

# 5800 Series

Thermal Mass Flow



Model 5850E

## Elastomer Sealed, Analog Thermal Mass Flow Meters and Controllers

### Overview

The 5800 Series mass flow meters and mass flow controllers have gained broad acceptance as the standard for stability and reliability. These products have a wide flow measurement range and are suitable for a broad range of temperature and pressure conditions making them well suited for applications in chemical and petrochemical research, laboratory, analytical, fuel cell and life science among others.

Highlights of the 5800 Series mass flow products include: industry leading long term stability, accuracy backed by superior metrology systems and methods using primary calibration systems directly traceable to international standards, and a range of analog I/O options

### Product Description

The 5800 Series provides a highly configurable platform based on a simple modular architecture. The 5800 Series feature set was carefully selected to enable drop-in replacement of many brands of mass flow controllers. With the wide range of options and features available, the 5800 Series provides users with a single platform to support a broad range of applications.

### Features and Benefits

Features	Benefits
Industry leading long term sensor stability	Increased system uptime and reduced cost of ownership by reducing maintenance and eliminating periodic recipe adjustments and/or recalibrations
Superior valve technology	Minimum leak-by, wide turndown, and superior corrosion resistant materials reduces overall gas panel cost
Adaptable mechanical configurations	Easily retrofit to existing systems
Primary standard calibration systems	Ensures measurement accuracy is traceable to international standards
Simple modular design	Easy-to-service elastomer sealed design provides for factory or field service maximizing uptime and reducing total cost of ownership

## Product Description

### Advanced Thermal Flow Measurement Sensor

Brooks' sensor technology combines:

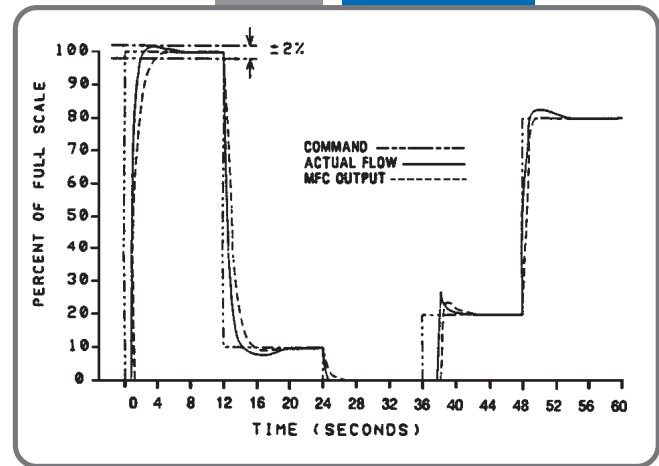
- Excellent signal to noise performance for improved accuracy at low setpoints
- Superior long-term stability through enhanced sensor manufacturing and burn in process
- Isothermal packaging to reduce sensitivity to external temperature changes

### Wide Flow Range

The 5800 Series covers an extremely broad range of flow rates. Model 5850 can have a full scale flow as low as 3 ccm. With a high turndown ratio of 50:1 repeatable gas flow can be measured or controlled down to 0.06 ccm! Model 5853 can monitor or control gas flows up to 1000 lpm.

### Fast Response Performance

The electronics and superior mechanical configuration in the 5800 Series provide for fast stable response characteristics.



## Product Specifications

### Flow Ranges and Pressure Ratings:

Mass Flow Controller Model	Mass Flow Meter Model	Flow Ranges N2 Eq. Ratings		Pressure Unit psi/bar Standard	PED Module H Category
		Min. F.S.	Max. F.S.		
5850	5860	0.003	30 lpm	1500 psi/100 bar	SEP
5851	5861	10	100 lpm*	1500 psi/100 bar	SEP
5853	5863	100	1000 lpm	1000 psi/70 bar	1 for all 150 lb flanges 2 for all other connections

\* 200 lpm of H2 possible, 600 lpm of H2 possible with decreased accuracy

## Product Specifications (continued)

Performance	5850/60	5851/61	5853/63
Flow Accuracy*	1% F.S. (<20 slpm) 1.5% F.S. (>20 SLPM)	1% F.S.	1% F.S.
Control Range	50:1		
Repeatability & Reproducibility	0.25% of rate		
Linearity	Included in accuracy		
Response Time (Settling Time within $\pm 2\%$ F.S. for 0-100% command step)	E-Series: <3 seconds i-Series: <6 seconds		
Zero Stability	< $\pm 0.2\%$ F.S. per year		
Temperature Coefficient	Zero: <0.075% of F.S. per °C. Span: <1.0% of F.S. shift from original calibration over 10-50°C (50-122°F) range		
Pressure Coefficient	$\pm 0.03\%$ per psi (0-200 psi N2)		
Attitude Sensitivity	<0.5% F.S. maximum deviation from specified accuracy after re-zeroing		

\* Accuracy including linearity at calibration conditions.

