



# RF Test Accessories Catalog

## Phase Shifter





沃肯科技有限公司



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## Broadband Phase Shifters DC-2.0 GHz

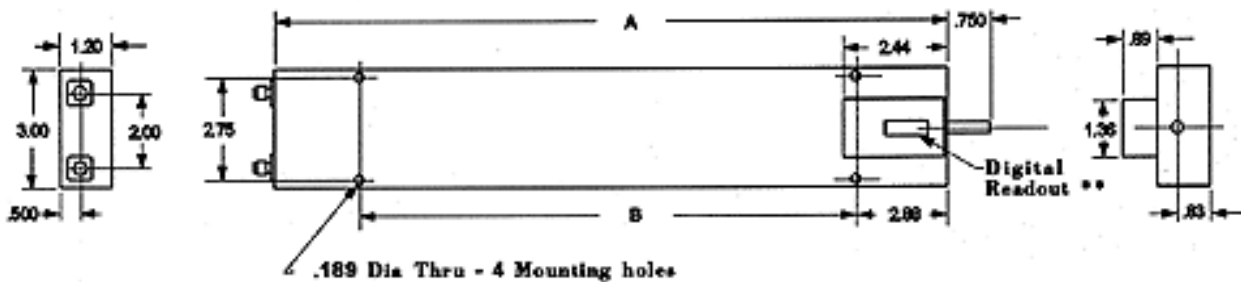


Model D3428B

Model 3248 Coaxial Phase Shifter has been added to ARRA's Broadband Phase Shifter Series in order to provide increased phase change capability at the low end of the microwave spectrum. Low insertion loss and low VSWR are maintained despite the longer length of travel. Phase change is controlled by means of a non-translating drive knob. A calibrated 5 digit readout ensures high resolution and reference indications. Repeatability and stability of phase setting result from precision design and manufacture.

### General Specifications

Frequency Range		DC-2.0 GHz
Phase Adjustment		See below
VSWR (max)		1.3 to 1 GHz 1.5 to 2 GHz
Insertion Loss (max)		0.5 dB to 1 GHz 0.75 dB to 2 GHz
RF Power		100 Watts average 5 kW peak
Connectors*		SMA Female standard
Control		1/4" Non-Translating Shaft
Material	Body	Aluminum
	Connectors	Stainless Steel
Mounting Provisions		4 thru holes
Finish		ARRA Blue per MIL-C-22750





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Freq Range (GHz)	Ins Delay (Approx) nsec	Min Phase Adjustment	Dim - Inches		Model No. *
			A	B	
DC-2.0	3.6 min 4.6 max	360°/GHz	24.27	18.52	3428A
DC-2.0	1.8 min 2.8 max	360°/GHz	15.27	9.52	3428B

\* For other connectors, precede model number with type required. Ex: N3428A.

\*\* Calibrated digital readout is standard on Model 3428A, optional on 3428B. Precede model number with D. Ex:DN3428B.



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**DC-4.0 GHz**



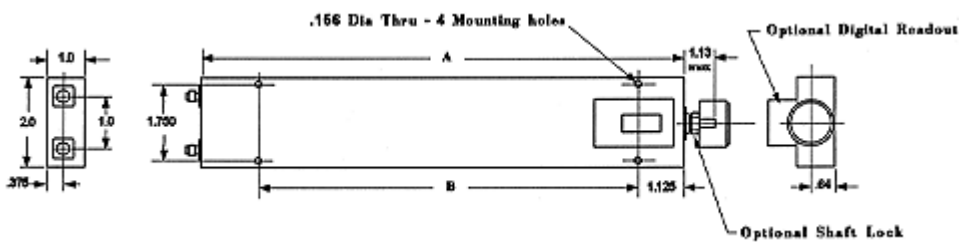
Model N4428D



Model D4428C

**General Specifications**

Frequency Range	DC-4 GHz
Phase Adjustment	See below
VSWR (max)	1.3 to 2 GHz 1.5 to 4 GHz
Ins Loss (max)	0.5 dB to 2 GHz 0.75 dB to 4 GHz
RF Power	100 Watts average 5 kW peak
Connectors*	SMA Female standard
Control	1/4" Non-Translating Shaft
Material	Body Aluminum Connectors MIL-C-39012
Mounting Provisions	4 thru holes
Finish	ARRA Blue per MIL-C-22750



