

Bettis RGS Q-Series

Quarter-Turn Spring-Return (SR) and Double-Acting (DA) Pneumatic Actuators

- Output Torques to 21,000 in-lb (2373 N·m)
- Ductile Iron or Stainless-Steel Construction
- Temperatures from -60°F to 450°F (-51°C to 232°C)
- Double-Acting and Spring-Return Models
- High Cycle Life, High Speed, High Reliability

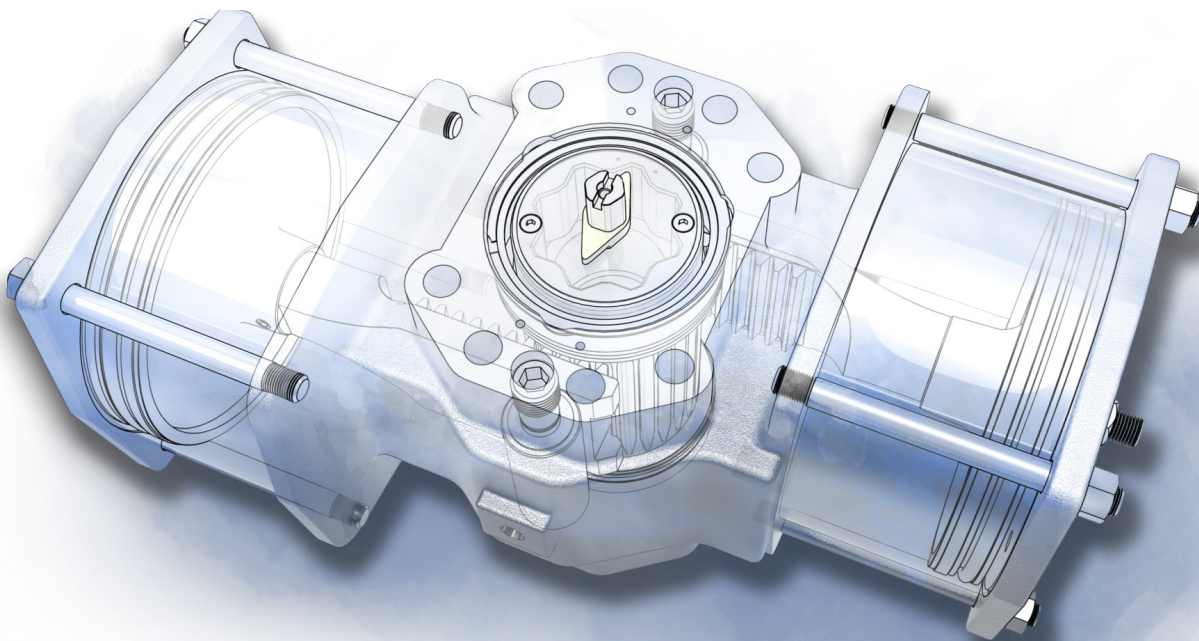


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Operation and Piping

Bettis RGS Q-Series actuators may be operated with instrument air, hydraulic fluid, water, or other power gases and fluids. Always ensure that the materials of construction are compatible with the application and that the pressure does not exceed the maximum allowable.

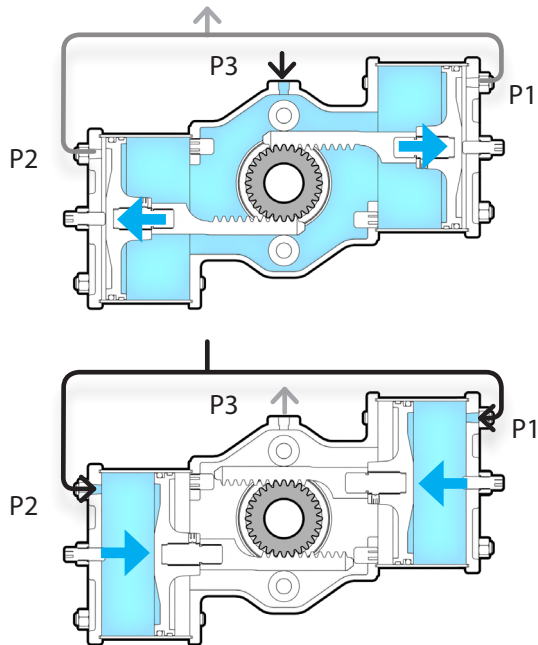
All Bettis actuators are shipped in the Fail-Close or Left-Hand orientation unless ordered as Fail-Open or Right-Hand. The mode of operation may be reversed in the field simply by turning the actuator top-side down.

- 1. Fail-Close (Left-Hand):** pressure on the end cap port(s) pushes the piston(s) inward resulting in counterclockwise rotation. Exhaustion of air allows springs to push outward on the piston and cause clockwise rotation.
- 2. Fail-Open (Right-Hand):** pressure on the end cap port(s) pushes the piston(s) inward resulting in clockwise rotation. Exhaustion of air allows springs push outward on the piston and cause counterclockwise rotation.
- 3. Double-Acting (Left-Hand):** pressure on the end cap port(s) pushes the piston(s) inward and causes counterclockwise rotation. Pressure on the body port pushes outward on the piston(s) and cause clockwise rotation.
- 4. Double-Acting (Right-Hand):** pressure on the end cap port(s) pushes the piston(s) inward and causes clockwise rotation. Pressure on the body port pushes outward on the piston(s) and cause counterclockwise rotation.

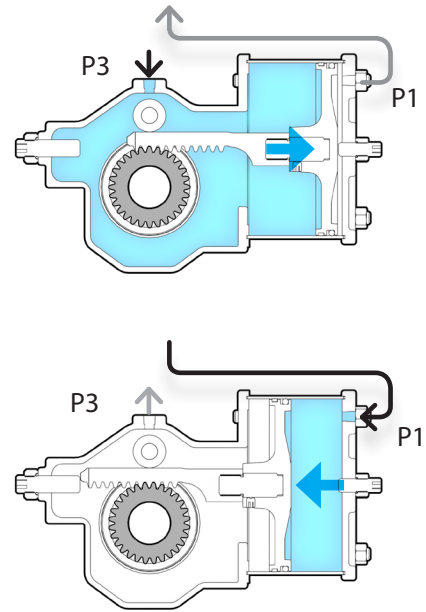
Piping Guidelines

1. Dual cylinder models (205, 210, 214), both endcap pressure ports (P1 and P2) must be utilized for proper operation.
2. P1 and P2 are typically connected together and powered by a single air pathway.
3. Single Cylinder models (203, 204, 207, 212), port 2 (P2) does not exist.
4. Spring-Return (SR) models port 3 (P3) is a breather port.
5. P3 is a pressure port for Double-Acting models.
6. P3 is a breather port for single cylinder SR models.

