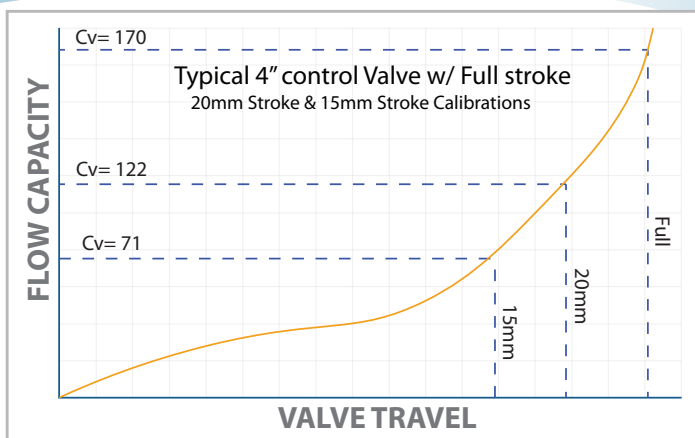


**NEW
FEATURE**

**MANAGE
YOUR STROKE,
MANAGE
YOUR FLOW**



**THIS NEW FEATURE COMES TO THE RESCUE
OF WATER HEATER APPLICATIONS USING
ARIA-ACTUATED CONTROL VALVES
FROM WARREN CONTROLS.**



It is unfortunately quite common for commercial steam-fired water heaters to be driven by a steam valve that was oversized. Oversizing can happen in a number of ways, but it is still common to size these water heaters via the 80-year-old method known as the Hunter's Curve which graphs Fixture Units against demand GPM in a predictive model. As it has been used for 80 years, it obviously works to a degree, but it isn't perfect. More often than not there is often some secondary 'hedging' involved with specifiers to knock the valve up once size after the sizing is done. It is important to realize that the Hunter's sizing method was already based on MAX demand, so adding more capacity to a control valve selection typically ruins controllability with the valve constantly cycling near the seat.

The Warren Controls ARIA Actuator now carries a new feature to let the user 'save the day', after the fact of realizing a valve may have been oversized. As the ARIA actuator inherently has a 12-bit hall-effect feedback, the controllable linear resolution is already over 2,000 parts per inch. This allows us to auto-recalibrate a prescribed shorter stroke to achieve the newly realized MAX Cv capacity for the actual demand, still with outstanding resolution and controllability.

**VARIOUS ARIA CVS
WITH FULL STROKE
AND PARTIAL STROKE
CALIBRATION**

Valve Size	4"
Valve Type	23 (Balanced)
Valve Cv	170
Valve Flow Curve	Equal Percent
Full Valve Stroke	1.125" (28.6 mm)

CV	PERCENT OF TRAVEL									
	100	90	80	70	60	50	40	30	20	10
Normal Full Stroke	170	159	143	122	95.1	62.9	31.3	15.6	9.9	4.1
20 mm calibration	122	103.1	82.2	59.7	37.6	23.5	14.5	10.5	6.4	2.9
15 mm calibration	70.9	54.2	37.6	26.2	18	13.5	10.5	7.4	4.4	2.2

Three different shorter calibration strokes are available under Auto-Cal.

- 10 mm
- 15 mm
- 20 mm

In the tables above and on the following page, you can see how tightly you can dial in your required demand for a given installation. If more capacity follows later (as in an early building start-up), the valve can always be recalibrated to the valve's full stroke.

Once deployed, when the local water heater temperature controller is calling for 100% demand, it never opens the valve more than that designated calibrated stroke value, and this is how the big difference in controllability is achieved!