### Ratings

Operating Temperature Range	5-65°C (41-149°F)		
Minimum Pressure Differential (Controllers)**	5 psi/0.35 bar	10 psi/0.69 bar	Min.: 7.5 psi/0.52 <500 lpm Min.: 11.8 psi/0.81 >500 lpm
Maximum Pressure Differential (Controllers)**	50 psi/3.45 bar		290 psi/20 bar
Leak Integrity (external)	$1 \times 10^{-9}$ atm. cc/sec He		

\*\* Differential pressures beyond the specified limits may be possible depending on process conditions.

### Mechanical

Valve Type	Normally Closed, Normally Open, Meter
Primary Wetted Materials	316L Stainless Steel, High Alloy Stainless Steel, Viton® fluoroelastomers, Buna-N, Kalrez® and Teflon®


### Electrical - 5800 E-Series

	5850E	5851E	5853E	5860E/5861E/5863E
Electrical Connection	15-Pin Male Sub D-Type (DA-15P) or Card Edge connector (Controller models only)			
Input (Setpoint) Signal	0 to 5 Vdc (200 K ohms input resistance)			N/A
Output Signal	0 to 5 Vdc into 2000 ohms (or greater) load			
Reference Output Signal	5 Vdc $\pm 0.01$ Vdc, max. load 2 K ohm			
Power Requirements	N. C. Valve or N.O. Valve with flow <2.5 slpm: 3.5 watts, +15 Vdc @ 35 mA, -15 Vdc @ 180 mA N.O. Valve with flow rate > 2.5 slpm: 10.5 watts, +15 Vdc @ 350 mA, -15 Vdc @ 350 mA	10.5 watts, +15 Vdc @ 350 mA, -15 Vdc @ 350 mA	3.5 watts, +15 Vdc @ 35 mA, -15 Vdc @ 180 mA	1.05 watts +15 Vdc @ 35 mA, -15 Vdc @ 35 mA

### Electrical - 5800 i-Series

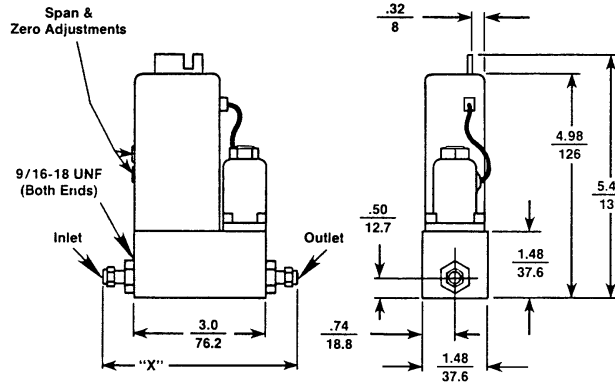
	5850i	5851i	5853i	5860i/5861i/5863i
Electrical Connection	15-Pin Male Sub D-Type (DA-15P)			
Input (Setpoint) Signal	0 to 5 Vdc (200 K ohms input resistance) or 4-20 mAdc (75 ohms input resistance)			N/A
Output Signal	0 to 5 Vdc into 2000 ohms (or greater) load and 4 - 20 mAdc or 0 - 20 mA, maximum loop resistance is power supply dependent (500 ohms maximum @ +15 Vdc)			
Reference Output Signal	5 Vdc $\pm 0.01$ Vdc, max. load 2 K ohm			
Power Requirements	+15 to +28 Vdc, 240 mA @ +15 Vdc 370 mA @ 28 Vdc	+22 to +28 Vdc, 290 mA @ 20 Vdc, 370 mA @ 28 Vdc	+15 to +28 Vdc, 240 mA @ +15 Vdc 370 mA @ 28 Vdc	+15 to + 28 Vdc, max current draw 90 mA @ 28 Vdc