Freq Range (GHz)	Ins Delay (Approx) nsec	Min Phase Adjustment	Dim - Inches		Model No. **
			A	B	
DC-4.0	2.0 min 2.63 max	225°/GHz 360° at 1.6 GHz	15.0	12.75	4428D
DC-4.0	1.7 min 2.2 max	180°/GHz 360° at 2.0 GHz	12.0	9.75	44

\* For other connectors, precede model number with type required. Ex: N4428D

\*\* For shaft lock, precede model number with L. Ex: LN4428C

For calibrated digital readout, precede model number with D. Ex: DLN4428D

(Digital Readout in 0.1° increments. Calibration accuracy ±0.7°/GHz over 225° change.)



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### DC-18.0 GHz Micrometer Drive



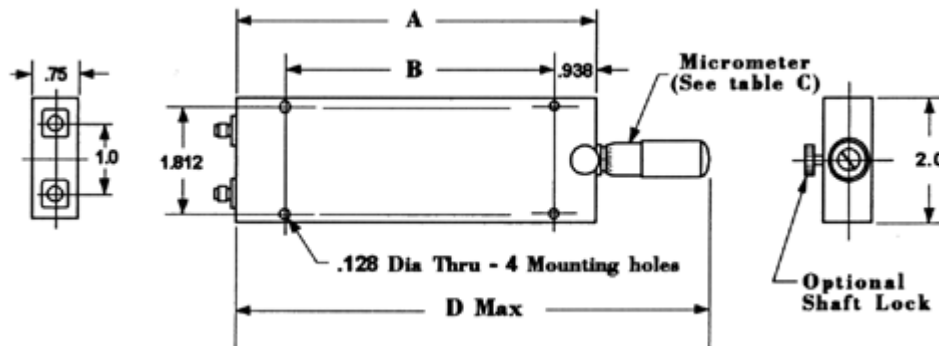
Model 9428A



Model L9428B

#### General Specifications

Frequency Range	DC-18.0 GHz
Phase Adjustment	See below
VSWR (max)	1.3 to 4 GHz 1.5 to 12 GHz 1.6 to 18 GHz
Insertion Loss (max)	0.5 dB to 8 GHz 0.75 dB to 12 GHz 1.0 dB to 18 GHz
RF Power	100 Watts average 5 kW peak
Connectors*	SMA Female standard
Control	Micrometer
Material	Body Aluminum Connectors Stainless Steel
Mounting Provisions	4 thru holes
Finish	ARRA Blue per MIL-C-22750



Freq Range (GHz)	Ins Delay (Approx) nsec	Min Phase Adjustment	Dim - Inches				Model No. *
			A	B	C	D	
DC-18.0	0.88 min 1.10 max	60°/GHz 360° at 6 GHz	5.50	3.625	1.00	8.75	9428A
DC-18.0	0.68 min 0.78 max	30°/GHz 180° at 6 GHz	3.75	1.875	0.50	5.75	9428B

\* To specify N connectors, contact factory. \*\* For shaft lock, precede model number with L. Ex: L9428A



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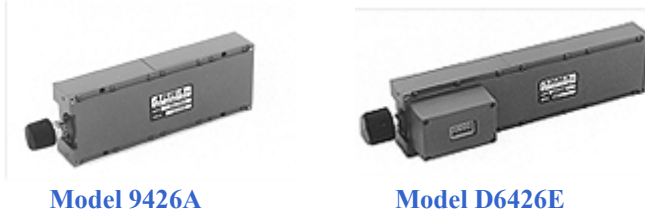


