# VALVE ELECTRONIC CV 6169

| Specification: MOA/CV6169<br>Issue 1 dated 13th August 1965<br>To be read in conjunction with K1001<br>BS448 etc. | SECURITY<br>Specification: Unclassified<br>Valve: Unclassified |
|---|---|

Type of Valve: Reliable Broad-Band TR Cell

Prototype: WF 471

**MARKING**
K1001/4

Base: None

**RATINGS AND CHARACTERISTICS**
(Not for Inspection purposes)

| | | | Note |
|---|---|---|---|
| Operating Frequency Range | Mc/s | 8500 to 9500 | |
| Max. Peak Power | kW | 50 | |
| Min. Peak Power | kW | 4 | |
| Min. Primer Supply Voltage | V | -850 | B |
| Primer Current | µA | 130 | B |

**DIMENSIONS**
See outline drawing

**TOP CAP**
None

**Primer connection is by** wrapped joint, single strand wire 20-25 swg

## NOTES

A. The cell may be used in branched or balanced duplexers.

B. The primer encapsulation contains 5.5 Mohms of external resistance. With a primer supply voltage of between -850V and -1000V the primer current will be limited to between 100 µA and 160 µA. With a primer supply voltage of not less than -950V, the supply to the primer must be connected at least 5 seconds before the application of high power RF pulses. With a primer supply voltage of between -850V and -950V, the supply to the primer must be connected at least 30 seconds before the application of high power RF pulses.

C. Transmission loss becomes disproportionately high at line powers of less than 4 kW.

D. There is a 3.3 Megohm resistor between the primer connection and the monitor point allowing a measurement to be made of the primer current without disconnecting the primer supply.

E. NATO Stock Number: 5960-99-037-4456.

Conditions: Unless otherwise stated, Primer Supply Voltage is -1000V

| K1001 5H | Test | Test Conditions | AQL % | Insp. Level | Sym-bol | LIMITS Min. | LIMITS Max. | Units |
|---|---|---|---|---|---|---|---|---|
| | GROUP A | | | | | | | |
| | Primer Breakdown | Applied Voltage -950V | | 100% | t | - | 5 | Secs |
| 2.5 | Primer Current | Applied Voltage -850V<br>Note 1 | | 100% | | 100 | - | µA |
| 4.1.3.1 | V.S.W.R. | Reflectometer check<br>8500 and 9500 Mc/s<br>8600 - 9400 Mc/s<br>Note 2 | | 100% | | <br>-<br>- | <br>1.40<br>1.30 | |
| 4.1.1.1 | Total Insertion Loss | Reflectometer check<br>8500 and 9500 Mc/s<br>8600-9400 Mc/s<br>Note 3 | | 100% | | <br>-<br>- | <br>1<br>0.8 | <br>dB<br>dB |
| | Leakage | f = 8900 Mc/s ± 100Mc/s<br>P.R.F. = 1000 p.p.s. ± 10%<br>Linepower = 50 kW ± 15%<br>Note 4 | | | | | | |
| | (1) Spike | tp = 0.15 µsec ± 15% | | 100% | | - | 0.30 | Ergs/ pulse |
| | (2) Total | tp = 1.0 µsec ± 10% | | 100% | | - | 100 | mW |
| | GROUP B omitted | | | | | | | |
| | GROUP C | | | | | | | |
| 4.2.4.4 | Low Level Leakage | f = 8900 Mc/s ± 100 Mc/s<br>P.R.F. = 1000 pps ± 10%<br>tp = 1.0 µsec ± 10%<br>Incident power varied from 100 mW peak to 100 W peak | 2.5 | II | | - | 250 | mW (pK) |
| | Recovery Time | To -6 dB<br>Note 5 | | | | | 0.5 | µSec |
| 4.1.10 | Electrical Length | (1) 8500 Mc/s<br>(2) 8900 Mc/s<br>(3) 9500 Mc/s<br>Note 6 | | | | 147<br>234<br>350 | 187<br>274<br>390 | deg.<br>deg.<br>deg. |