TYPE 20 - UNBALANCED

2.5"
EQ%

Various ARIA Cvs with Full Stroke and Partial Stroke Calibration	Valve Size	2 1/2"
	Valve Type	20 (unbalanced)
	Valve Cv	65
	Valve Flow Curve	Equal Percent
	Full Valve Stroke	3/4" (19 mm)

PERCENT OF TRAVEL										
CV	100	90	80	70	60	50	40	30	20	10
Normal Full Stroke	65	55.6	43.8	29.8	15.4	8.1	5.7	4.1	2.8	1.5
15 mm calibration	42	30.5	16.7	11.6	7.4	5.5	4.3	3.2	2.2	1.2
10 mm calibration	10	7.4	6.2	5.7	4.4	3.6	2.9	2.3	1.6	0.7

2.5"
LIN

Various ARIA Cvs with Full Stroke and Partial Stroke Calibration	Valve Size	2 1/2"
	Valve Type	20 (unbalanced)
	Valve Cv	65
	Valve Flow Curve	LINEAR
	Full Valve Stroke	3/4" (19 mm)

PERCENT OF TRAVEL										
CV	100	90	80	70	60	50	40	30	20	10
Normal Full Stroke	65	58.5	52	45.5	39	32.5	26	19.5	13	6.5
15 mm calibration	51.3	46.1	41.1	36.1	30.8	25.7	20.5	15.4	10.3	5.1
10 mm calibration	34.2	30.8	27.4	23.9	20.5	17.1	13.7	10.3	6.8	1.7

3"
EQ%

Various ARIA Cvs with Full Stroke and Partial Stroke Calibration	Valve Size	3"
	Valve Type	20 (unbalanced)
	Valve Cv	90
	Valve Flow Curve	Equal Percent
	Full Valve Stroke	3/4" (19 mm)

PERCENT OF TRAVEL										
CV	100	90	80	70	60	50	40	30	20	10
Normal Full Stroke	90	83.6	75.1	63.8	49.2	31.6	12.9	4.8	3.4	2
15 mm calibration	74	65	53.8	40.9	26.7	12.5	6.1	3.9	2.8	1.8
10 mm calibration	36	26.7	16.8	10.3	6.1	4.3	3.5	2.8	2.1	1.1

3"
LIN

Various ARIA Cvs with Full Stroke and Partial Stroke Calibration	Valve Size	3"
	Valve Type	20 (unbalanced)
	Valve Cv	90
	Valve Flow Curve	LINEAR
	Full Valve Stroke	3/4" (19 mm)

PERCENT OF TRAVEL										
CV	100	90	80	70	60	50	40	30	20	10
Normal Full Stroke	90	81	72	63	54	45	36	27	18	9
15 mm calibration	71	64	56.8	49.7	42.6	35.5	28.4	21.3	14.2	7.1
10 mm calibration	47.3	42.6	37.9	33.2	28.4	23.7	19	14.2	9.5	4.7

4"
EQ%

Various ARIA Cvs with Full Stroke and Partial Stroke Calibration	Valve Size	4"
	Valve Type	20 (unbalanced)
	Valve Cv	170
	Valve Flow Curve	Equal Percent
	Full Valve Stroke	1.25" (31.8 mm)

PERCENT OF TRAVEL										
CV	100	90	80	70	60	50	40	30	20	10
Normal Full Stroke	170	159	143	122	95.1	62.9	31.3	15.6	9.9	4.1
20 mm calibration	103	84.2	63.9	44	27.8	17.9	12.8	9.2	5.6	2.6
15 mm calibration	54	39	27.8	20.3	14.6	12.1	9.2	6.5	3.9	1.9

4"
LIN

Various ARIA Cvs with Full Stroke and Partial Stroke Calibration	Valve Size	4"
	Valve Type	20 (unbalanced)
	Valve Cv	170
	Valve Flow Curve	LINEAR
	Full Valve Stroke	1.25" (31.8 mm)

PERCENT OF TRAVEL										
CV	100	90	80	70	60	50	40	30	20	10
Normal Full Stroke	170	153	136	119	102	85	68	51	34	17
20 mm calibration	107	96.2	85.5	74.9	64.2	53.5	42.8	32.1	21.4	10.7
15 mm calibration	80.2	72.2	64.2	56.1	48.1	40.1	32.1	24.1	16	8

TYPE 23 - BALANCED

2.5"
EQ%

Various ARIA Cvs with Full Stroke and Partial Stroke Calibration	Valve Size	2 1/2"
	Valve Type	23 (Balanced)
	Valve Cv	65
	Valve Flow Curve	Equal Percent
	Full Valve Stroke	3/4" (19 mm)

