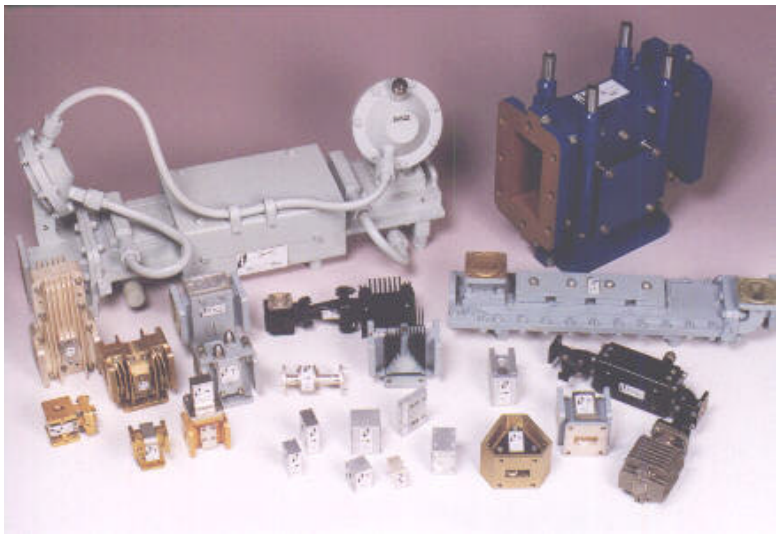

CONTENTS

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1. Isolators and Circulators for Communication Equipment

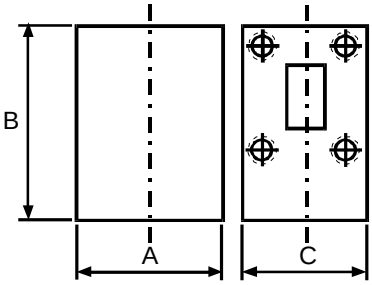


Fig.1

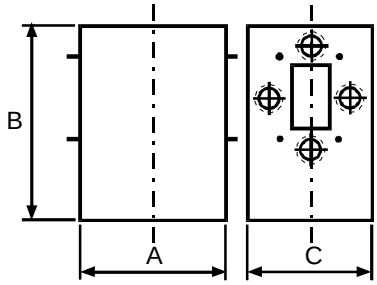


Fig. 2

Frequency range GHz	Model	Bandwidth %	Insertion loss (Typ*/Max) dB	Isolation (Typ*/Min) dB	VSWR (Typ*/Max)
26.5 to 40	4❑WN35-1	20	0.3/0.4	20/18	1.25/1.3
26.5 to 40	4❑WN35-2	15	0.2/0.25	20/18	1.2/1.25
33 to 50	4❑WN42-1	15	0.3/0.4	20/18	1.25/1.3
40 to 60	4❑WN50-1	10	0.3/0.3	20/18	1.25/1.3
50 to 75	4❑WN63-1	5	0.4/0.4	20/18	1.25/1.3
60 to 90	4❑WN75-1	5	0.4/0.4	20/18	1.25/1.3
75 to 110	4❑WN93-1	3.5	0.4/0.4	20/18	1.25/1.3
80 to 100	4❑WN90-1**	7.5	0.5/0.5	20/18	1.25/1.3
90 to 140	5❑WN12-1**	3	0.7/0.7	20/18	1.25/1.3
110 to 170	5❑WN14-1**	2	0.8/0.8	18/18	1.3/1.3
Notes. * - Typical performance at (+25 ± 10) ^{o}C. Max. and Min. values within temperature range (-30 to +85) ^{o}C, except ** - within temperature range (-10 to +70) ^{o}C. Average power: for isolators - 1 W, for circulator - 2 W.					

