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TRIAXIAL MAGNETIC VARIOMETER

USERS MANUAL

PRINCIPALS OF OPERATION

The unit is based on a Bartington fluxgate sensor 03ms. The basic sensitivity of the fluxgate system is $\pm 70,000\text{nt}$ for ± 10.000 Volt output with a guaranteed orthogonality of better than 0.1° and < 10 pT noise RMS.

A microprocessor controls three ultra stable digital to analogue converters, to drive three precision instrumentation amplifiers to null output on power up or reset condition, for the X, Y & Z axis. When nulling has occurred the microprocessor shuts down so as not to introduce any noise into the system. The gain of the instrumentation amps is scaled to give ± 300 nt for ± 10 volt output. The variometer will backoff to within 3nt of zero volts providing that the magnetic field is clean. It is unlikely that a site can be found that will have no 50Hz component therefore some care will have to be taken with the analog to voltage conversion method. The simplest method is to trigger a comparator from the mains supply and use this to trigger conversions so that they always fall in the same place on the mains cycle. The best method is to oversample as many times as possible within a 20 mS period and average this to give a much better noise figure.

Temperature sensing is with an LM35 which has an output sensitivity of 10 mV $^\circ\text{C}$ from zero degrees.

A CONDOR D.C low noise power supply model HTAA-16W-A+ has been supplied to give trouble free operation. 240 volt input is on terminal 1 & 4 of the transformer. Adjust -Ve output for -15 volts & +Ve for +15 volts

The magnetometer is internally protected against reverse voltage.

* The instrument was returned to Microscan and modified to give $\pm 300\text{nt}$ for $\pm 5\text{V}$ output
R.M.

INSTALLATION

The unit is sealed to within IP65 so care should be taken so as not to submerge in water, and keep as dry as possible. Standard cable glands have been used so replacement is possible if damaged, if there is any evidence of damage to the outer of the cable it should be replaced if serious or at least sealed with self-amalgamating tape. The cable used is a Farnell type catalogue number **140-489**.

It is recommended that the unit be placed in an outer case of about 150mm PVC pipe approx 1500mm long with an end cap glued on the lower end this can be placed in the ground in a hole bored with a large post hole borer. The magnetometer unit can then be fitted into a similar length of 75 mm PVC pipe with some packing spacers for adjustment purposes. The PVC pipes can then be filled with dry sand for temperature insulation.

Set the inner pipe with the instrument fitted in the centre of the 150mm pipe and add about 500mm of sand between the two. With a spirit level adjust the tube to be vertical.

Adjust the Y axis raw signal to be as close to zero as possible with the X raw signal positive, by rotating the inner tube whilst keeping it vertical.

Both tubes can then be completely filled with sand and a PVC end cap with gland can be fitted to keep moisture out.

WIRING

Ground the frame of the Condor power supply to mains ground at the supply, **do not ground** the common of the +/- 15volt output to mains ground.

Ground the braid of the shielded cable only at the A/D signal Gnd terminal or to the braid of an extending cable whose other end is grounded at the signal earth terminal.

To reset the instrument the reset line can be grounded to power common or signal ground with a relay closure or an open collector from a transistor or fet.

CABLE COLOUR CODES

Power common	Red/Black & Green/Brown
Power +15 volt	Red/Yellow
Power -15 volt	Blue/Yellow

