VALVE ELECTRONIC

ADMIRALTY SURFACE WEAPONS ESTABLISHMENT

CV2430

SPECIFICATION: AD/CV2430 Issue 2 dated 22/9/59 To be read in conjunction with K1001	SECURITY Specification: Unclassified Valve: Unclassified

→ Indicates a change

TYPE OF VALVE: Pre-T.R. Switch, S-Band, plug-in type. ENVELOPE: Metal and glass PROTOTYPE: VX3221	MARKING See K1001/4

RATING All limiting values are absolute.			Note	DIMENSIONS See Drawing on Page 5 ←
Operating Frequency Range		S-band	A	
Max. Peak Power	(kW)	500		
Min. Peak Power	(kW)	10		
Max. Mean Power	(W)	500		
TYPICAL OPERATING CONDITIONS			B	
Centre Frequency	(Mc/s)	3305		
Loaded Q		1.0		
Insertion Loss	(dB)	0.07		
Recovery Time	(μS)	4.0	C	
Arc Loss	(dB)	0.4	D	
Position of Short Circuit	(in)	0.09	E	

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

C. 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.

D. Operating at 10 kW peak power.

E. Measured from the axis of the mount towards the generator.

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	The line shall be energised through a not less than 10 dB resistive attenuator with 20 ± 10 mW RF power incident on the valve and shall be terminated in an impedance matched better than 0.98 VSWR. Test frequency = 3305 ± 3 Mc/s	VSWR at 3305 Mc/s	0.93	-	100%	1
b	Test Frequency to be varied. Other conditions as in test (a)	Centre Frequency (Mc/s) The 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
c	The line shall be energised with 20 ± 10 mW RF power incident on the valve. The valve shall be mounted between impedances matched better than 0.9 VSWR. Test frequency = 3305 ± 3 Mc/s.	Low Power Level Insertion Loss (dB)	-	0.2	100%	1
d	The valve shall be mounted in the side arm of a T-junction. The line shall be energised with 100 ± 10 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 (watts)	- -	1500 150	T.A. T.A.	2,3, 4,7.

TESTS (cont'd)

	Test Conditions	Test	Limits Min.	Limits Max.	No. Tested	Note
e	The test shall be done at least 7 days after any previous discharge. The valve shall be mounted on the side arm of a T-junction. The line shall be energised with 10 ± 1 kW peak RF power incident on the T-junction. The main run shall be terminated in an impedance matched better than 0.9 VSWR. Test frequency = 3305 ± 40 Mc/s	Arc Loss (dB)	-	0.8	100%	1,4, 5
f	The line shall be energised with 100 ± 10 kW peak RF power incident on the valve. Test frequency = 3305 ± 40 Mc/s.	Position of Short Circuit (ins) Measured from the axis of the mount towards the generator.	0.060	0.110	T.A.	1,4
g	Conditions as in test (d). Frequency of simulated echo = 3305 ± 40 Mc/s. Power of simulated echo pulse such that not more than 100 mW echo power is incident on the valve.	Recovery Time (usecs) 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.	-	15	100%	2,4
h	The valve shall be mounted with two CV2429 TR switches in the side arm of a T-junction. The line shall be energised with 350 ± 50 kW peak RF power incident on the T-junction. The main run shall be terminated in an impedance matched better than 0.9 VSWR. Test frequency = 3305 ± 40 Mc/s. Pulse duration = 0.75 ± 0.05 µs PRF = 1350 pps.	Life (hours)	500	-	T.A.	6

NOTES

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

2. The valve shall be tested with the T-junction shown in drawing on Page 8.

3. 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

   $$\text{Peak "Flat" Power} = \frac{P_3 - P_2}{t_3 - t_2} \times \frac{1}{PRF} \text{ Watts}$$

   Suggested values of the pulse lengths are

   $t_1 = 0.2\,\mu S$
   $t_2 = 0.8\,\mu S$
   $t_3 = 2.2\,\mu S$

4. 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.

5. The side arm shall be fitted with a removable short circuit placed so as to produce the maximum transmission of power in the main run. The valve shall be mounted so that its mean position of short circuit is one-half of the guide wavelength beyond the removable short circuit. The side arm shall be terminated in a short circuit placed a further one-quarter of the guide wavelength beyond the mean position of short circuit of the valve.

