	Full	69	62.1	55.2	48.3	41.4	34.5	27.6	20.7	13.8	6.9
3	Linear	Full	86	77.4	68.8	60.2	51.6	43.0	34.4	25.8	17.2	8.6
4	Linear	Full	156	140.4	124.8	109.2	93.6	78.0	62.4	46.8	31.2	15.6
5	Linear	Full	270	243.0	216.0	189.0	162.0	135.0	108.0	81.0	54.0	27.0
6	Linear	Full	347	312.3	277.6	242.9	208.2	173.5	138.8	104.1	69.4	34.7

CONTROL VALVE

Body Sizes:	1" – 10"
End Connections:	Flanged, ANSI 125 LB., PN16, ANSI 150 LB. or 250 LB.
Body Materials:	Cast Iron, Ductile Iron, WCB Carbon Steel, CF8M Stainless Steel
Body Ratings:	ANSI 125 LB., PN16, ANSI 250 LB for Cast Iron / ANSI 150 Lb. for Ductile Iron and CF8M & WCB, ANSI 300lb for WCB and CF8M
Trim Material:	Bronze, 316 SS, 400 SS Stainless Steel,PEEK or PTFE
Valve Styles:	2-Way - Balanced & Unbalanced 3-Way - Converging flow pattern

ACTUATOR

Voltage:	Varies by selection - 24 Vac/Vdc, 110 Vac, 220 Vac
Control:	4-20 mA or 2-10 Vdc
Feedback:	2-10 Vdc – Some models also offer 4-20 mA
Linear Force:	Varies based on Actuator
Fail Modes:	Fail-In-Place or Fail-Safe on loss of power, depending on model.

CONTROLLER

Universal Power Supply: 110 – 240 Vac, 50/60 Hz.
Up to four process inputs for sensors and command signals
Up to two process outputs – one for actuator control, one for selectable feedback
Dedicated Control Algorithms and Display Interface
TCP/IP communications with Modbus (Future BACNet Model)
NEMA 4X Enclosure

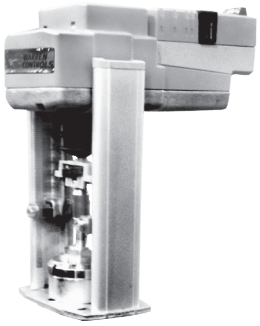
MONITROL MON-RG CLOSE OFFS

				E024		E025		E026		E029/E030		E022/E023		ACTUATOR SERIES
VALVE SERIES	SIZE	TRIM SIZE	PORT SIZE	III	IV	III	IV	III	IV	III	IV	III	IV	ANSI LEAKAGE CLASS
28N20	1"	1.126	Full	265	229	265	229	378	343	740	740	-	740	
		0.876	1SR	451	405	451	405	638	592	740	740	-	740	
		0.876	2SR	451	405	451	405	638	592	740	740	-	740	
		0.876	3SR	451	405	451	405	638	592	740	740	-	740	
		0.626	4SR	720	720	720	720	720	720	720	720	-	720	
	1 1/2"	1.676	Full	112	88	112	88	163	139	417	393	-	434	
		1.438	1SR	156	129	156	129	226	198	571	543	-	598	
		1.126	2SR	265	229	265	229	378	343	740	740	-	740	
		0.876	3SR	451	405	451	405	638	592	740	740	-	740	
		0.876	4SR	451	405	451	405	638	592	740	740	-	740	
	2"	2.126	Full	65	47	65	47	97	78	255	236	-	262	
		1.676	1SR	112	88	112	88	163	139	417	393	-	434	
		1.438	2SR	156	129	156	129	226	198	571	543	-	598	
		1.126	3SR	265	229	265	229	378	343	740	740	-	740	
		0.876	4SR	451	405	451	405	638	592	740	740	-	740	
58N40	1"	0.876	Full	-	339	-	339	-	526	-	740	-	740	
		0.501	1SR	-	740	-	740	-	740	-	740	-	740	
		0.376	2SR	-	740	-	740	-	740	-	740	-	740	
		0.251	3SR	-	740	-	740	-	740	-	740	-	740	
	1 1/2"	1.251	Full	-	138	-	138	-	229	-	686	-	740	
		0.876	1SR	-	339	-	339	-	526	-	740	-	740	
		0.501	2SR	-	740	-	740	-	740	-	740	-	740	
	2"	1.688	Full	-	57	-	57	-	108	-	358	-	398	
		1.251	1SR	-	138	-	138	-	229	-	686	-	740	
		0.876	2SR	-	339	-	339	-	526	-	740	-	740	
29N20	2 1/2"		Full	-	-	-	-	71	55	186	170	-	-	
	3"		Full	-	-	-	-	47	34	127	113	-	-	
29N23	2 1/2"		All	358	226	358	226	400	400	-	-	-	400	
	3"		All	275	140	275	140	400	300	-	-	-	400	
	4"		All	-	-	-	-	281	141	400	400	-	400	
	5"		All	-	-	-	-	187	46	400	400	-	400	
	6"		All	-	-	-	-	-	-	400	400	-	400	
	8"		All	-	-	-	-	-	-	400	400	-	400	
29N22	8"		All	-	-	-	-	-	-	400	-	400	-	
	10"		All	-	-	-	-	-	-	392	-	400	-	
58H40	2 1/2"	2.126	Full	-	-	-	-	-	-	-	-	-	232	
		1.688	1SR	-	-	-	-	-	-	-	-	-	387	
	3"	2.501	Full	-	-	-	-	-	-	-	-	-	161	
		2.126	1SR	-	-	-	-	-	-	-	-	-	232	
58H43	4"	3.376	Full	-	-	-	-	-	-	-	-	-	400	
			1SR	-	-	-	-	-	-	-	-	-	400	

