## Models 1350E and 1355E

# Sho-Rate<sup>™</sup> "50" Model 1350E and Sho-Rate<sup>™</sup> "150" Model 1355E

#### FEATURES AND BENEFITS

- Heavy-wall, precision bore, borosilicate glass metering tubes
- A wide range of scales on the metering tube with contrasting background for easy readability
- Tubes sealed on compression gasket by threaded seal spindle
- Tubes removable without disconnecting instrument
- Integral float stops prevent loss of float during tube • removal
- Interchangeable tubes and floats

#### DESCRIPTION

The Sho-Rate 1350 and 1355 Series of low flow indicators provides a cost-effective means of flow indication for both 5% (Model 1355) and 10% (Model 1350) accuracy requirements. Available options include the Standard or NRS<sup>™</sup> integral needle control valves, as well as flow controllers on the inlet or outlet.

#### **SPECIFICATIONS**

#### Capacities

1350 Series: Refer to Tables 1, or 2 and 3 1355 Series: Refer to Tables 2 and 3, or 4

#### Accuracy

1350 Series Standard: Accuracy of ±10% of full scale 1355 Series Standard: ±5% of full scale

#### Repeatability

0.5% full scale

#### Pressure Equipment Directive (97/23/EC)

Note: Equipment falls under Sound Engineering Practice (SEP) according to the directive.

#### **Pressure/Temperature**

200 psig at 33°F to 250°F (1°C to 121°C) 170 psig at 33°F to 250°F (1°C to 121°C)(CRN Certification)

**Pressure Drop** Inquire at factory

#### **Flow Meter Assembly**

#### Scales

1350 Series: Length: 65 mm, nominal Graduations: Standard: R-65mm, or R-100 linear reference scale with air or water calibration table.



Sho-Rate "50"

(No valve)





Sho-Rate "50" with optional integral flow controller





(No valve)

Model 1355E-8800 Sho-Rate "150" with optional Model 1355E integral flow Sho-Rate "150" controller



Model 1355E Sho-Rate "150" with optional needle valve



## Models 1350E and 1355E

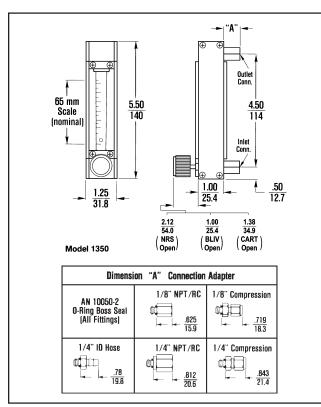


Figure 1 Dimensions - Sho-Rate 1350E

#### 1355 Series:

Length: 150mm, nominal

Graduations: Standard: R-150 mm, or R-100 linear reference scale with air or water calibration table. Optional: for either 65 mm or 150 mm direct reading scale, ceramic ink fused on glass tube or metal scale plate mounted beside tube

Type: Standard: Ceramic ink fused on meter tube with contrasting yellow background

### Materials of Construction

Metering Tubes: Borosilicate glass

**Floats:** Glass, 316 stainless steel, sapphire, Carboloy<sup>®</sup>, tantalum

#### **Structural Members:**

**End fittings:** Chrome plated brass, black anodized aluminum, 316 stainless steel

#### Side Plates:

Standard: Black anodized aluminum Optional: 316 stainless steel

**Window:** Clear polycarbonate; Back Window: Milk white polycarbonate

#### Float Stops:

Standard: Teflon<sup>®</sup> Optional: 316 Stainless Steel

#### **Tube Packing:**

**Standard:** Buna-N (Brass and aluminum meters), Viton-A<sup>®</sup> fluoroelastomers (316 stainless steel meters) **Optional:** Teflon, EPM (also known as EPR)

#### O-rings:

**Standard:** Buna-N (Brass and aluminum meters), Viton-A fluoroelastomers (316 stainless steel meters) **Optional:** Teflon (not available with needle valves), EPM, Kalrez<sup>®</sup>

#### Connections

**Standard:** Horizontal female 1/8" NPT threaded adapters with locknuts for front of panel mounting

#### Dimensions

Refer to Figures 1, 2 and 4

#### **Optional Equipment**

Standard integral flow control valve on inlet or outlet (See DS-VA-CART-eng).