6. The valve shall be tested in the mount shown in drawing on Page 9. The CV2430 shall be fitted in the position nearest the T-junction. The valve shall be deemed to have reached the end of life when any one of the following conditions occurs:-

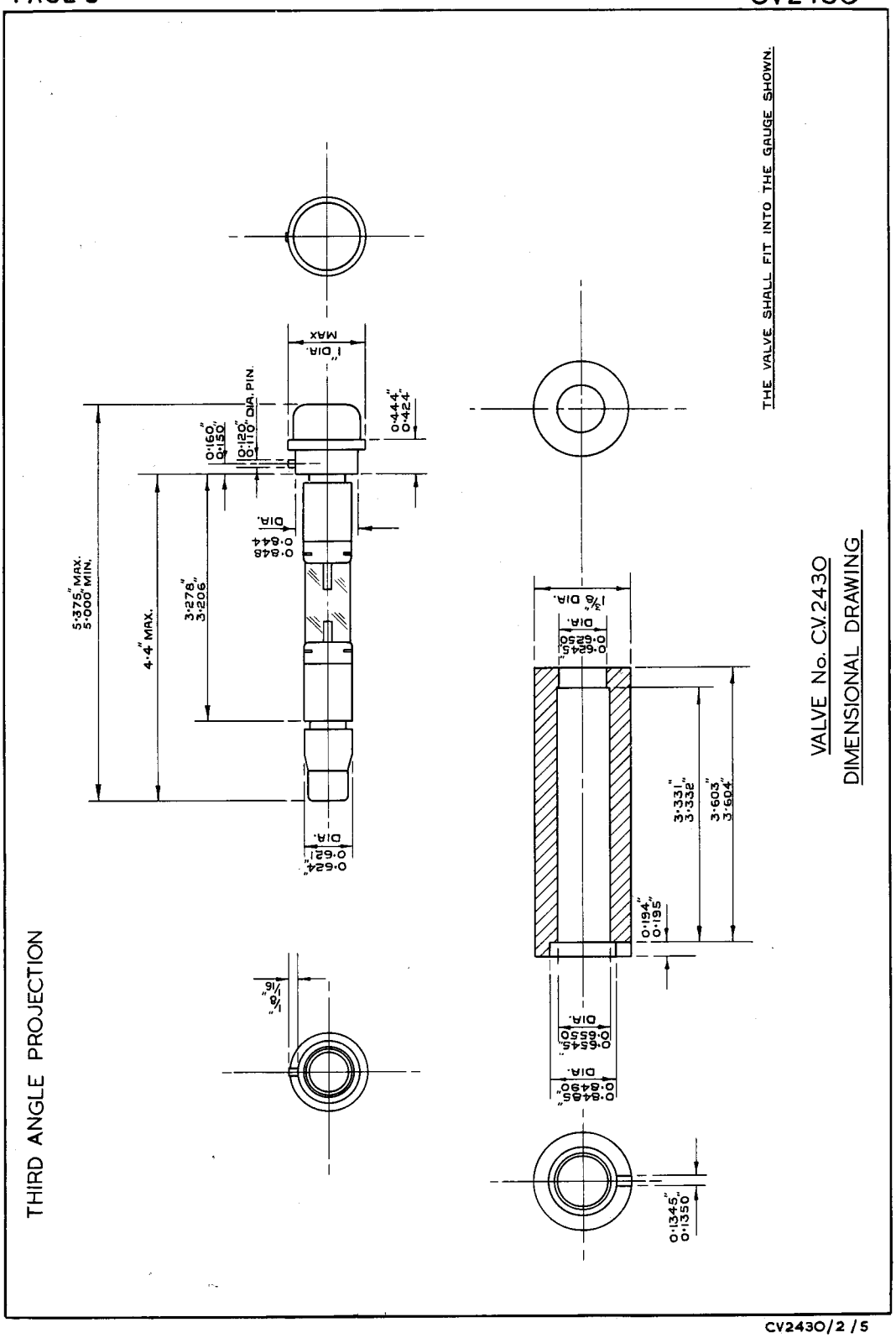
   (1) The centre frequency (test b) is outside the limits 3270 - 3344 Mc/s.

