

1136 Hardwood Dr.
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PREPARED BY: KENNETH V. FIELD
COMPAD INC.

**TAMS COUPLING
ALIGNMENT
SYSTEM**

COMPUTER

OPERATIONS
MANUAL

**TAMS
CASE**

RIM DIGITAL PANEL METERS

SENSOR ZEROING ADJUSTMENT

FACE DIGITAL PANEL METERS

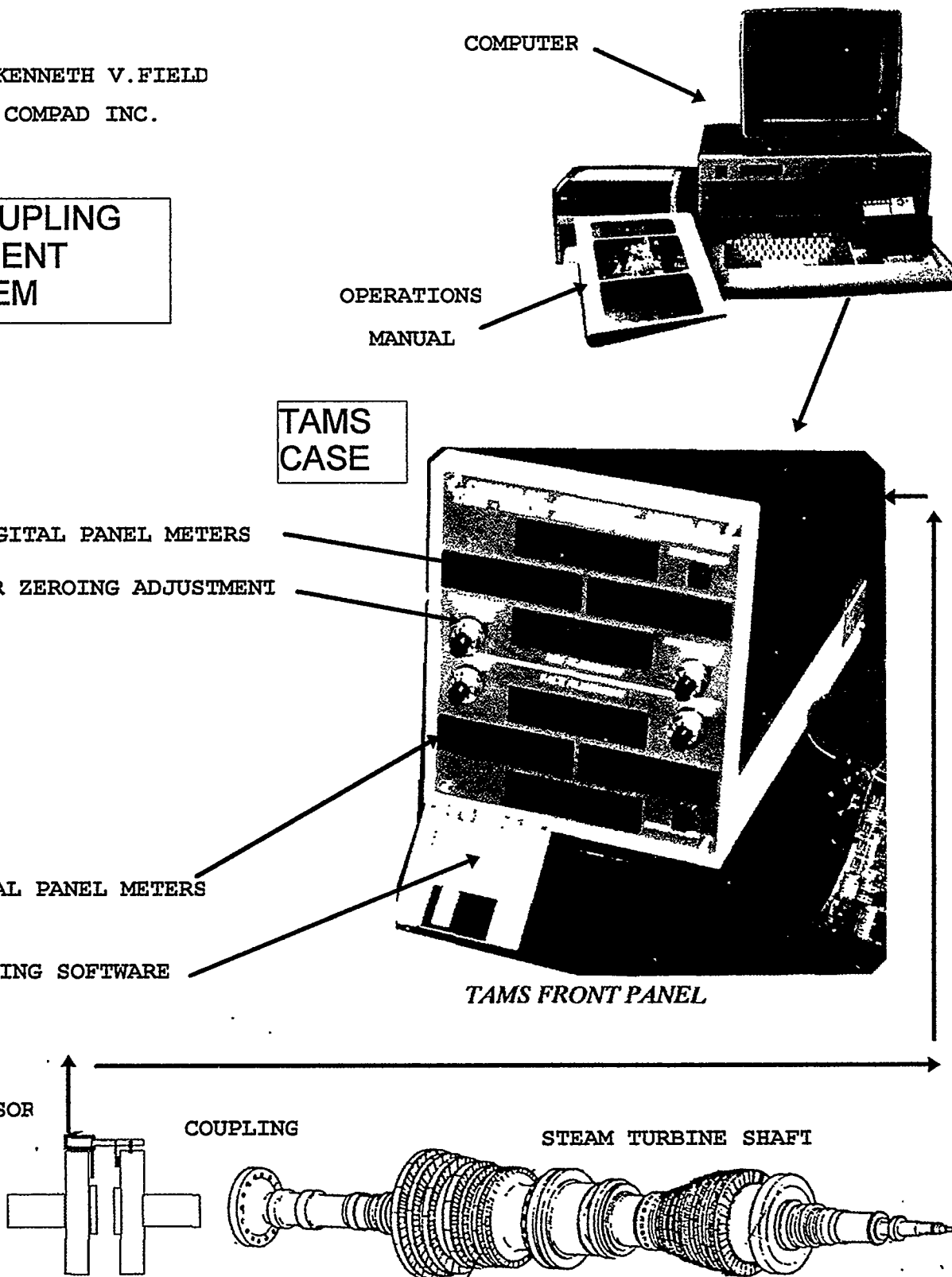
COUPLING SOFTWARE

TAMS FRONT PANEL

COUPLING SENSOR

COUPLING

STEAM TURBINE SHAFT



DOE PROJECT 353

TAMS PROTOTYPE AND PRODUCTION COUPLING ALIGNMENT UNITS

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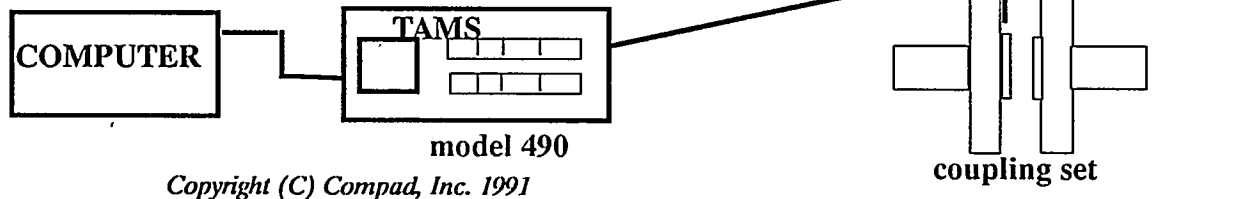
Modem Alignment 813-641-2008

TRUELINE AUTOMATED MEASUREMENT SYSTEM

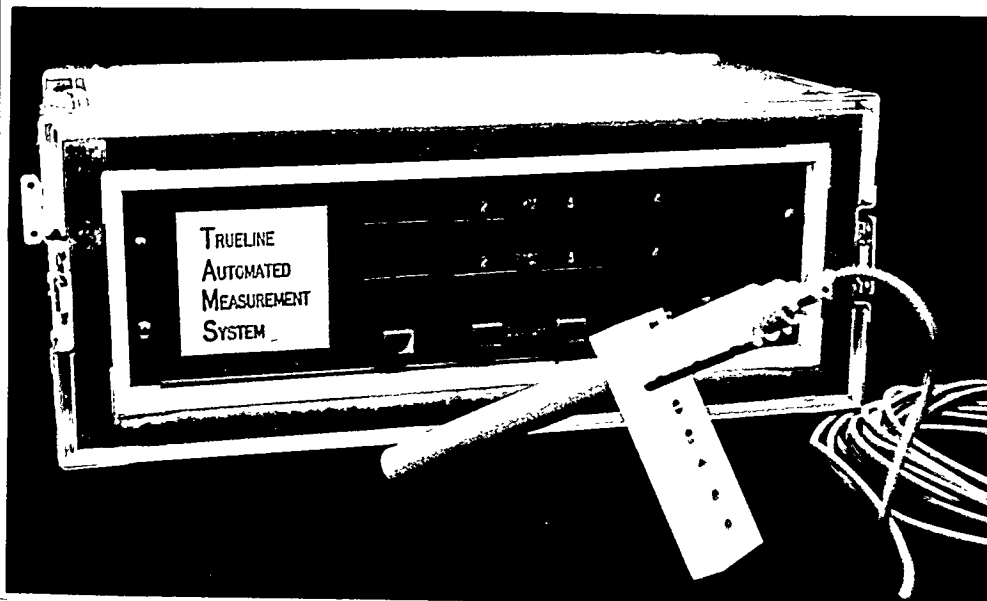
TAMS

TAMS is a fully automated alignment system. When TAMS is coupled to a micro-computer it becomes the ultimate alignment hardware and software for professionals responsible for turbines, generators, pumps, and motors just like you! COMPAD has been designing and selling alignment tools since 1984 to the power generation industries. TAMS is easy to use and can be in service in a matter of minutes. The TAMS unit is flexible and versatile and can be used on a variety of turbines, pumps and motors. We stand firmly behind any product we build at COMPAD and offer the highest quality product attainable for the power industry. We introduced the first commercially available computer alignment system in the USA to run on a micro-computer for large steam turbines. TAMS transforms your alignment during an overhaul into an UNEQUALED process measured in terms of accuracy, reduced maintenance time and a smoother running machine. TAMS is simple to use, sets up quickly, and dramatically simplifies alignment.

TAMS SYSTEM OUTLINE



COMPAD MODEL 490 TAMS UNIT AND SENSOR



CASE: Heavy duty shock mounted. Dim 23"X23"X10".

ALIGNS: Turbines, pumps, motors.