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**DC-18.0 GHz**

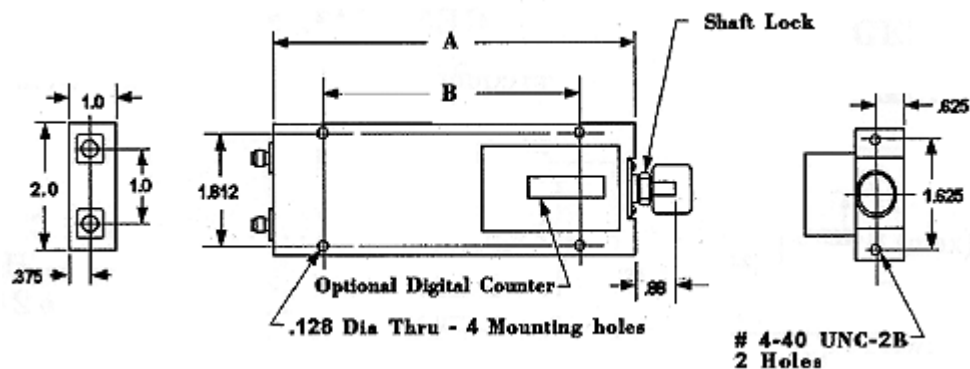


Model 9426A

Model D6426E

**General Specifications**

Frequency Range	DC-18 GHz
Phase Adjustment	See below
VSWR (max)	1.3 to 4 GHz 1.5 to 12 GHz 1.6 to 18 GHz
Ins Loss (max)	0.5 dB to 8 GHz 0.75 dB to 12 GHz 1.0 dB to 18 GHz
RF Power	100 Watts average 5 kW peak
Connectors	SMA Female standard
Control	1/4" Non-Translating Shaft
Material	Body Aluminum Connectors Stainless Steel
Mounting Provisions	4 thru holes 2 tapped holes
Finish	ARRA Blue per MIL-C-22750



Freq Range (GHz)	Ins Delay (Approx) nsec	Min Phase Adjustment	Dim - Inches		Model No. *
			A	B	
DC-18.0	0.88 min 1.10 max	60°/GHz 360° at 6 GHz	5.50	3.625	9426A
DC-18.0	0.68 min 0.78 max	30°/GHz 180° at 6 GHz	3.75	1.875	9426B
DC-12.0	1.20 min 1.49 max	90°/GHz 540° at 6 GHz	8.00	6.125	6426E

\* To specify Type N connectors, contact factory. For calibrated digital readout, precede model number with D. Ex: D9426B(Digital Readout in 0.1° increments. Calibration accuracy ±0.7°/GHz)



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## Multi-Line Phase Shifters

**DC-2.0 GHz**



**Model D2448A**



**Model 3448B**

These models utilize a multilined "open trough" design in which only the center conductor's length is varied to achieve phase change. This design combines high reliability with small package size and long delay adjustments.

An optional digital readout is available, calibrated directly for degrees at 1 GHz. Readings at other frequencies are obtained by multiplying phase readout by frequencies in GHz. Resolution is 0.1° and accuracy is ±0.5°/GHz on Model 3448B and ±1.5°/GHz for Model 2448A.

### General Specifications

Frequency Range

Model 2448A	DC-1.0 GHz
Model 3448B	DC-2.0 GHz

Phase Adj See below

VSWR (max)

Model 2448A	1.3 to 0.5 GHz
	1.5 to 1.0 GHz
Model 3448B	1.3 to 1.0 GHz
	1.5 to 2.0 GHz

Ins Loss (max)

Model 2448A	0.5 dB to 0.5 GHz
	0.75 dB to 1.0 GHz
Model 3448B	0.5 dB to 1.0 GHz
	0.75 dB to 2.0 GHz