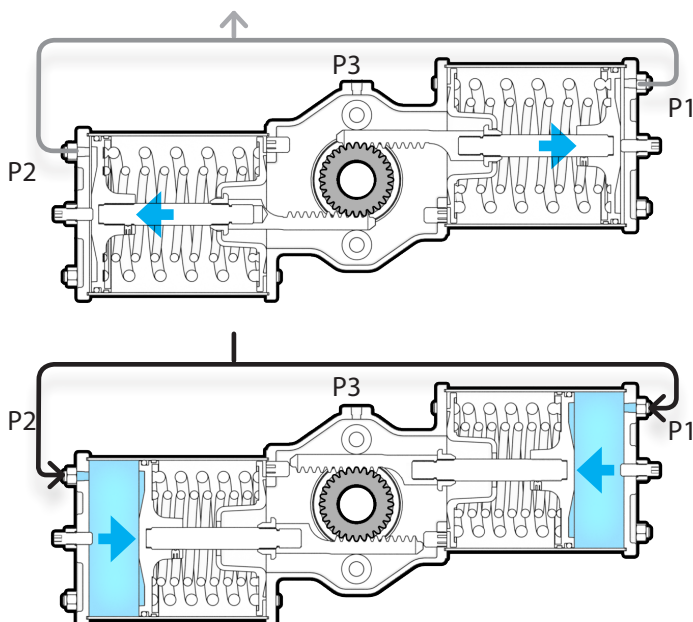
205DA, 210DA, 214DA



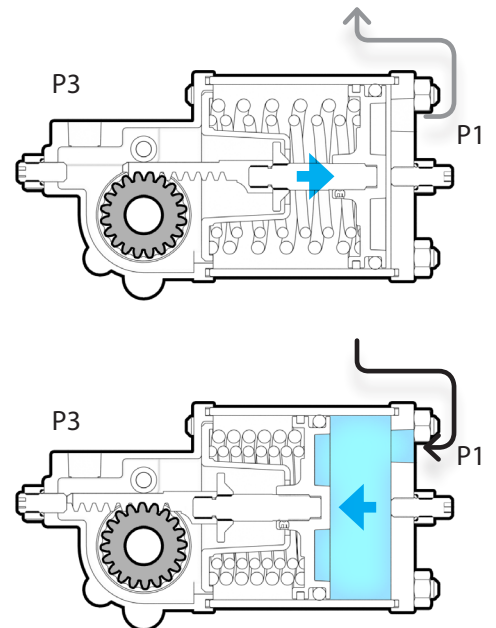
203DA, 204DA, 207DA, 212DA



205SR, 210SR, 214SR

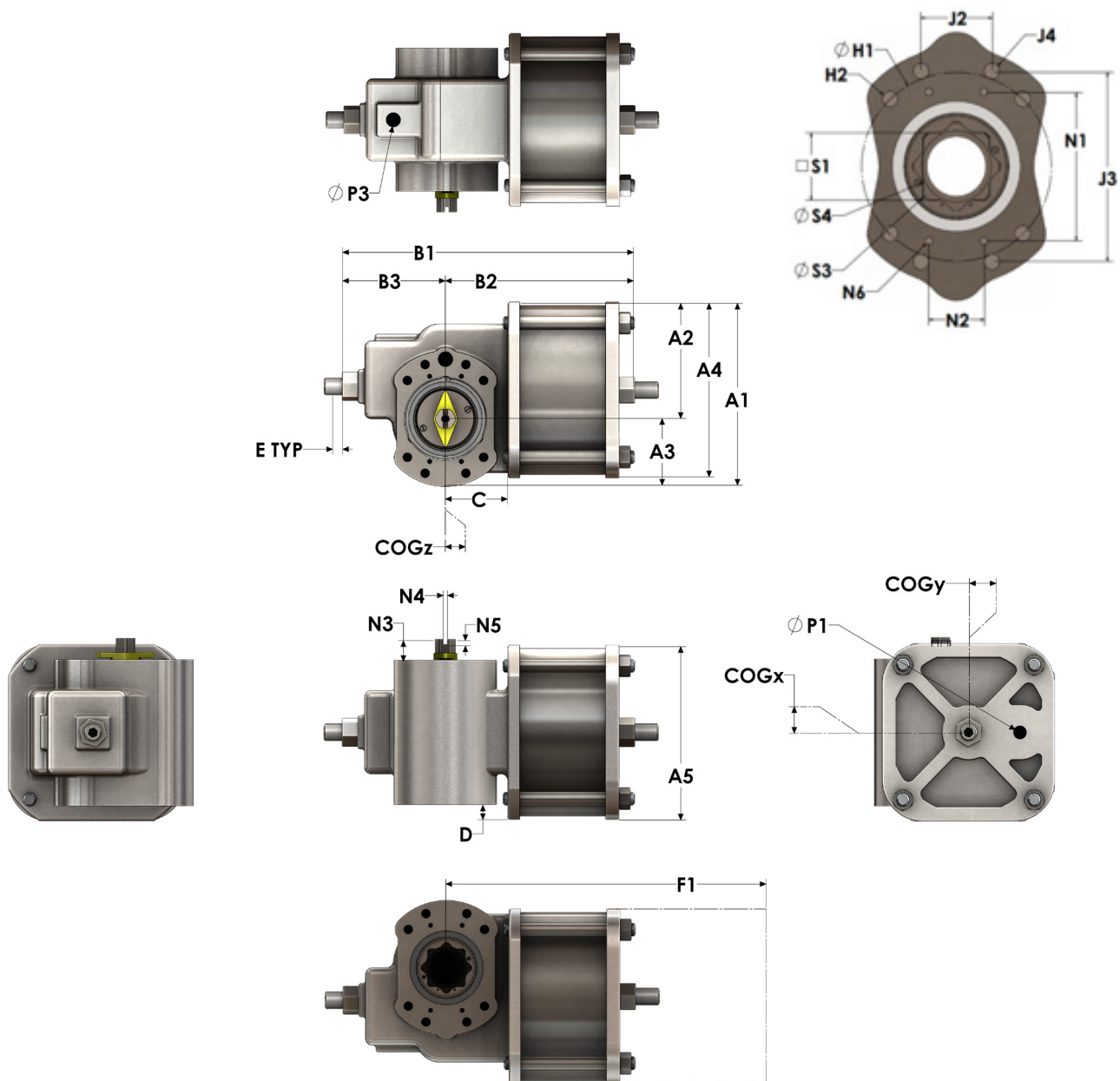


203SR, 204SR, 207SR, 212SR

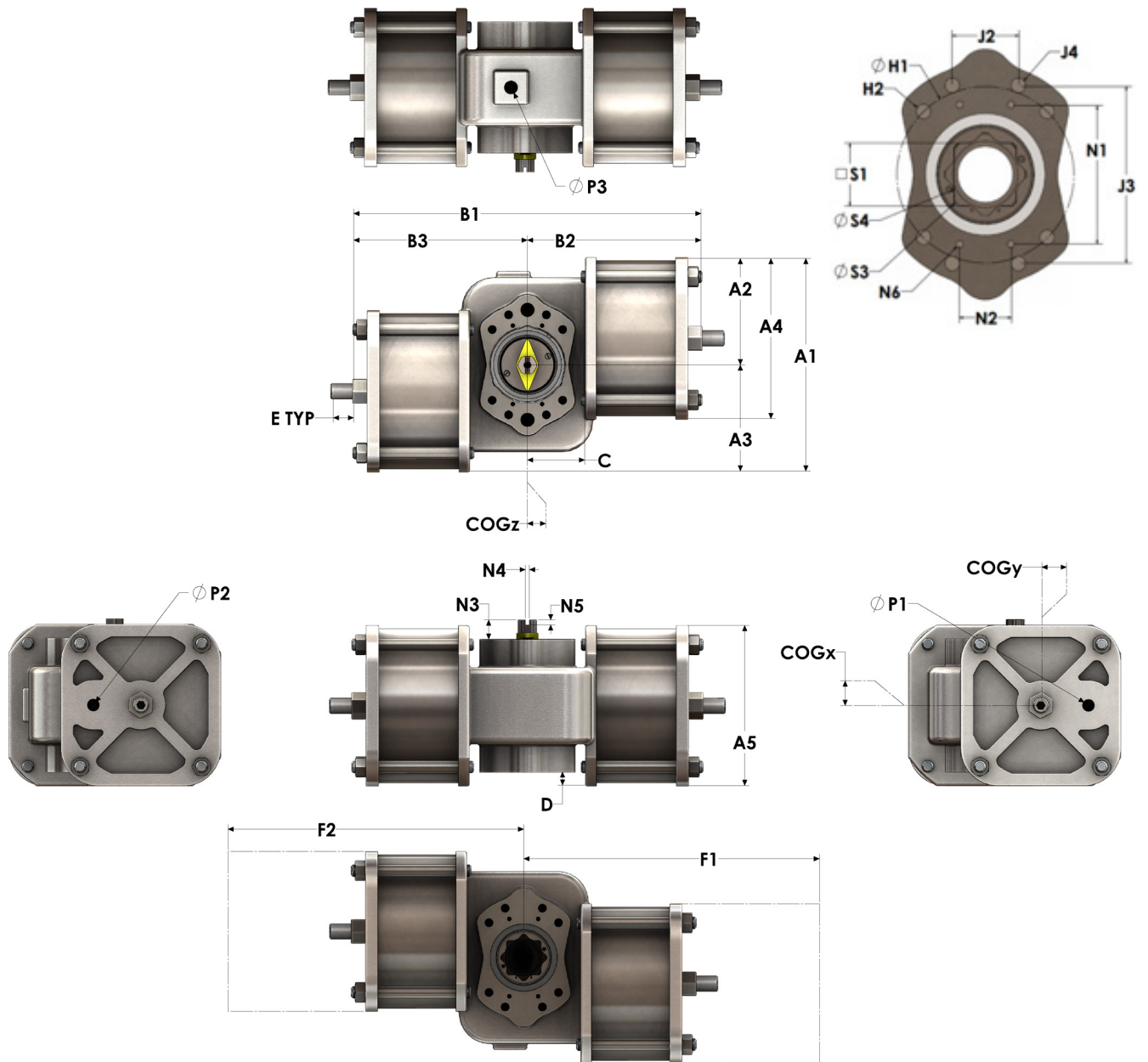


Dimension and Technical Data

Single Cylinder Models (203, 204, 207, 212)



Dual Cylinder Models (205, 210, 214)



Dimension and Technical Data (Imperial, Inches)

ENVELOPE DIMENSIONS		203		204		205		207	
		DA	SR	DA	SR	DA	SR	DA	SR
Width Total	A1	4.19		4.75		5.75		6.81	
Width Side 1	A2	2.31		2.88		2.88		4.31	
Width Side 2	A3	1.88		1.88		2.88		2.50	
Width Cylinder	A4	3.38		4.50		4.50		6.50	
Height Cylinder	A5	3.38		4.50		4.50		6.50	
Length Total	B1	5.71	6.67	7.16	9.01	9.10	12.80	10.89	15.19
Length Side 1	B2	3.77	4.73	4.55	6.40	4.55	6.40	7.05	11.35
Length Side 2	B3	1.94		2.61		4.55	6.40	3.85	
Flange Distance	C	0.82		1.43		1.43		2.15	
Flange Depth*	D	0.00		0.00		0.00		0.54	
Stop Extension	E	0.29		0.29		0.29		0.68	
Maint. Clearance	F1	5.71	7.63	6.43	10.13	6.43	10.13	10.25	18.83
Maint. Clearance	F2	-		-		6.43	10.13	-	

*On 203, 204, and 205 models, the cylinder flange is flush with the mounting surface.