NRS integral flow control valve on inlet or outlet (See DS-VA-8503-eng). These valves are particularly suitable for precise control requirements, and are recommended for flow rates below 500 sccm of Air (@STP) or 10 cc/min water.

Flush mounting bezels in aluminum

Threaded adapters and locknuts for front of panel mounting (standard with 1/8" NPT) 1/8" and 1/4" compression fittings 1/4" female NPT connections 1/4" ID serrated hose connections Base plates, without level

#### Data Sheet DS-VA-1350E-eng August, 2012

## Models 1350E and 1355E

#### Ordering Information (Refer to Table 5)

- 1. Model
- 2. Size, connections, type
- 3. Quantity required
- 4. Fluid
- 5. Minimum, normal and maximum operating temperature
- 6. Minimum, normal and maximum operating pressure (inlet and outlet)
- 7. Minimum, normal and maximum flow rate
- 8. Materials of construction
  - a. End fittings
  - b. Side plates
  - c. Bezel
  - d. Elastomers
- 9. Fluid
- 10. Fluid specific gravity
- 11. Fluid viscosity
- 12. Unusual system conditions (For ranges and pressure drops other than those listed, consult factory).
- 13. Optional equipment
  - a. Valve type and location
  - b. Flow controller and type

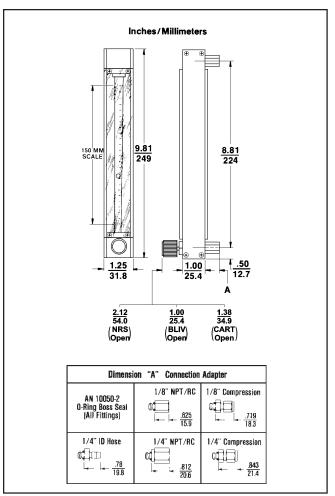


Figure 2 Dimensions - Sho-Rate 1355E



Figure 3 Optional Equipment

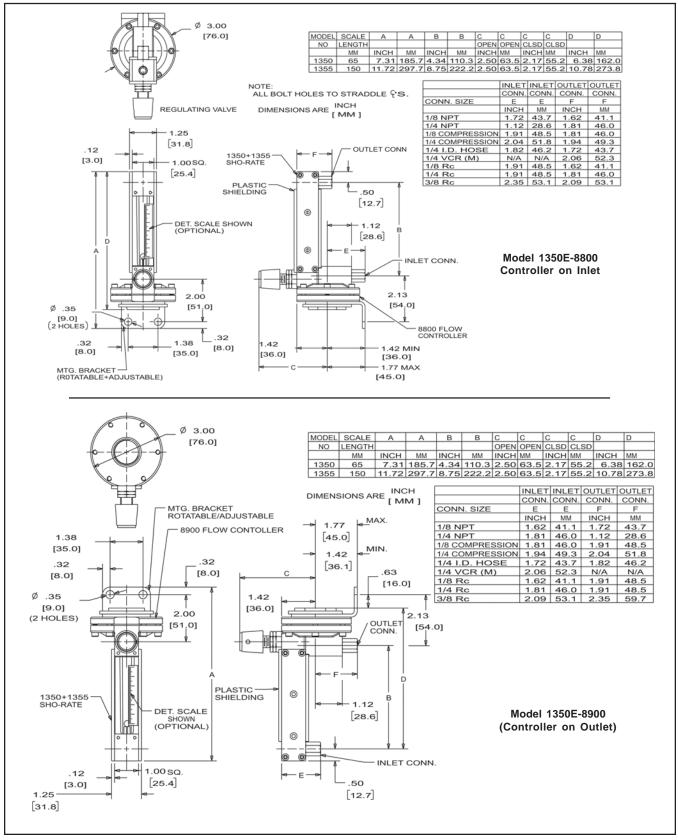


Figure 4 Dimensions - Sho-Rate 1350E & 1355E with Integral Flow Controller

	RIBBED TUBES, SPHERICAL FLOATS											
METER	TUBE	FLOAT	FLOAT MAXIMUM FLOW RATE									
SIZE	NO.	MATERIAL	WATER					AIR*				
			GPH	CODE	LPH	CODE		SCFH	CODE	NLPH	CODE	
		GLASS	0.011	JB6	0.042	JB9		0.13	JB7	3.4	JB8	
		SAPPHIRE	0.022	JC4	0.085	JC2		0.18	JC3	5.0	JC1	
	R-2-65-A	STN. STL.	0.046	JC8	0.18	JC5		0.34	JC7	9.0	JC6	
		CARBOLOY	0.10	JB4	0.38	JB5		0.65	JB2	17.0	JB3	
		TANTALUM	0.11	JD2	0.42	JC9		0.70	JD1	19.0	JD3	
		GLASS	0.013	KB8	0.048	KB2		0.15	KB7	4.0	KB9	