RF Power 100 Watts average  
5 kW peak

Connectors\* SMA Female standard

Control 1/4" Non-Translating Shaft

Material: Body Aluminum

Connectors MIL-C-39012

Mounting Provisions 8 thru holes - Model 2448A

4 thru holes - Model 3448B

Finish ARRA Blue per MIL-C-22750





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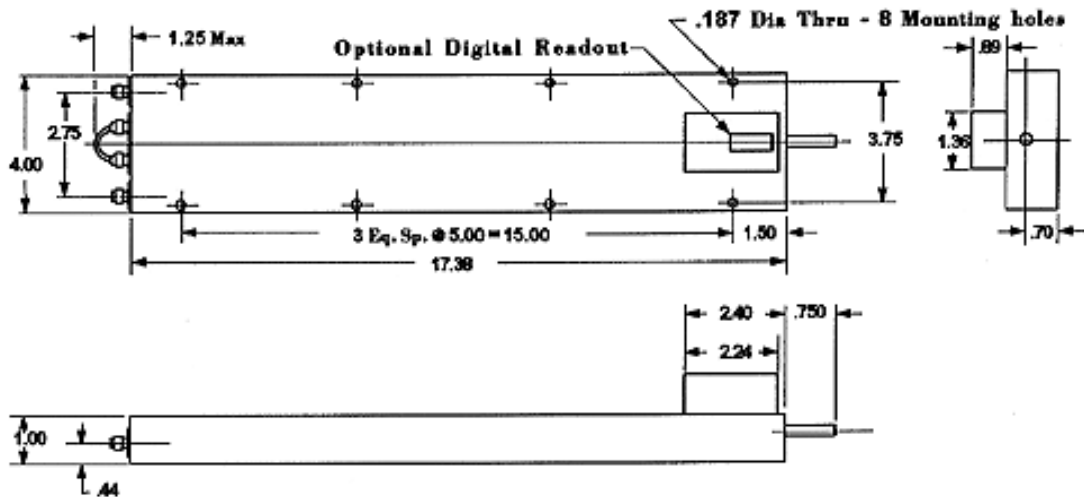


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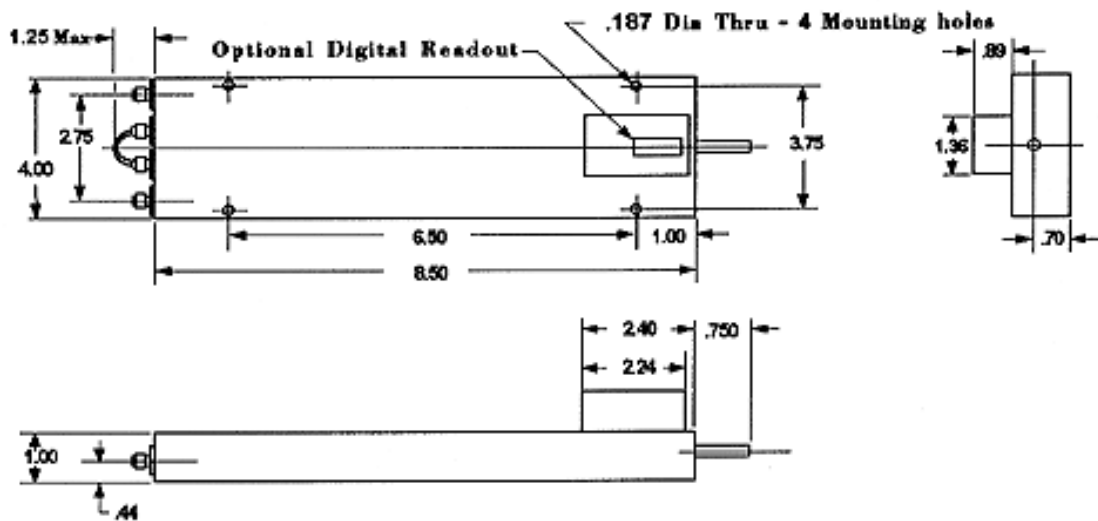
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Model 2448A



Model 3448B



Freq Range (GHz)	Ins Delay (Approx) nsec	Min Phase Adjustment	Model No. *
DC-1.0	3.75 min 6.25 max	900°/GHz	2448A
DC-2.0	2.2 min 3.2 max	360°/GHz	3448B

\* For Type N Female connectors, precede model number with N. Ex: N2448A

For digital readout option, precede model number with D. Ex: DN2448A





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## High Resolution Phase Shifters

### DC-18.0 GHz Direct Reading



Model 6425E

This series of directly calibrated phase shifters feature a very high degree of accuracy and extremely high resolution for fine tuning of phase. The digital readout is calibrated in 0.01°/GHz increments with an accuracy of  $\pm 0.1^\circ$ .