				E024		E025		E026		E029/E030		E022/E023		ACTUATOR SERIES
VALVE SERIES	SIZE	TRIM SIZE	PORT SIZE	III	IV	III	IV	III	IV	III	IV	III	IV	ANSI LEAKAGE CLASS
28N30	1"	1.126	Full	265	229	265	229	378	343	740	740	-	740	
		0.876	1SR	451	405	451	405	638	592	740	740	-	740	
		0.626	2SR	720	720	720	720	720	720	720	720	-	720	
		0.626	3SR	720	720	720	720	720	720	720	720	-	720	
	1 1/2"	1.676	Full	112	88	112	88	163	139	417	393	-	434	
		1.126	1SR	265	229	265	229	378	343	740	740	-	740	
	2"	2.126	Full	65	47	65	47	97	78	255	236	-	262	
		1.676	1SR	112	88	112	88	163	139	417	393	-	434	
29N30	2 1/2"		Full	40	24	40	24	62	46	-	-	-	208	
	3"		Full	25	12	25	12	41	28	-	-	-	142	
	4"		Full	-	-	-	-	-	-	65	55	-	77	
	5"		Full	-	-	-	-	-	-	40	32	-	48	
	6"		Full	-	-	-	-	-	-	27	20	-	32	

ACTUATOR SPECIFICATIONS

E024



E025

E026

E029

E030

E024, E025, E026, E029 & E030: (Not Available for 58H40 and 58H43 Valve Series)

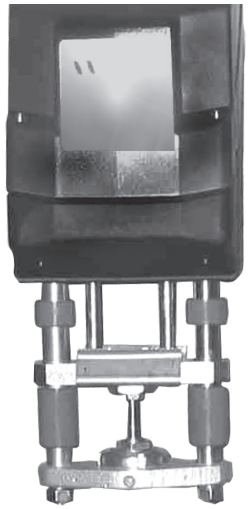
Control Signal:	2-10 Vdc (4-20 mAdc with 500 ohm resistor Kit KR500-supplied with motor)
Control Action, Loss of Signal:	Increasing Signal Opens Valve, Loss of Signal Closes Valve (Default Setting) Reversible with Switch. Can be specified when ordering.
Feedback Signal:	2-10 Vdc
Power Supply:	24 VAC/DC
Loss of Power:	**E024 & E029** (FAIL LAST POSITION) **E030** (E029 w/ VMS-35 BCM, FAIL SAFE TO LOSS OF SIGNAL POSITION) **E025 & E026** (ELECTRONIC FAIL SAFE) Fail Closed (Default Setting) Reversible with Switch. Can be specified when ordering.
Power Consumption	
Running:	**E024** 4W; **E025** 8.5W; **E026** 12W; **E029/E030** 6W
Holding:	**E024** 2.5W; **E025** 2.5W; **E026** 3W; **E029/E030** 3.5W
Timing:	See Configuration Tables
Manual Override:	Hex crank (supplied with actuator)
Construction:	Aluminum Die Cast and Plastic Housing
Locations:	NEMA Type 2 / IP54, UL enclosure type 2
Temperature Limits:	+32ºF to 122ºF Ambient
Mounting:	Vertical above centerline of valve
Safety Agency Listing:	CE , cUL