TESTS (Cont'd)



| K1001 5H | Test | Test Conditions | AQL % | Insp. level | Symbol | LIMITS Min. | LIMITS Max. | Units |
|---|---|---|---|---|---|---|---|---|
| | GROUP D | | | | | | | |
| 4.2.2 | Arc Loss | 4 kW min. Power<br>Note 7 | | QA | | - | 0.8 | dB |
| 4.2.7 | Position of short circuit | Note 8 | | QA | | 0.058 | 0.072 | inches |
| | GROUP E | | | | | | | |
| | Damp Heat | DEF 5011 Section 5 Category H.5 | | QA | | | | |
| | Shock | DEF 5011 Section 13 Category S.2 | | QA | | | | |
| | Dry Cold | DEF 5011 Section 15 Category -25°C | | QA | | | | |
| | Dry Heat | DEF 5011 Section 16 Category +85°C | | QA | | | | |
| | Vibration | DEF 5011 Section 18 Category V.2 | | QA | | | | |
| | GROUP F | | | | | | | |
| | Life | Note 9 | | | | | | |
| 5.3 | Life Test End point 1000 Hrs | | | 4.0% | | Record | | |
| | Inoperatives | | 2.5 | | | | | |
| | Electrical Tests | Combined AQL | 6.5 | | | | | |
| | Recovery Time | to -6 dB<br>Note 5 | | | | | 3 | µsecs |
| | V.S.W.R. | Reflectometer check | | | | | | |
| | | 8500, 9500 Mc/s | | | | | 1.5 | Ratio |
| | | 8600 to 9400 Mc/s | | | | | 1.4 | Ratio |
| | | Note 2 | | | | | | |
| | Insertion Loss | Reflectometer check | | | | | | |
| | | 8500, 9500 Mc/s | | | | | 1.2 | dB |
| | | 8600 to 9400 Mc/s | | | | | 1.0 | dB |
| | Crystal Protection | Xtal N.F. Deterioration in dB measured after 500 Hours. | | | | Record | | |

NOTES

(1) D.C. Primer Supply as specified in K1001 5H.2.5. Cell unmounted.

(2) V.S.W.R. measurements shall be made with the line energised at not greater than 10 mW. The termination shall be matched better than 1.02 over the frequency band.

(3) Measurement of insertion loss shall be made with the valve mounted between impedances matched better than 1.10 V.S.W.R. over the frequency band and the line energised at not greater than 10 mW.

(4) For high power measurements, the magnetron shall be a CV2284 or equivalent. The rate of rise of magnetron voltage shall be 100 kV/μsec ± 10%. A thermistor with the following characteristics shall be used:-

$$\text{Efficiency (E)} = \frac{\text{Measured Power}}{\text{Incident Power}} \quad \text{shall be greater than 0.9}$$

V.S.W.R. better than 1.10 over 8900 Mc/s ± 100 Mc/s

" " 1.33 over 8900 Mc/s ± 250 Mc/s

If the measured leakage powers are $P_1$ and $P_2$ microwatts at pulse lengths of 0.15 μsec. and 1.0 μsec. respectively, then

4.1. Spike energy $= \frac{10P_1}{E \times p.r.f.}$ ergs/pulse

4.2. Total leakage $= \frac{1000P_2}{E \times p.r.f.}$ mW peak

(5) Recovery time shall be measured with the cell in a side-arm T-junction operated under the following conditions:-

Peak power = 10 kW Pulse length = 1.0 μsec. ± 10%

PRF = 1000 pps ± 10%

The frequency of the simulated echo pulse shall be within the range 8500 to 9500 Mc/s and shall be not greater than 10 mW peak incident on the cell. The time shall be measured from the trailing edge of the transmitter pulse for an insertion loss exceeding that immediately before the transmitter pulse by 6 dB.

(6) The length of RCSC No. 16 waveguide having the same effective electrical length as the cell shall be determined, with the line energised at a convenient low power level.

(7) Arc Loss shall be measured with the line energised at not greater than 4 kW RF peak measured immediately after the cell.

PRF = 1000 pps ± 10% tp = 1.0 μsec. ± 10%

(8) The position of short circuit shall be measured as the distance of the effective RF short behind the input flange of the cell.