Altho units are calibrated at 1 GHz, use at other frequencies is easily obtained by multiplying phase readout x operating frequency GHz.

#### General Specifications

Frequency Range		DC-18 GHz
Phase Adjustment		See below
VSWR (max)		1.3 to 4 GHz 1.5 to 12 GHz 1.6 to 18 GHz
Ins Loss (max)		0.5 dB to 8 GHz 0.75 dB to 12 GHz 1.0 dB to 18 GHz
RF Power		100 Watts average 5 kW peak
Connectors*		SMA Female standard
Control		1/4" Non-Translating Shaft
Material	Body	Aluminum
	Connectors	MIL-C-39012
Mounting Provisions		4 thru holes 2 tapped holes
Finish		ARRA Blue per MIL-C-22750



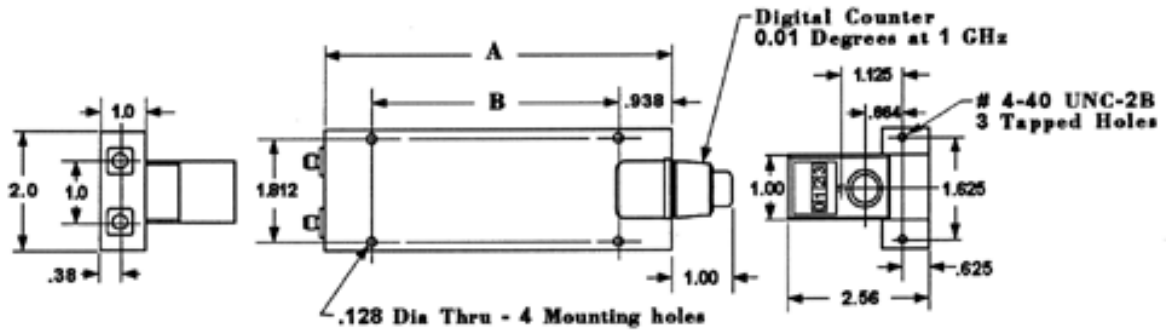
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Freq Range (GHz)	Ins Delay (Approx) nsec	Min Phase Adjustment	Dim - Inches		Model No. *
			A	B	
DC-18.0	0.88 min 1.10 max	60°/GHz 360° at 6 GHz	5.50	3.625	9425A
DC-18.0	0.68 min 0.78 max	30°/GHz 180° at 6 GHz	3.75	1.875	9425B
DC-12.0	1.20 min 1.49 max	90°/GHz 540° at 6 GHz	8.00	6.125	6425E

- To specify Type N connectors, contact factory



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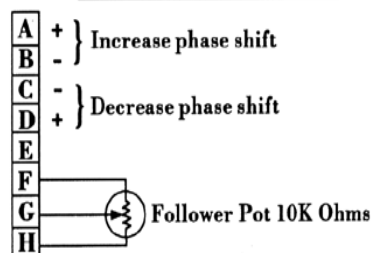
## Motorized Phase Shifters DC-4 GHz



### General Specifications

Frequency Range	DC-4 GHz
Phase Adjustment	See below
VSWR (max)	1.3 to 2 GHz 1.5 to 4 GHz
Ins Loss (max)	0.5 dB to 2 GHz 0.75 dB to 4 GHz
RF Power	100 Watts average 5 kW peak
Connectors*	SMA Female
DC Voltage	28 Volts
Variable Speed	2.5 minutes max 4.0 minutes min
Material:	
Body	Aluminum
Connectors	Stainless Steel
Mounting Provisions	4 tapped holes
Finish	ARRA Blue per MIL-C-22750