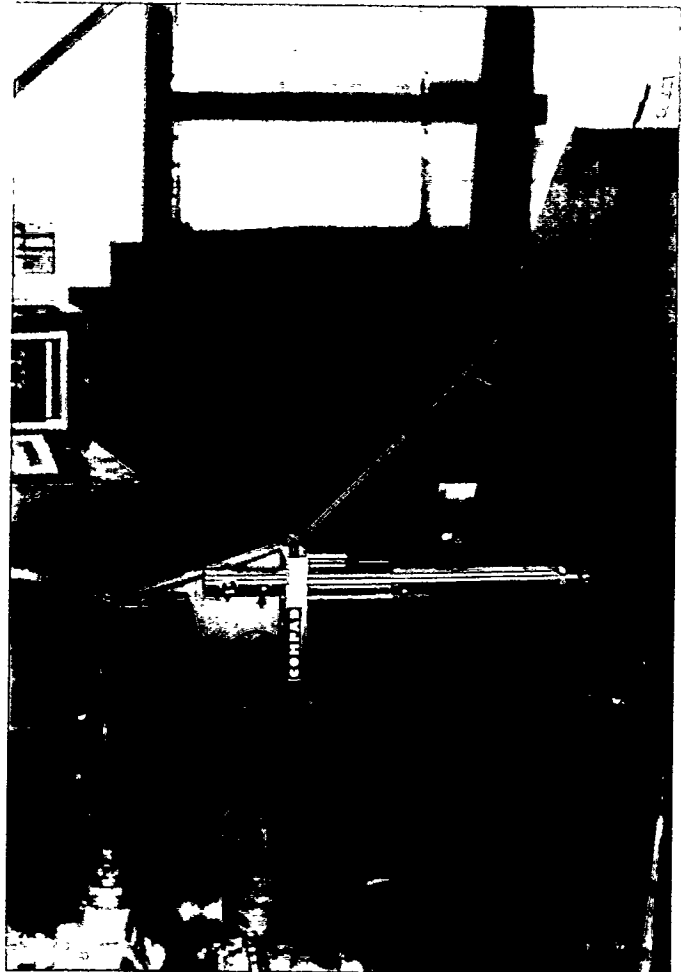
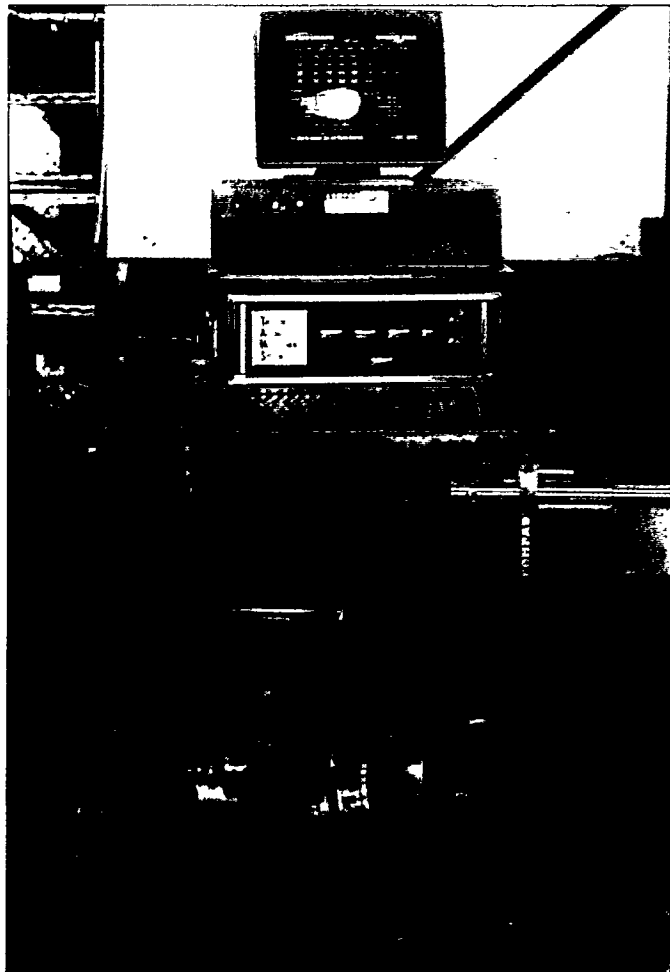
ENVIRONMENT: TAMS can operate in temperatures up to 115 (F)

SENSORS: Manufactured by COMPAD and are of the direct measurement type, accurate to within 0.00025"

TIME: Reduces alignment time by 50%.

TAMS comes with a full one year parts and labor WARRANTY.
THIS PRODUCT DESIGNED, MANUFACTURED, AND ASSEMBLED IN THE USA.
COMPAD reserves the right to alter this product at anytime.

COMPUTERIZED ALIGNMENT DEVICES, INC.



(DOE UNIT)

COMPAD TECHNICIAN CHECKS THE

ALIGNMENT OF 130 MEGAWATT

WESTINGHOUSE TURBINE

LP-GENERATOR COUPLING DURING

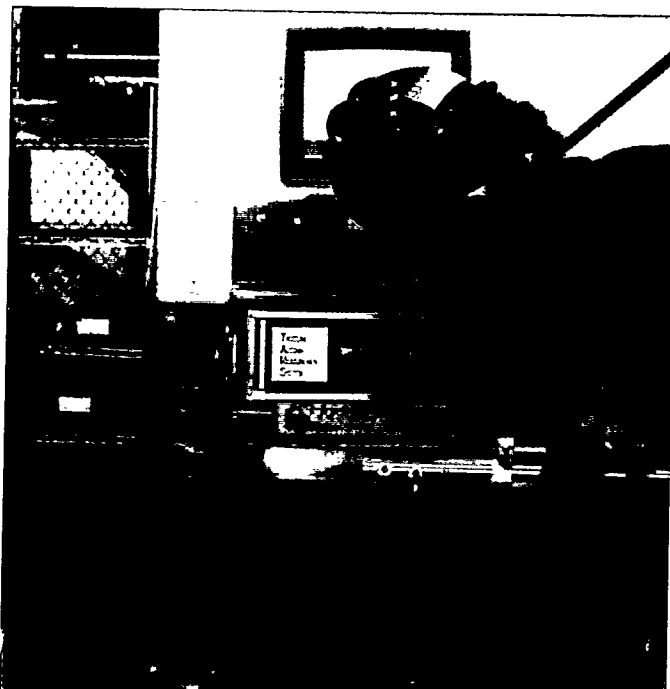
AN OVERHAUL USING TAMS.

(TRUELINE AUTOMATED MEASUREMENT SYS)

U L PICT: SYSTEM READY TO READ DATA.

U R PICT: TAMS SENSOR
(DIRECT MEASUREMENT TYPE)
MORE ACCURATE THAN LASER.

L L PICT: TECHNICIAN CHECKS LP-GEN
ALIGNMENT.



COMPAD

INC

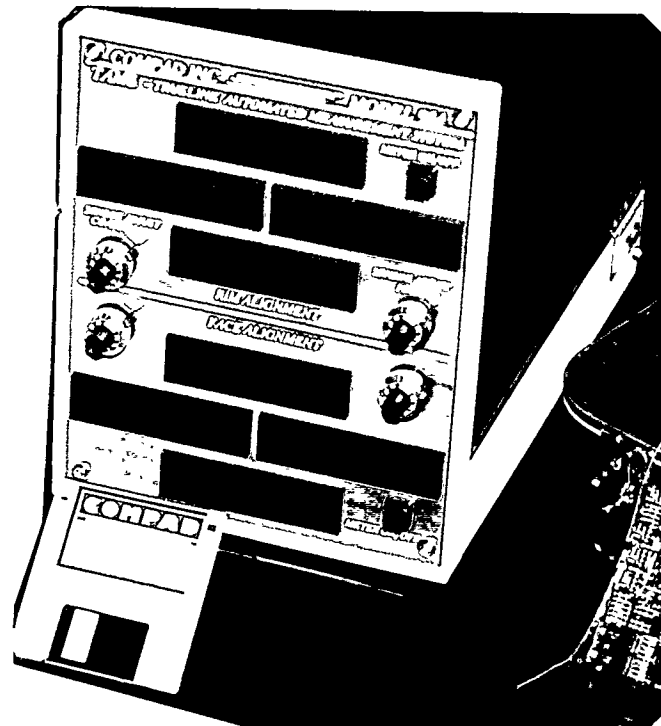
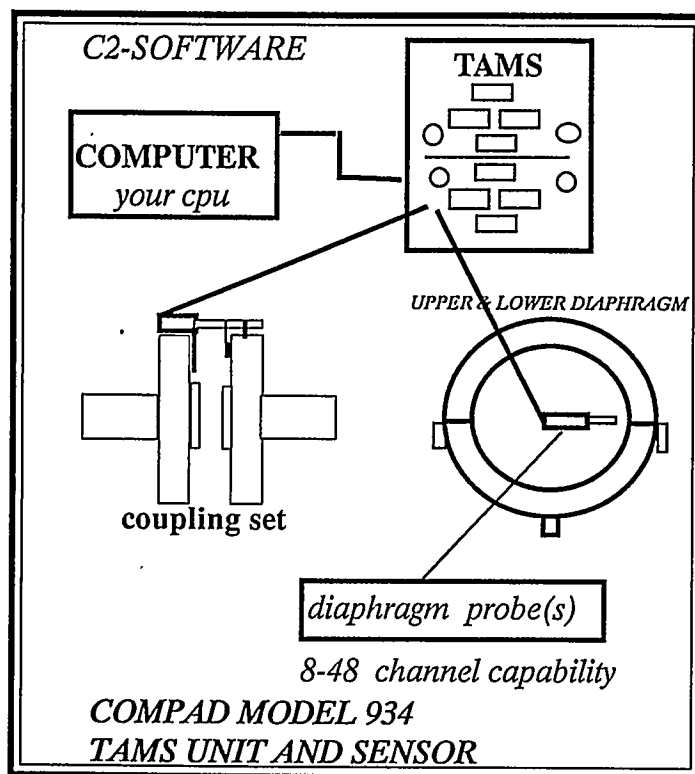
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TRUELINE AUTOMATED MEASUREMENT SYSTEM TAMS

TAMS IS RELIABLE AND IS EASY TO USE. ALIGNMENT CHECKS CAN BE MADE WITHOUT TURNING THE SHAFTS IF DESIRED! IMPROVED ALIGNMENTS CAN BE SEEN AS SOON AS YOU USE TAMS. TAMS IS SUPERIOR IN ALL RESPECTS.

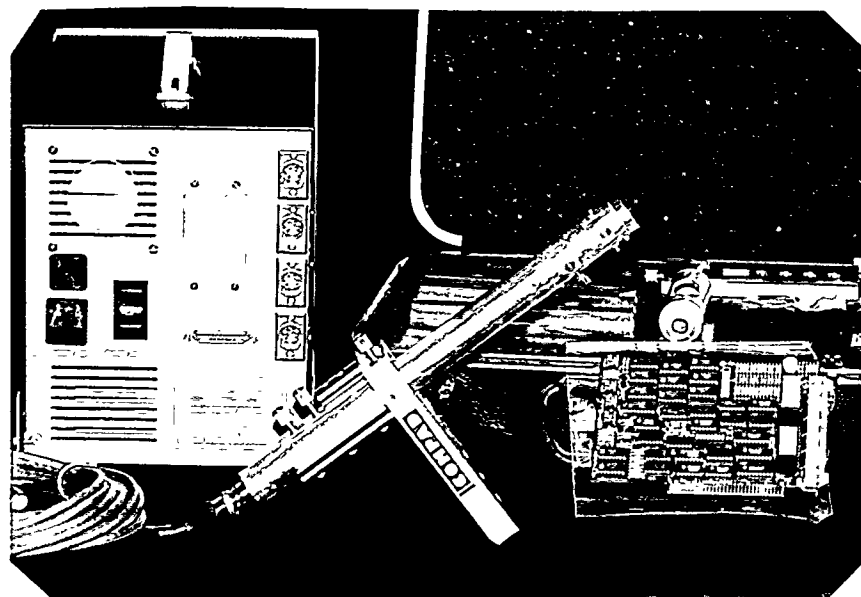


TAMS FRONT PANEL

TAMS SYSTEM 934 comes with carrying case, TAMS unit, coupling probe, & 8 channels for diaphragms and all interconnecting cables and computer cards, software & manuals.