2. Isolators & Circulators for General Use

Frequency range GHz	Model	Band width %	Insertion loss dB	Isolation dB	VSWR
26.5 to 40	4❑WY33-1	Full	0.6	15	1.45
26 to 30	4❑WN28-2	Full	0.3	20	1.2
37 to 40	4❑WN38-2	Full	0.3	20	1.2
Note. Operating temperature range (0 to +50) °C.					

3. Cryogenic (4 to 77 K) Isolators and Circulators

Frequency range GHz	Model	Band width %	Insertion loss dB	Isolation dB	VSWR
26.5 to 40.0	4❑WC33-1	12	0.3	20	1.3
33.0 to 50.0	4❑WC42-1	8	0.4	20	1.3
40.0 to 60.0	4❑WC50-1	5	0.4	20	1.3
50.0 to 75.0	4❑WC63-1	5	0.4	20	1.3
60.0 to 90.0	4❑WC75-1	4	0.5	20	1.3
75.0 to 110.0	4❑WC93-1	3	0.5	20	1.3
90.0 to 140.0	5❑WC12-1	2	0.6	20	1.3
110.0 to 150.0	5❑WC14-1	2	0.8	20	1.3

Note. In blank ❑: I - Isolator, C- Circulator

Outlines (all dimensions are in millimeters)

1. Isolators and Circulators for Communication Equipment

Isolator model	Circulator model	A	B	C	Waveguide	Flange	Fig.
4IWN35-1		15	32	20	WR-28	UG-599/U	1
	4CWN35-1	19.1	25	20			
4IWN35-2		15	32	20			
	4CWN35-2	19.1	25	20			
4IWN42-1		15	32	20	WR-22	UG-599/U	1
	4CWN42-1	19.1	25	20			
4IWN50-1		15	32	31	WR-19	UG-383/U	2
	4CWN50-1	34	34	31			
4IWN63-1		19.1	32	21	WR-15	UG-385/U	2
	4CWN63-1	19.1	25	23			
4IWN75-1		13	25	22	WR-12	UG-387/U	2
	4CWN75-1	25	25	23			
4IWN93-1		12	25	22	WR-10	UG-387/U	2
	4CWN93-1	25	25	23			
4IWN90-1		12	25	22			
	4CWN90-1	25	25	23			
5IWN12-11		12	25	22	WR-8	UG-387/U	2
	5CWN12-1	25	25	23			
5IWN14-11		12	25	22	WR-6	UG-387/U	2
	5CWN14-1	25	25	23			

2. Isolators & Circulators for General Use

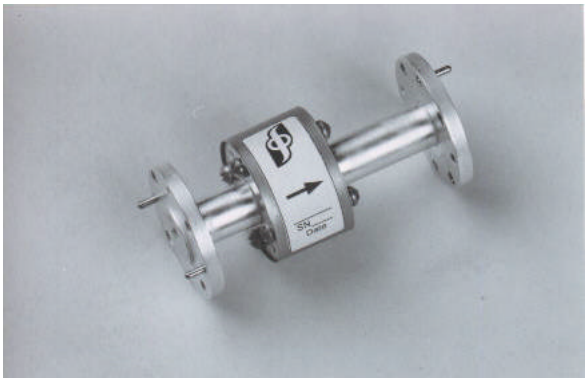
Isolator model	Circulator model	A	B	C	Waveguide	Flange	Fig.
4IWY33-1		12.7	32	20	WR-28	UG-599/U	1
	4CWY33-1	19.05	25	20			
4IWN28-2		12.7	32	20			
	4CWN28-2	25.4	25.4	20			
4IWN38-2		12.7	32	20			
	4CWN38-2	25.4	25.4	20			

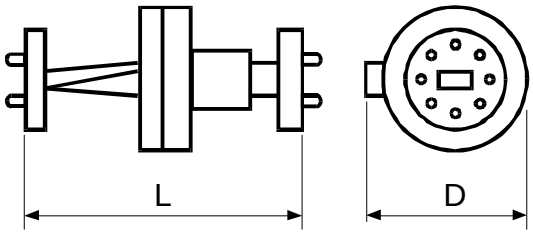
3. Cryogenic (4 to 77 K) Isolators and Circulators