### PIN CONFIGURATION





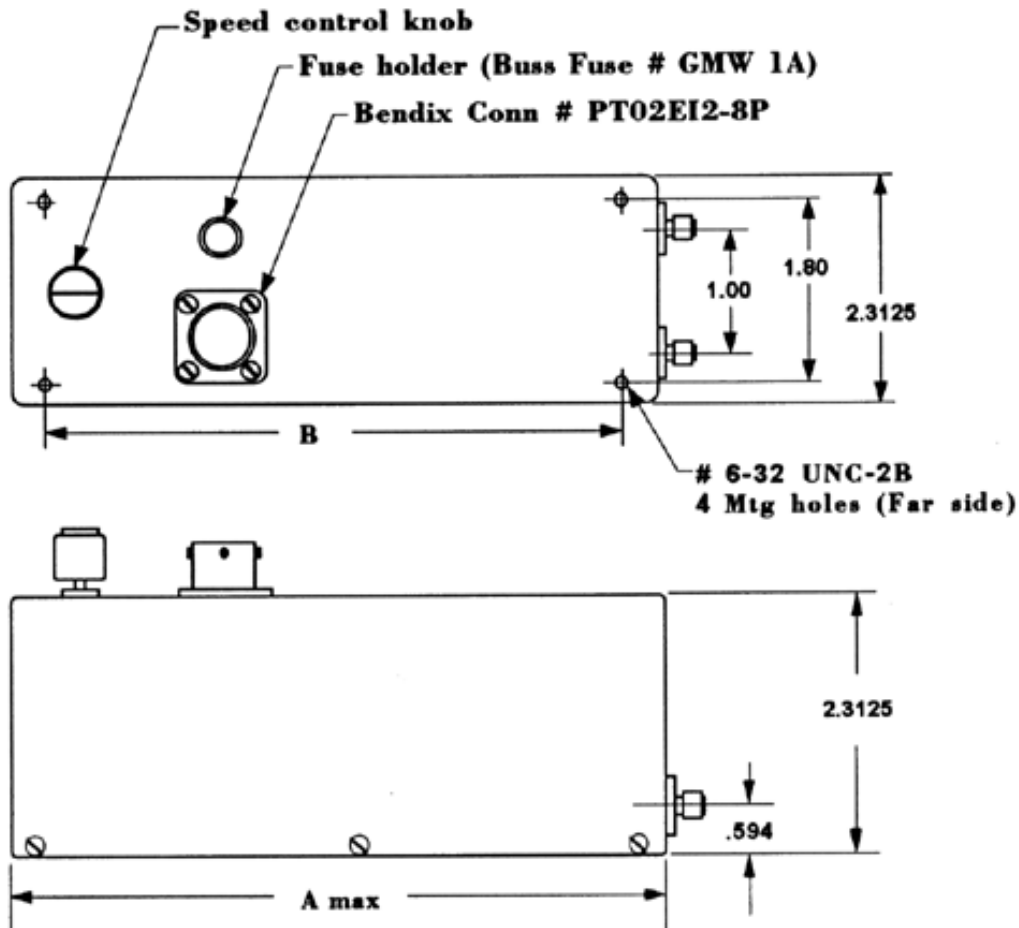
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Freq Range (GHz)	Min Phase Adjustment	Ins Delay (Approx) nsec	Dim - Inches		Model No. *
			A	B	
DC-4	225°/GHz 360° min at 1.6 GHz	2.0 nsec	15	14	4428D-28
DC-4	180°/GHz 360° min at 2.0 GHz	1.7 nsec	12	11	4428C-28

\* To specify Type N Female connectors, precede model number with N.  
 Ex: N4428C-28