PERCENT OF TRAVEL										
CV	100	90	80	70	60	50	40	30	20	10
Normal Full Stroke	65	55.6	43.8	29.8	15.4	8.1	5.7	4.1	2.8	1.5
15 mm calibration	42	30.5	16.7	11.6	7.4	5.5	4.3	3.2	2.2	1.2
10 mm calibration	10	7.4	6.2	5.7	4.4	3.6	2.9	2.3	1.6	0.7

2.5"
LIN

Various ARIA Cvs with Full Stroke and Partial Stroke Calibration	Valve Size	2 1/2"
	Valve Type	23 (Balanced)
	Valve Cv	65
	Valve Flow Curve	LINEAR
	Full Valve Stroke	3/4" (19 mm)

PERCENT OF TRAVEL										
CV	100	90	80	70	60	50	40	30	20	10
Normal Full Stroke	65	58.5	52	45.5	39	32.5	26	19.5	13	6.5
15 mm calibration	51.3	46.1	41.1	36.1	30.8	25.7	20.5	15.4	10.3	5.1
10 mm calibration	34.2	30.8	27.4	23.9	20.5	17.1	13.7	10.3	6.8	1.7

3"
EQ%

Various ARIA Cvs with Full Stroke and Partial Stroke Calibration	Valve Size	3"
	Valve Type	23 (Balanced)
	Valve Cv	90
	Valve Flow Curve	Equal Percent
	Full Valve Stroke	3/4" (19 mm)

PERCENT OF TRAVEL										
CV	100	90	80	70	60	50	40	30	20	10
Normal Full Stroke	90	83.6	75.1	63.8	49.2	31.6	12.9	4.8	3.4	2
15 mm calibration	74	65	53.8	40.9	26.7	12.5	6.1	3.9	2.8	1.8
10 mm calibration	36	26.7	16.8	10.3	6.1	4.3	3.5	2.8	2.1	1.1

3"
LIN

Various ARIA Cvs with Full Stroke and Partial Stroke Calibration	Valve Size	3"
	Valve Type	23 (Balanced)
	Valve Cv	90
	Valve Flow Curve	LINEAR
	Full Valve Stroke	3/4" (19 mm)

PERCENT OF TRAVEL										
CV	100	90	80	70	60	50	40	30	20	10
Normal Full Stroke	90	81	72	63	54	45	36	27	18	9
15 mm calibration	71	64	56.8	49.7	42.6	35.5	28.4	21.3	14.2	7.1
10 mm calibration	47.3	42.6	37.9	33.2	28.4	23.7	19	14.2	9.5	4.7

4"
EQ%

Various ARIA Cvs with Full Stroke and Partial Stroke Calibration	Valve Size	4"
	Valve Type	23 (Balanced)
	Valve Cv	170
	Valve Flow Curve	Equal Percent
	Full Valve Stroke	1.125" (28.6 mm)

PERCENT OF TRAVEL										
CV	100	90	80	70	60	50	40	30	20	10
Normal Full Stroke	170	159	143	122	95.1	62.9	31.3	15.6	9.9	4.1
20 mm calibration	122	103.1	82.2	59.7	37.6	23.5	14.5	10.5	6.4	2.9
15 mm calibration	70.9	54.2	37.6	26.2	18	13.5	10.5	7.4	4.4	2.2

4"
LIN

Various ARIA Cvs with Full Stroke and Partial Stroke Calibration	Valve Size	4"
	Valve Type	23 (Balanced)
	Valve Cv	170
	Valve Flow Curve	LINEAR
	Full Valve Stroke	1.125" (28.6 mm)

PERCENT OF TRAVEL										
CV	100	90	80	70	60	50	40	30	20	10
Normal Full Stroke	170	153	136	119	102	85	68	51	34	17
20 mm calibration	119	107.1	95.2	83.3	71.4	59.5	47.6	35.7	23.8	11.9
15 mm calibration	93.9	80.3	71.4	62.5	53.6	44.6	35.7	26.8	17.9	9