Isolator model	Circulator model	A	B	C	Waveguide	Flange	Fig.
4IWC33-1		15	32	22	WR-28	UG-599/U	1
	4CWC33-1	19.1	25	22			
4IWC42-1		15	32	22	WR-22	UG-599/U	1
	4CWC42-1	19.1	25	22			
4IWC50-1		15	32	31	WR-19	UG-383/U	2
	4CWC50-1	34	34	31			
4IWC63-1		19.1	32	21	WR-15	UG-385/U	2
	4CWC63-1	19.1	25	23			
4IWC75-1		13	25	22	WR-12	UG-387/U	2
	4CWC75-1	25	25	23			
4IWC93-1		12	25	22	WR-10	UG-387/U	2
	4CWC93-1	25	25	23			
5IWC12-1		12	25	22	WR-8	UG-387/U	2
	5CWC12-1	25	25	23			
5IWC14-1		12	25	22	WR-6	UG-387/U	2
	5CWC14-1	25	25	23			

Note. Dimensions and flange types are specified by agreement with customer.

4. Broad Bandwidth (Faraday Rotational) Isolators 26.5 to 170 GHz





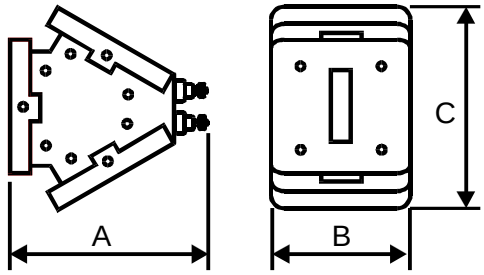
Frequency range GHz	Model	Bandwidth	Insertion loss dB	Isolation dB	VSWR
26.5 to 40	4IWF33-1	Full	1.5	25	1.4
33 to 50	4IWF42-1	Full	1.5	25	1.4
40 to 60	4IWF50-1	Full	1.8	25	1.4
50 to 75	4IWF63-1	Full	1.8	25	1.4
60 to 90	4IWF75-1	Full	2.0	25	1.4
75 to 110	4IWF93-1	Full	2.3	25	1.5
90 to 140	5IWF12-1	Full	3.0	25	1.5
110 to170	5IWF14-1	Full	3.5	25	1.5
Notes. Operating power 0.5 W. Operating temperature (0 to + 50) °C.					

Outlines (all dimensions are in millimeters)

Model	L	D	Waveguide	Flange
4IWF33-1	70	30	WR-28	UG-599/U
4IWF42-1	60	30	WR-22	UG-383/U
4IWF50-1	60	30	WR-19	UG-383/U
4IWF63-1	50	30	WR-15	UG-385/U
4IWF75-1	50	25	WR-12	UG-387/U
4IWF93-1	50	25	WR-10	UG-387/U
5IWF12-1	50	25	WR-8	UG-387/U
5IWF14-1	50	25	WR-6	UG-387/U