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### Broadband DC-18 GHz

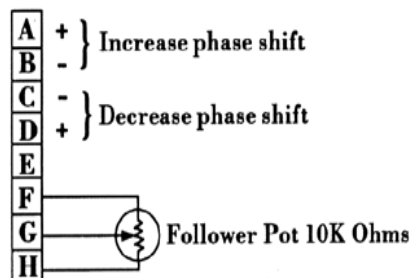


Model 9428A-28

#### General Specifications

Frequency Range	DC-18 GHz
Phase Adjustment	See below
VSWR (max)	1.3 to 4 GHz 1.5 to 12 GHz 1.6 to 18 GHz
Ins Loss (max)	0.5 dB to 8 GHz 0.75 dB to 12 GHz 1.0 dB to 18 GHz
RF Power	100 Watts average 3 kW peak
Connectors*	SMA Female
DC Voltage	28 Volts
Variable Speed	1.5 minutes max 4.0 minutes min
Material:	
Body	Aluminum
Connectors	Stainless Steel
Mounting Provisions	4 tapped holes
Finish	ARRA Blue per MIL-C-22750

#### PIN CONFIGURATION





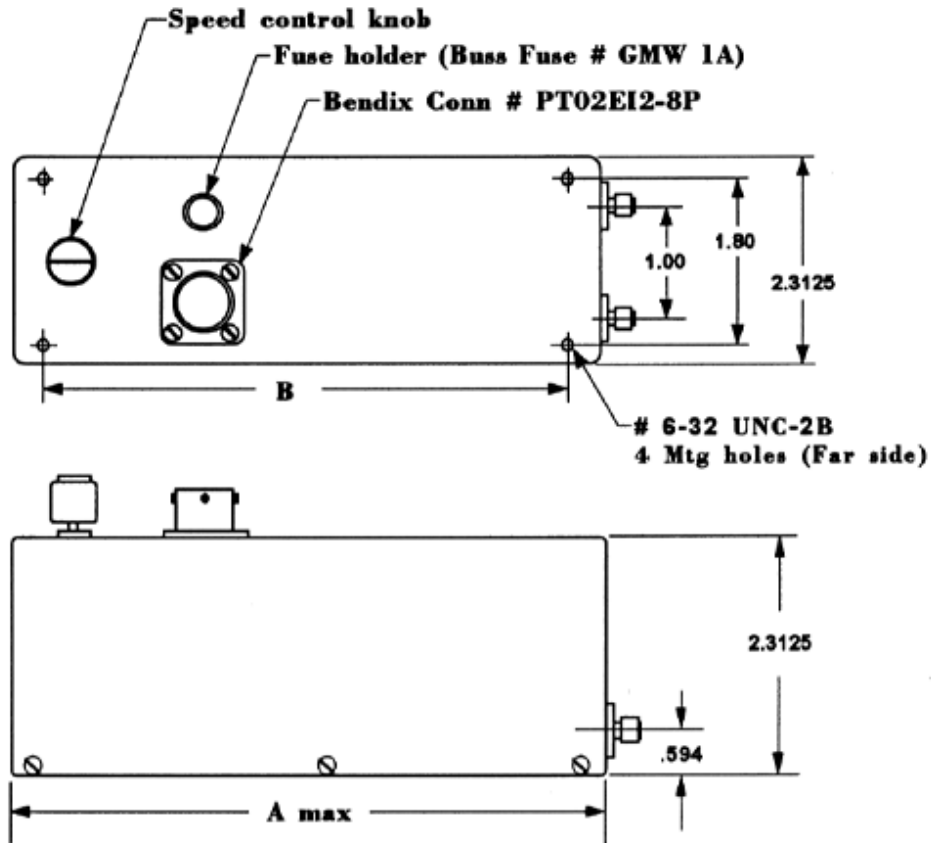
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Freq Range (GHz)	Min Phase Adjustment	Ins Delay (Approx) nsec	Dim - Inches		Model No. *
			A	B	
DC-18	60°/GHz 360°min at 6 GHz	0.85 nsec	9.000	7.890	9428A-28
DC-18	30°/GHz 180°min at 6 GHz	0.65 nsec	6.375	5.340	9428B-28

\* To specify Type N connectors, contact factory.