VALVE ELECTRONIC

ADMIRALTY SURFACE WEAPONS ESTABLISHMENT

CV2429

Specification AD/CV2429 Issue 2, Dated 22-9-59. To be read in conjunction with K1001.	SECURITY Specification: Unclassified Valve: Unclassified

→ Indicates a change

TYPE OF VALVE: T.R. Switch, S-band, plug-in type.

ENVELOPE: Metal and glass

PROTOTYPE: VX3220

MARKING

See K1001/4

RATING		Note
All limiting values are absolute		
Operating Frequency Range	S-band	A
Max. Peak Power (W)	300	B
Max. Mean Power (mW)	300	
Min. Negative D.C. Primer Supply Voltage (V)	1000	
Max. Primer Current (μA)	150	C
Min. Primer Current (μA)	90	C
TYPICAL OPERATING CONDITIONS		
Centre Frequency (Mc/s)	3305	D
Loaded Q	4.0	D
Total Insertion Loss (dB)	0.2	D, E
"Spike" Leakage (ergs/pulse)	0.25	E, F
Recovery Time (μS)	7	D, E, G
Primer Running Voltage (V)	340	E

DIMENSIONS

See drawing on Page 5 ←

NOTES

A. The valve is designed for use with No. WG10 waveguide and the operating frequency depends on the mounting. The valve can be used with No. WG11 waveguide in the higher frequency part of S-band.

B. The valve may be used in conjunction with the CV2430 Pre-TR Switch at a maximum peak RF power level of 500 kW.

C. The primer current shall be limited by series resistors of which at least 2 megohms shall be adjacent to the primer terminal.

D. Operating in the mounting shown in drawing on Page 6.

E. With primer current 100 μA.

F. Operating in a combination of two CV2429 TR switches and one CV2430 Pre-TR switch.

G. The time shall be measured from the trailing edge of the transmitter pulse to the instant when the insertion loss is 6 dB greater than it was immediately before the transmitter pulse occurred.

TESTS

To be performed in addition to those applicable in K1001 and after a holding period of 28 days.

	Test Conditions	Test	Limits Min.	Limits Max.	No. Tested	Note
a	See Note 1. The test shall be done at least 7 days after any previous discharge.	Primer Breakdown (Secs) The time shall be measured from the application of primer voltage to the breakdown.	-	5	100%	
b	The line shall be energised through a not-less-than-10 dB resistive attenuator so that 20 ± 10 mW RF power is incident on the valve, and shall be terminated in an impedance matched better than 0.98 VSWR at the test frequency of 3305 ± 3 Mc/s.	VSWR at 3305 Mc/s	0.87	-	100%	1,2
c	Test frequency to be varied. Other conditions as in test (b).	Centre Frequency (Mc/s) This frequency shall be determined as the geometric mean of the frequencies at which the VSWRs are equal and in the range 0.75 ± 0.05.	3288	3324	100%	1,2
d	The line shall be energised with 20 ± 10 mW RF power incident on the valve. The valve shall be mounted between impedance matched better than 0.9 VSWR. Test frequency = 3305 ± 3 Mc/s.	Low Power Level Insertion Loss (dB)	-	0.4	100%	1,2

TESTS (Cont'd)

CV2429

	Test Conditions	Test	Limits Min.	Limits Max.	No. Tested	Note
e	A combination of one CV2430 and two CV2429 switches shall be mounted on the side arm of a T-junction. The CV2430 shall be in the position adjacent to the main run and the CV2429 under test in the position remote from the main run. The line shall be energised with 350 ± 50 kW peak RF power incident on the T-junction. Both the main run and the side arm shall be terminated in impedances matched better than 0.9 VSWR. Test frequency = 3305 ± 40 Mc/s.	High Power Leakage 1. "Spike" energy (ergs/pulse) 2. Peak "flat" power (mW)	- -	0.30 40	100% 100%	1,3 4,5, 6
f	The line shall be energised through a resistive attenuator with 500 ± 50W peak RF power incident on the valve. Test frequency of transmitter pulse 3305 ± 40 Mc/s. The power of the simulated echo pulse shall be insufficient to maintain the RF discharge in the valve. Test frequency of simulated echo pulse = 3305 ± 40 Mc/s.	Recovery Time (μS) The time shall be measured from the trailing edge of the transmitter pulse to the instant when the insertion loss is 6 dB greater than it was immediately before the transmitter pulse occurred.	-	25	100%	1,2, 5
g	Conditions as in test (e) but with the CV2429 under test in the centre position. Test frequency 3305 ± 40 Mc/s. Pulse duration = 0.75 μS. PRF = 1350 pps.	Life (hrs)	500	-	T.A.	1,3, 7

NOTES

1. The primer supply shall be 1000V ± 3% DC, having a peak-to-peak ripple voltage not exceeding 1% and shall be negative with respect to the body of the valve. The supply should be connected to the primer through a total resistance of 6.6 megohms ± 5%, of which at least 2 megohms shall be adjacent to the primer terminal.