### Certifications

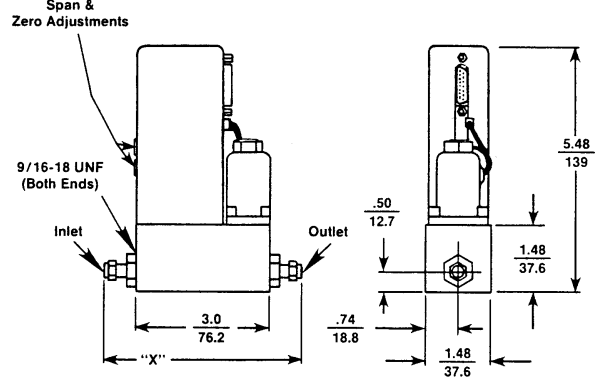
Mark	Agency	Certification	Applicable Standard	Details
	CE	EMC Directive 2004/108/EC	EN:61326-1:2006	PASS

# Product Dimensions - Models 5850 & 5860

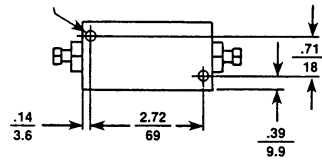
## 5850E, Card Edge Connector



## 5850E/5850i, 15-Pin D Connector



8-32 UNC  
x 3/16 DP  
Mtg. Holes (2)

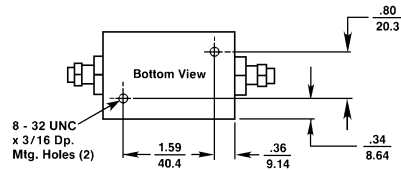
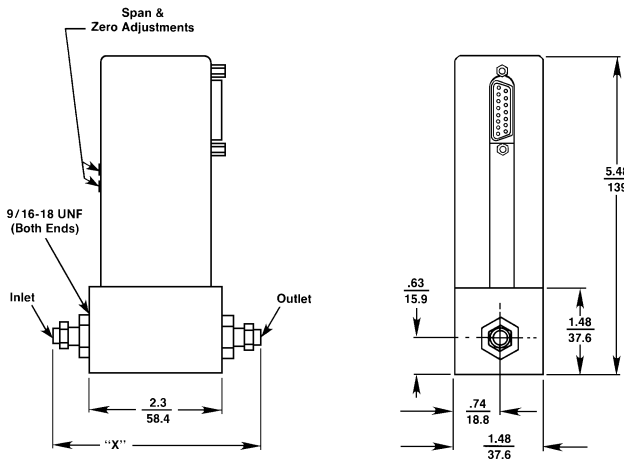


Bottom View

Connection Type	"X" Dim.
1/8" Compression Fitting	4.84/122.9
1/4" Compression Fitting	5.02/127.5
3/8" Compression Fitting	5.14/130.5
1/4" Tube VCO®	4.56/115.8
1/4" Tube VCR®	4.88/124.0

Inches/Millimeters

## 5860E/5860i, 15-Pin D Connector

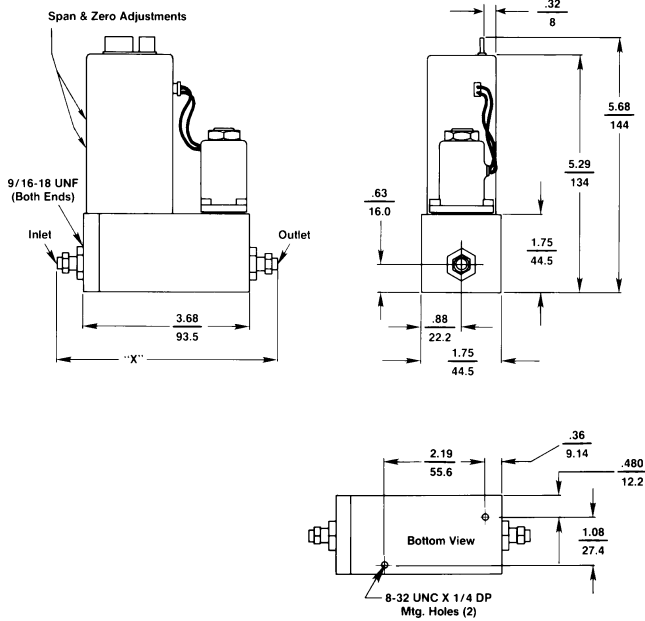


Connection Type	"X" Dim
1/8" Compression Fitting	4.14/105.2
1/4" Compression Fitting	4.32/109.7
3/8" Compression Fitting	4.44/112.8
1/4" Tube VCO®	3.86/98.0
1/4" VCR®	4.18/106.2