ACTUATOR SPECIFICATIONS

VM5000:

Control Signal:	4-20 mAdc (Factory Setting), 0-20 mAdc, 0-10 Vdc, or 2-10 Vdc, and Floating. Self-Adjusting, Field-Selectable
Control Action:	Increasing Signal Closes Valve (Factory Setting) - Reversible
Power Consumption:	VM5000E : 25VA
Timing:	See Configuration Tables
Feedback Signal:	0-10 Vdc or 2-10 Vdc, 4-20 mA (Factory Setting)
Manual Override:	Yes
Construction:	Polycarbonate Motor Housing with Steel Linkage and Yoke
Locations:	NEMA Type 2 / IP54 Indoor Only
Temperature Limits:	Ambient... +32F to 122F
Mounting:	Vertical Above Centerline of Valve

VM5000

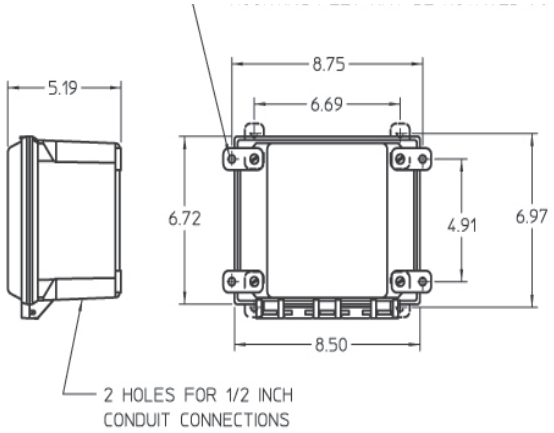


BCM SPECIFICATIONS

VMS-25 BCM:

Actuator Usage:	VM-5000
Power supply:	24 VAC ± 20% 50/60 Hz
Power Consumption:	40 VA (add VA rating for actuator used)
Construction:	Battery w/Circuit Board, Charger and Transformer
Enclosure Type:	NEMA 4X, IP66, UL 4X, CSA 4X
Flame Retardant:	UL 50
Construction:	UV Stabilized Fiberglass Reinforced Polyester, Polycarbonate Hinge and Closed Cell Neoprene Gasket
Connections:	Two 1/2 IN conduit with one plug
Battery Life:	Up to 5 years … Replacement battery model UB1213 / 12V, 1.3 Ah
Mounting:	Feet for Wall Mount (4.91" x 8.75" centers)
Environmental:	***Operating/ Storage:*** Ambient +32°F to +104°F (0 to +40°C) – due to battery
Weight:	4.25 lbs (2 kg)

VMS-25/35 BCM



VMS-35 BCM:

Actuator Usage:	E030 (E030 includes a VMS-35 BCM), E029, E024
Power supply:	24 VAC ± 20% 50/60 Hz
Power Consumption:	40 VA (add VA rating for actuator used)
Construction:	Battery w/Circuit Board, Charger and Transformer
Enclosure Type:	NEMA 4X, IP66, UL 4X, CSA 4X
Flame Retardant:	UL 50
Construction:	UV Stabilized Fiberglass Reinforced Polyester, Polycarbonate Hinge and Closed Cell Neoprene Gasket
Connections:	Two 1/2 IN conduit with one plug
Battery Life:	Up to 5 years … Replacement battery model UB1213 / 12V, 1.3 Ah
Mounting:	Feet for Wall Mount (4.91" x 8.75" centers)
Environmental:	***Operating/ Storage:*** Ambient +32°F to +104°F (0 to +40°C) – due to battery
Weight:	4.25 lbs (2 kg)

ACTUATOR CODES:

E022	VM-5000
E023	VM-5000 with VMS-25 BCM

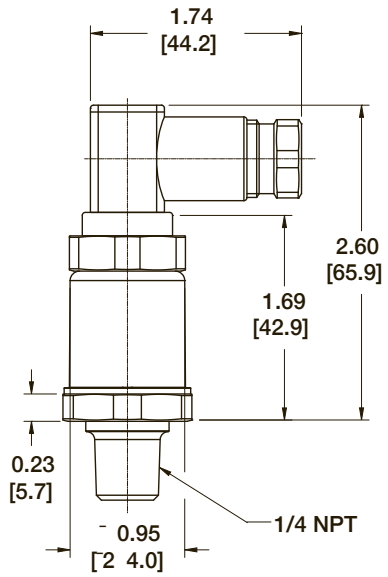
The Monitrol uses industrial grade Pressure and Temperature sensors of a particular form factor and electrical interface. For mounting into the pressure boundary of the control valve or fluid system the sensors interface with male ¼ NPT fittings. These match the fitting plugs in the Monitrol valve assemblies. Electrically they use a 3-wire connection powered from the Monitrol controller via a 5 Vdc power supply whose output is ratiometric from 4.5 Vdc to 0.5 Vdc.