2. The valve shall be tested in the mount shown in drawings on Pages 6 and 7.

3. The valve shall be tested with the T-junction shown in drawing on Page 8. The CV2430 and the other CV2429 shall be within specification. The primer supply for both CV2429's of the combination shall be as in Note 1.

4. A variable-pulse-length method is suggested for determining the high power leakage characteristics. Using three pulse lengths t_1, t_2 and t_3 microseconds the corresponding leakage powers are measured as p_1, p_2 and p_3 microwatts respectively.

   (1) "Spike" Energy If t_1 is so short that p_1 can be attributed entirely to the "spike",

   $$\text{"spike" Energy} = \frac{10 p_1}{PRF} \text{ ergs/pulse.}$$

   (2) Peak "Flat" Power This is given by the expression

   $$\text{Peak "Flat" Power} = \frac{p_3 - p_2}{t_3 - t_2} \times \frac{10^3}{PRF} \text{ milliwatts.}$$

   Suggested values of the pulse lengths are: $t_1 = 0.2$ µS
   $t_2 = 0.8$ µS
   $t_3 = 2.2$ µS

5. This test may be done using Modulator Panel 3BA, Admiralty Pattern No. W8229/A, or 3CC, Admiralty Pattern No. 66501B, modified to give suitable pulse characteristics with CV1476 or CV1477 magnetron.

6. The bandwidths at 0.67 VSWR of the thermistor mount used to measure leakage shall be between 9% and 11% of the test frequency. The thermistor mount shall be separated from the mount containing the valves by not less than 5 feet of waveguide.

7. The valve shall be deemed to have reached the end of life when any one of the following conditions occurs:

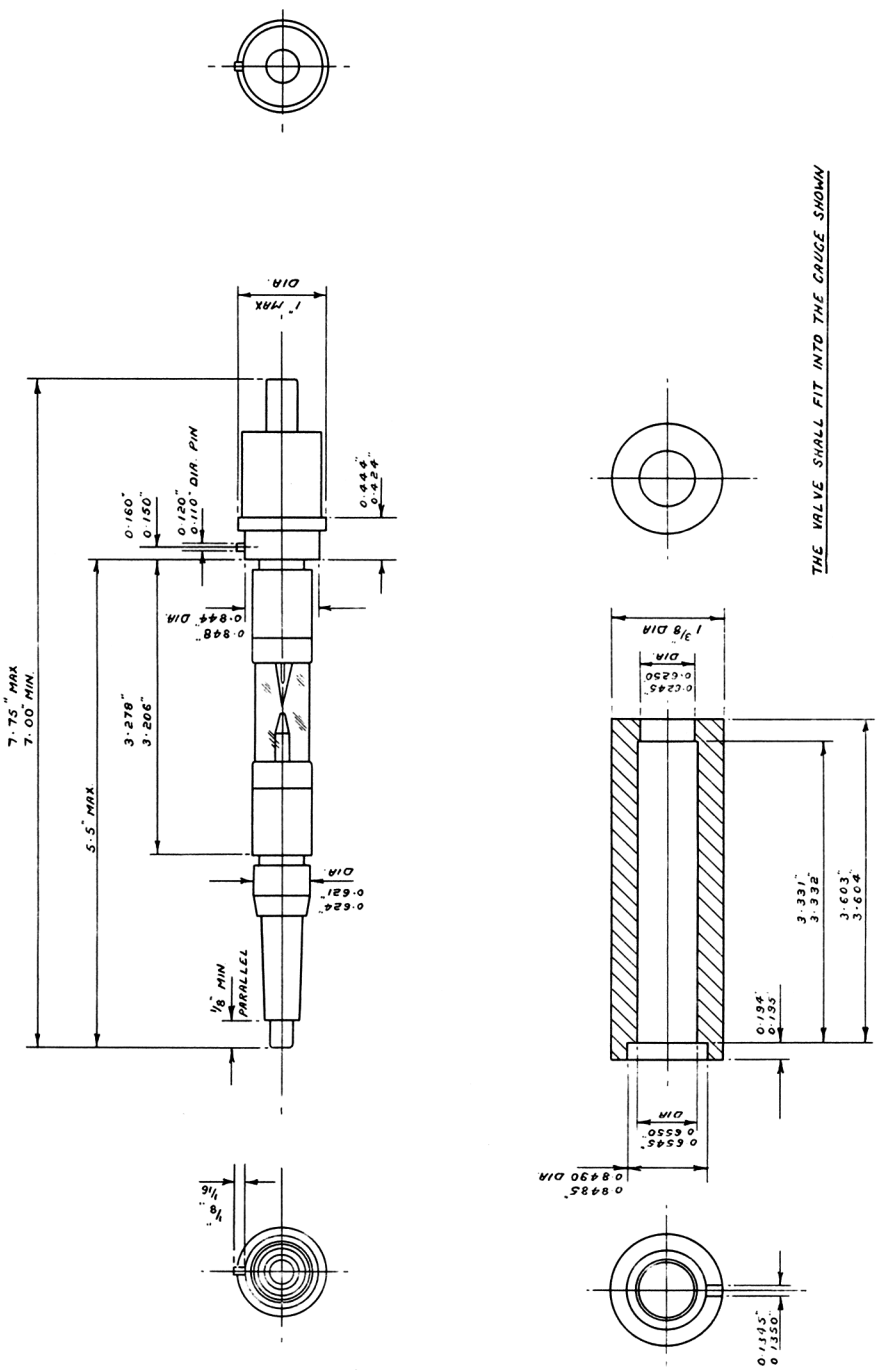
   (1) VSWR at 3305 Mc/s (test b) is less than 0.85.