TAMS system is geared toward the OEM industry standards. Standard rim & face alignment convention is easy to understand and implement alignment moves.

CALL US NOW TO TEST DRIVE THE TAMS SYSTEM, YOU WILL BE GLAD YOU DID!



TAMS BACK PANEL & COUPLING PROBE

TAMS comes with a full one year parts and labor WARRANTY.

THIS PRODUCT DESIGNED, MANUFACTURED, AND ASSEMBLED IN THE USA.

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TURBINE INSPECTIONS 0 COMPUTER ALIGNMENT 0 OEM TRAINED ENGINEERS 0 CONTROLS 0 STARTUPS 0 BALANCING

GENERATOR TESTING 0 STEAM PATH EVALUATIONS 0 PROJECT MANAGEMENT

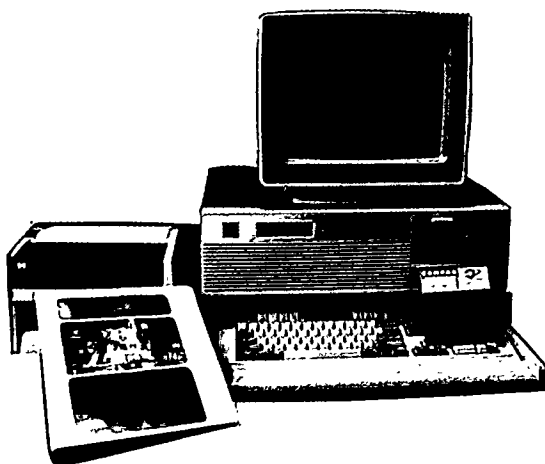
FASTER, MORE RELIABLE TURBINE ALIGNMENT EVERY TIME! LET THE "C2" TURBINE GENERATOR ALIGNMENT SYSTEM GIVE YOU THE EDGE.

There is more to turbine alignment than just sharpening your pencil. More and more utilities are discovering this everyday. The "C2" Turbine Generator Alignment System provides rapid, reliable alignment of steam, gas and nuclear turbines. The "C2" System's technology is not just 5% better but 500% better over existing techniques. "C2" provides the means needed for accomplishing design specified alignment right every time.

The "C2" System achieves this higher standard by providing the user with an improved alignment process measured in terms of:

VASTLY IMPROVED ALIGNMENT

- * Design Quality positioning of shafts & casing for longer equipment life and lower stress.
- * Situation analysis before alignment moves.
- * Standard approach to alignment with documentation for quality control.



BENEFITS OF A "C2" ALIGNMENT

- * Improved uptime of the unit.
- * Improved operational performance.
(lower 2X vibration and better steam rate.)
- * Highly improved alignment analysis.
- * Alignment time cut by as much as 50%.
(Save 2-4 days outage time depending on the size of the turbine.)

The "C2" System is designed specifically for use as a tool for calculating coupling and casing alignment for multi-shaft turbines. "C2" provides the user instantaneous, error free alignment moves (shim changes) based on state of the art technology. Using today's microprocessors, equipment alignment problems become clear and solved immediately.

The "C2" System uses proven industry standard calculations, terminology and methods. By concentrating on the best of these and using new technology we provide desired results.

FEATURES

- * Bearing Pad Shim Changes printed or displayed.
- * Coupling report for analyzing rim & face alignment.
- * Oil and Gland Bore shaft positions calculated with variance from design.
- * Graphics - printed or displayed for:
 - Shaft Moves
 - Coupling Alignment
 - Casing Alignment and Moves including Step Shims
- * Up to 7 shafts calculated simultaneously.
- * Projects alignment moves for all shafts.
- * Data validation and error checking.
- * Horizontal and vertical alignment calculated simultaneously.

TRAINING

- * COMPAD offers complete training for all of its software products. Training is done at either our "Hands On" Computerized Turbine Alignment Workshop or at your job site and taught by a qualified instructor.

FOR MORE INFORMATION

Call or Write:

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COMPAD

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— The Alignment Experts Serving the Power Industry —

DOE PROJECT 353

TECHNICAL REPORT AND EVALUATION

Trueline Automated Measurement System (TAMS)
Compad, Inc
Apollo Beach, FL

Project Description

TAMS is an electronic measurement system used to determine the alignment of turbine-generator shafts at the coupling interface. The displacement transducer is a strain gage based sensor mounted in a portable probe. The measurement system was experiencing zero input drift and temperature induced drift. This project endeavored to determine the source of these problems and to revise a unit to be returned to a customer, Baltimore Gas and Electric (BGE), within a period of five weeks.

Detailed Report

As designed, the TAMS unit used a single active strain gage as the measurement transducer. The resulting signal was used to drive TAMS unit panel meters and a personal computer based Data Acquisition System (DAS). The excitation voltage for the strain gage bridge was set at 12 vdc so that the output was approximately 1 mvdc per 1 mil of displacement at the transducer. Front panel potentiometers were used in the loading portion of the single active bridge. The loading resistance was nominally about 1K ohm, therefore the resulting voltage across the strain gage was about 6 vdc. Since the nominal resistance of the gage was 1K ohms, the power dissipation of the gage was about 36 mw. While this power dissipation is within the acceptable range, it is outside the recommended range of 0 - 25 mw and resulted in excess self heating of the gage. The temperature response time constant of the transducer seemed to be on the order of 30 min, resulting in very long stabilization times of about 2 hours.

Our first correction experiment consisted of simply reducing the excitation voltage to 5 vdc. While this voltage reduced the extent of the temperature induced drift, it did not change the zero input temperature effect. We next constructed an equivalent strain gage based temperature compensation network to be used in a half active bridge configuration. This compensation was preferred to be installed in the measurement probe and not require additional cabling between the probe and the TAMS unit.

Initial results with a prototype TAMS and probe were promising although the light piece of metal the compensating gages were mounted to was easily deformed and contributed deformation errors occasionally.

A second compensator was constructed for the BGE unit, but on a stiffer extrusion. The stiffer extrusion suffered a much longer temperature time constant than expected. The first activation of the circuit was acceptable, however. A subsequent long term test was not encouraging. One circuit (face) drifted up with temperature while the other (rim) drifted down.

Additionally, the face circuit had a tendency to continually drift in a positive direction over time. Further testing showed that because of vastly different Thermal Coefficients of Resistance (TCR) between the legs of the active bridges, temperature related errors were still a problem.

The strain gages were disconnected so that each gage could be characterized individually. Once the bonded TCRs of each gage were determined, trimming resistors could be calculated and added in order to match the complimentary legs of the bridges. However, this procedure is an iterative process, therefore time was insufficient to determine the ultimate success of this effort. Initial observations indicated reduced susceptibility to temperature changes but there was still an overall bridge value shift with temperature change.

Wire bundles inside the TAMS unit were subject to heat being generated by the panel meter power supply. Moving these wires away from this heat source seemed to help stabilize meter output. The enclosure cooling fan was reversed so that its air flow would impact directly on the power supply.

A 3.8 vdc power supply was constructed to energize the probe bridge circuit. The lower excitation voltage resulted in lower power dissipation on the strain gages and lower overall shifts due to temperature rise.

Amplifiers were constructed to boost the bridge voltage up to a level that provided the 1 mv = 1 mil displacement relationship. The gain of these amps is about 3.0. The reference voltage was generated by attenuating the 6.9 reference voltage supply from the DAS through the panel potentiometers.

BGE unit change summary

1. Rim and face reference voltages developed from Omega 6.9 vdc source through panel pots to 5-7 vdc
2. Strain gage excitation by new 3.8 vdc source, powered by Omega 12 vdc supply
3. Temperature compensation strain gage network installed in probe
4. Strain gage multiplexer circuits not used
5. Rim and face bridge circuits trimmed for equal TCR
6. Amplifier circuit with adjustable gain installed in TAMS unit
7. Amplifier gains set for 1 mv = 1 mil at opposite ends of span
8. Rim panel meters recalibrated to Fluke DVM
9. Amplifier/regulator board installed on top of Mux board
10. TAMS cooling fan reversed direction to help cool off 5 v power supply

Recommendations

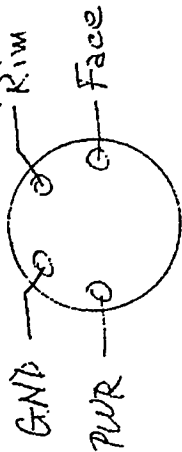
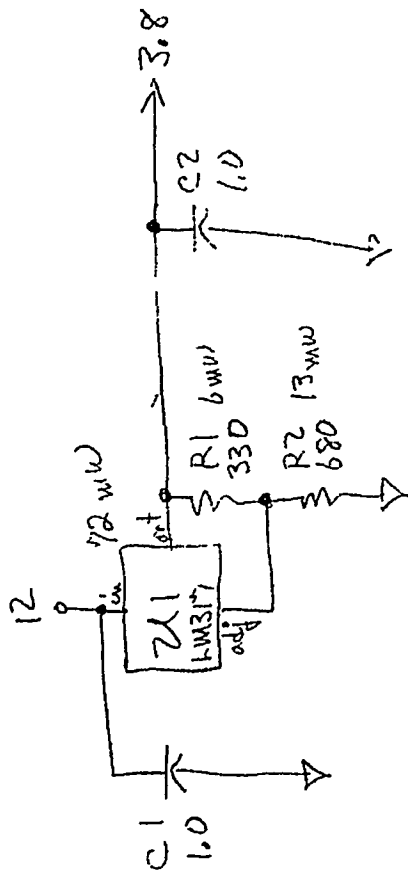
1. Provide signal conditioning and temperature compensation as close to the transducer area as possible.
2. Eliminate effects of instrumentation loop resistance such as cabling, multiplexers, and connectors.
3. Revise meter power supply design for more efficient, cooler operation.
4. Provide shielded instrumentation leads inside TAMS unit and arrange away from noise sources (transformers).