ISO BOLT PATTERN		F05	F05/F07	F05/F07	F10
BCD 1	H1	1.969	1.969	1.969	4.016
Thread 1	H2	M6-1	M6-1	M6-1	M10-1.5
BCD 2	J1	-	2.756	2.756	-
RECT X	J2	-	-	-	1.52
RECT Y	J3	-	-	-	4.02
Thread 2	J4	-	M8-1.25	M8-1.25	-
Thread depth		0.63	0.63	0.63	0.88

Identical mounting patterns on both sides of actuator for all sizes. Size 203 has a single ISO pattern. Sizes 204/205 have two ISO patterns. Sizes 207/210/212/214 have an ISO pattern and a rectangular pattern.

NAMUR PATTERN		1	1	1	1
Length	N1	3.15	3.15	3.15	3.15
Width	N2	1.18	1.18	1.18	1.18
Height	N3	0.79	0.79	0.79	0.79
Slot Width	N4	0.157	0.157	0.157	0.157
Slot Depth	N5	0.197	0.197	0.197	0.197
Thread 2	N6	M5-0.8	M5-0.8	M5-0.8	M5-0.8
Thread Depth		0.375	0.375	0.375	0.375

The NAMUR slotted drive can be moved to the opposite side for field reversibility. 203, 204, and 205 sizes include a removable NAMUR adapter plate that can be moved to the opposite side.
The NAMUR adapter plate covers the accessory side mounting patterns when installed.

ENVELOPE DIMENSIONS		210		212		214		216
		DA	SR	DA	SR	DA	SR	SR
Width Total	A1	8.62		10.06		12.24		18.14
Width Side 1	A2	4.31		6.12		6.12		9.07
Width Side 2	A3	4.31		3.95		6.12		9.07
Width Cylinder	A4	6.50		8.75		8.75		14.50
Height Cylinder	A5	6.50		8.75		8.75		14.50
Length Total	B1	14.10	22.70	15.95	20.68	20.31	29.77	37.00
Length Side 1	B2	7.05	11.35	10.16	14.89	10.16	14.89	18.50
Length Side 2	B3	7.05	11.35	5.80		10.16	14.89	18.50
Flange Distance	C	2.15		3.93		3.93		3.93
Flange Depth*	D	0.54		0.38		0.38		3.38
Stop Extension	E	0.68		0.59		0.59		0.59
Maint. Clearance	F1	10.25	18.83	14.50	23.85	14.50	23.85	31.08
Maint. Clearance	F2	10.25	18.83	-		14.50	23.85	31.08

*On 203, 204, and 205 models, the cylinder flange is flush with the mounting surface.

ISO BOLT PATTERN		F10	F16	F16	F16
BCD 1	H1	4.016	6.496	6.496	6.496
Thread 1	H2	M10-1.5	M20-2.5	M20-2.5	M20-2.5
BCD 2	J1	-	-	-	-
RECT X	J2	1.52	2.00	2.00	2.00
RECT Y	J3	4.02	6.50	6.50	6.50
Thread 2	J4	-	-	-	-
Thread depth		0.88	1.00	1.00	1.00

Identical mounting patterns on both sides of actuator for all sizes. Size 203 has a single ISO pattern. Sizes 204/205 have two ISO patterns. Sizes 207/210/212/214 have an ISO pattern and a rectangular pattern.

NAMUR PATTERN		1	3	3	3
Length	N1	3.15	5.12	5.12	5.12
Width	N2	1.18	1.18	1.18	1.18
Height	N3	0.79	1.18	1.18	1.18
Slot Width	N4	0.157	0.157	0.157	0.157
Slot Depth	N5	0.197	0.197	0.197	0.197
Thread 2	N6	M5-0.8	M5-0.8	M5-0.8	M5-0.8
Thread Depth		0.375	0.375	0.375	0.375

The NAMUR slotted drive can be moved to the opposite side for field reversibility. 203, 204, and 205 sizes include a removable NAMUR adapter plate that can be moved to the opposite side. The NAMUR adapter plate covers the accessory side mounting patterns when installed.

DOUBLE SQUARE FEMALE DRIVE		203		204		205		207	
		DA	SR	DA	SR	DA	SR	DA	SR
		F07		F07		F07		F14	
Square	S1	0.669		0.669		0.669		1.417	
Square Depth	S2	1.30		1.30		1.30		1.00	
Outer Diameter	S3	0.870		0.870		0.870		1.890	
Inner Diameter	S4	0.750		0.750		0.750		1.600	

Identical double square female drive on both sides of the actuator for all sizes.

AIR VOLUME cubic inches (cu in)		203		204		205		207	
Body		14	-	25	-	44	-	111	-
End Caps		9		15		30		59	

PORT SIZE (P1, P2, P3)		203		204		205		207	
Normal		1/4" NPT		1/4" NPT		1/4" NPT		1/4" NPT	
Max		1/2" NPT		1/2" NPT		1/2" NPT		3/4" NPT	

STROKE TIME seconds (sec)		203		204		205		207	
Normal		0.25		0.5		0.5		1	
Min		0.01		0.015		0.015		0.03	

*Stroke time varies with supply pressure, temperature, spring rate, travel adjustment, working medium, piping, accessory flow rates, and valve torque. Values shown with no valve resistance.

CENTER OF GRAVITY		203		204		205		207	
COGx		0.41	0.45	0.43	0.47	0.00	0.00	0.88	0.88
COGy		0.11	0.10	0.04	0.04	0.04	0.03	0.01	0.01
COGz*		1.1/1.2	1.5/1.7	1.1/1.3	1.8/2.1	0.00	0.00	1.9/2.3	4.1/4.4

*CoGz is variable for some models and changes with actuator stroke. Values are shown as min/max.

WEIGHT pounds (lb)		203		204		205		207	
QS - Stainless		6	7	14	17	22	29	33	51
QD - Ductile		5	6	12	14	19	24	29	45

MAX RATED TORQUE (in-lb)	500	825	1650	3300
MAX PRESSURE (psig)	150	150	150	150

TEMPERATURE LIMITS		
Low	Standard	High
-60°F to 185°F	-20°F to 185°F	-20°F to 400°F

Environmental temperature requirements may limit the use of certain trim materials. Temperature ranges may be extended with proper insulation. Ductile iron units may be used in low temperature (less than -20°F), but stroke speed should be limited to prevent brittle fracture. Extended temperature ranges available upon request.

DOUBLE SQUARE FEMALE DRIVE		210		212		214		216
		DA	SR	DA	SR	DA	SR	SR
		F14		F25		F25		F25
Square	S1	1.417		2.165		2.165		2.165
Square Depth	S2	1.00		1.80		1.80		1.80
Outer Diameter	S3	1.890		2.870		2.870		2.870
Inner Diameter	S4	1.600		2.430		2.430		2.430

Identical double square female drive on both sides of the actuator for all sizes.

AIR VOLUME cubic inches (cu in)							
Body	166	-	302	-	469	-	-
End Caps	117		163		326		700

PORT SIZE (P1, P2, P3)							
Normal	1/4" NPT		1/4" NPT		1/4" NPT		3/4" NPT
Max	3/4" NPT		1" NPT		1" NPT		2 1/2" NPT

STROKE TIME seconds (sec)							
Normal	1		3		3		3
Min	0.03		0.05		0.05		0.05

*Stroke time varies with supply pressure, temperature, spring rate, travel adjustment, working medium, piping, accessory flow rates, and valve torque. Values shown with no valve resistance.

CENTER OF GRAVITY							
COGx	0.00	0.00	0.94	1.12	0.01	0.01	0.00
COGy	0.00	0.00	0.01	0.00	0.01	0.00	0.00
COGz*	0.00	0.00	2.2/2.8	4.5/4.9	0.00	0.00	0.00

*CoGz is variable for some models and changes with actuator stroke. Values are shown as min/max.

WEIGHT pounds (lb)							
QS - Stainless	52	88	87	113	126	177	455
QD - Ductile	44	78	78	102	111	155	418

MAX RATED TORQUE (in-lb)	6600		10500		21000		21000
MAX PRESSURE (psig)	150		150		150		120

TEMPERATURE LIMITS		
Low	Standard	High
-60°F to 185°F	-20°F to 185°F	-20°F to 400°F

Environmental temperature requirements may limit the use of certain trim materials. Temperature ranges may be extended with proper insulation. Ductile iron units may be used in low temperature (less than -20°F), but stroke speed should be limited to prevent brittle fracture. Extended temperature ranges available upon request.

Dimension and Technical Data (Metric, Millimeters)

ENVELOPE DIMENSIONS		203		204		205		207	
		DA	SR	DA	SR	DA	SR	DA	SR
Width Total	A1	106		121		146		173	
Width Side 1	A2	59		73		73		109	
Width Side 2	A3	48		48		73		64	
Width Cylinder	A4	86		114		114		165	
Height Cylinder	A5	86		114		114		165	
Length Total	B1	145	169	182	229	231	325	277	386
Length Side 1	B2	96	120	116	163	116	163	179	288
Length Side 2	B3	49		66		116	163	98	
Flange Distance	C	21		36		36		55	
Flange Depth*	D	0		0		0		14	
Stop Extension	E	7		7		7		17	
Maint. Clearance	F1	145	194	163	257	163	257	260	478
Maint. Clearance	F2	-		-		163	257	-	

*On 203, 204, and 205 models, the cylinder flange is flush with the mounting surface.