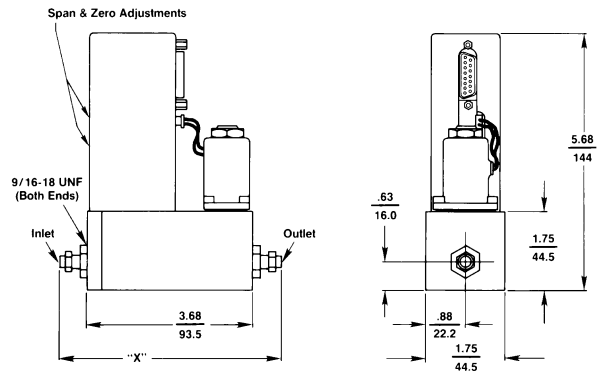
Inches/Millimeters

# Product Dimensions - Models 5851 & 5861

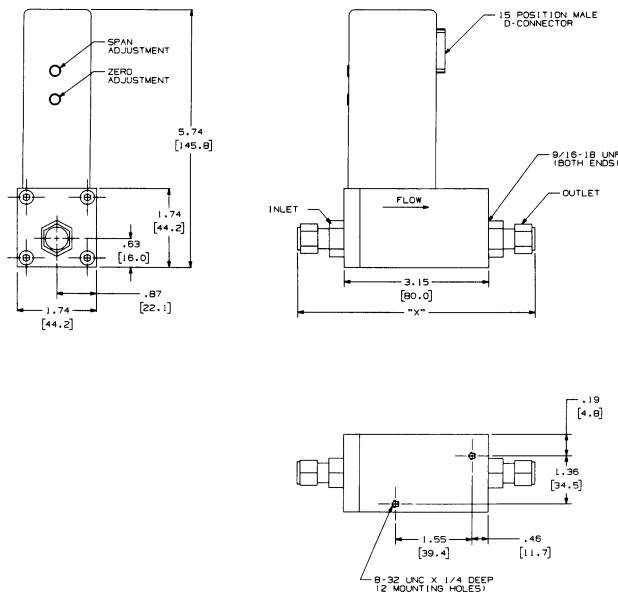
## 5851E, Card Edge Connector



## 5851E/5851i, 15-Pin D Connector



## 5861E/5861i, 15-Pin D Connector

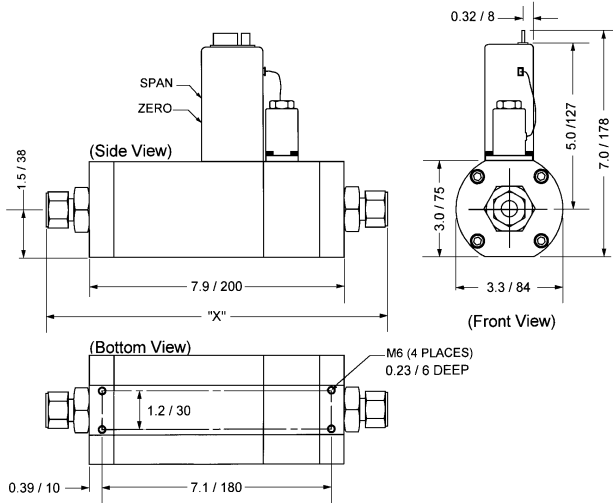


Connection Type	"X" Dim
1/4" Compression Fitting	5.17/131
1/4" Tube VCO®	4.71/120
1/4" Tube VCR®	5.03/128
3/8" Compression Fitting	5.29/134
3/8" or 1/2" Tube VCO®	5.15/131
3/8" or 1/2" Tube VCR®	5.33/135