1. Ferrite Switches

1.1. Narrow Bandwidth Y-junction Latching Switches

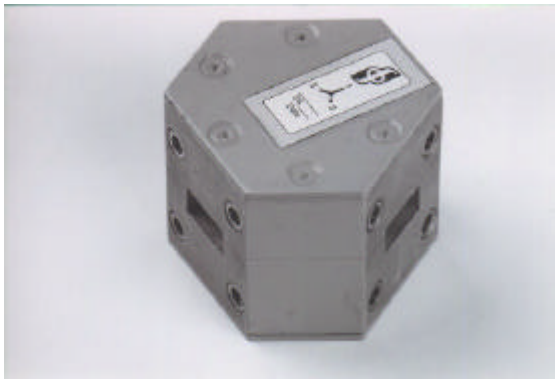


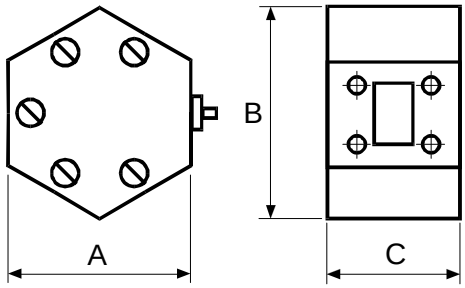
Frequency range GHz	Model	Band width %	Insertion loss (Typ∗/Max) dB	Isolation (Typ∗/ Min) dB	VSWR (Typ∗/Max)	Average power W	Switch time μs	Switch energy μJ
26.5 to 40	4SWS33-1	5	0.2/0.25	20/18	1.2/1.35	1	1.5	150
26.5 to 40	4SWS33-2	5	0.4/0.5	20/18	1.25/1.35	20		
26.5 to 40	4SWS33-3	10	0.4/0.5	20/18	1.25/1.35	1		
Notes ∗ - Typical performance at (+ 25 ± 10) °C. Max and Min values within temperature ranges 0 to +50 °C. Some devices can be delivered in T-junction configuration.								

Outlines (all dimensions are in millimeters)

Model	A	B	C	Waveguide
4SWS33-1	40	40	24	WR-28
4SWS33-2				
4SWS33-3				

1.2. Switches for General Use



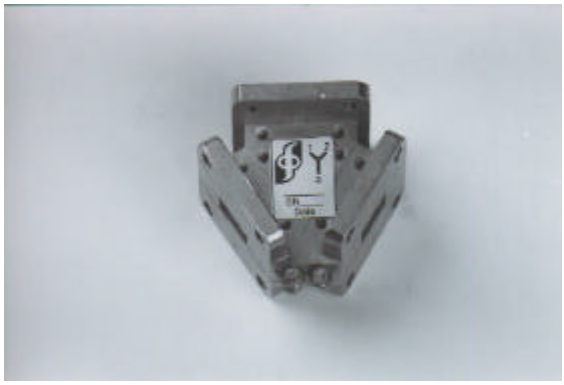


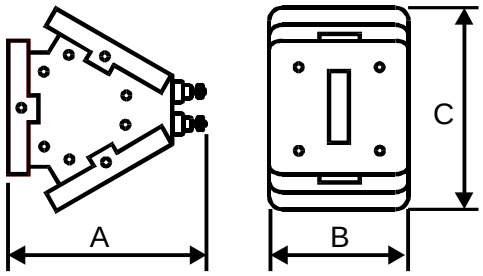
Frequency range GHz	Model	Band width %	Insertion loss (Typ∗/Max) dB	Isolation (Typ∗/Min) dB	VSWR (Typ∗/Max)	Average power W	Switch time ms	Switch energy V/A
26.5 to 40.0	4SWY33-1	10	0.2/0.25	20/18	1.15/1.2	2	2.5	27/3
26.5 to 40.0	4SWY33-2	15	0.25/0.3	20/18	1.2/1.25			
26.5 to 40.0	4SWY33-3	12	0.3/0.35	20/18	1.25/1.3			
40 to 60	4SWY50-1	8	0.3/0.35	20/18	1.25/1.3			
Notes. ∗ - Typical performance at (+ 25 ± 10) °C. Max and Min values within temperature ranges - -(30 to + 70) °C.								