ISO BOLT PATTERN		F05	F05/F07	F05/F07	F10
BCD 1	H1	50.0	50.0	50.0	102.0
Thread 1	H2	M6-1	M6-1	M6-1	M10-1.5
BCD 2	J1	-	70.0	70.0	-
RECT X	J2	-	-	-	38.6
RECT Y	J3	-	-	-	102.0
Thread 2	J4	-	M8-1.25	M8-1.25	-
Thread depth		15.9	15.9	15.9	22.2

Identical mounting patterns on both sides of actuator for all sizes. Size 203 has a single ISO pattern. Sizes 204/205 have two ISO patterns. Sizes 207/210/212/214 have an ISO pattern and a rectangular pattern.

NAMUR PATTERN		1	1	1	1
Length	N1	80	80	80	80
Width	N2	30	30	30	30
Height	N3	20	20	20	20
Slot Width	N4	4	4	4	4
Slot Depth	N5	5	5	5	5
Thread 2	N6	M5-0.8	M5-0.8	M5-0.8	M5-0.8
Thread Depth		9.5	9.5	9.5	9.5

The NAMUR slotted drive can be moved to the opposite side for field reversibility. 203, 204, and 205 sizes include a removable NAMUR adapter plate that can be moved to the opposite side.
The NAMUR adapter plate covers the accessory side mounting patterns when installed.

ENVELOPE DIMENSIONS		210		212		214		216
		DA	SR	DA	SR	DA	SR	SR
Width Total	A1	219		256		311		460
Width Side 1	A2	109		155		155		231
Width Side 2	A3	109		100		155		231
Width Cylinder	A4	165		222		222		368
Height Cylinder	A5	165		222		222		368
Length Total	B1	358	577	405	525	516	756	940
Length Side 1	B2	179	288	258	378	258	378	476
Length Side 2	B3	179	288	147		258	378	476
Flange Distance	C	55		100		100		100
Flange Depth*	D	14		10		10		86
Stop Extension	E	17		15		15		15
Maint. Clearance	F1	260	478	368	606	368	606	790
Maint. Clearance	F2	260	478	-		368	606	790

*On 203, 204, and 205 models, the cylinder flange is flush with the mounting surface.

ISO BOLT PATTERN		F10	F16	F16	F16
BCD 1	H1	102.0	165.0	165.0	165.0
Thread 1	H2	M10-1.5	M20-2.5	M20-2.5	M20-2.5
BCD 2	J1	-	-	-	-
RECT X	J2	38.6	50.8	50.8	50.8
RECT Y	J3	102.0	165.1	165.1	165.1
Thread 2	J4	-	-	-	-
Thread depth		22.2	25.4	25.4	25.4

Identical mounting patterns on both sides of actuator for all sizes. Size 203 has a single ISO pattern. Sizes 204/205 have two ISO patterns. Sizes 207/210/212/214 have an ISO pattern and a rectangular pattern.

NAMUR PATTERN		1	3	3	3
Length	N1	80	130	130	130
Width	N2	30	30	30	30
Height	N3	20	30	30	30
Slot Width	N4	4	4	4	4
Slot Depth	N5	5	5	5	5
Thread 2	N6	M5-0.8	M5-0.8	M5-0.8	M5-0.8
Thread Depth		9.5	9.5	9.5	9.5

The NAMUR slotted drive can be moved to the opposite side for field reversibility. 203, 204, and 205 sizes include a removable NAMUR adapter plate that can be moved to the opposite side. The NAMUR adapter plate covers the accessory side mounting patterns when installed.

DOUBLE SQUARE FEMALE DRIVE		203		204		205		207	
		DA	SR	DA	SR	DA	SR	DA	SR
		F07		F07		F07		F14	
Square	S1	17		17		17		36	
Square Depth	S2	33		33		33		25	
Outer Diameter	S3	22.1		22.1		22.1		48.0	
Inner Diameter	S4	19.1		19.1		19.1		40.6	

Identical double square female drive on both sides of the actuator for all sizes.

AIR VOLUME liters (L)		203		204		205		207	
Body		0.23	-	0.40	-	0.72	-	1.81	-
End Caps		0.15		0.25		0.49		0.97	

PORT SIZE (P1, P2, P3)		203		204		205		207	
Normal		1/4" NPT		1/4" NPT		1/4" NPT		1/4" NPT	
Max		1/2" NPT		1/2" NPT		1/2" NPT		3/4" NPT	

STROKE TIME seconds (sec)		203		204		205		207	
Normal		0.25		0.5		0.5		1	
Min		0.01		0.015		0.015		0.03	

*Stroke time varies with supply pressure, temperature, spring rate, travel adjustment, working medium, piping, accessory flow rates, and valve torque. Values shown with no valve resistance.

CENTER OF GRAVITY		203		204		205		207	
COGx		10	11	11	12	0	0	22	22
COGy		3	3	1	1	1	1	0	0
COGz*		27/31	39/42	28/33	46/53	0.00	0.00	47/57	104/112

*CoGz is variable for some models and changes with actuator stroke. Values are shown as min/max.

WEIGHT kilograms (kg)		203		204		205		207	
QS - Stainless		2.7	3.2	6.4	7.7	10.0	13.2	15.0	23.2
QD - Ductile		2.3	2.7	5.5	6.4	8.6	10.9	13.2	20.5

MAX RATED TORQUE (N·m)	56	93	186	373
MAX PRESSURE (bar)	10.34	10.34	10.34	10.34

TEMPERATURE LIMITS		
Low	Standard	High
-51°C to 85°C	-28°C to 85°C	-28°C to 204°C

Environmental temperature requirements may limit the use of certain trim materials. Temperature ranges may be extended with proper insulation. Ductile iron units may be used in low temperature (less than -28°C), but stroke speed should be limited to prevent brittle fracture. Extended temperature ranges available upon request.

DOUBLE SQUARE FEMALE DRIVE		210		212		214		216
		DA	SR	DA	SR	DA	SR	SR
		F14		F25		F25		F25
Square	S1	36		55		55		55
Square Depth	S2	25		46		46		46
Outer Diameter	S3	48.0		72.9		72.9		72.9
Inner Diameter	S4	40.6		61.7		61.7		61.7

Identical double square female drive on both sides of the actuator for all sizes.

AIR VOLUME liters (L)							
Body	2.72	-	4.95	-	7.69	-	-
End Caps	1.92		2.67		5.34		11.47

PORT SIZE (P1, P2, P3)							
Normal	1/4" NPT		1/4" NPT		1/4" NPT		3/4" NPT
Max	3/4" NPT		1" NPT		1" NPT		2 1/2" NPT

STROKE TIME seconds (sec)							
Normal	1		3		3		3
Min	0.03		0.05		0.05		0.10

*Stroke time varies with supply pressure, temperature, spring rate, travel adjustment, working medium, piping, accessory flow rates, and valve torque. Values shown with no valve resistance.

CENTER OF GRAVITY							
COGx	0	0	24	28	0	0	0
COGy	0	0	0	0	0	0	0
COGz*	0.00	0.00	56/71	114/124	0.00	0.00	0

*CoGz is variable for some models and changes with actuator stroke. Values are shown as min/max.

WEIGHT kilograms (kg)							
QS - Stainless	23.6	40.0	39.5	51.4	57.3	80.5	206.8
QD - Ductile	20.0	35.5	35.5	46.4	50.5	70.5	190.0

MAX RATED TORQUE (N·m)	746		1186		2373		2373
MAX PRESSURE (bar)	10.34		10.34		10.34		8.27

TEMPERATURE LIMITS		
Low	Standard	High
-51°C to 85°C	-28°C to 85°C	-28°C to 204°C

Environmental temperature requirements may limit the use of certain trim materials. Temperature ranges may be extended with proper insulation. Ductile iron units may be used in low temperature (less than -28°C), but stroke speed should be limited to prevent brittle fracture. Extended temperature ranges available upon request.

Pressure Equipment Directive (PED) Category Determination

The European Pressure Equipment Directive (PED, 2014/68/EU, supersedes 97/23/EC) requires equipment to be placed in categories based on Fluid Group and Bar Liter rating. Determination of Fluid Group is the responsibility of the End User. Bettis RGS Q-Series actuator ratings are listed below:

MODEL	BAR LITER RATING	CATEGORY	
		Fluid Group 2	Fluid Group 1
Q203SR	1.52	SEP	SEP
Q204SR	2.88	SEP	SEP
Q205SR	5.59	SEP	SEP
Q207SR	11.18	SEP	SEP
Q210SR	22.52	SEP	SEP
Q212SR	29.64	SEP	1
Q214SR	59.11	1	2
Q216SR	94.9	1	2

MODEL	BAR LITER RATING	CATEGORY	
		Fluid Group 2	Fluid Group 1
Q203DA	2.03	SEP	SEP
Q204DA	5.42	SEP	SEP
Q205DA	8.30	SEP	SEP
Q207DA	18.46	SEP	SEP
Q210DA	31.50	SEP	1
Q212DA	53.69	1	2
Q214DA	82.82	1	2

Ratings are shown at maximum operating pressure. Models that fall under SEP are below the minimum Bar Liter rating and not required to comply with the PED. Those models can still be supplied as fully PED compliant if required by customer request. The CE mark will be applied to SEP models only if PED compliance is requested or if the mark is applicable to other directives (for example, ATEX).