   (2) The spike energy in test (d) exceeds 2500 ergs/pulse or the peak flat power in test (d) exceeds 300 watts.

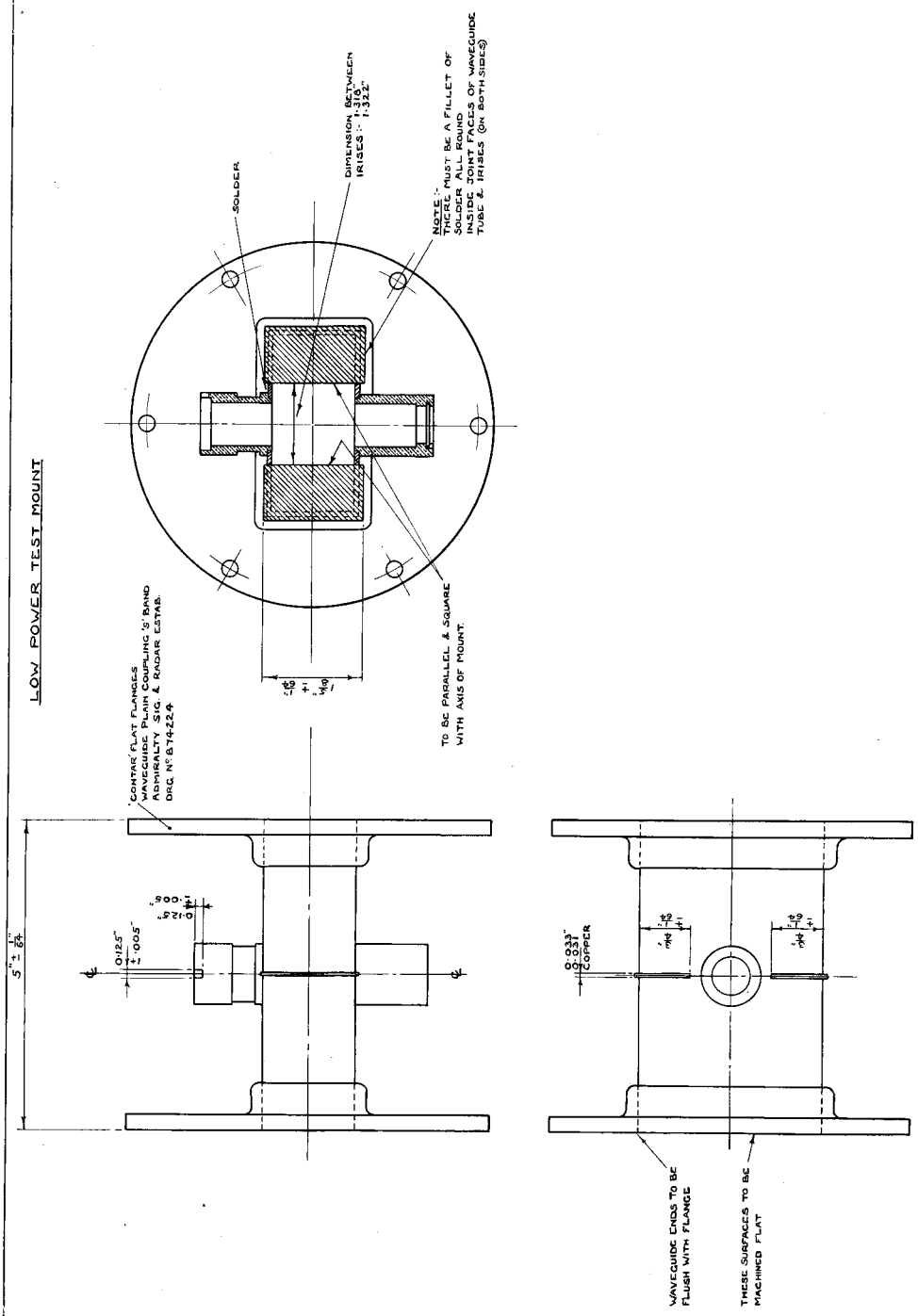
   (3) The arc loss (test e) exceeds 1.0 dB.