		SAPPHIRE	0.026	KC1	0.10	KD3		0.22	KC2	5.5	KC3	
	R-2-65-B	STN. STL.	0.06	KC5	0.22	KC6		0.42	KC7	11.0	KC8	
		CARBOLOY	0.12	KB4	0.48	KB5		0.80	KB3	22.0	KB6	
		TANTALUM	0.13	KD2	0.50	KD5		0.85	KD4	22.0	KD1	
2		GLASS	0.11	LB9	0.42	LB7	1	0.95	LB6	24.0	LB8	
	R-2-65-C	SAPPHIRE	0.15	LC1	0.6	LC2		1.3	LC3	34.0	LC4	
		STN. STL.	0.38	LC7	1.4	LC8		2.0	LC9	50.0	LC6	
		CARBOLOY	0.65	LB3	2.4	LB2		3.0	LB4	80.0	LB5	
		TANTALUM	0.65	LD1	2.6	LD2		3.2	LD3	85.0	LD4	
	R-2-65-D	GLASS	0.65	MB9	2.4	MB7	1	3.8	MB8	100	MC1	
		SAPPHIRE	0.95	MC2	3.6	MC3		5.0	MC4	130	MC5	
		STN. STL.	1.60	MC7	6.0	MD1		7.5	MC6	200	MC8	
		CARBOLOY	2.40	MB5	9.0	MB2		11.0	MB3	280	MB4	
		TANTALUM	2.60	MD5	10.0	MD6		12.0	MD2	300	MD4	
		GLASS	2.40	NB8	8.5	NB7		13.0	NC1	340	NB9	
		SAPPHIRE	3.40	NC4	13.0	NC3		17.0	NC6	460	NC5	
	R-6-65-A	STN. STL.	5.50	ND1	20.0	ND3		26.0	NC9	650	ND2	
		CARBOLOY	8.50	NB2	32.0	NB3		36.0	NB5	950	NB6	
		TANTALUM	9.0	ND6	34.0	ND5		38.0	ND7	1000	ND4	
6		GLASS	8.0	PB9	30.0	PB8		44.0	PC1	1100	PB7	
		SAPPHIRE	12.0	PC5	44.0	PC3		60.0	PC4	1500	PC2	
	R-6-65-B	STN. STL.	19.0	PD1	70.0	PC9		85.0	PC8	2200	PC6	
		CARBOLOY	28.0	PB3	100	PB2		130	PB6	3400	PB4	
		TANTALUM	30.0	PD7	110	PD6		140	PD5	3600	PD4	

Table 1 Capacities for Sho-Rate Model 1350E Rib Guided Tubes, Spherical Floats

\* FLOW RATES GIVEN ARE MAXIMUM VALUES. AIR FLOWS ARE AT 14.7 PSIA AND 70 DEGREES F.

TRADEMARKS	
Brooks	Brooks Instrument, LLC
Carboloy	General Electric Co.
Kalrez	DuPont Performance Elastomers
NRS	Brooks Instrument, LLC
Sho-Rate	Brooks Instrument, LLC
Teflon	
Viton-A	DuPont Performance Elastomers

FIRST DIGIT FOR DETACHABLE SCALE CONFIGURATION								
CODE	MODEL 1350 TUBE	MODEL 1355 TUBE						
Α		R-2-15-A						
В		R-2-15-AA						
С								
D		R-2-15-B						
E		R-2-15-C						
F		R-2-15-D						
G		R-6-15-A						
н		R-6-15-B						
J	R-2-65-A	R-2-15-AAAA						
К	R-2-65-B							
L	R-2-65-C							
М	R-2-65-D							
Ν	R-6-65-A							
Р	R-6-65-B							
Y	NO TUBE	NO TUBE						