Figure Legend

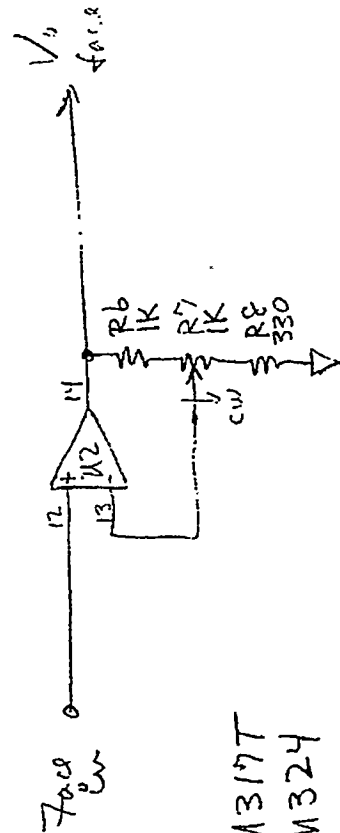
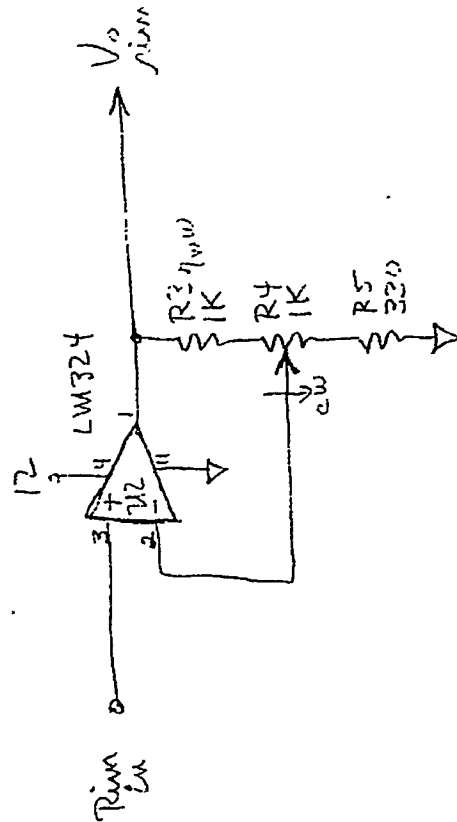
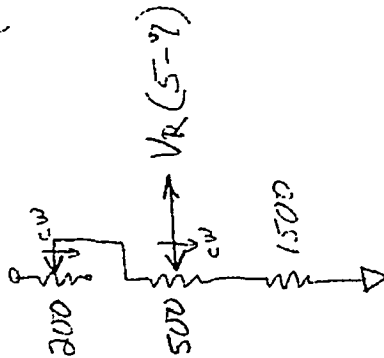
Voltage data recorded automatically with Omega DAS except as indicated; 1 minute intervals.

Temperature data recorded manually, data points shown as diamonds

1. Drift test at Compad, prototype probe and box
12v excitation
Manual data recording
2. Drift test, proto probe and box
unrecorded ambient temperature variation
5v exc., unamplified
3. Drift test, proto probe and box
ambient temp variation (change not recorded)
5v exc, unamplified
4. Drift test, prototype probe w/external compensation
ambient temperature changing during test
5v exc, unamplified
5. Drift test, proto probe w/ext comp
step change temp variation w/light bulb
5v exc, unamplified
6. Drift test, proto probe w/ext comp
relatively stable amb temp
5v exc, unamplified
7. Drift test, BGE probe w/internal comp, proto box
amb temp changing during test
5v exc, unamplified
8. Drift test, BGE probe w/int comp, proto box
Long term drift test
6.9v exc, unamplified
9. Drift test, BGE probe and compensator gages individually
6.9v exc through 1K ohm resistors
10. Excitation voltage test, individual gages
1K ohm dropping resistors for each gage
11. Drift test, BGE box and probe w/trimmed internal compensation
Voltage manually recorded from front panel meters
3.8v exc, amplified
probe in cooler, ambient temp relatively constant (not recorded)
12. Drift test, BGE box with dummy probe load (1K resistors)
3.8v exc, amplified
13. Drift test, BGE box and probe
3.8v exc, amplified
probe in cooler at start of test, moved to warmer location as shown
14. Drift test, BGE box and probe
3.8v exc, amplified
amb temp increasing slowly (not recorded)
first 75 minutes of data recorded at 5 second intervals
15. Drift test, BGE box and probe
3.8v exc, amplified
amb temp relatively constant (not recorded)

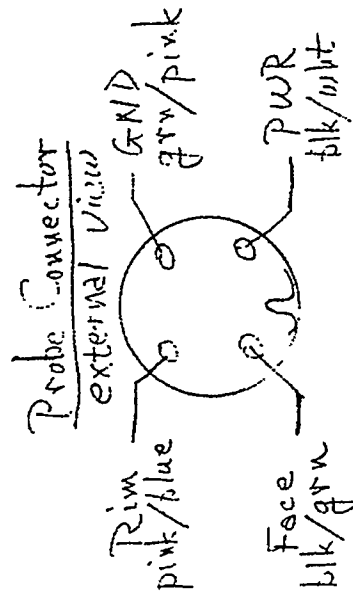
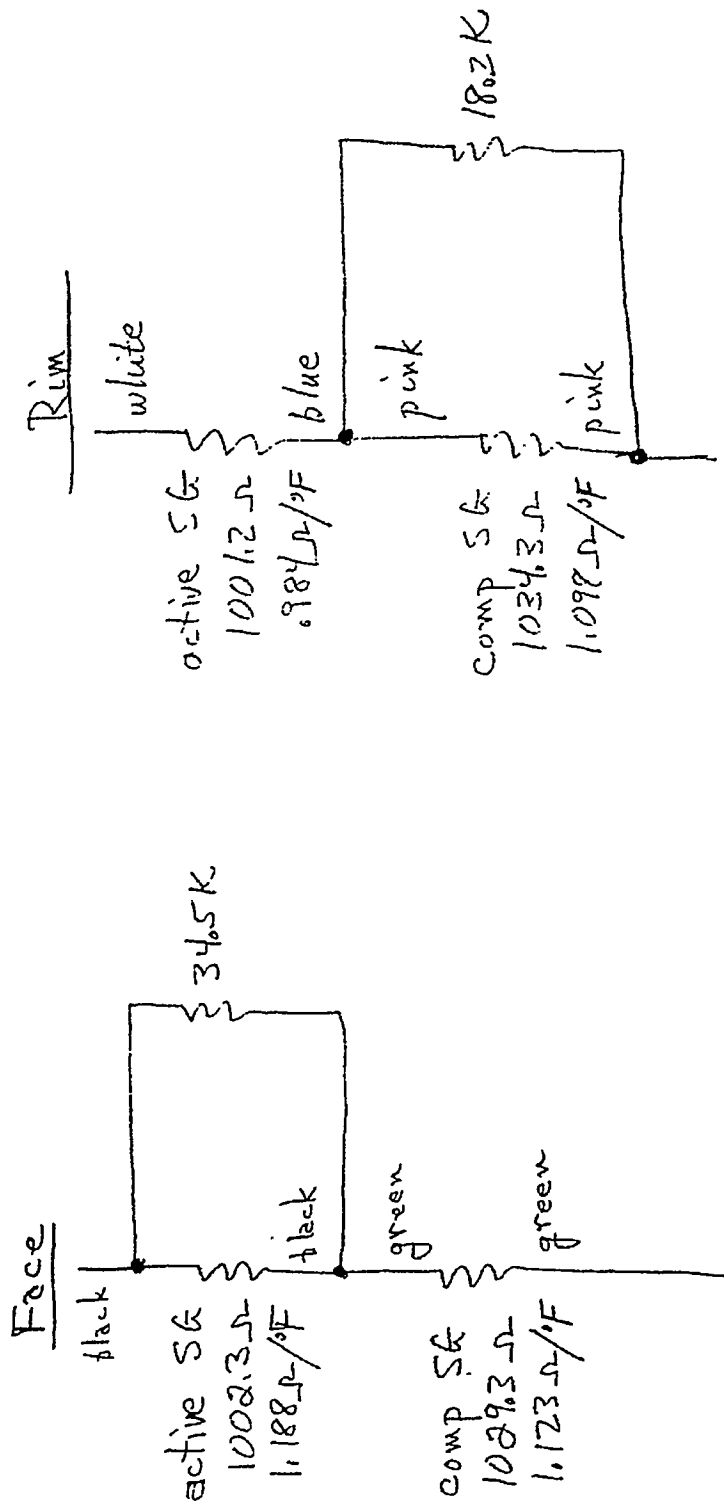


Reference Voltage. typical
6.7V (from image 1A1)