   (4) The recovery time (test g) exceeds 30 μsecs.

7. The bandwidth at 0.67 VSWR of the thermistor mount used to measure leakage shall be between 9% and 11% of the test frequency. The leakage shall be measured through a not less than 10 dB resistive attenuator which shall be matched better than 0.9 VSWR over a bandwidth of 30% of the test frequency.

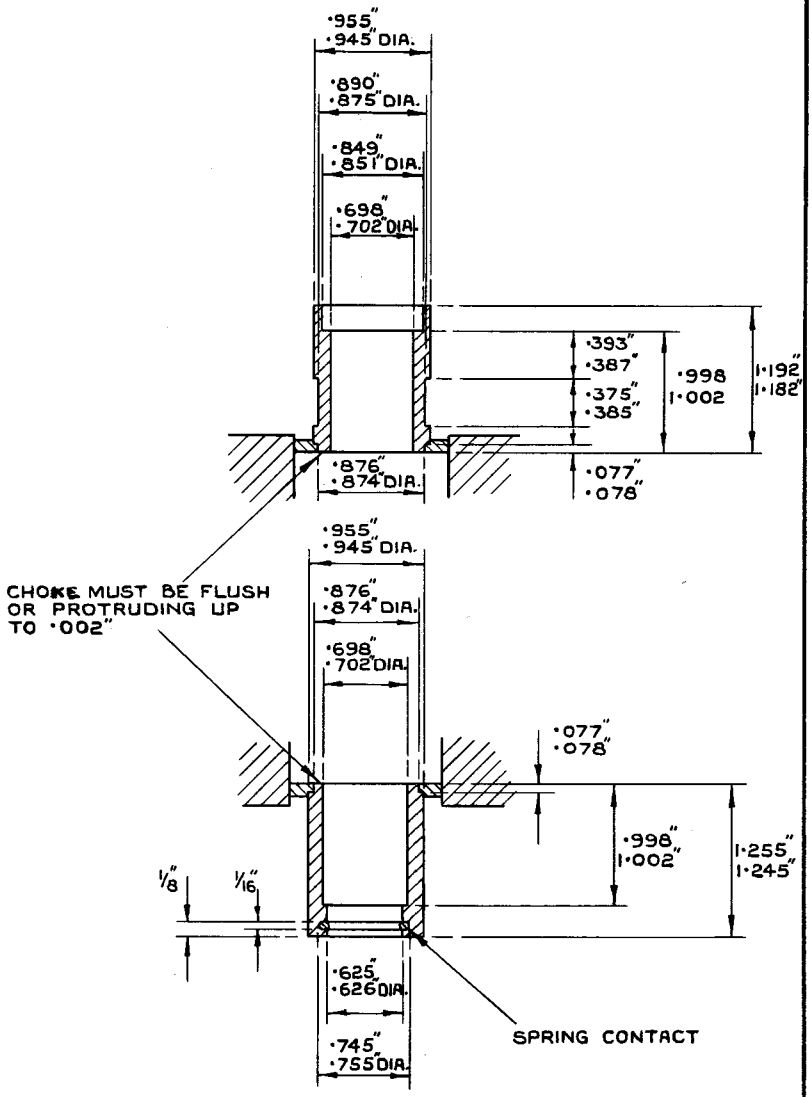

THIRD ANGLE PROJECTION
VALVE No. CV.2430
DIMENSIONAL DRAWING
THE VALVE SHALL FIT INTO THE GAUGE SHOWN.
MAX
1" DIA.
0·444"
0·424"
0·160"
0·150"
10·120"
10·110" DIA. PIN.
DIA.
0·648"
0·644"
5·375" MAX.
5·000" MIN.
4·4" MAX.
3·278"
3·206"
DIA.
0·625"
0·624"
1¾" DIA.
DIA.
0·6245"
0·6240"
3·331"
3·332"
3·603"
3·604"
0·194"
0·195"
DIA.
0·6545"
0·6550"
DIA.
0·8485"
0·8490"
⅛"
0·1345"
0·1350"