## Table 2Tube and Float Code,Detachable Scale Option, 1st Digit

Table 3 Tube and Float Code,

Detachable Scale Option, 2nd & 3rd Digits

Detachable Scale Option, 2nd & 3rd Digits										
SECOND AND THIRD DIGITS FOR										
METER	FLOAT	SPECIAL	SPECIAL							
ACCURACY	MATERIAL	SINGLE	DUAL							
		SCALE	SCALE							
STANDARD	GLASS	2A	2N							
(1350-10%)	STN. STL.	2B	2P							
(1355- 5%)	SAPPHIRE	2C	2Q							
	CARBOLOY	2D	2R							
	TANTALUM	2E	2S							
CALIBRATED	GLASS	2G	2U							
(1350-5%)	STN. STL.	2H	2V							
(1355-2%)	SAPPHIRE	2J	2W							
	CARBOLOY	2K	2X							
TANTALUM 2L 2Y										

C	APACITIES (RI	B GUIDE TUBES, SPHER	CAL FLOATS) -	FOR USE WITH	1355 SERIES ONLY		
				LOW RATE *	MODEL CODE - SCALE ON		
METER			WATER		TUBE		
SIZE	TUBE NO.	FLOAT MATERIAL	(CC/MIN.)	AIR	0-150 MM	0-100 LINEAR	
		GLASS	0.59	50 SCC/M	JA6	JA1	
		SAPPHIRE	1.1	79 SCC/M	JA8	JA3	
	R-2-15-AAAA	STN. STL.	2.6	150 SCC/M	JA7	JA2	
		CARBOLOY	5.2	280 SCC/M	JA9	JA4	
		TANTALUM	5.8	310 SCC/M	JB1	JA5	
		GLASS	1.11	88 SCC/M	BA6	BA1	
		SAPPHIRE	2.15	136 SCC/M	BA8	BA3	
	R-2-15-AA	STN. STL.	4.93	258 SCC/M	BA7	BA2	
		CARBOLOY	9.33	439 SCC/M	BA9	BA4	
		TANTALUM	10.4	478 SCC/M	BB1	BA5	
		GLASS	5.75	380 SCC/M	FA6	FA1	
		SAPPHIRE	10.5	518 SCC/M	FA8	FA3	
2	R-2-15-D	STN. STL.	20.6	832 SCC/M	FA7	FA2	
		CARBOLOY	33.2	1240 SCC/M	FA9	FA4	
		TANTALUM	35.9	1320 SCC/M	FB1	FA5	
		GLASS	16.6	.83 SLPM	AA6	AA1	
		SAPPHIRE	26.3	1.1 SLPM	AA8	AA3	
	R-2-15-A	STN. STL.	46.2	1.69 SLPM	AA7	AA2	
		CARBOLOY	70.8	2.44 SLPM	AA9	AA4	
		TANTALUM	75.9	2.6 SLPM	AB1	AA5	
		GLASS	52.8	2.37 SLPM	DA6	DA1	
		SAPPHIRE	79.7	3.08 SLPM	DA8	DA3	
	R-2-15-B	STN. STL.	133	4.7 SLPM	DA7	DA2	
		CARBOLOY	199	6.7 SLPM	DA9	DA4	
		TANTALUM	212	7.1 SLPM	DB1	DA5	
		GLASS	84.6	3.9 SLPM	EA6	EA1	
		SAPPHIRE	129	5.1 SLPM	EA8	EA3	
	R-2-15-C	STN. STL.	218	7.6 SLPM	EA7	EA2	
		CARBOLOY	326	10.6 SLPM	EA9	EA4	
		TANTALUM	349	11.3 SLPM	EB1	EA5	
		GLASS	200	8.7 SLPM	GA6	GA1	
		SAPPHIRE	297	11.2 SLPM	GA8	GA3	
	R-6-15-A	STN. STL.	493	16.6 SLPM	GA7	GA2	
		CARBOLOY	726	23.2 SLPM	GA9	GA4	
6		TANTALUM	772	24.6 SLPM	GB1	GA5	
1		GLASS	573	23.9 SLPM	HA6	HA1	
		SAPPHIRE	851	30.2 SLPM	HA8	HA3	
	R-6-15-B	STN. STL.	1350	43.8 SLPM	HA7	HA2	
		CARBOLOY	1950	61.2 SLPM	HA9	HA4	
		TANTALUM	2060	64.7 SLPM	HB1	HA5	

NOTE: ALL AIR FLOWS ARE AT 14.7 PSIA AND 70 DEGREES F.