U1 - LM317T
U2 - LM324

TAMS, BGE Unit
Amplifier Prd & Comp-1
Compd
3-2-75



BFE Probe
Compad
2-77-9-11

Drift Test, 2-1-95
Prototype probe and unit @ Compad office

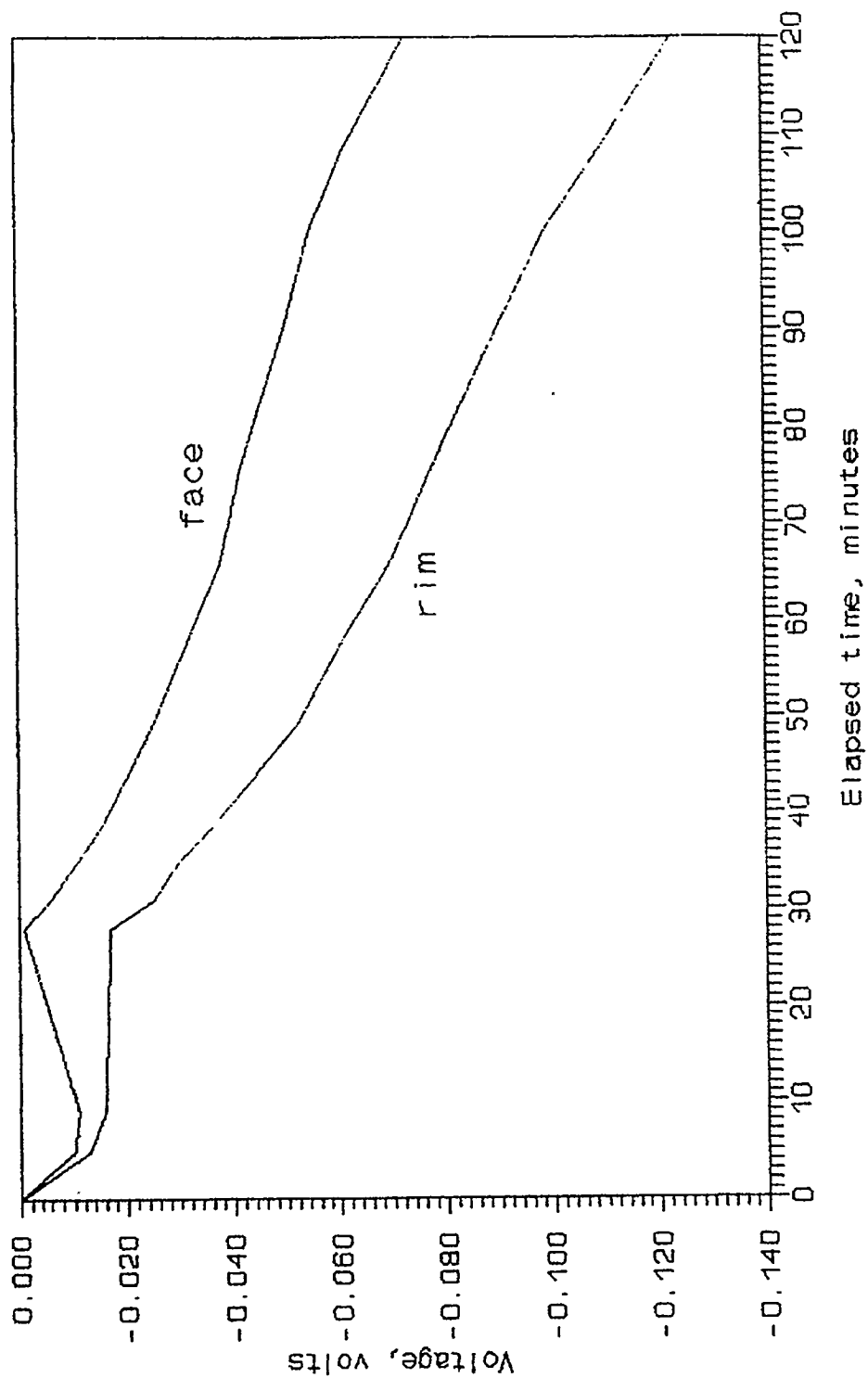


Figure 1

Drift Test, 2-15-95
Prototype probe and unit, uncompensated

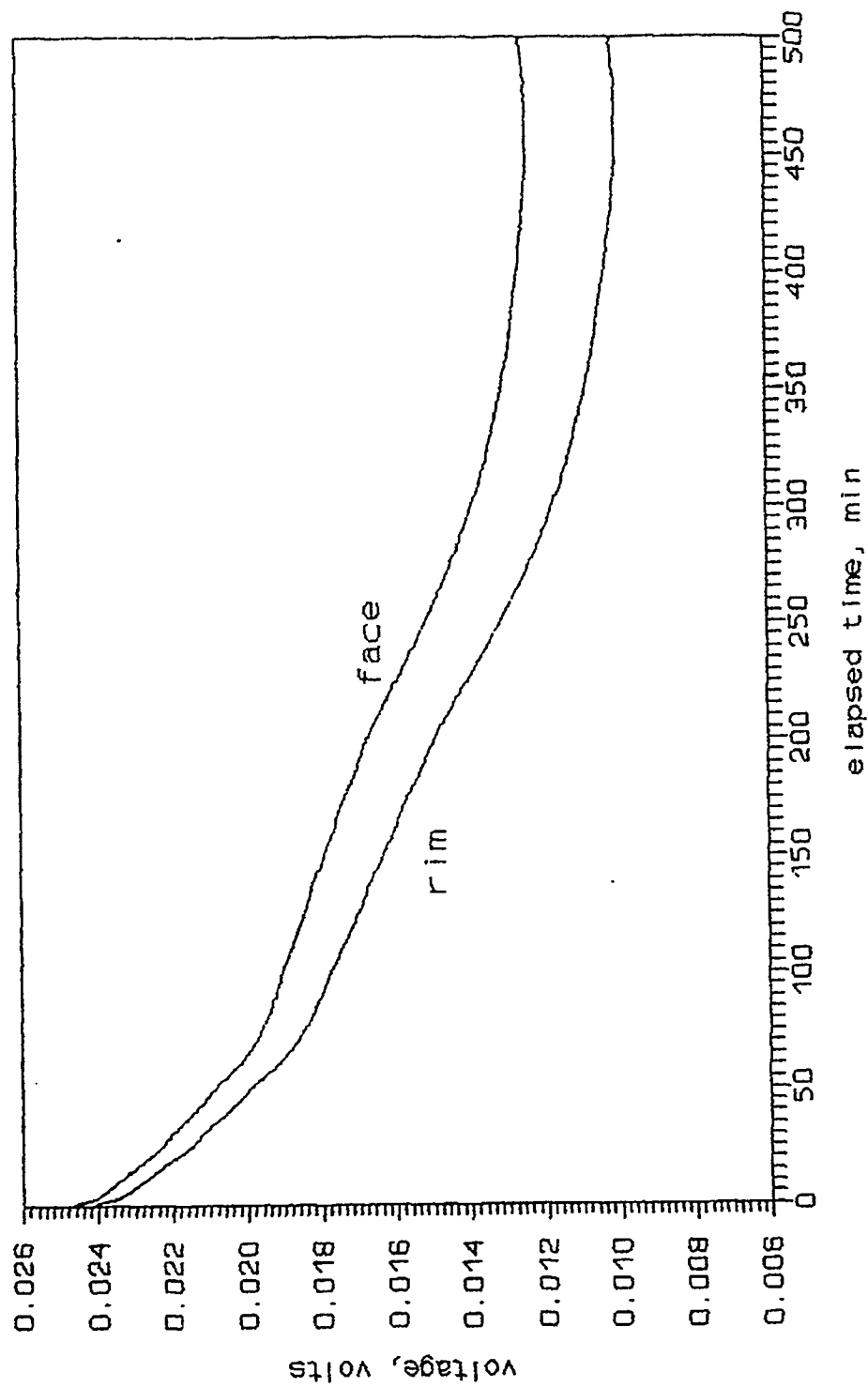


Figure 2

Drift Test, 2-16-95