   (2) The centre frequency (test c) is outside the limits 3280 - 3324 Mc/s.

   (3) The spike energy in test (e) exceeds 0.40 ergs/pulse or the Peak flat power in test (e) exceeds 80 mW.

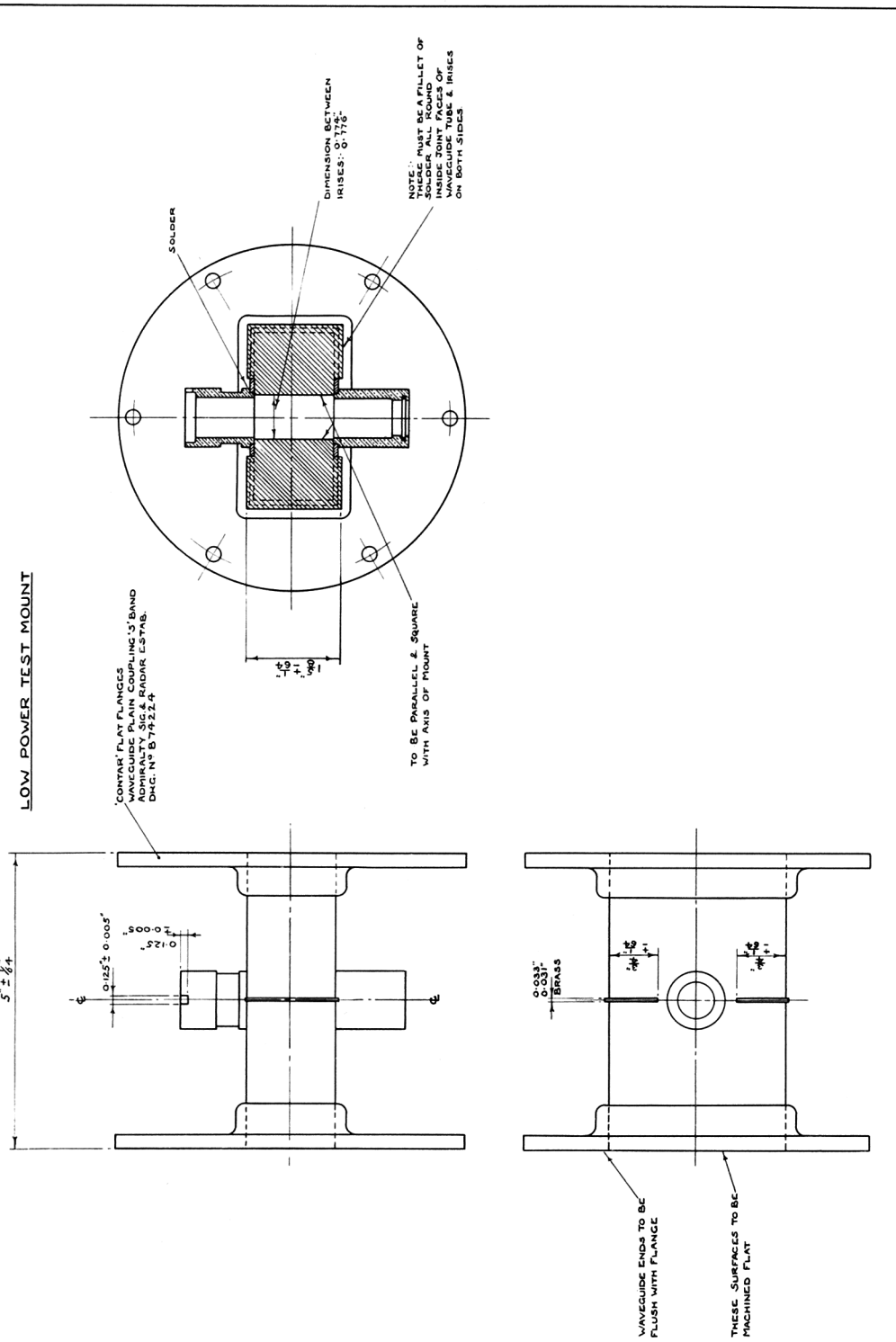
   (4) The recovery time (test f) exceeds 40 µsecs.