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\*FLOW RATES SHOWN ARE MAXIMUM CAPACITIES. DIRECT READ SCALES MAY END AT SLIGHTLY DIFFERENT MAXIMUM FLOWS.

Table 5 Ordering Information and Model Code

		PURGE FLOWMETER											
		A TUBE, SIZES 2-6											
		TUBE, SIZES 2-6											
				AND FLOA	AT								
i			MODEL 1350 OR 1355 DETACHABLE SCALE - SEE TABLES 2 & 3										
i		MODEI	NODEL 1350 - SEE TABLE 1										
1		MODEI	MODEL 1355 - SEE TABLE 4										
	Ι	CODE	TUBE P	ACKING	O-RING MATERIAL (METER/VALVE ASSEMBLY)								
I	1	Α	BUN	N- A	BUNA-N (STD FOR ALUMINUM AND BRASS METERS)								
I	1	В	VIT	ON	BUNA-N								
I	1	С	VIT	ΓΟΝ	VITON (STD FOR STN. STL. METERS)								
I	I	D	VI	TON	TEFLON/KALREZ (KALREZ O-RINGS IN VALVE OR CONTROLLER)								
I	1	Е	VIT	ΓΟΝ	PM								
I	I	F	VIT	TON	KALREZ								
I		G	TEF	LON	BUNA-N								
I		н		LON	VITON								
I		J		LON	TEFLON/KALREZ (KALREZ O-RINGS IN VALVE OR CONTROLLER)								
		ĸ			EPM								
		L			KALREZ								
I		M			EPM BUTYL								
I		N P			BUNA-N								
1		Q			VITON								
1		R			TEFLON/KALREZ (KALREZ O-RINGS IN VALVE OR CONTROLLER)								
1	i	S			· · · · · · · · · · · · · · · · · · ·								
i	i	Т											
i	i	U			BUTYL								
Ì	Ì	I	CODE	FITTING	AND ADAPTER MATERIAL/PROCESS CONNECTION SIZE AND TYPE								
I	1	1	Α	BRASS/	/ 1/8" NPT								
I.	1	D BRASS			S/ THD 1/8" NPT WITH LOCKNUTS (STANDARD)								
I.	1		G	BRASS/	SS/ 1/4" NPT (STD WITH FLOW CONTROLLER)								
I	1	1	L	BRASS/	S/ THD 1/4" NPT WITH LOCKNUTS								
I			Р		S/ 1/8" COMPRESSION								
I	I				ASS/ THD 1/8" COMPRESSION WITH LOCKNUTS								
1		. !	V		S/ 1/4" COMPRESSION								
1			Ŷ		THD 1/4" COMPRESSION WITH LOCKNUTS								
			2		1/4" I.D. HOSE								
	1		5 E		NO ADAPTOR-INTEGRAL 5/16-24 THD								
I	1		H		UM/ THD 1/8" NPT WITH LOCKNUTS (STANDARD) UM/ 1/4" NPT (STD WITH FLOW CONTROLLER)								
I	1		6		UM/ NO ADAPTOR-INTEGRAL 5/16-24 THD								
ı I			c		INLESS STEEL/ 1/8" NPT								
I	i	i	F		INLESS STEEL/ THD 1/8" NPT WITH LOCKNUTS (STANDARD)								
i	i	i	J		INLESS STEEL/ 1/4" NPT (STD WITH FLOW CONTROLLER)								
I	I		Ν		INLESS STEEL/ THD 1/4" NPT WITH LOCKNUTS								
I	1	1	R	316 STA	INLESS STEEL/ 1/8" COMPRESSION								
I	l	<u> </u>	U		STAINLESS STEEL/ THD 1/8 COMPRESSION WITH LOCKNUTS								
			X		TAINLESS STEEL/ 1/4" COMPRESSION								
			1		INLESS STEEL/ THD 1/4" COMPRESSION WITH LOCKNUTS INLESS STEEL/ 1/4" I.D. HOSE								
l	Ì		7		INLESS STEEL/ NO ADAPTER INTEGRAL 5/16-24 THD								
Ī	i	i	8		INLESS STEEL/ 1/4" VCR								
I	I		Т	316 STA	INLESS STEEL/ THD 1/8" Rc WITH LOCKNUTS								
I	1		INLESS STEEL/ THD 1/4" Rc WITH LOCKNUTS										
			3		INLESS STEEL/ THD 3/8" Rc WITH LOCKNUTS								
<u>1350E</u>	<u>LC7</u>	<u>C</u>	E	A	<u>1</u> <u>A</u> TYPICAL MODEL CODE								