Prototype probe and unit, uncompensated

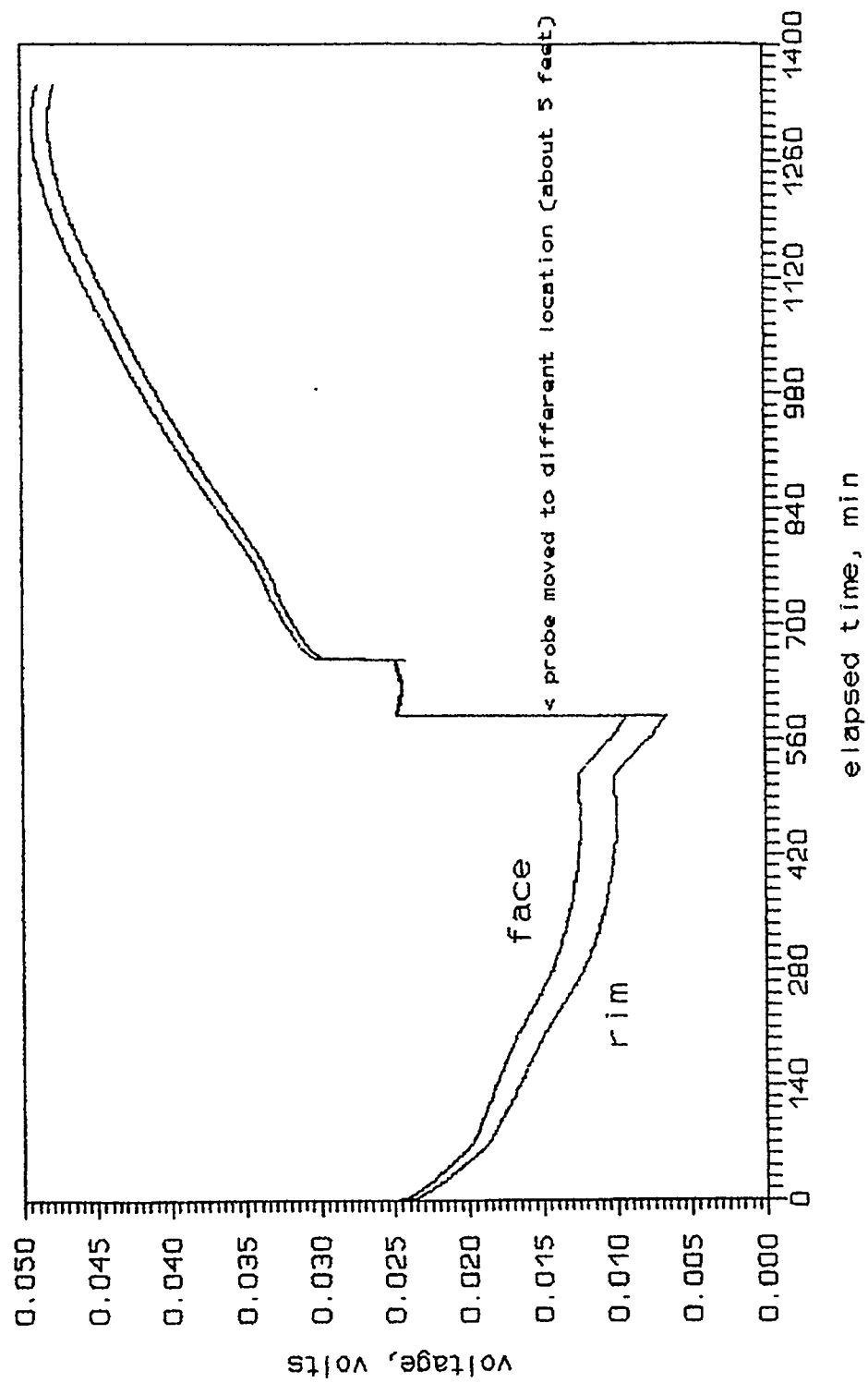


Figure 3

Drift test, 2-20-95
Prototype probe and unit, compensated

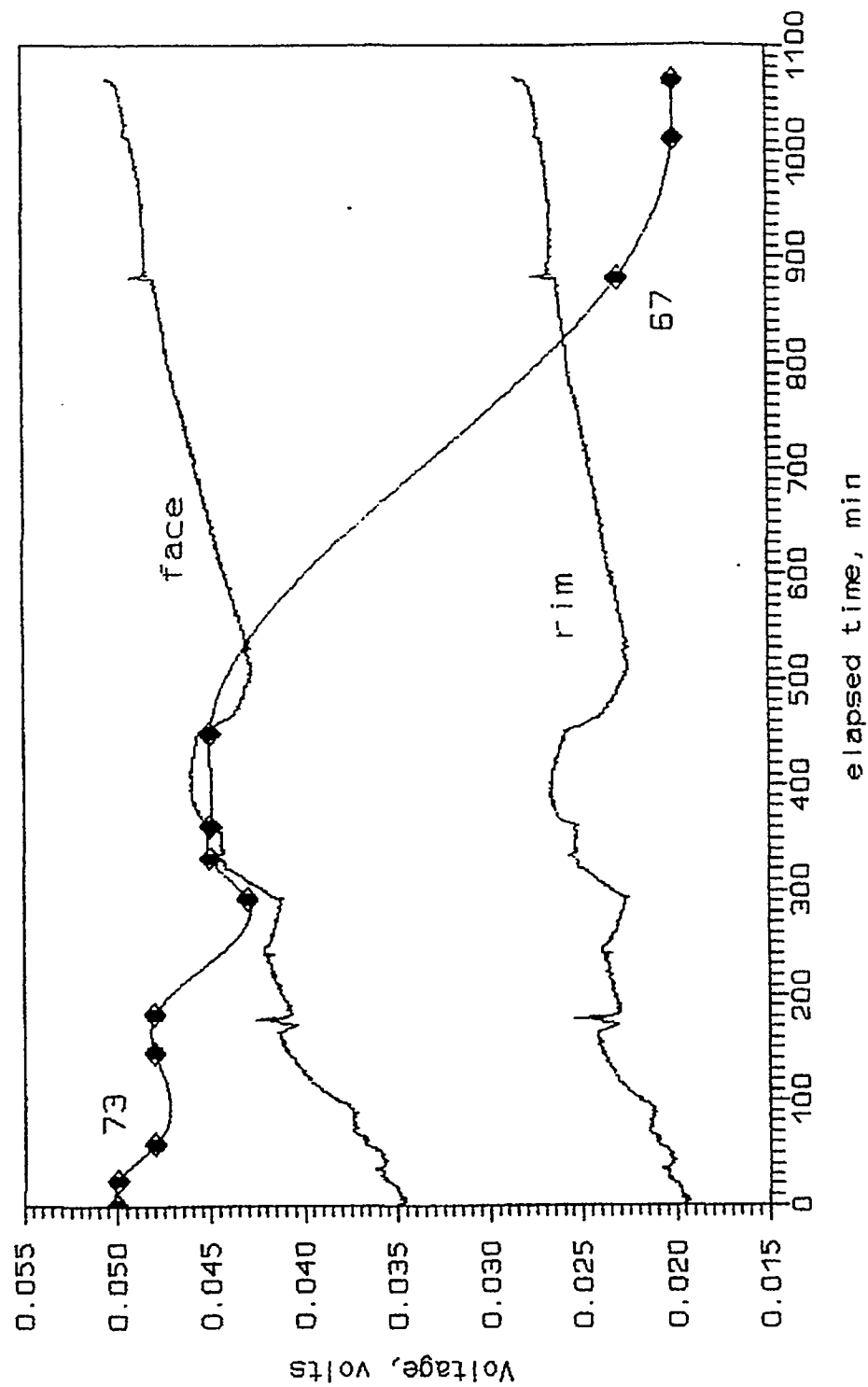


Figure 4

Drift test, 2-21-95
Prototype probe and unit, compensated

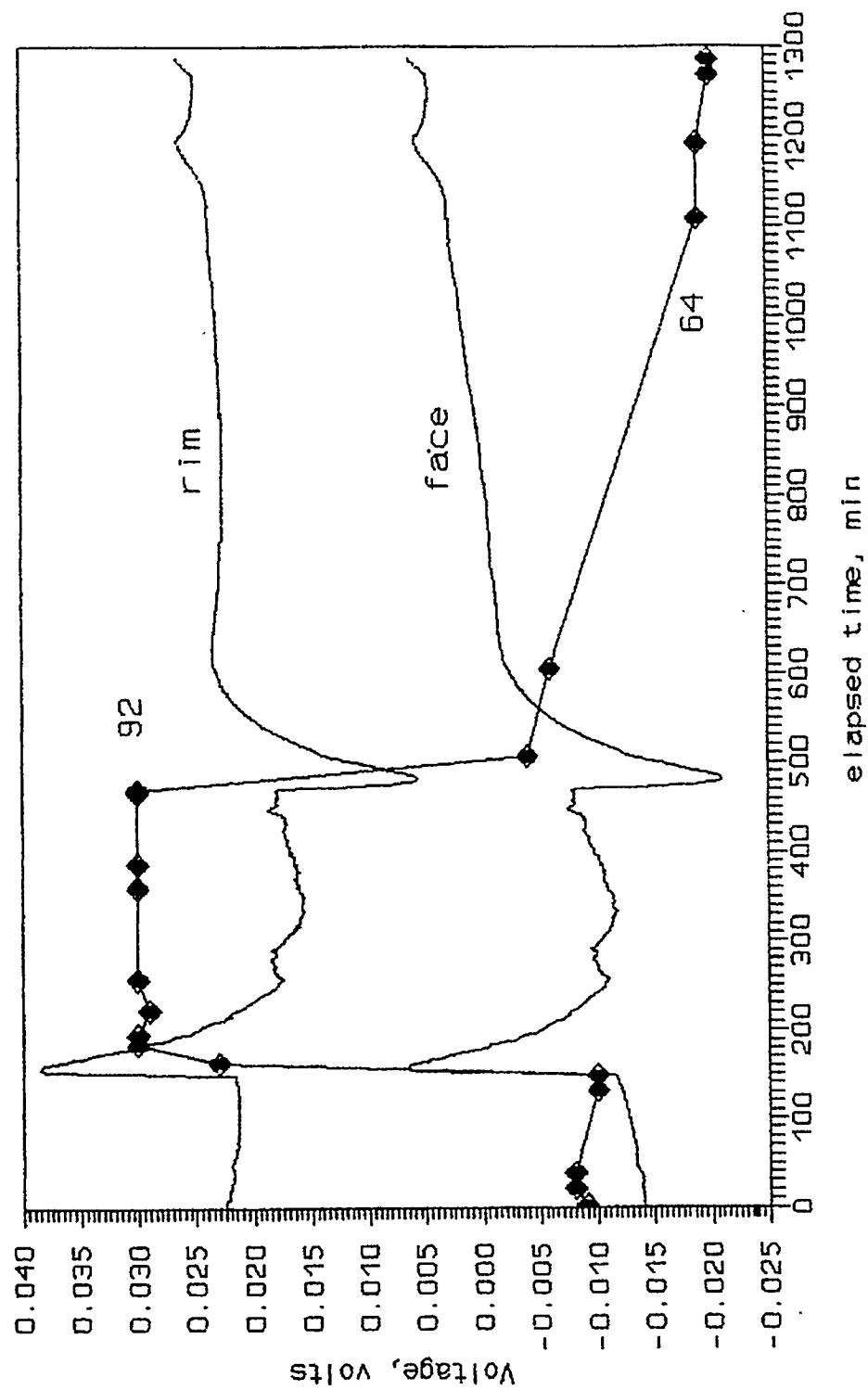


Figure 5

Drift test, 2-22-95