Reset	Red/White
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Signal ground	Black & Green
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Temperature	Pink
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X RAW	Brown
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X VARIOMETER	Red
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Y RAW	Orange
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Y VARIOMETER	Yellow
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Z RAW	Blue
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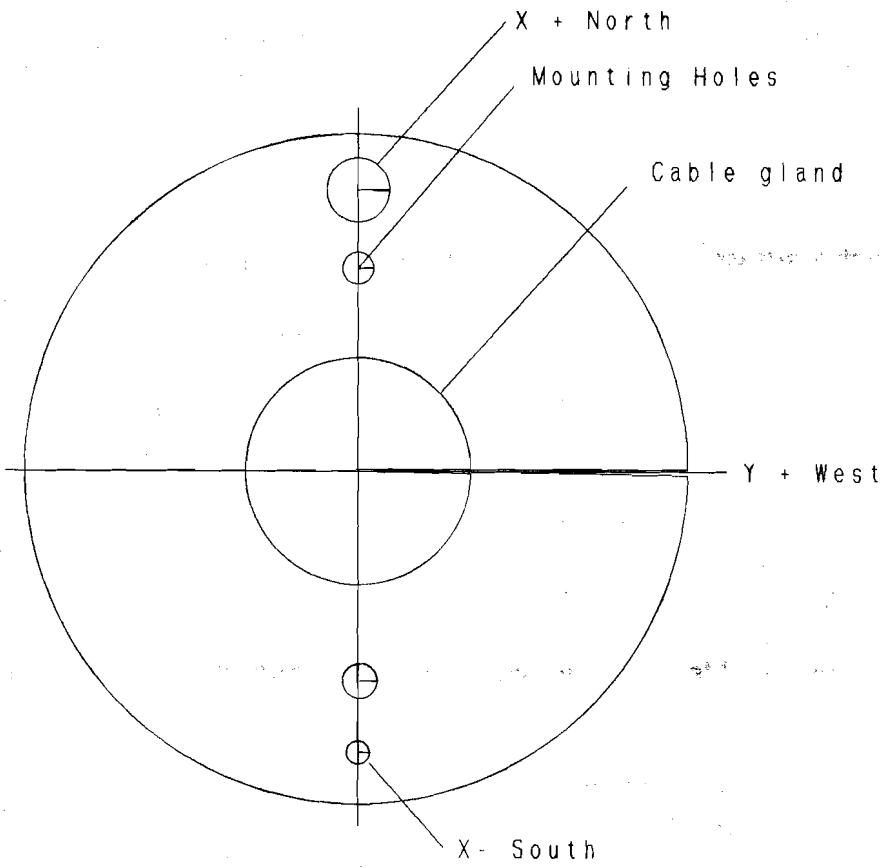
Z VARIOMETER	Violet
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All others spare.

25-Way Connector Pin-Out

- | | |
|--------------|-----------------|
| 1) Braided | 13) Yellow/Red |
| 2) Green/Red | 14) Red/White |
| 3) Black | 15) Red/Black |
| 4) Orange | 16) Yellow/Blue |
| 5) Pink | |
| 6) Red | |
| 7) Blue | |
| 8) Yellow | |
| 9) Green | |
| 10) Purple | |
| 11) Brown | |
| 12) N.C. | |

Top View of unit



GUARANTEE

Your Microscan Electronics Magnetometer, which has been fully tested, inspected and adjusted, carries, in the case of non-commercial users a twelve month guarantee on labour and parts. Batteries, cables, and connectors are not subject to this guarantee. Although every effort has been made to seal the unit it is **NOT** guaranteed waterproof. Any ingress of water into this unit is **NOT** covered under this guarantee. Any transportation costs involved in the repair of the unit shall be borne by the claimant. This guarantee commences from the date of purchase or dispatch from Microscan Electronics whichever is the later.

CONDITIONS

1. This Guarantee is not transferable and protects only the original purchaser of the new product.
2. Microscan Electronics shall be under no obligation:
 - (a) In any case in which the defect or the condition of the Magnetometer or part thereof is due in any way to undue wear and tear, dirt, misuse, incorrect installation or operation, neglect, accident or other similar cause.
 - (b) If the Magnetometer has been altered or repaired, otherwise than by a person authorised by Microscan Electronics.
 - (c) For failure of the internal battery, cables or connectors.
3. Microscan Electronics shall not in any event be liable for any consequential loss or damage whatsoever, direct or indirect.
4. This is the only guarantee or warranty which will be recognised by Microscan Electronics. No one is authorised by Microscan Electronics to give any other Guarantee or Warranty or to make any representation in respect of the product.