Table 5 Ordering Information and Model Code Continued

ing innorm	lation a	in a n			maoa							
I				CODE	VALVE	TYPE						
1				Α	VALVE	PLUG						
1				В	STAND	ARD VA	LVE - BRASS - LOW F	LOW				
1				С	STAND	ARD VA	LVE - BRASS - MEDIU	M FLOW				
	1	1		D	STAND	ARD VA	LVE - BRASS - HIGH F	LOW				
Í	i i	- İ	i i	E	STAND	ARD VA	LVE - 316 STAINLESS	STEEL - LOW FLOW				
i	i	- i	i	F	STAND	ARD VA	LVE - 316 STAINLESS	<b>STEEL - MEDIUM FLOW</b>				
i	i	i	i	G	STAND	ARD VA	LVE - 316 STAINLESS	STEEL - HIGH FLOW				
i	i	i	i	н	NRS-B	RASS #	1					
i	i	i	i	J	NRS-B	RASS #	2					
i	i	i	i	к	NRS-B	RASS #	3					
i	i	i	i	L	NRS-BF	RASS #	4					
i	i	i.	i	м	NRS-B	RASS #	5					
i	i i	i	i	N	NRS-B	RASS #	6					
i	i	i	i	Р	NRS - 3	16 STAI	INLESS STEEL #1					
i	i	i.	i	Q			INLESS STEEL #2					
i	i i	i	i	R	NRS - 3	16 STA	INLESS STEEL #3					
i	i i	i	i	s	<b>NRS - 3</b>	16 STA	NLESS STEEL #4					
i	i i	i	i	т	NRS - 3	16 STA	NLESS STEEL #5					
i	i i	i	i	U	NRS - 3	16 STA	INLESS STEEL #6					
i	i i	i	i	v	TO INTI	EGRALI	Y MOUNTED FLOW C	ONTROLLER (NOT	E 1 & NOTE 2)			
i	i i	i.	i	w				VE ASSEMBLY OR PLUG	,			
i	i i	i	i	x				v for Valve Cavity Location) KYN				
i	i i	i	i	1		C-VALVE - 316 STAINLESS STEEL - LOW FLOW - SPECIAL						
i	i i	i	i i	2				EDIUM FLOW - SPECIAL				
i	i i	i	i	3	C-VALV	'E - 316	STAINLESS STEEL - H	IGH FLOW - SPECIAL				
i	i i	i	i					CONNECTION ORIEN	TATION			
i	i	- i	i	i i	1	INLET		IN-BACK,				
i	i	- i -	- i	i i	5	OUTLE	т	IN-BACK,	OUT-BACK (STD)			
i	i i	- i	l l	- i	9	NONE		IN-BACK,	OUT-BACK			
i	i	- i -	- i	i i	<u> </u>		ACCESSORIES - 1,2,					
i	- i	- i -	i	- i	- i	A	NONE					
		1		i		В	ALUMINUM FLUSH	OUNTING BEZEI				
		- i		- i	i i	J	DEGREASE FOR OXYGEN SERVICE					
1		÷			i	Ľ		AINLESS STEEL SIDE PLATES				
1		- i				м	STAINLESS STEEL SIDE FLATES					
1		1	ł			1350: 5% 1355)						
1						N CALIBRATE FOR NIST TRACEABILITY (10%, 1350; 5%, 1355)						
1						R CRN CERTIFICATION						
1								1				
1350E	LC7	<u>C</u>	Ē	Å	1 1	A	TYPICAL MODEL CO	DF				
10002	201	×	<u>L</u>		<u>+</u>							
NOTES:		1	FLOW C	ONTROL	LERS TO	D HAVE	SEPARATE MODEL C	ODE AND BE A SECOND	LINE ITEM ON ORDER			

2 FLOW CONTROLLERS TO HAVE SEPARATE MODEL CODE AND BE A SECOND LINE ITER 2 FLOW CONTROLLERS NOT AVAILABLE WITH THREADED ADAPTERS AND LOCKNUTS



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