The pressure sensors come in five different ranges of gauge pressure. 0 – 30 PSIG, 0 – 60 PSIG, 0 – 100 PSIG, 0 – 200 PSIG and 0 – 300 PSIG

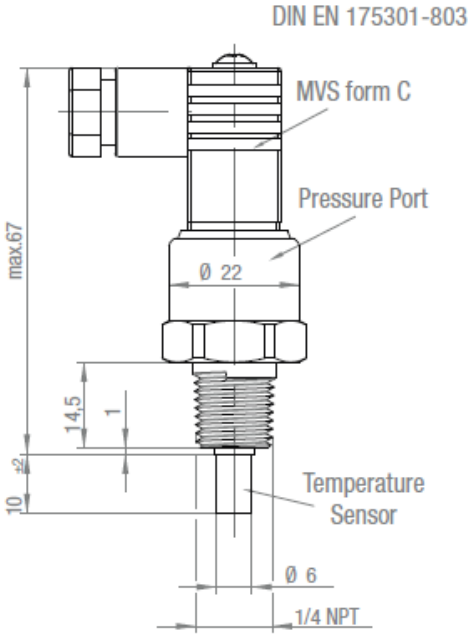
These pressure sensors can accept direct contact with fluid temperatures up to 257°F (125°C). For temperatures above this (as typically might be with saturated steam) pigtail fittings are required. The temperature sensors come in two tip lengths: either 10 mm when installed in a valve or 100 mm when installed in a larger diameter pipe. In either case it is the tip of the sensor that is sensing the temperature. The temperature sensors come in one fixed range of: – 58 to 275°F (– 50°C to 135°C)

For all other temperature requirements outside that range a standard thermocouple or 24 Vdc sourced temperature transmitter can be applied.

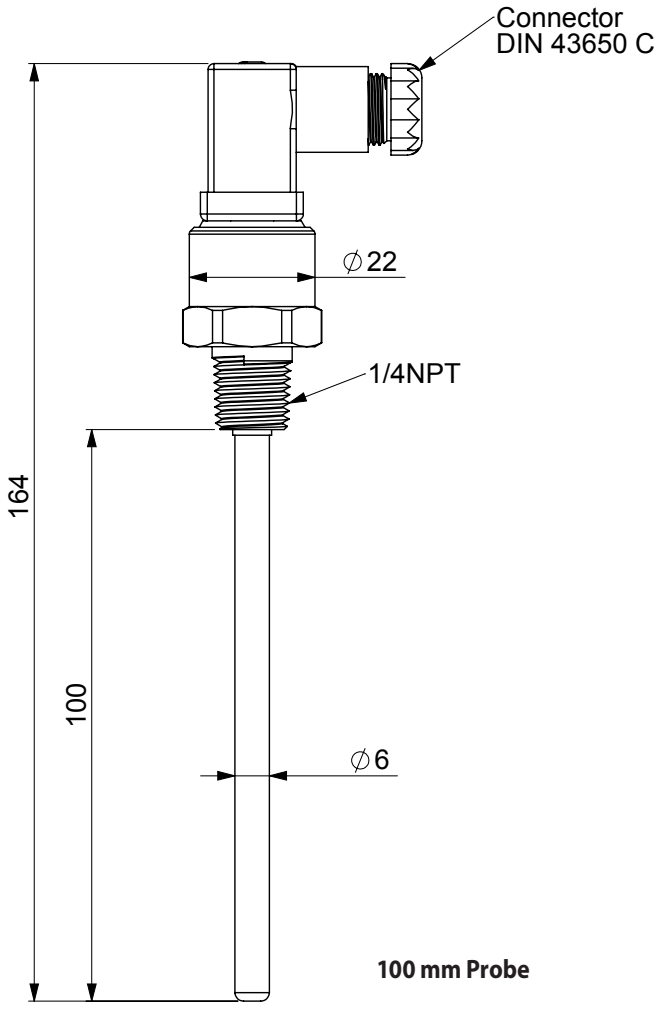
PRESSURE SENSORS



TEMPERATURE SENSORS



10 mm Probe



100 mm Probe

THE CONTROLLER

The Monitrol Controller is ordered as a separate line item. See the Monitrol Controller Product Specification for details.