THIRD ANGLE PROJECTION



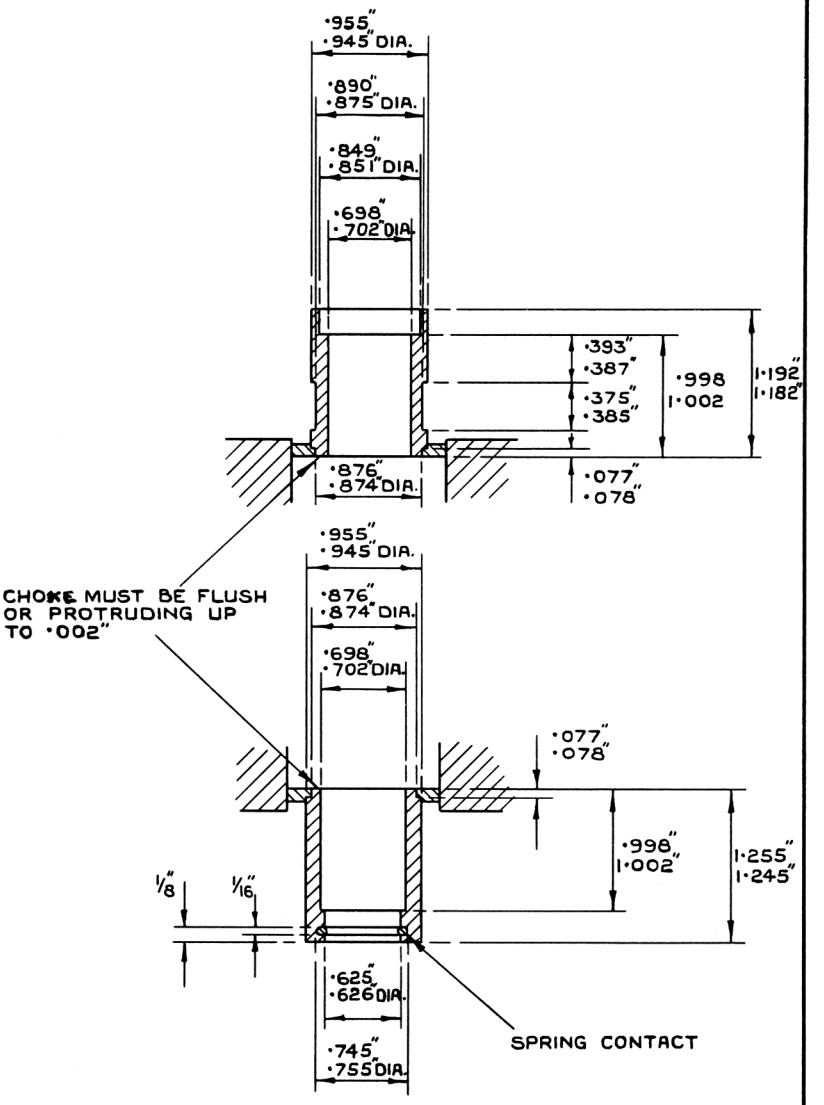
VALVE No. C.V. 2429

DIMENSIONAL DRAWING


LOW POWER TEST MOUNT
'CONTAR' FLAT FLANGES
WAVEGUIDE PLAIN COUPLING 'S' BAND
ADMIRALTY SIG & RADAR ESTAB.
DWG. No B 74-224
SOLDER
DIMENSION BETWEEN IRISES: 0·776"
NOTE: THERE MUST BE A FILLET OF SOLDER ALL ROUND INSIDE JOINT FACES OF WAVEGUIDE TUBE & IRISES ON BOTH SIDES
TO BE PARALLEL & SQUARE WITH AXIS OF MOUNT
5" ± 1/64"
0·125" ± 0·005"
0·033"
0·031"
BRASS