Outlines (all dimensions are in millimeters)

Model	A	B	C	Waveguide
4SWY33-1	34	34	34	WR-28
4SWY33-2				
4SWY33-3				
4SWY50-1	40	40	40	WR-19

2. Cryogenic (20 K) Y-junction Latching Switches



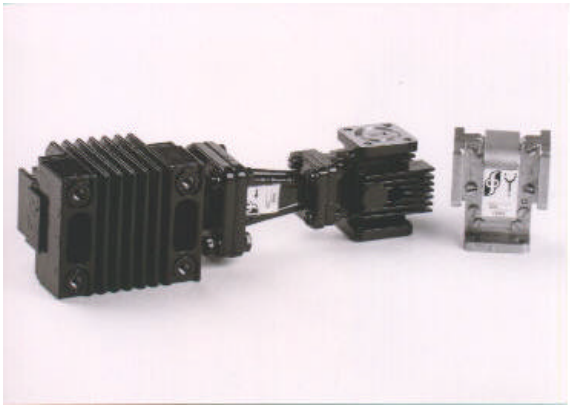


Frequency range GHz	Model	Band width %	Insertion loss (Typ∗/Max) dB	Isolation (Typ∗/Min) dB	VSWR (Typ∗/Max)	Average power W	Switch time μs	Switch energy μJ
26.5 to 40	4SWC33-1	5	0.2	20	1.2	0.2	1.5	150
26.5 to 40	4SWC33-2	10	0.4		1.25			
Note. ∗ - Typical performance at (+ 25 ± 10) °C. Max and Min values within temperature ranges (-60 to +85) °C.								

Outlines (all dimensions are in millimeters)

Model	A	B	C	Waveguide
4SWC33-1	40	40	24	WR-28
4SWC33-2				

1. High Power Y-junction Isolators and Circulators



Frequency range GHz	Model	Band width %	Insertion loss max dB	Isolation min dB	VSWR max	Power Av/Peak kW
26.5 to 40	4IWH35-5	15	0.2	23	1.2	0.2/2
26.5 to 40	4IWH35-6	15	0.2	23	1.2	0.25/-
26.5 to 40	4CWH35-5	10	0.25	20	1.2	0.2/2
26.5 to 40	4CWH35-6	10	0.25	20	1.2	0.25/-
33 to 50	4IWH41-3	6	o.3	20	1.25	0.1/1
33 to 50	4IWH41-4	6	0.3	20	1.25	0.15/-
33 to 50	4CWH41-2	8	0.4	20	1.3	0.05/2
33 to 50	4CWH41-4	5	0.3	20	1.3	0.15/-
40 to 60	4IWH50-2	8	0.4	20	1.35	0.05/1.5
40 to 60	4IWH50-3	5	0.4	20	1.3	0.08/-
40 to 60	4CWH50-2	5	0.5	18	1.35	0.05/1.5
40 to 60	4CWH50-3	5	0.5	18	1.35	0.08/-
Notes. Reflected power 10%. Devices are destined for forced air cooling. Operating temperature (+ 5 to + 50) °C.						

Outlines (all dimensions are in millimeters)