Peak power = 50 kW tp = 1.0 μsec ± 10%

PRF = 1000 pps ± 10%

(9) Life tests shall be carried out with the cells mounted on E-plane T-junctions. Crystals type CV2154 shall be mounted in approved holders at the optimum distance behind each cell. The main run shall be terminated in a matched load. Input power to each cell shall be 50 ± 10 kW.

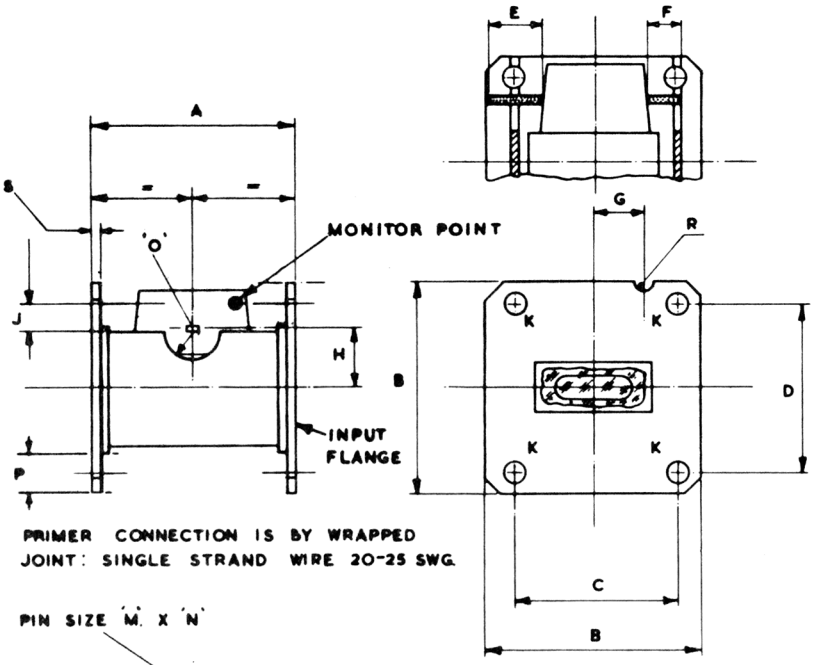
PRF = 1000 pps ± 10% tp = 1.0 μsec ± 10%

f = 9375 Mc/s ± 100 Mc/s.

# CV 6169

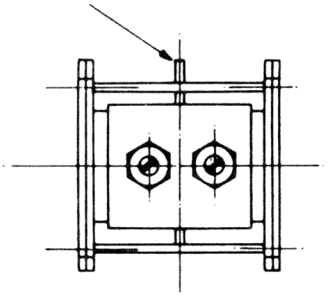
## OUTLINE DRAWING

(THIRD ANGLE PROJECTION)




PRIMER CONNECTION IS BY WRAPPED JOINT: SINGLE STRAND WIRE 20-25 SWG.

PIN SIZE 'M' X 'N'



| | INCHES | | M.M. | |
|---|---|---|---|---|
| | MAX. | MIN. | MAX. | MIN. |
| A. | 1·557 | 1·553 | 39,54 | 39,44 |
| B. | 1·640 | 1·610 | 41,65 | 40,89 |
| C. | 1·223 | 1·217 | 31,06 | 30,91 |
| D. | 1·283 | 1·277 | 32,59 | 32,44 |
| E. | 0·425 | NOM. | 10,8 | NOM. |
| F. | 0·250 | NOM. | 6,35 | NOM. |
| G. | 0·245 | 0·225 | 6,23 | 5,72 |
| H. | 0·500 | NOM. | 12,7 | NOM. |
| J. | 0·215 | NOM. | 5,46 | NOM. |
| P | 0·350 | NOM. | 9,00 | NOM |
| K | 0·172 | 0·168 | 4,37 | 4,27 |
| M | 0·036 | NOM. | 0,91 | NOM. |
| N | 0·048 | NOM. | 1,21 | NOM. |
| R | 0·063 | NOM. | 1,60 | NOM. |
| O | 0·188 | NOM. | 4,76 | NOM. |
| S | 0·080 | 0·060 | 2,03 | 1,52 |

HOLES ARE CO-AXIAL WITHIN POS$^{N}$ TOL OF ·008 DIA. (0,2)

ALL DIMENSIONS ARE IN INCHES.