WAVEGUIDE ENDS TO BE FLUSH WITH FLANGE
THESE SURFACES TO BE MACHINED FLAT

CV2429
CV2430

THIRD ANGLE PROJECTION



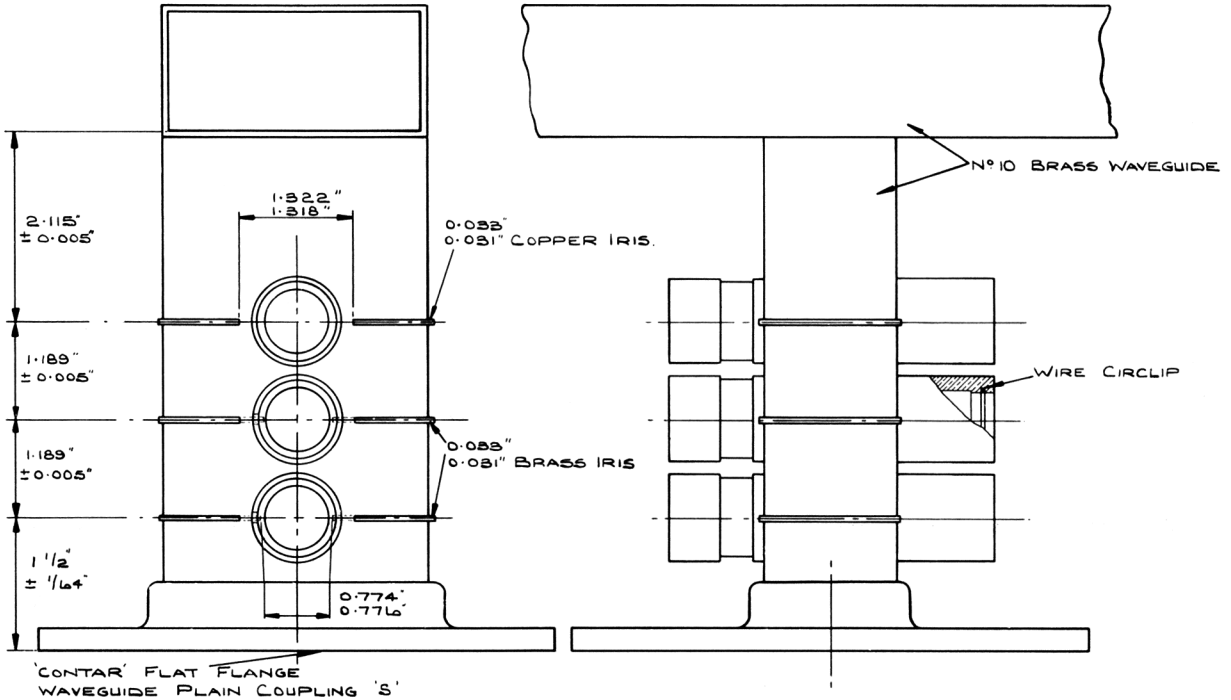
SCRAP VIEWS OF CHOKES
IN POSITION

CV2429/2/7
CV2430/2/7

T-JUNCTION TRIPLE MOUNT
HIGH POWER TEST.

NOTE.

THERE MUST BE A FILLET OF SOLDER ALL ROUND INSIDE JOINT FACES OF WAVEGUIDE TUBE AND IRISES (ON BOTH SIDES)



'CONTAR' FLAT FLANGE WAVEGUIDE PLAIN COUPLING 'S' BAND. ADMIRALTY SIG: AND RADAR ESTAB. DRG: No B74224