Output Torque Data

The following tables show output torque for common pressures. Actuators may generate more torque than the maximum rating at higher pressures (refer to torque ratings). Actuators should not be sized above their maximum torque rating unless there is no possibility that the valve will resist with a value above that rating.

Double-Acting (Imperial, in-lb)

	Operating Pressure, psig														MOP psi	MAWP psi	Max Rated Torque in-lb
	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0			
203DA	71	106	141	177	212	247	283	318	353	389	424	459	495	530	141	150	500
204DA	126	188	251	314	377	440	503	565	628	691	754	817	880	----	131	150	825
205DA	276	415	553	691	829	968	1106	1244	1382	1521	1659	----	----	----	119	150	1650
207DA	481	721	962	1202	1443	1683	1924	2164	2404	2645	2885	3126	3366	----	137	150	3300
210DA	1058	1587	2116	2645	3174	3703	4232	4761	5290	5819	6348	6877	----	----	125	150	6600
212DA	1407	2111	2815	3519	4222	4926	5630	6333	7037	7741	8445	9148	9852	10556	149	150	10500
214DA	3096	4645	6193	7741	9289	10837	12385	13934	15482	17030	18578	20126	21674	----	136	150	21000

Double-Acting (Metric, N·m)

	Operating Pressure, barg														MOP BAR	MAWP BAR	Max Rated Torque N.m
	1.5	2.0	2.5	3.0	3.5	4.0	5.0	5.52	6.0	7.0	8.0	9.0	10.0	10.34			
203DA	9	12	14	17	20	23	29	32	35	41	46	52	58	----	9.73	10.34	56.5
204DA	15	21	26	31	36	41	51	57	62	72	82	93	103	----	9.05	10.34	93
205DA	34	45	57	68	79	91	113	125	136	159	181	----	----	----	8.23	10.34	186
207DA	59	79	99	118	138	158	197	218	236	276	315	355	394	----	9.46	10.34	373
210DA	130	173	217	260	303	347	433	479	520	607	693	780	----	----	8.60	10.34	746
212DA	173	231	288	346	404	461	577	637	692	807	923	1038	1153	1192	10.29	10.34	1186
214DA	381	507	634	761	888	1015	1269	1400	1522	1776	2030	2283	2537	----	9.35	10.34	2373

Notes:

MOP: The pressure required to achieve the maximum rated actuator torque.

MAWP: The maximum safe pressure that may be applied.

Max Rated Torque: The torque generated at the lesser of MOP or MAWP.

Spring-Return (Imperial, in-lb)

SPRING RETURN (in-lb)	SPRINGS		20 psig		30 psig		40 psig		50 psig		60 psig		70 psig		80 psig		90 psig		
	START	END	START	END	START	END	START	END	START	END	START	END	START	END	START	END	START	END	
203	203SR-S10	76	46			60	32	95	68	131	104	166	140	201	176	237	212	272	248
	203SR-S20	102	74					67	40	103	75	138	110	173	146	209	181	244	216
	203SR-S30	130	85							92	47	127	83	163	118	198	153	233	189
	203SR-S40	168	117											131	79	166	115	201	150
	203SR-S50	186	136											112	61	147	97	183	132
204	204SR-S10	110	86	40	15	103	78	166	141	228	203	291	266	354	329	417	392	480	454
	204SR-S20	148	124			64	40	127	103	190	166	253	229	315	292	378	355	441	418
	204SR-S30	216	161							153	97	216	160	278	223	341	285	404	348
	204SR-S40	253	200									177	123	240	186	302	248	365	311
	204SR-S50	289	210											229	150	292	213	355	276
	204SR-S60	327	248											191	112	253	175	316	238
	204SR-S70	423	317													185	79	248	142
205	205SR-S10	243	189	87	33	225	171	363	309	501	447	639	585	777	723	915	861	1,053	999
	205SR-S20	326	272			142	89	280	227	418	366	556	504	694	642	832	781	970	919
	205SR-S30	476	354							338	216	476	354	614	492	753	631	891	769
	205SR-S40	558	439									391	270	529	409	668	547	806	685
	205SR-S50	635	461											505	331	643	469	781	607
	205SR-S60	719	547											420	247	558	385	696	523
	205SR-S70	930	697													408	174	546	312
207	207SR-S09	492	389			332	229	573	470	813	710	1,053	951	1,294	1,191	1,534	1,432	1,775	1,672
	207SR-S11	644	478					483	318	724	559	964	799	1,205	1,040	1,445	1,280	1,685	1,521
	207SR-S12	733	585					376	228	617	469	857	709	1,098	949	1,338	1,190	1,579	1,430
	207SR-S13	836	643							559	366	799	606	1,040	847	1,280	1,087	1,520	1,328
	207SR-S31	1,225	974											709	458	949	698	1,189	939
	207SR-S32	1,378	1,064											619	305	860	546	1,100	786
	207SR-S33	1,480	1,122													802	444	1,042	684

	SPRING RETURN (in-lb)	100 psig		110 psig		120 psig		130 psig		140 psig		150 psig		MOP psi	MAWP psi	Max Rated Torque in-lb
		START	END	START	END	START	END	START	END	START	END	START	END			
203	203SR-S10	307	284	343	319	378	355	413	391	449	427	484	463	150	150	484
	203SR-S20	280	252	315	287	350	323	386	358	421	393	456	429	150	150	456
	203SR-S30	269	224	304	259	339	295	375	330	410	365	445	401	150	150	445
	203SR-S40	237	185	272	221	307	256	343	291	378	327	413	362	150	150	413
	203SR-S50	218	168	253	203	289	238	324	274	360	309	395	344	150	150	395
204	204SR-S10	543	517	606	580	669	643	732	705	794	768	857	831	145	150	825
	204SR-S20	504	481	566	543	629	606	692	669	755	732	817	795	150	150	817
	204SR-S30	467	411	529	474	592	536	655	599	717	662	780	725	150	150	780
	204SR-S40	428	374	491	437	553	499	616	562	679	625	741	688	150	150	741
	204SR-S50	418	339	480	401	543	464	606	527	669	589	731	652	150	150	731
	204SR-S60	379	301	442	363	504	426	567	489	630	552	693	614	150	150	693
	204SR-S70	311	205	373	267	436	330	499	393	562	456	624	518	150	150	624
205	205SR-S10	1,191	1,138	1,329	1,276	1,467	1,414	1,605	1,552					133	150	1,650
	205SR-S20	1,108	1,057	1,246	1,196	1,384	1,334	1,522	1,472					139	150	1,650
	205SR-S30	1,029	907	1,168	1,046	1,306	1,184	1,444	1,322	1,583	1,460			145	150	1,650
	205SR-S40	944	823	1,083	961	1,221	1,099	1,359	1,237	1,498	1,375	1,636	1,513	150	150	1,636
	205SR-S50	919	745	1,057	883	1,195	1,021	1,333	1,159	1,471	1,297	1,609	1,435	150	150	1,609
	205SR-S60	834	661	972	799	1,110	937	1,248	1,075	1,386	1,213	1,524	1,351	150	150	1,524
	205SR-S70	684	450	822	588	960	726	1,098	864	1,236	1,002	1,374	1,140	150	150	1,374
207	207SR-S09	2,015	1,912	2,256	2,153	2,496	2,393	2,736	2,634	2,977	2,874	3,217	3,115	150	150	3,217
	207SR-S11	1,926	1,761	2,166	2,002	2,407	2,243	2,647	2,483	2,888	2,724	3,128	2,964	150	150	3,128
	207SR-S12	1,819	1,671	2,059	1,911	2,300	2,152	2,540	2,392	2,781	2,632	3,021	2,873	150	150	3,021
	207SR-S13	1,761	1,568	2,001	1,808	2,242	2,049	2,482	2,289	2,723	2,530	2,963	2,770	150	150	2,963
	207SR-S31	1,430	1,179	1,670	1,419	1,911	1,660	2,151	1,900	2,392	2,141	2,632	2,381	150	150	2,632
	207SR-S32	1,341	1,027	1,581	1,267	1,821	1,507	2,062	1,748	2,302	1,988	2,543	2,229	150	150	2,543
	207SR-S33	1,283	925	1,523	1,165	1,763	1,405	2,004	1,646	2,244	1,886	2,485	2,127	150	150	2,485

Notes:

MOP: The pressure required to achieve the maximum rated actuator torque.

MAWP: The maximum safe pressure that may be applied.

Max Rated Torque: The torque generated at the lesser of MOP or MAWP.