Prototype probe and unit, compensated

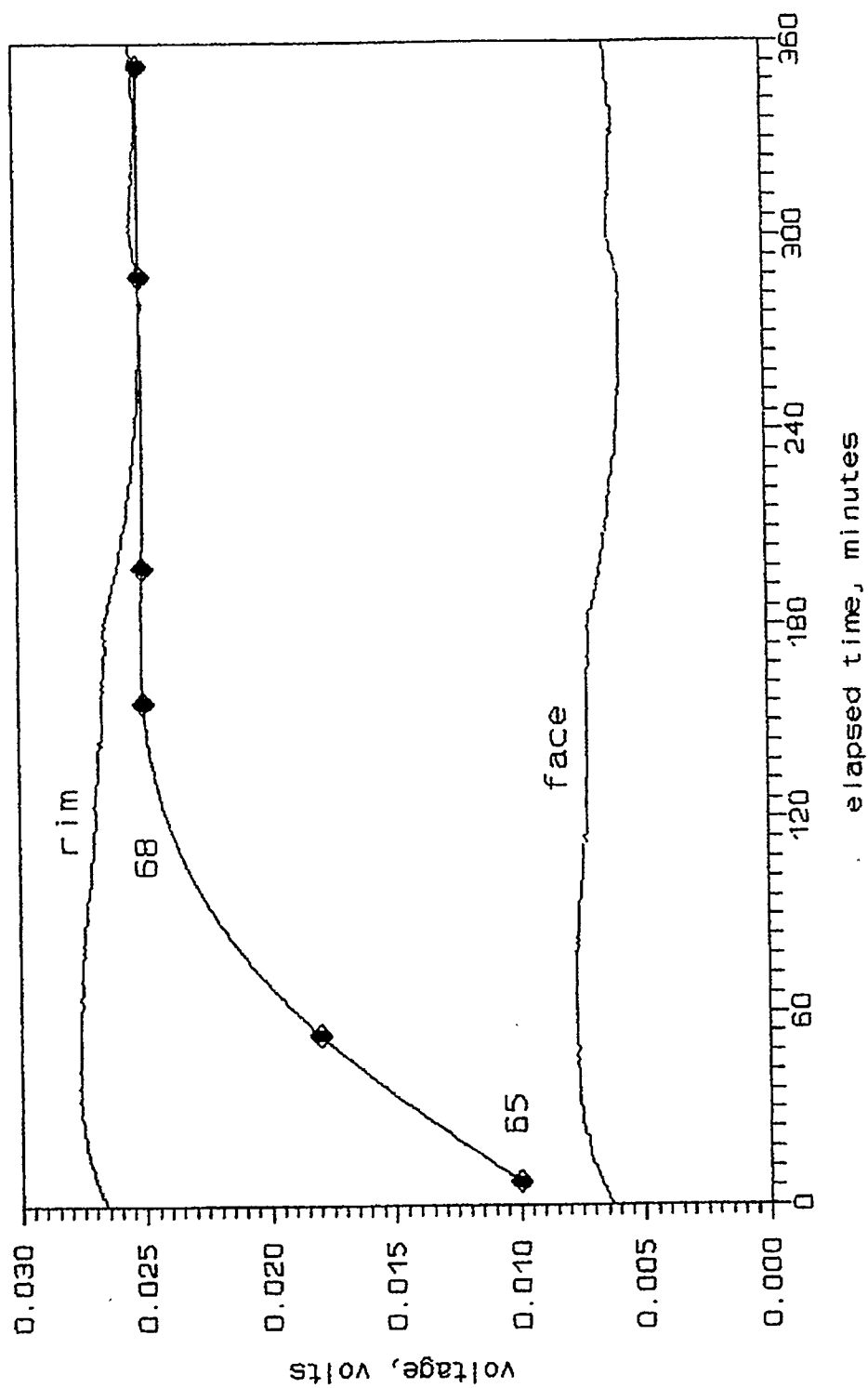


Figure 6

Drift test, 2-23-95
BGE probe into prototype box

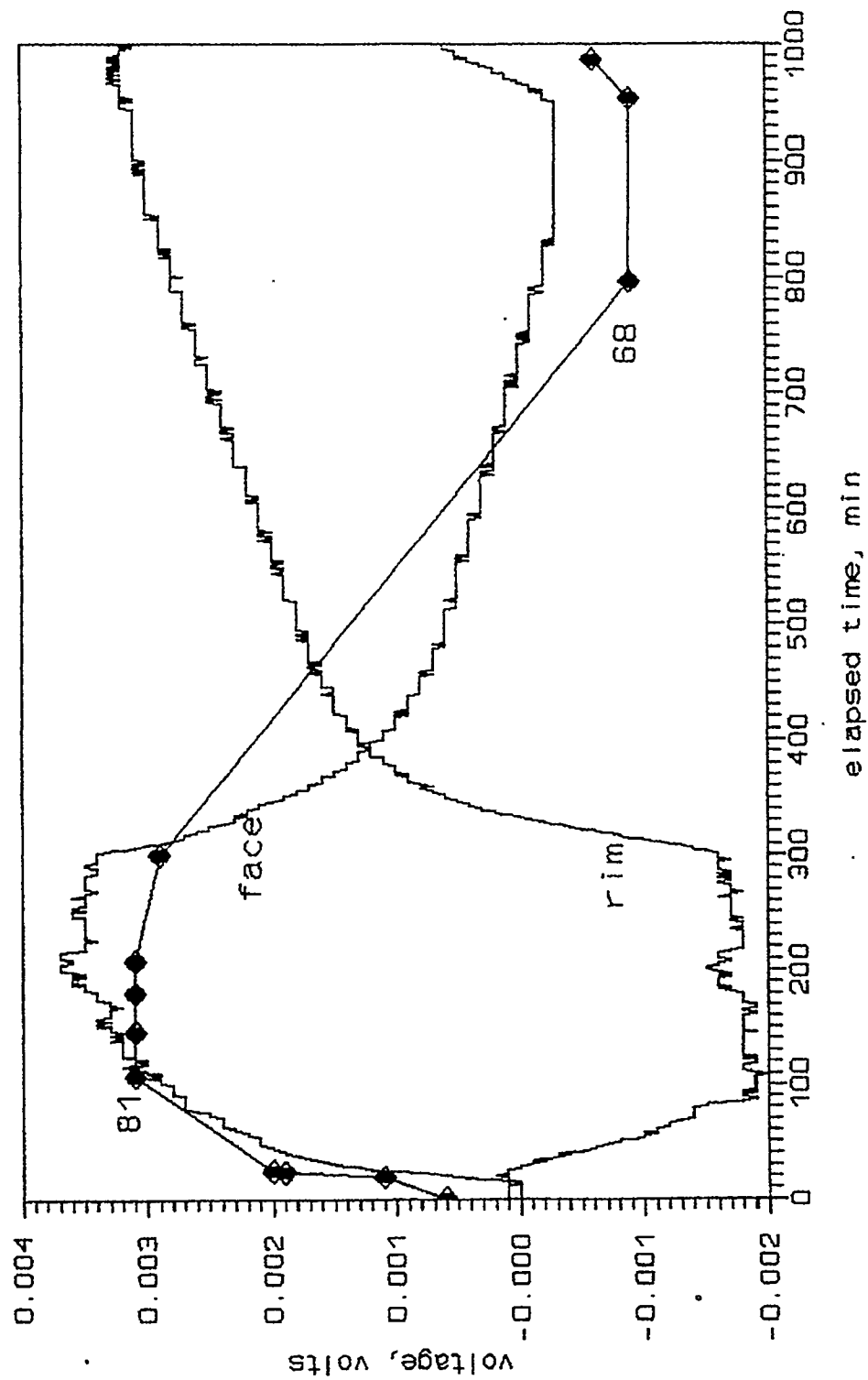


Figure 7

Drift Test, 2-24-95 to 2-27-95
BGE Probe, 6.9 volt bridge excitation

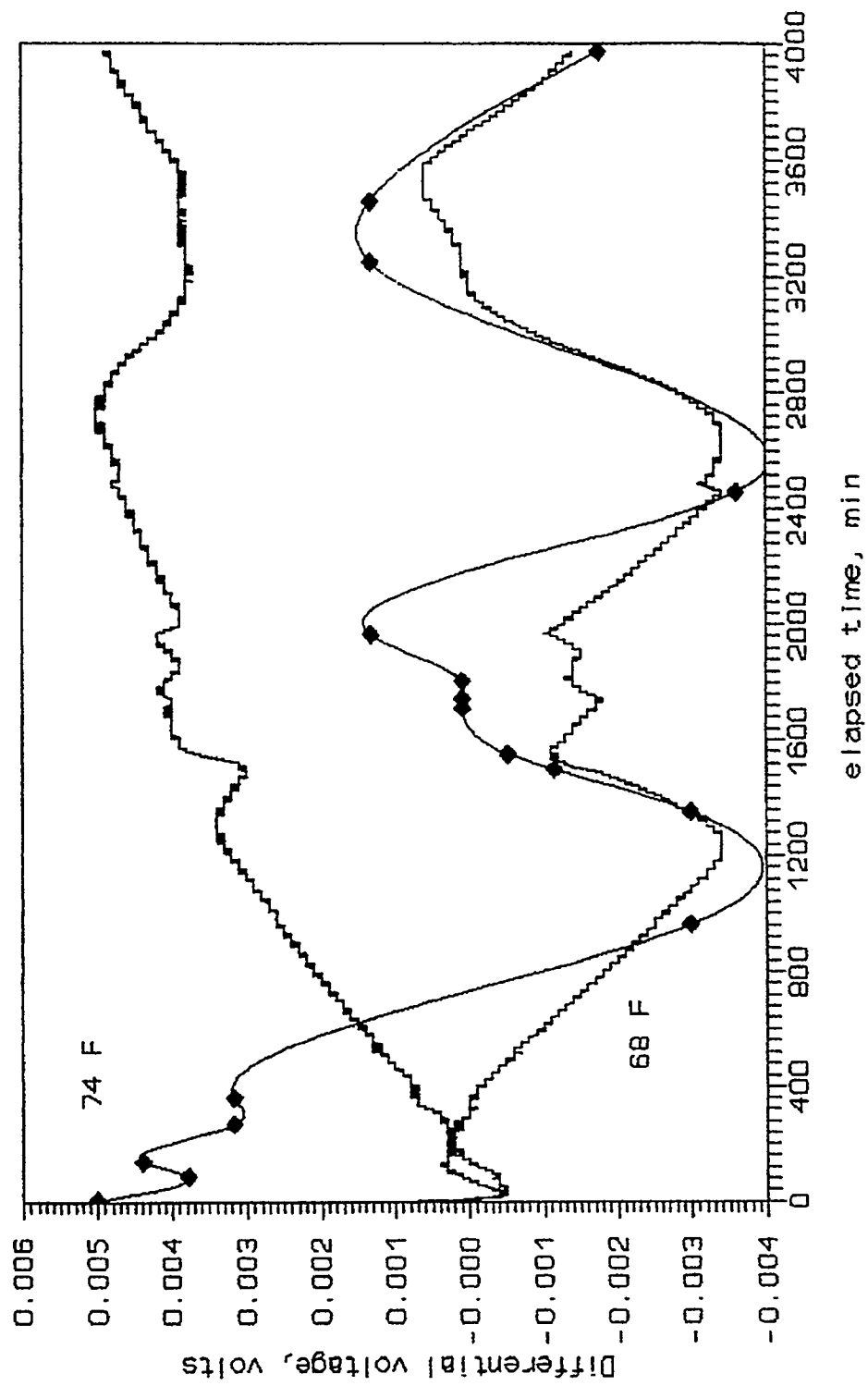


Figure 8

Drift Test, 2-28-95
BGE gages and compensator gages individually