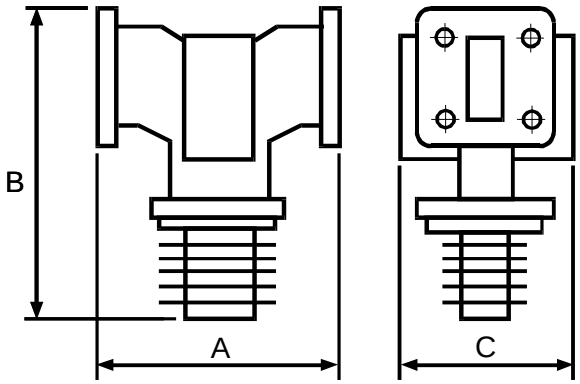


Fig. 1

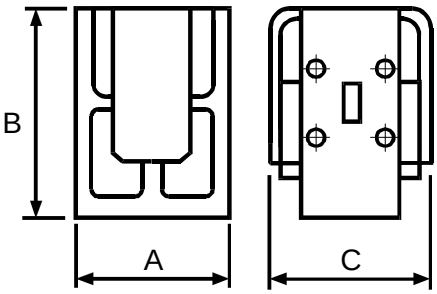
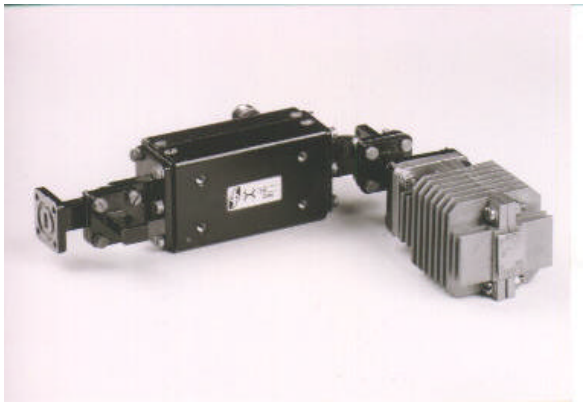


Fig. 2

Model	A	B	C	Waveguide	Fig.
4IWH35-5	45	150	45	WR-28	1
4IWH35-6	45	150	45		1
4CWH35-5	30	35	40		2
4CWH35-6	30	35	40		2
4IWH41-3	50	200	50	WR-22	1
4IWH41-4	45	150	45		1
4CWH41-2	28	35	40		2
4CWH41-4	28	35	40		2
4IWH50-2	50	200	50	WR-19	1
4IWH50-3	50	200	50		1
4CWH50-2	28	32	38		2
4CWH50-3	28	32	38		2

Special Designs

2. High Power 4-port Phase Isolators and Circulators



Shown here are few examples of some special design we have built for our customers. Contact us for other types of design.

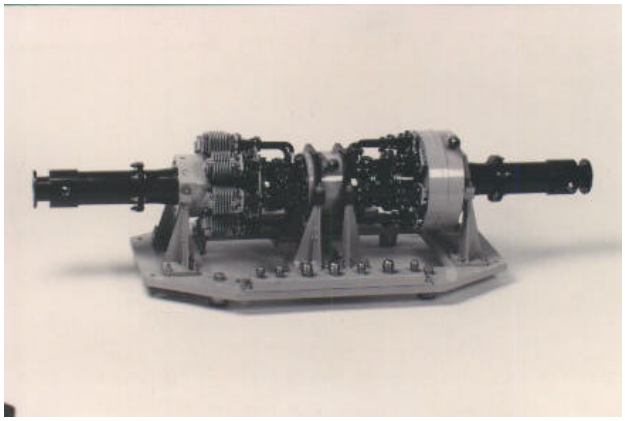
Frequency range GHz	Model	Band width %	Insertion loss max dB	Isolation min dB	VSWR max	Power Av./Peak kW
26.5 to 40	4IWP35-3	10	0.4	22	1.25	1/100
26.5 to 40	4IWP35-5	6	0.3	22	1.2	2/70
26.5 to 40	4IWP35-6	6	0.3	22	1.2	2.5/-
26.5 to 40	4CWP35-3	5	0.4	20	1.2	1/100
26.5 to 40	4CWP35-4	5	0.4	20	1.2	1.5/70
26.5 to 40	4CWP35-5	5	0.4	20	1.2	2/70
26.5 to 40	4CWP35-6	5	0.4	20	1.2	2.5/-
33 to 50	4IWP41-2	6	0.5	20	1.3	0.5/10
33 to 50	4IWP41-3	6	0.5	20	1.3	1/-
33 to 50	4CWP41-2	5	0.6	18	1.3	0.5/10
33 to 50	4CWP41-3	5	0.6	18	1.3	1/-
40 to 60	4IWP50-2	6	0.55	20	1.35	0.3/5
40 to 60	4IWP50-3	6	0.55	20	1.35	0.7/-
40 to 60	4CWP50-2	5	0.6	18	1.35	0.3/5
40 to 60	4CWP50-3	5	0.6	18	1.35	0.7/-
Notes. Reflected power 10 %. Operating temperature (+5 to +50) °C. All devices have a liquid cooling.						