SPRING RETURN (in-lb)	SPRINGS		20 psig		30 psig		40 psig		50 psig		60 psig		70 psig		80 psig		90 psig		
	START	END	START	END	START	END	START	END	START	END	START	END	START	END	START	END	START	END	
210	210SR-S09	1,082	856			731	505	1,260	1,034	1,789	1,563	2,319	2,092	2,848	2,621	3,377	3,149	3,906	3,678
	210SR-S11	1,416	1,052					1,063	699	1,592	1,228	2,121	1,757	2,650	2,286	3,179	2,815	3,708	3,344
	210SR-S12	1,615	1,288					828	502	1,357	1,031	1,886	1,560	2,415	2,089	2,944	2,618	3,473	3,147
	210SR-S13	1,840	1,415							1,229	806	1,758	1,335	2,287	1,864	2,816	2,393	3,345	2,922
	210SR-S31	2,697	2,143											1,560	1,007	2,089	1,536	2,618	2,065
	210SR-S32	3,031	2,341											1,363	673	1,892	1,202	2,421	1,731
	210SR-S33	3,256	2,469													1,764	977	2,293	1,506
212	212SR-S10	2,493	1,676							1,843	1,022	2,547	1,725	3,250	2,428	3,954	3,130	4,658	3,833
	212SR-S20	2,659	1,986							1,533	859	2,237	1,563	2,940	2,267	3,644	2,970	4,348	3,674
	212SR-S30	3,297	2,222											2,704	1,629	3,407	2,333	4,111	3,037
	212SR-S40	4,093	2,956													2,674	1,537	3,378	2,241
214	214SR-S10	5,484	3,687							4,054	2,248	5,602	3,794	7,151	5,341	8,699	6,887	10,247	8,433
	214SR-S20	5,851	4,369							3,372	1,890	4,921	3,438	6,469	4,987	8,017	6,535	9,565	8,083
	214SR-S30	7,253	4,889									4,400	2,036	5,948	3,584	7,496	5,132	9,045	6,681
	214SR-S40	9,004	6,503													5,883	3,382	7,431	4,930
216	216SR-S10	9,728	6,842			3,608	723	7,091	4,206	10,575	7,689	14,058	11,173	17,541	14,656	21,025	18,140	24,508	21,623
	216SR-S20	11,233	8,768					5,166	2,701	8,649	6,184	12,133	9,667	15,616	13,151	19,100	16,634	22,583	20,118
	216SR-S30	16,397	12,506									8,394	4,504	11,878	7,987	15,361	11,470	18,844	14,954
	216SR-S40	21,000	15,571													12,297	6,867	15,780	10,351

SPRING RETURN (in-lb)	100 psig		110 psig		120 psig		130 psig		140 psig		150 psig		MOP psi	MAWP psi	Max Rated Torque in-lb	
	START	END	START	END	START	END	START	END	START	END	START	END				
210	210SR-S09	4,435	4,207	4,964	4,736	5,493	5,265	6,022	5,794				141	150	6,600	
	210SR-S11	4,237	3,873	4,766	4,402	5,295	4,931	5,824	5,460	6,353	5,989		145	150	6,600	
	210SR-S12	4,002	3,676	4,531	4,205	5,060	4,734	5,588	5,263	6,117	5,793		149	150	6,600	
	210SR-S13	3,874	3,451	4,403	3,980	4,932	4,509	5,461	5,038	5,990	5,567	6,518	6,097	150	150	6,518
	210SR-S31	3,147	2,594	3,676	3,123	4,205	3,652	4,735	4,182	5,264	4,711	5,793	5,240	150	150	5,793
	210SR-S32	2,950	2,260	3,479	2,789	4,008	3,318	4,537	3,847	5,066	4,376	5,595	4,905	150	150	5,595
	210SR-S33	2,822	2,035	3,351	2,564	3,880	3,093	4,409	3,622	4,938	4,151	5,468	4,680	150	150	5,468
212	212SR-S10	5,361	4,536	6,065	5,239	6,769	5,942	7,473	6,645	8,176	7,348	8,880	8,051	150	150	8,880
	212SR-S20	5,052	4,378	5,755	5,082	6,459	5,785	7,163	6,489	7,866	7,193	8,570	7,896	150	150	8,570
	212SR-S30	4,815	3,740	5,519	4,444	6,222	5,148	6,926	5,852	7,630	6,555	8,333	7,259	150	150	8,333
	212SR-S40	4,081	2,945	4,785	3,648	5,489	4,352	6,193	5,056	6,896	5,759	7,600	6,463	150	150	7,600
214	214SR-S10	11,795	9,980	13,343	11,526	14,891	13,072	16,440	14,618	17,988	16,165	19,536	17,711	150	150	19,536
	214SR-S20	11,113	9,631	12,662	11,179	14,210	12,728	15,758	14,276	17,306	15,824	18,854	17,372	150	150	18,854
	214SR-S30	10,593	8,229	12,141	9,777	13,689	11,325	15,237	12,873	16,785	14,422	18,334	15,970	150	150	18,334
	214SR-S40	8,979	6,478	10,527	8,026	12,075	9,574	13,624	11,123	15,172	12,671	16,720	14,219	150	150	16,720
216	216SR-S10													80	150	21,000
	216SR-S20													85	150	21,000
	216SR-S30	22,328	18,437											96	150	21,000
	216SR-S40	19,263	13,834	22,747	17,317									105	150	21,000

Notes:

MOP: The pressure required to achieve the maximum rated actuator torque.

MAWP: The maximum safe pressure that may be applied.

Max Rated Torque: The torque generated at the lesser of MOP or MAWP.

Spring-Return (Metric, N·m)

SPRING RETURN (N·m)		SPRINGS		1.5 bar		2.0 bar		2.5 bar		3.0 bar		3.5 bar		4.0 bar		5.0 bar		5.52 bar	
		START	END	START	END	START	END	START	END	START	END	START	END	START	END	START	END	START	END
203	203SR-S10	9	5			6	3	9	6	12	9	15	12	18	15	24	21	27	24
	203SR-S20	12	8					6	3	9	6	12	9	15	12	21	17	24	20
	203SR-S30	15	10							8	3	11	6	14	9	19	14	22	17
	203SR-S40	19	13											10	4	16	10	19	13
	203SR-S50	21	15											8	2	14	8	17	11
204	204SR-S10	12	10	6	3	11	8	16	13	21	18	26	24	32	29	42	39	47	44
	204SR-S20	17	14			7	4	12	9	17	14	22	19	27	24	37	35	43	40
	204SR-S30	24	18							13	6	18	12	23	17	33	27	39	32
	204SR-S40	29	23									13	7	19	12	29	23	34	28
	204SR-S50	33	24											17	8	28	19	33	24
	204SR-S60	37	28											13	4	23	14	29	20
	204SR-S70	48	36													16	4	21	9
205	205SR-S10	27	21	13	7	24	18	35	29	47	40	58	52	69	63	92	86	103	97
	205SR-S20	37	31			14	8	26	20	37	31	48	42	60	54	82	77	94	88
	205SR-S30	54	40							28	14	39	26	51	37	73	60	85	71
	205SR-S40	63	50									30	16	41	27	64	50	76	62
	205SR-S50	72	52											38	19	61	41	73	53
	205SR-S60	81	62											29	9	51	32	63	44
	205SR-S70	105	79													34	8	46	20
207	207SR-S09	56	44			35	23	55	43	74	63	94	82	114	102	153	141	174	162
	207SR-S11	73	54					44	26	64	45	84	65	104	85	143	124	163	145
	207SR-S12	83	66					32	16	52	35	72	55	91	75	131	114	151	135
	207SR-S13	94	73							46	24	65	43	85	63	124	103	145	123
	207SR-S31	138	110											48	19	87	59	107	79
	207SR-S32	156	120											37	2	77	41	97	62
	207SR-S33	167	127													70	30	91	50

SPRING RETURN (N-m)	6.0 bar		7.0 bar		8.0 bar		9.0 bar		10.0 bar		10.34 bar		MOP psi	MAWP psi	Max Rated Torque in-lb	
	START	END	START	END	START	END	START	END	START	END	START	END				
203	203SR-S10	30	27	35	33	41	39	47	44	53	50	55	52	10.34	10.34	55
	203SR-S20	26	23	32	29	38	35	44	41	50	46	52	48	10.34	10.34	52
	203SR-S30	25	20	31	26	37	32	43	38	48	43	50	45	10.34	10.34	50
	203SR-S40	22	16	27	22	33	27	39	33	45	39	47	41	10.34	10.34	47
	203SR-S50	19	14	25	20	31	25	37	31	43	37	45	39	10.34	10.34	45
204	204SR-S10	52	49	62	60	73	70	83	80	93	90	97	94	9.98	10.34	93
	204SR-S20	48	45	58	55	68	66	79	76	89	86	92	90	10.34	10.34	92
	204SR-S30	44	37	54	48	64	58	74	68	85	78	88	82	10.34	10.34	88
	204SR-S40	39	33	49	43	60	54	70	64	80	74	84	78	10.34	10.34	84
	204SR-S50	38	29	48	39	59	50	69	60	79	70	83	74	10.34	10.34	83
	204SR-S60	34	25	44	35	54	45	64	56	75	66	78	69	10.34	10.34	78
	204SR-S70	26	14	36	24	46	34	57	45	67	55	71	59	10.34	10.34	71
205	205SR-S10	114	108	137	131	160	154	182	176					9.19	10.34	186
	205SR-S20	105	99	128	122	150	145	173	167					9.60	10.34	186
	205SR-S30	96	82	119	105	141	128	164	150	187	173			9.99	10.34	186
	205SR-S40	86	73	109	95	132	118	154	141	177	163	185	171	10.34	10.34	185
	205SR-S50	84	64	106	87	129	109	151	132	174	154	182	162	10.34	10.34	182
	205SR-S60	74	54	97	77	119	100	142	122	164	145	172	153	10.34	10.34	172
	205SR-S70	57	31	80	53	102	76	125	98	147	121	155	129	10.34	10.34	155
207	207SR-S09	192	181	232	220	271	260	311	299	350	338	363	352	10.34	10.34	364
	207SR-S11	182	164	222	203	261	243	301	282	340	321	353	335	10.34	10.34	353
	207SR-S12	170	154	210	193	249	232	288	272	328	311	341	325	10.34	10.34	341
	207SR-S13	164	142	203	181	242	221	282	260	321	299	335	313	10.34	10.34	335
	207SR-S31	126	98	166	137	205	177	244	216	284	256	297	269	10.34	10.34	297
	207SR-S32	116	81	156	120	195	160	234	199	274	238	287	252	10.34	10.34	287
	207SR-S33	110	69	149	109	188	148	228	187	267	227	281	240	10.34	10.34	281