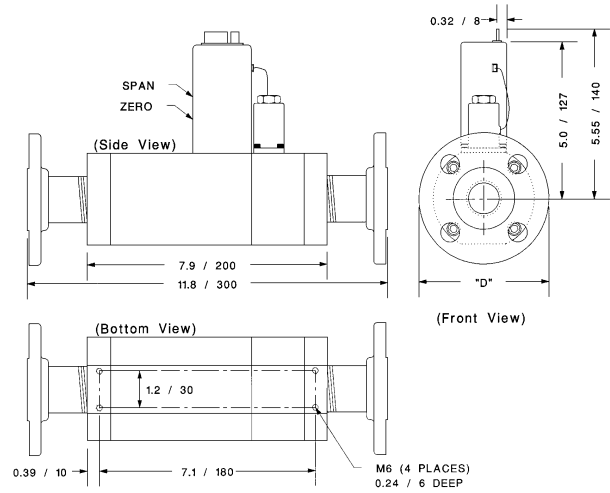
Inches/Millimeters

# Product Dimensions - Model 5853

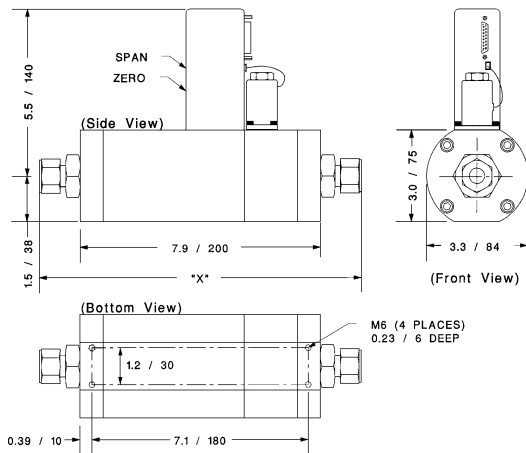
## 5853E, Card Edge Connector With Fittings



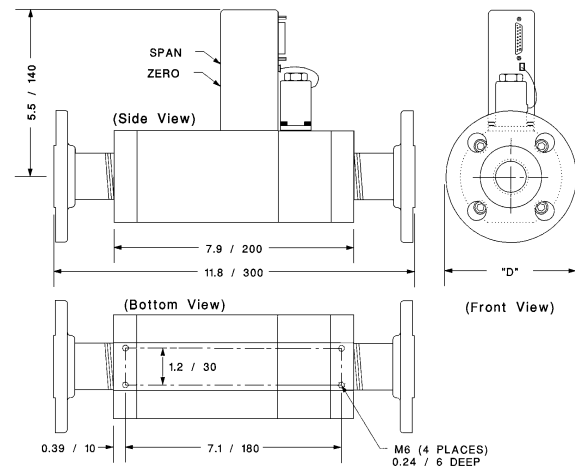
## 5853E, Card Edge Connector With Flanges



## 5853E/5853i, 15-Pin D Connector With Fittings



## 5853E/5853i, 15-Pin D Connector With Flanges



Connection Type	"X" Dimension	
	inch	mm
Female Pipe Thread	7.9	200
1/2" Tube Compression*	10.6	268
3/4" Tube Compression*	10.6	268
1" Tube Compression*	10.9	277
1/2" VCO** (100 slpm max.)	9.9	251
3/4" VCO*	10.2	258
1/2" VCR** (100 slpm max.)	10.1	257
1/2" VCR*	10.2	259