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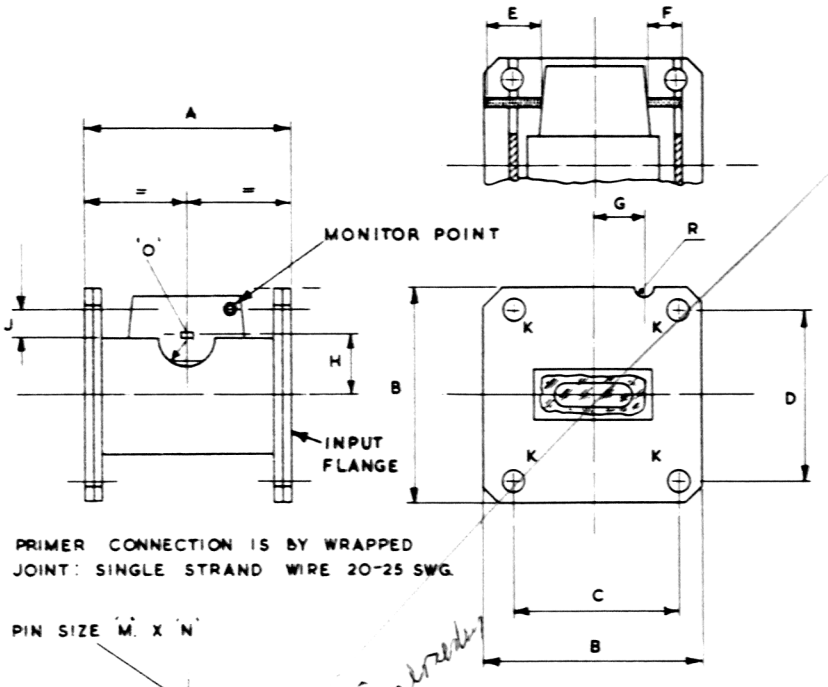


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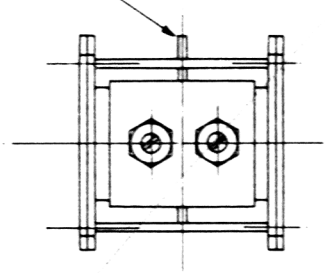

| | INCHES | | M.M. | |
|---|---|---|---|---|
| | MAX. | MIN. | MAX. | MIN. |
| A. | 1·557 | 1·553 | 39,54 | 39,44 |
| B. | 1·640 | 1·610 | 41,65 | 40,89 |
| C. | 1·223 | 1·217 | 31,06 | 30,91 |
| D. | 1·283 | 1·277 | 32,59 | 32,44 |
| E. | 0·425 | NOM. | 10,8 | NOM. |
| F. | 0·250 | NOM. | 6,35 | NOM. |
| G. | 0·245 | 0·225 | 6,23 | 5,72 |
| H. | 0·500 | NOM. | 12,7 | NOM. |
| J. | 0·215 | NOM. | 5,46 | NOM. |
| | | | | |
| K | 0·172 | 0·168 | 4,37 | 4,27 |
| M | 0·086 | NOM. | 0,91 | NOM. |
| N | 0·048 | NOM. | 1,21 | NOM. |
| R | 0·063 | NOM. | 1,60 | NOM. |
| O | 0·188 | NOM. | 4,76 | NOM. |

HOLES ARE CO-AXIAL WITHIN POS$^{N}$ TOL OF ·008" DIA. (0,2)

ALL DIMENSIONS ARE IN INCHES.

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION MOA/CV6169 ISSUE 1 DATED 13th AUGUST 1965

AMENDMENT NO. 1.

Page 5 Outline Drawing

Remove and destroy existing Page 5 and substitute new page 5, dated 21st November 1965, attached hereto.

December 1966.

TVC for R.R.E.

(44547)