Notes:

MOP: The pressure required to achieve the maximum rated actuator torque.

MAWP: The maximum safe pressure that may be applied.

Max Rated Torque: The torque generated at the lesser of MOP or MAWP.

SPRING RETURN (N-m)		SPRINGS		1.5 bar		2.0 bar		2.5 bar		3.0 bar		3.5 bar		4.0 bar		5.0 bar		5.52 bar	
		START	END	START	END	START	END	START	END	START	END	START	END	START	END	START	END	START	END
210	210SR-S09	122	97	/	/	77	51	120	94	163	138	207	181	250	224	337	311	382	356
	210SR-S11	160	119	/	/	/	/	98	57	141	100	184	143	228	187	314	273	360	318
	210SR-S12	182	145	/	/	/	/	71	34	115	78	158	121	201	164	288	251	333	296
	210SR-S13	208	160	/	/	/	/	/	/	100	52	143	96	187	139	273	226	319	271
	210SR-S31	305	242	/	/	/	/	/	/	/	/	/	/	105	42	191	129	236	174
	210SR-S32	342	264	/	/	/	/	/	/	/	/	/	/	82	4	169	91	214	136
	210SR-S33	368	279	/	/	/	/	/	/	/	/	/	/	/	/	155	66	200	111
212	212SR-S10	282	189	/	/	/	/	/	/	157	64	214	122	272	179	387	294	447	354
	212SR-S20	300	224	/	/	/	/	/	/	122	45	179	103	237	161	352	276	412	336
	212SR-S30	372	251	/	/	/	/	/	/	/	/	/	210	89	326	204	385	264	
	212SR-S40	462	334	/	/	/	/	/	/	/	/	/	/	/	243	114	303	174	
214	214SR-S10	620	417	/	/	/	/	/	/	345	141	471	267	598	394	852	647	984	779
	214SR-S20	661	494	/	/	/	/	/	/	268	100	394	227	521	354	775	607	907	739
	214SR-S30	819	552	/	/	/	/	/	/	/	/	336	68	462	195	716	449	848	581
	214SR-S40	1,017	735	/	/	/	/	/	/	/	/	/	/	/	534	251	666	383	
216	216SR-S10	1,099	773	/	/	369	43	654	328	939	613	1,225	899	1,510	1,184	2,081	1,755	2,378	2,052
	216SR-S20	1,269	991	/	/	/	/	436	158	722	443	1,007	729	1,293	1,014	1,863	1,585	2,160	1,882
	216SR-S30	1,853	1,413	/	/	/	/	/	/	/	/	585	145	870	431	1,441	1,001	1,738	1,298
	216SR-S40	2,373	1,759	/	/	/	/	/	/	/	/	/	/	/	1,095	481	1,392	778	

SPRING RETURN (N-m)	6.0 bar		7.0 bar		8.0 bar		9.0 bar		10.0 bar		10.34 bar		MOP psi	MAWP psi	Max Rated Torque in-lb	
	START	END	START	END	START	END	START	END	START	END	START	END				
210	210SR-S09	423	398	510	484	597	571	684	658				9.72	10.34	746	
	210SR-S11	401	360	488	447	575	533	661	620	748	707		9.98	10.34	746	
	210SR-S12	375	338	461	424	548	511	635	598	721	685		10.28	10.34	746	
	210SR-S13	360	312	447	399	533	486	620	572	707	659	736	689	10.34	10.34	736
	210SR-S31	278	216	365	302	451	389	538	476	625	562	654	592	10.34	10.34	654
	210SR-S32	256	178	342	264	429	351	516	438	603	525	632	554	10.34	10.34	632
	210SR-S33	241	152	328	239	415	326	501	412	588	499	618	529	10.34	10.34	618
212	212SR-S10	503	409	618	525	733	640	849	755	964	870	1,003	909	10.34	10.34	1,003
	212SR-S20	468	391	583	507	698	622	814	737	929	853	968	892	10.34	10.34	968
	212SR-S30	441	319	556	435	671	550	787	665	902	781	941	820	10.34	10.34	942
	212SR-S40	358	230	473	345	589	460	704	575	819	691	858	730	10.34	10.34	859
214	214SR-S10	1,106	901	1,359	1,154	1,613	1,408	1,867	1,661	2,120	1,914	2,207	2,001	10.34	10.34	2,207
	214SR-S20	1,029	861	1,282	1,115	1,536	1,369	1,790	1,622	2,043	1,876	2,130	1,962	10.34	10.34	2,130
	214SR-S30	970	703	1,224	956	1,477	1,210	1,731	1,464	1,985	1,718	2,071	1,804	10.34	10.34	2,071
	214SR-S40	787	505	1,041	759	1,295	1,012	1,549	1,266	1,802	1,520	1,889	1,606	10.34	10.34	1,889
216	216SR-S10													5.51	10.34	2,373
	216SR-S20													5.89	10.34	2,373
	216SR-S30	2,012	1,572											6.63	10.34	2,373
	216SR-S40	1,666	1,052	2,236	1,623									7.24	10.34	2,373

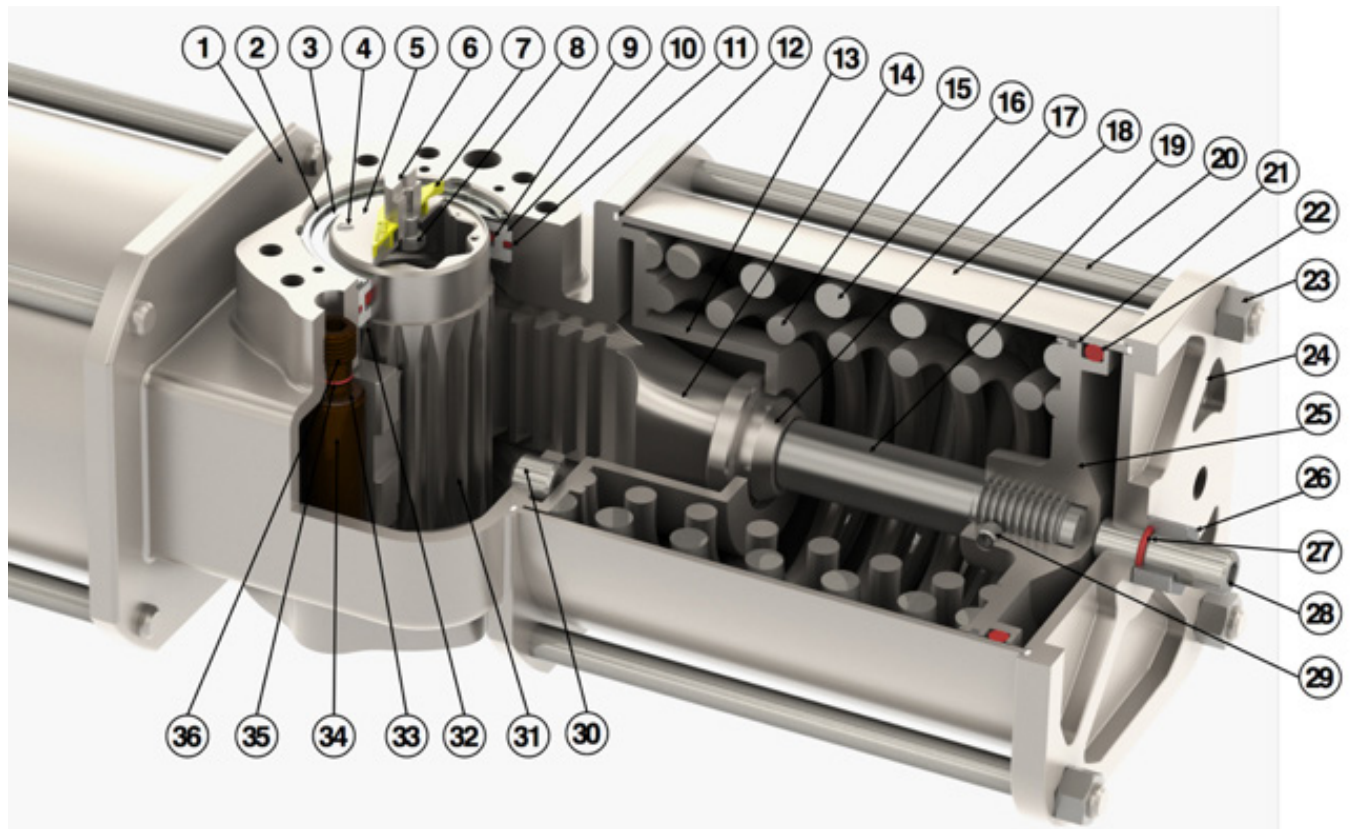
Notes:

MOP: The pressure required to achieve the maximum rated actuator torque.