The Monitrol Controller is designed to work seamlessly with the MON-RG hardware.

Incorporating dedicated algorithms for selection the MON-RG can be used as a smart pressure regulator or temperature regulator.

A Multi-Loop / Multi-Variable version of the controller additionally offers temperature control as the primary control variable and pressure as the second control variable in a cascade configuration and in addition to that a Feed-forward input variable that would be used to compensate for downstream loads changes.

ALARMS

There are (2)two each of four different types of alarms:
High limit, low limit, band alarm and deviation alarm. These are not only displayed message but also tied to digital outputs.

HOME SCREEN

The home screen of the software displays the actual flow rate, the desired flow rate, the command signal received from the supervisory system and the current valve position.

The valve can also be controlled manually from the main screen. The reset button allows any technician to reset the flow rate set point if required. Error messages are displayed in the message box on the bottom and notify the user of the current status of the system.

Configuration of the application can be accessed by pressing the settings button in the top right corner, which is password protected. The available configurations and their definitions are shown in the next page.

SETTINGS

On logging in, the settings screen allows the authorized user to configure the controller as per the requirement. The configuration screen allows user to access the parameters for various parts of the system like the actuator, supervisory system, valve and sensors.

The various options available are elaborately described. While configuring the parameters the user may press the exit button on the top right corner to exit to the home screen at anytime. This would cause the authorization to be removed unless calibration mode is on, which allows user to return to the configuration screen without re-entering the username and password.

ENCLOSURE

The two enclosures offered are polycarbonate (shown) and stainless steel. Both are NEMA 4X, include conduit fittings and in lockable front covers.

A single 4-20MA or 2-10VDC control outputs can be used to modulate a control valve or two output can be used to control two control valves.
One duel output algorithm is called staging, where only one valve is engaged at one time. The other dual output algorithm is proprietary and called load leveling. It uses up to two outputs simultaneously with demand calls to make best use of available valve capacity.

OUTPUTS

A single 4-20MA or 2-10VDC control outputs can be used to modulate a control valve or two output can be used to control two control valves.
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CONFIGURATIONS

MODEL & SERIES

Model & Family	
MON-RG-29N	Temp or Pressure Regulator Version
MON-RG-58N/ H	Temp or Pressure Regulator Version
MON-RG 28-N	Temp or Pressure Regulator Version

Valve Body	
20	Single Seat Valve 2-1/2" & 3"
22	Double Seat Valve 8" & 10" only
23	Cylinder Balanced 2 1/2"-8"
30	
40	Cage Unbalanced 2 1/2" & 3"
43	Caged Balanced 4" Only

BODY

Body Size	
100	1"
150	1" 1/2"
200	2"
250	2" 2 1/2""
300	3"
400	4"
500	5"
600	6"
800	8"
010	10"

Body Material	
R	Cast Iron
W	WCB
B	Bronze
S	CF8M

Ends	
F	ANSI 125/ 150 Lb.
G	ANSI 250/ 300 Lb.
6	PN16 Flg.
S	NPT/ ASME

Flow Char.	
E	Equal %
L	Linear

Trim Material	
B	Bronze
S	300 SS
T	PTFE w/316SS
P	PEEK w/316SS
7	400 SS (4" size 43 only)

Port Size	
F	Full Port
1	1st Reduc.
2	2nd Reduc.
E	Extnd. Port

Packing	
L	NLP - Ethylene Prop. Lip Packing
T	Teflon V-ring Self Adj.

NOTE: 400ºF for Teflon; 400ºF for NLP

Port Size: Xtnd Port ONLY available on 6" Type 23.

Bronze Trim only available in certain MON-RG-29N model valve types and port sizes. Review the specification for details

SENSORS

The Standard temperature sensor has a 'stub' tip end.

The 100 mm Temperature sensor has a 100 mm tip end. For applications above 125C (257F), where a pressure sensor is used, the optional pigtail is required in the special order code.

Fluid & Temperature are required process condtions for accepting an Order!