\* 1-1/16 - 12 UNF Connection To Body

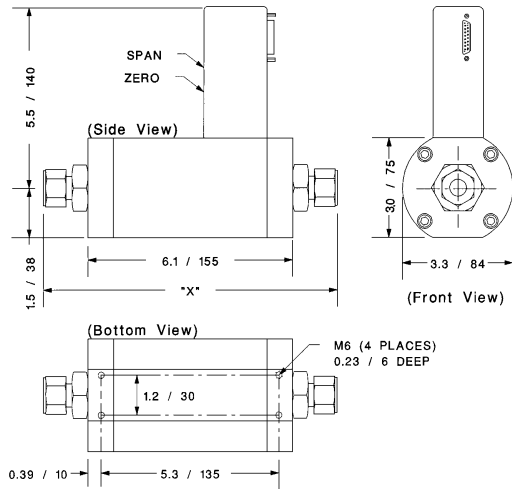
\*\* 9/16 - 18 UNF Connection To Body

Flange Type	Flange OD, "D"	
	inch	mm
ANSI 1/2" 150 lb	3-1/2	89
ANSI 1/2" 300 lb	3-3/4	95
ANSI 1.0" 150 lb	4-1/4	108
ANSI 1.0" 300lb	4-7/8	124
ANSI 1.5" 150 lb	5	127
ANSI 1.5" 300 lb	6-1/8	156
ANSI 2.0" 150 lb	6	152
ANSI 2.0" 300 lb	6-1/2	165
DIN DN15 PN40	3.74	95
DIN DN25 PN40	4.53	115
DIN DN40 PN40	5.90	150
DIN DN50 PN40	6.50	165

Inches/Millimeters

# Product Dimensions - Model 5863

## 5863E/5863i, 15-Pin D Connector With Fittings

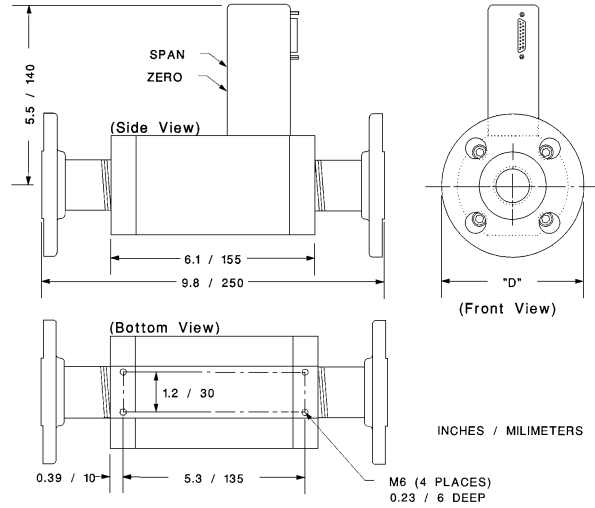


Connection Type	"X" Dimension	
	inch	mm
Female Pipe Thread	6.1	155
1/2" Tube Compression*	8.8	223
3/4" Tube Compression*	8.8	223
1" Tube Compression*	9.1	232
1/2" VCO ** (100 slpm max.)	8.1	206
3/4" VCO *	8.4	213
1/2" VCR ** (100 slpm max.)	8.3	211
1/2" VCR*	8.4	214

\* 1-1/16 - 12 UNF Connection To Body

\*\* 9/16 - 18 UNF Connection To Body

## 5863E/5863i, 15-Pin D Connector With Flanges



Flange Type	Flange OD, "D"	
	inch	mm
ANSI 1/2" 150 lb	3-1/2	89
ANSI 1/2" 300 lb	3-3/4	95
ANSI 1.0" 150 lb	4-1/4	108
ANSI 1.0" 300lb	4-7/8	124
ANSI 1.5" 150 lb	5	127
ANSI 1.5" 300 lb	6-1/8	156
ANSI 2.0" 150 lb	6	152
ANSI 2.0" 300 lb	6-1/2	165
DIN DN15 PN40	3.74	95
DIN DN25 PN40	4.53	115
DIN DN40 PN40	5.90	150
DIN DN50 PN40	6.50	165

Inches/Millimeters

## Brooks Service and Support

Brooks is committed to assuring all of our customers receive the ideal flow solution for their application, along with outstanding service and support to back it up. We operate first class repair facilities located around the world to provide rapid response and support. Each location utilizes primary standard calibration equipment to ensure accuracy and reliability for repairs and recalibration and is certified by our local Weights and Measures Authorities and traceable to the relevant International Standards.

*Visit [www.BrooksInstrument.com](http://www.BrooksInstrument.com) to locate the service location nearest to you.*

### START-UP SERVICE AND IN-SITU CALIBRATION

Brooks Instrument can provide start-up service prior to operation when required. For some process applications, where ISO-9001 Quality Certification is important, it is mandatory to verify and/or (re)calibrate the products periodically. In many cases this service can be provided under in-situ conditions, and the results will be traceable to the relevant international quality standards.

### CUSTOMER SEMINARS AND TRAINING

Brooks Instrument can provide customer seminars and dedicated training to engineers, end users, and maintenance persons.

*Please contact your nearest sales representative for more details.*

Due to Brooks Instrument's commitment to continuous improvement of our products, all specifications are subject to change without notice.

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