MAWP: The maximum safe pressure that may be applied.

Max Rated Torque: The torque generated at the lesser of MOP or MAWP.

Parts Diagram and Materials of Construction



ITEM NUMBER	PART DESCRIPTION	MATERIAL (QS)	MATERIAL (QD)
1	Body	CF8M SST	Ductile Iron ⁴
2	Shaft Retaining Ring	316 SST	316 SST
3	Shaft Thrust Washer ⁵	316 SST	316 SST
4	Top Hat Base Bolt	316 SST	316 SST
5	Top Hat Base	316 SST	316 SST
6	Top Hat	316 SST PM	316 SST PM
7	Top Hat Indicator	Nylon 6/6 GF30	Nylon 6/6 GF30
8	Top Hat Bolt	316 SST	316 SST
9	Shaft O-ring Inner	Option ²	Option ²
10	Shaft Bushing	Option ²	Option ²
11	Shaft O-ring Outer	Option ²	Option ²
12	Cylinder Seal	PTFE	PTFE
13	Spring Retainer ³	CF8M SST	Ductile Iron ⁴
14	Rack	CF8M SST	CF8M SST
15	Spring, Inner ³	Chrome Silicon ¹	Chrome Silicon ¹
16	Spring, Outer ³	Chrome Silicon ¹	Chrome Silicon ¹
17	Safety Collar ³	316 SST	316 SST
18	Cylinder	316 SST ²	Black Amalgon ²
19	Piston Bolt	316 SST	316 SST
20	Tie Rod	316 SST	316 SST
21	Piston Wiper Ring	PTFE	PTFE
22	Piston O-ring	Option ²	Option ²
23	Tie Rod Nut	316 SST	316 SST
24	End Cap	CF8M SST	Ductile Iron ⁴
25	Piston	CF8M SST	Ductile Iron
26	Travel Stop Nut	316 SST	316 SST
27	Travel Stop O-ring	Option ²	Option ²
28	Travel Stop A	316 SST	316 SST
29	Piston Set Screw	316 SST	316 SST
30	Travel Stop B	316 SST	316 SST
31	Shaft	CF8M SST	CF8M SST
32	Shaft Shoulder Washer ⁵	316 SST	316 SST
33	Saddle Thrust Washer	Bronze	Bronze
34	Saddle Roller	316 SST NIT	316 SST NIT
35	Saddle Pin O-ring	Option ²	Option ²
36	Saddle Pin	316 SST NIT	316 SST NIT

1: Chrome Silicon springs are powder coated. Stainless Steel springs available.

2: "Option" materials depend on trim code, see engineering string.

3: These parts not present on Double-Acting models.

4: Ductile iron components are protected with a resilient E-coating.

5: Not present on 203, 204, or 205 models.

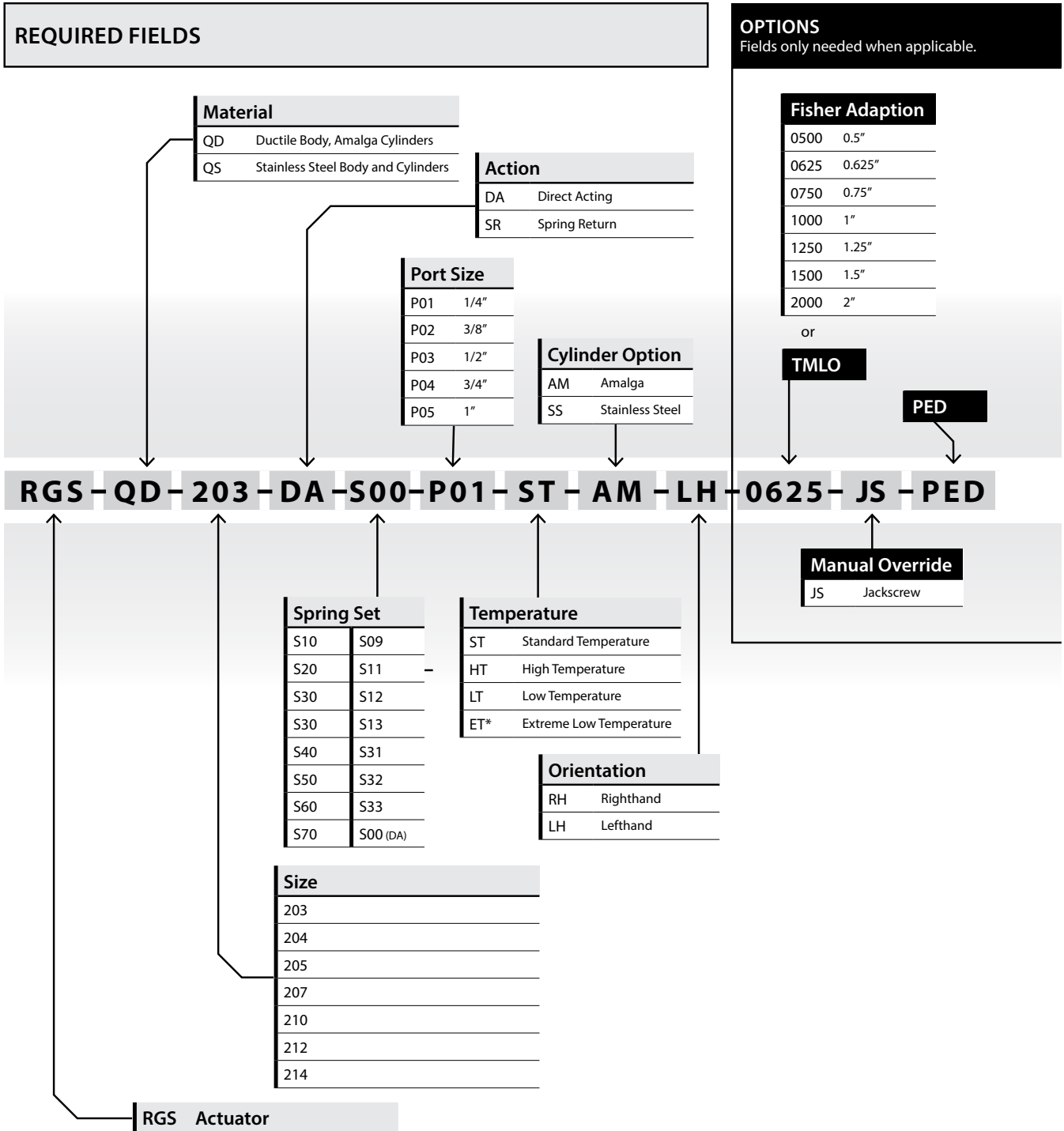
CF8 stainless steel may be upgraded to 316 or CF8M stainless steel based on availability or customer request.

Materials shown are standard.

Other materials available, contact Bettis for special options.

Special coatings, plating, or surface treatments are also available.

Bettis RGS Q-Series Actuator Model Number Matrix



Notes:

* Items are considered standard.

Ensure material compatibility of all components with applications requirements.

(1) Environmental temperature requirements may limit the use of certain trim materials. Temperature ranges may be extended with proper insulation. Ductile iron units may be used in low temperature (less than -20°F), but stroke speed should be limited to prevent brittle fracture.

(2) Bettis selects the appropriate grease based on application requirements.

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Brazil
T +55 15 3413 8888

ASIA PACIFIC

No. 9 Gul Road
#01-02 Singapore 629361
T +65 6777 8211

No. 1 Lai Yuan Road
Wuqing Development Area
Tianjin 301700
P. R. China
T +86 22 8212 3300

MIDDLE EAST & AFRICA

P. O. Box 17033
Jebel Ali Free Zone
Dubai
T +971 4 811 8100

P. O. Box 10305
Jubail 31961
Saudi Arabia
T +966 3 340 8650

24 Angus Crescent
Longmeadow Business Estate East
P.O. Box 6908 Greenstone
1616 Modderfontein Extension 5
South Africa
T +27 11 451 3700

EUROPE

Holland Fisor 6
Székesfehérvár 8000
Hungary
T +36 22 53 09 50

Strada Biffi 165
29017 Fiorenzuola d'Arda (PC)
Italy
T +39 0523 944 411

For complete list of sales and manufacturing sites, please visit www.emerson.com/actuationtechnologieslocations or contact us at info.actuationtechnologies@emerson.com

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