Outlines (all dimensions are in millimeters)

Model	**A** (length)	**B** (width)	**C** (height)	Waveguide
4IWP35-3	200	85	100	WR-28
4IWP35-5	200	85	90	
4IWP35-6	200	85	90	
4CWP35-3	200	85	60	
4CWP35-4	200	85	60	
4CWP35-5	200	85	60	
4CWP35-6	200	85	60	
4IWP41-2	190	85	100	WR-22
4IWP41-3	190	85	90	
4CWP41-2	190	85	60	
4CWP41-3	190	85	60	
4IWP50-2	180	85	90	WR-19
4IWP50-3	180	85	90	
4CWP50-2	180	85	60	
4CWP50-3	180	85	60	

Special Designs

3. Super High Power Isolators



Shown here are few examples of some special design we have built for our customers. Contact us for other types of design.

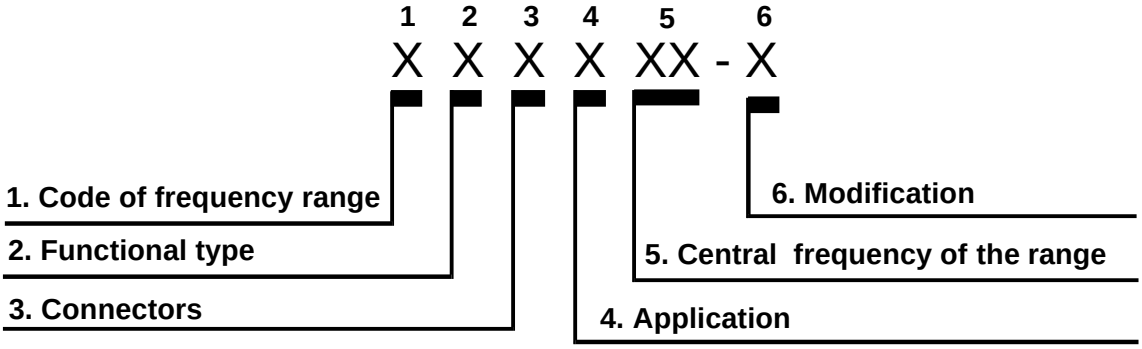
Frequency range GHz	Model	Band width %	Insertion loss max dB	Isolation min dB	VSWR max	Power Av/Peak kW
33 to 37	4IWU35-2	10	1.5	20	1.25	10/100
33 to 37	4IWU35-4	6	1.7	20	1.25	20/-
33 to 37	4IWU35-5	10	1.5	20	1.25	3/300
Notes. Reflected power 10 %. All devices have a liquid cooling. Operating temperature (+5 to +50) °C.						

Outlines (all dimensions are in millimeters)

Model	**A** (length)	**B** (width)	**C** (height)	Waveguide diameter
4IWU35-2	1500	400	480	40
4IWU35-4	700	500	450	
4IWU35-5	1500	400	480	

Millimeter Wave Waveguide Device model numbering system describes many options. Adapting our basic catalog models to your specific needs will frequently result in lower costs and prompt delivery.

Product identification



1. Code of frequency range and its Central frequency

1		5
Code of frequency range	**Frequency range**	**Central frequency of the range**
0	1 to 9 MHz	XX · 0.1 MHz
1	10 to 99 MHz	XX · 1 MHz
2	100 to 999 MHz	XX · 10 MHz
3	1 to 9 GHz	XX · 100 MHz
4	10 to 99 GHz	XX · 1 GHz
5	Over 100 GHz	XX · 10 GHz

2. Functional type

Code of the type	Product type
I	Isolator
C	Circulator
S	Switch

3. Connectors

Code of connectors	Type
W	Waveguide

4. Application

Code of application	Application
C	Cryogenic
F	Faraday rotational
H	High power
L	Slim line
N	Low loss
S	Narrow band
U	Super high power
Y	Broad bandwidth

5. Central frequency of the range

6. Modification