TRIM TYPE / VALVE SIZE / BODY MATERIAL - COMPATIBILITY	
MON-RG-28N:	Type 20 for 1", 1.5" & 2"
	Type 30 for 1", 1.5" & 2"
MON-RG-29N:	Type 20 for 2.5" & 3"
	Type 23 for 2.5", 3" , 4" , 5" , 6" & 8"
	Type 22 for 8" & 10"
	Type 30 for 2.5", 3" , 4" , 5" , 6" & 8"
MON-RG-58H:	Type 43 for 4" only - must use type '7' Trim
	Type 40 for 2.5" & 3" only
MON-RG-58N:	Type 40 for 1", 1.5" , & 2"

	Upstream Upper	*Downstream Lower*	
☐☐	☐☐	☐☐	☐☐

SENSORS

Location 1		Location 2		Location 3		Location 4	
00	No Sensor / Plug	**P0**	No Sensor/ Plug	**P0**	No Sensor/ Plug	**00**	No Sensor / Plug
P0	30 PSIG.	**P0**	30 PSIG.	**P0**	30 PSIG.	**P0**	30 PSIG.
P1	60 PSIG.	**P1**	60 PSIG.	**P1**	60 PSIG.	**P1**	60 PSIG.
P2	100 PSIG.	**P2**	100 PSIG.	**P2**	100 PSIG.	**P2**	100 PSIG.
P3	200 PSIG.	**P3**	200 PSIG.	**P3**	200 PSIG.	**P3**	200 PSIG.
P4	300 PSIG.	**P4**	300 PSIG.	**P4**	300 PSIG.	**P4**	300 PSIG.
T1	100 mm	**T1**	10 mm	**T1**	10 mm	**T1**	100 mm
T2	10 mm					**T2**	10 mm

ACTUATION

☐☐☐☐

Actuation Series	
E022	Lin. 1100 Lb. / 24 Vac Fail-In Place - VM5000 Only for 58H interface
E023	Lin. 1100 Lb. / 24 Vac w/Bat Back. - VM5000 Only for 58H interface
E024	Lin. 330 Lb. / 24 Vac Fail-in-Place - no 5800 2.5"- 4"
E025	Lin. 330 Lb. / 24 Vac w/Capacitive Backup - no 5800 2.5"- 4"
E026	Lin. 550 Lb. / 24 Vac w/Capacitive Backup - no 5800 2.5"- 4"
E029	Lin. 1100 Lb. / 24 Vac Fail-in-Place - no 5800 2.5"- 4"
E030	Lin. 1100 Lb. / 24 Vac w/Battery Backup - no 5800 2.5" - 4"
PL1A	Lin. 1100 Lb. / 24 Vac - NEMA 4X
PL1B	Lin. 1100 Lb. / 120 Vac - NEMA 4X
PL1C	Lin. 1100 Lb. / 230 Vac - NEMA 4X
PL2A	Lin. 2200 Lb. / 24 Vac - NEMA 4X
PL2B	Lin. 2200 Lb. / 120 Vac - NEMA 4X
PL2C	Lin. 2200 Lb. / 230 Vac - NEMA 4X

COMM.

☐

Protocol	
0	None
M	Modbus Ethernet
B	BACnet Ethernet

SPEC.

☐

Specials	
0	None
S	Described By Line Item

NOTE:
E024 - E030 Actuators are excluded from use on HD3A interface valves.
The E029/E030 with the 8" 23 will result in reduced MAX Cv for stroke length.
E024 & E025 Actuators are excluded for valves 4" and larger.

ACTUATOR COMPATIBILITY TABLE
Promation PL1100 & PL2200 - ALL Valves
8"- 10" compatible for all actuators except E024, E035, and E026
MON-RG-58H valve only compatible with E022, E023, and Promation Actuators
Type 20 and 30, 2.5" & 3" compatible with all actuators except E024, & E025
Type 23 and 30, 4", 5", 6", and 8" compatible w/ all except the E024, E025 actuators
Type 23, 2.5" and 3" are compatible with all actuators
Type 20 and 30, 1"- 2" are compatible with all actuators
MON-RG-58N valves compatible with all actuators

ADDITIONAL ACTUATORS

Warren Controls also offers Promation Linear actuators in 1100 Lbf and 2200 Lbf sizes. These are industrial grade actuators of heavy all metal construction featuring NEMA 4X enclosures and standard 4-20 mA control and feedback signals. This document does not cover the details of individual close off performance for each valve series with each Promation Linear actuator, nor does it cover the detail specifications of this actuator series.

For additional specifications and information on this actuator series contact Warren Controls

MON-RG PS No Rev_0815

MON-RG PRODUCT SPECIFICATION

WARREN CONTROLS

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DEPENDABLE, RUGGED, PRECISION CONTROL VALVES AND ACCESSORIES