LOW POWER TEST MOUNT



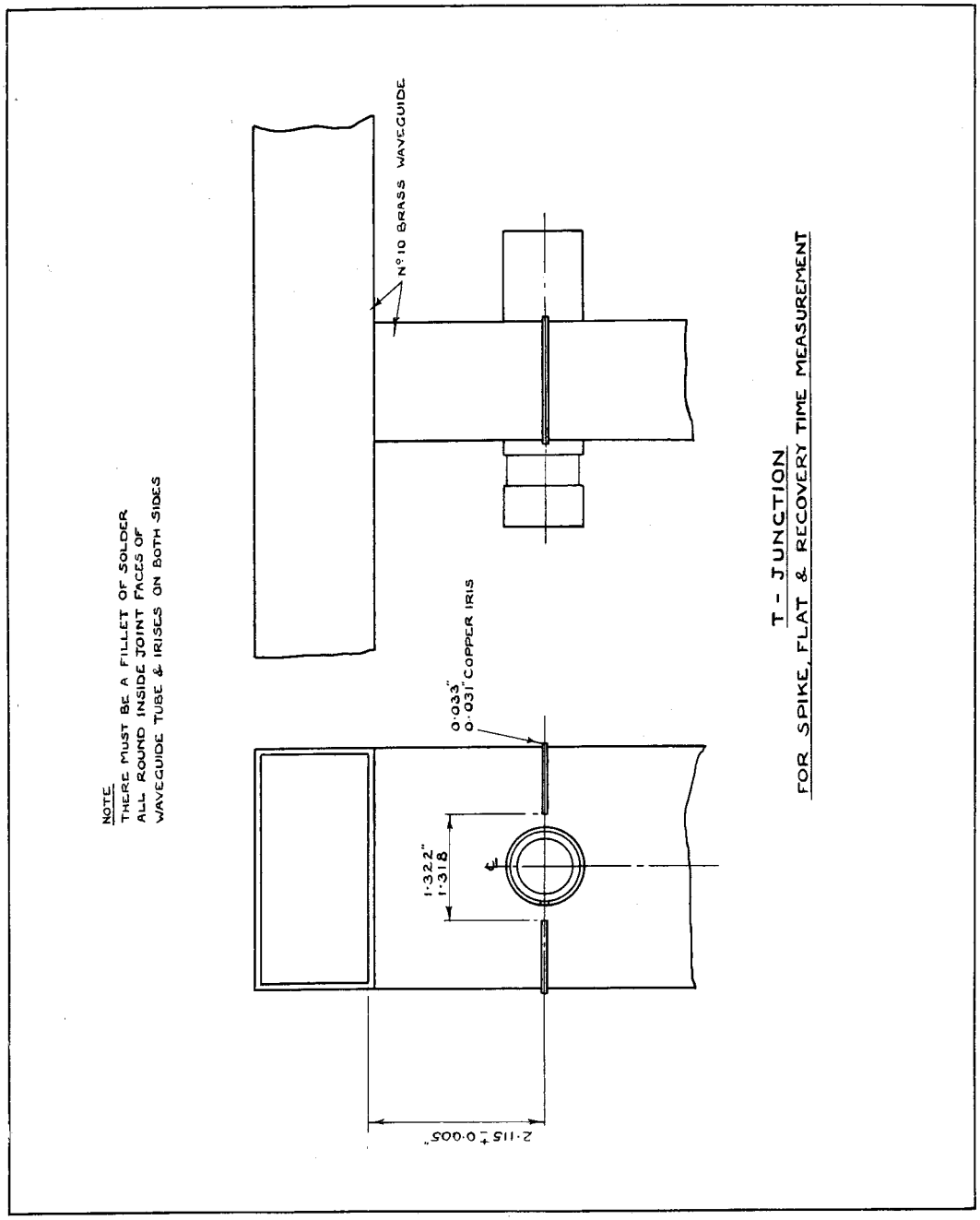
CV2429
CV2430

THIRD ANGLE PROJECTION



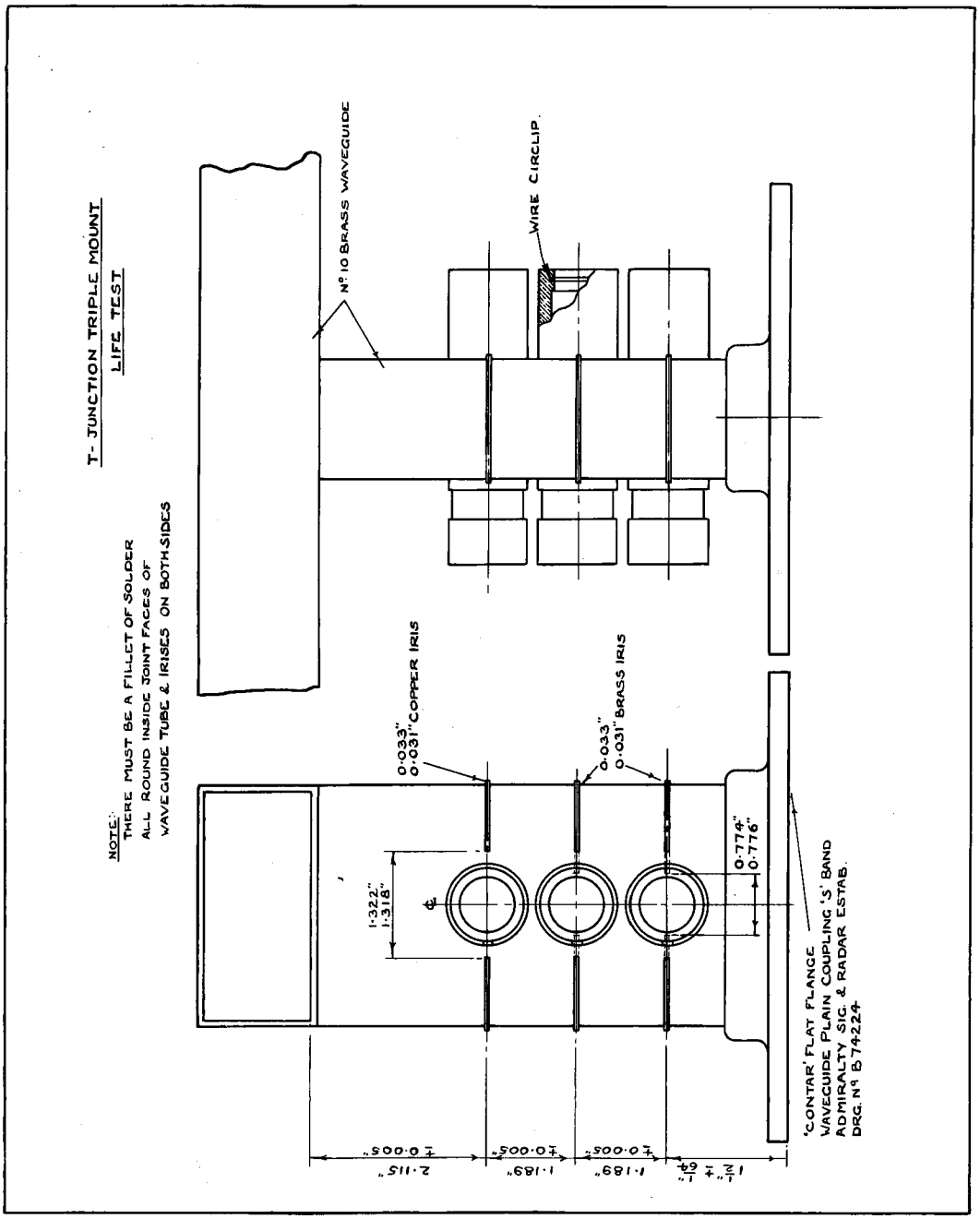
SCRAP VIEWS OF CHOKES
IN POSITION

CV2429/2/7
CV2430/2/7


T - JUNCTION
FOR SPIKE, FLAT & RECOVERY TIME MEASUREMENT
NOTE
THERE MUST BE A FILLET OF SOLDER
ALL ROUND INSIDE JOINT FACES OF
WAVEGUIDE TUBE & IRISES ON BOTH SIDES
No 10 BRASS WAVEGUIDE
0·033"
0·031" COPPER IRIS
1·322"
1·318
2·115 ± 0·005"

CV2430/2/8

CV2430



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