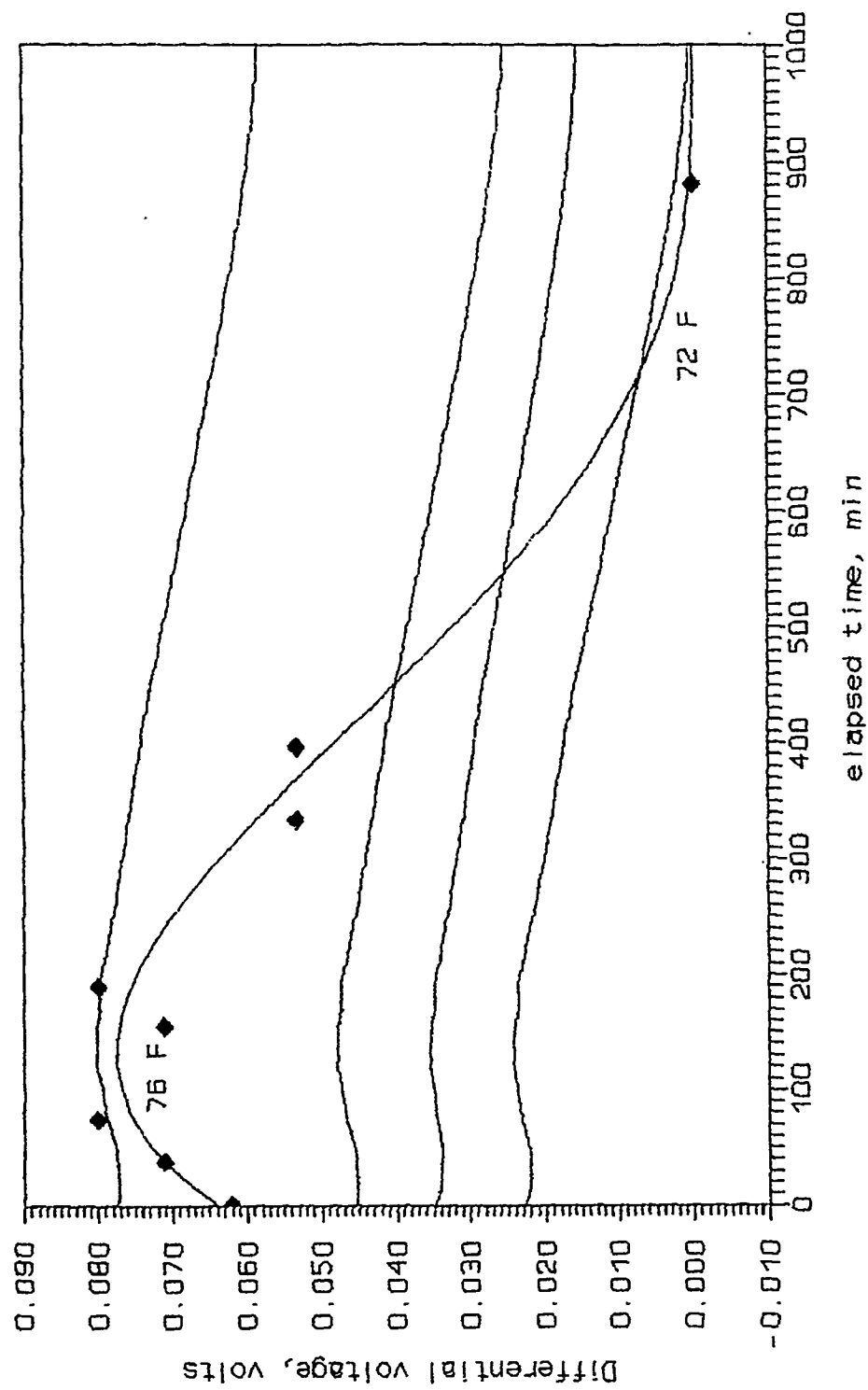


Figure 9

Excitation voltage test, individual gages
voltage set as shown, pots not adjusted

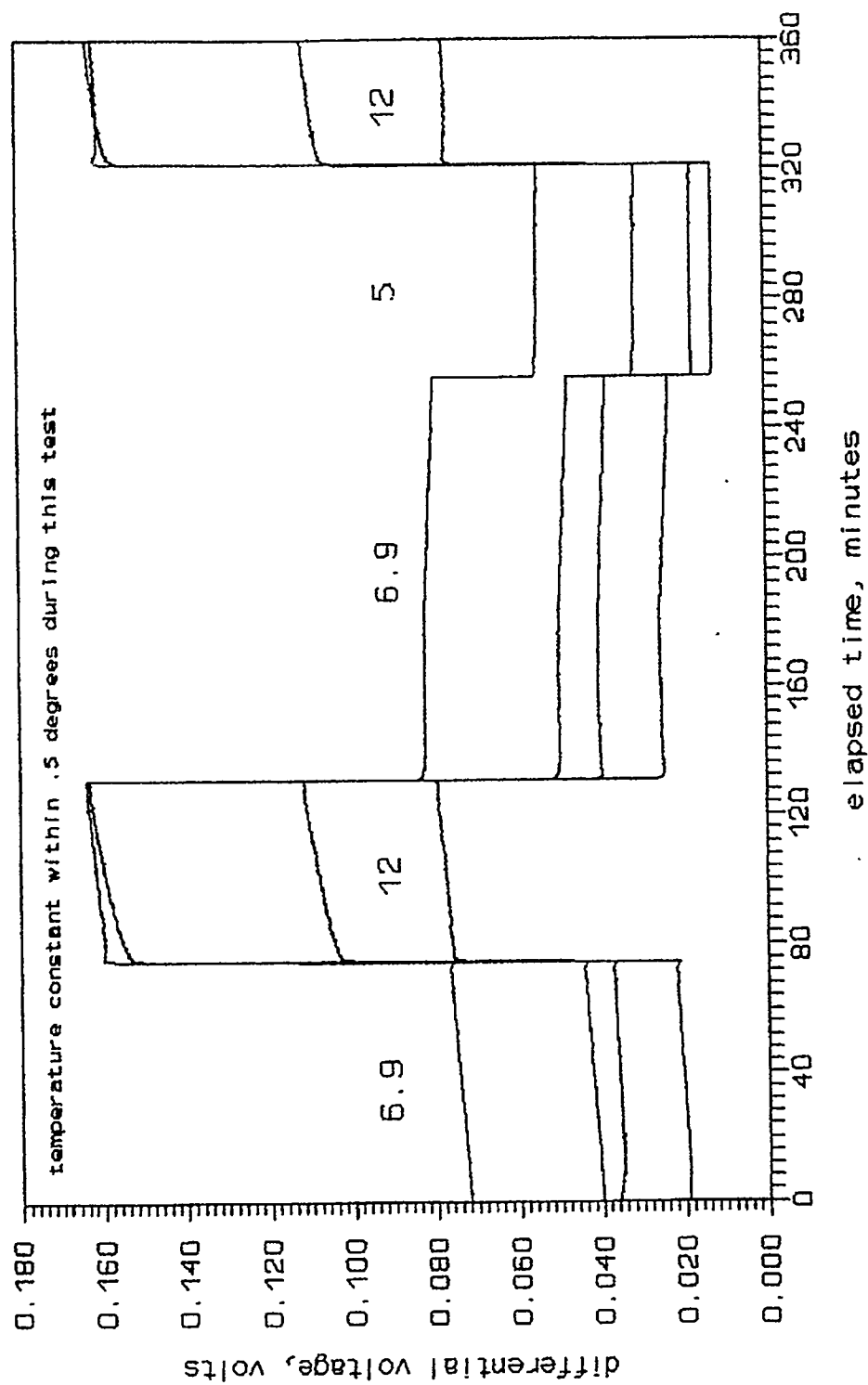


Figure 10

Drift Test, 3-5-95
BGE box and probe

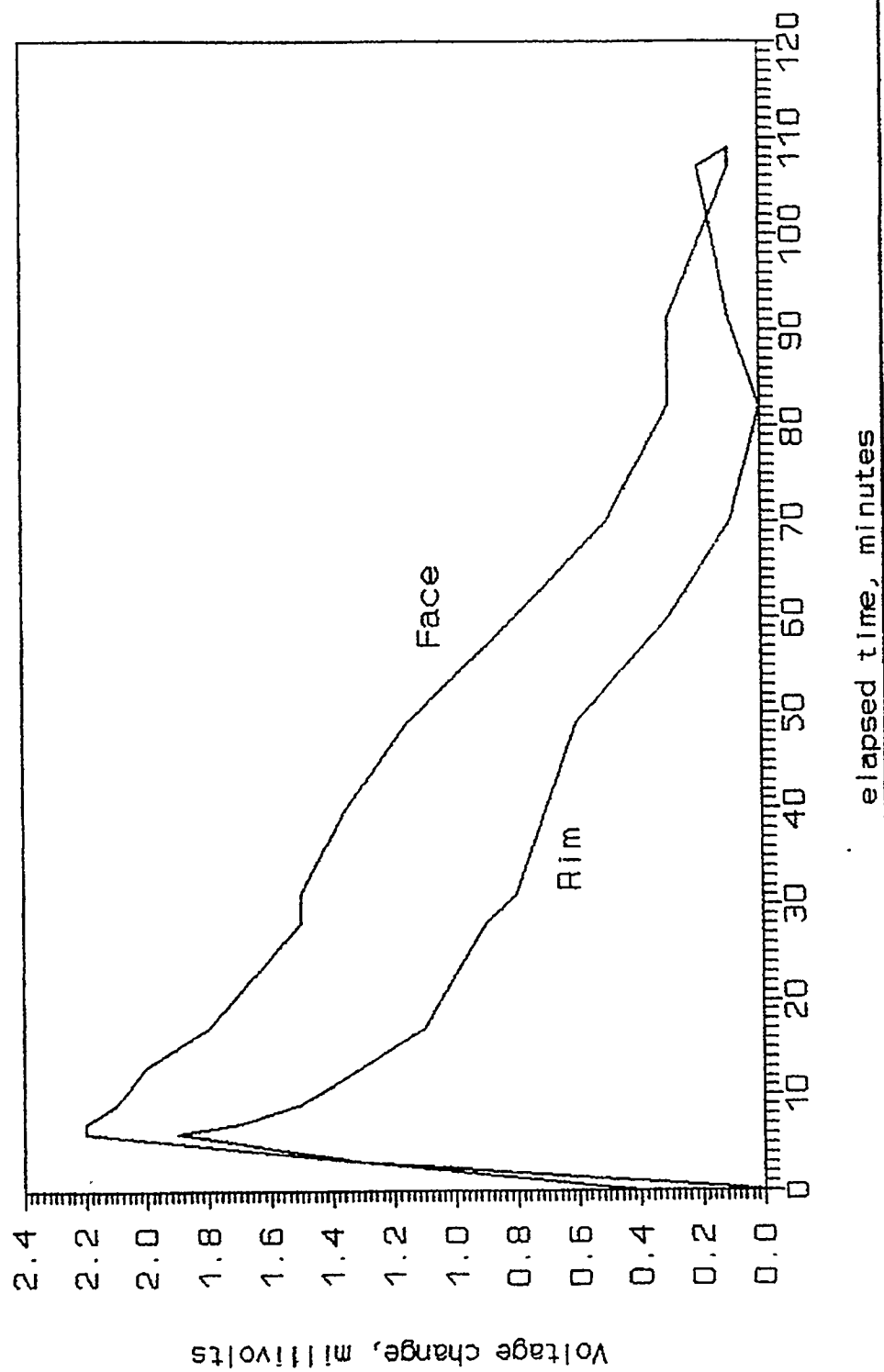


Figure 11

Drift Test, 3-6-95
BGE unit with dummy probe load

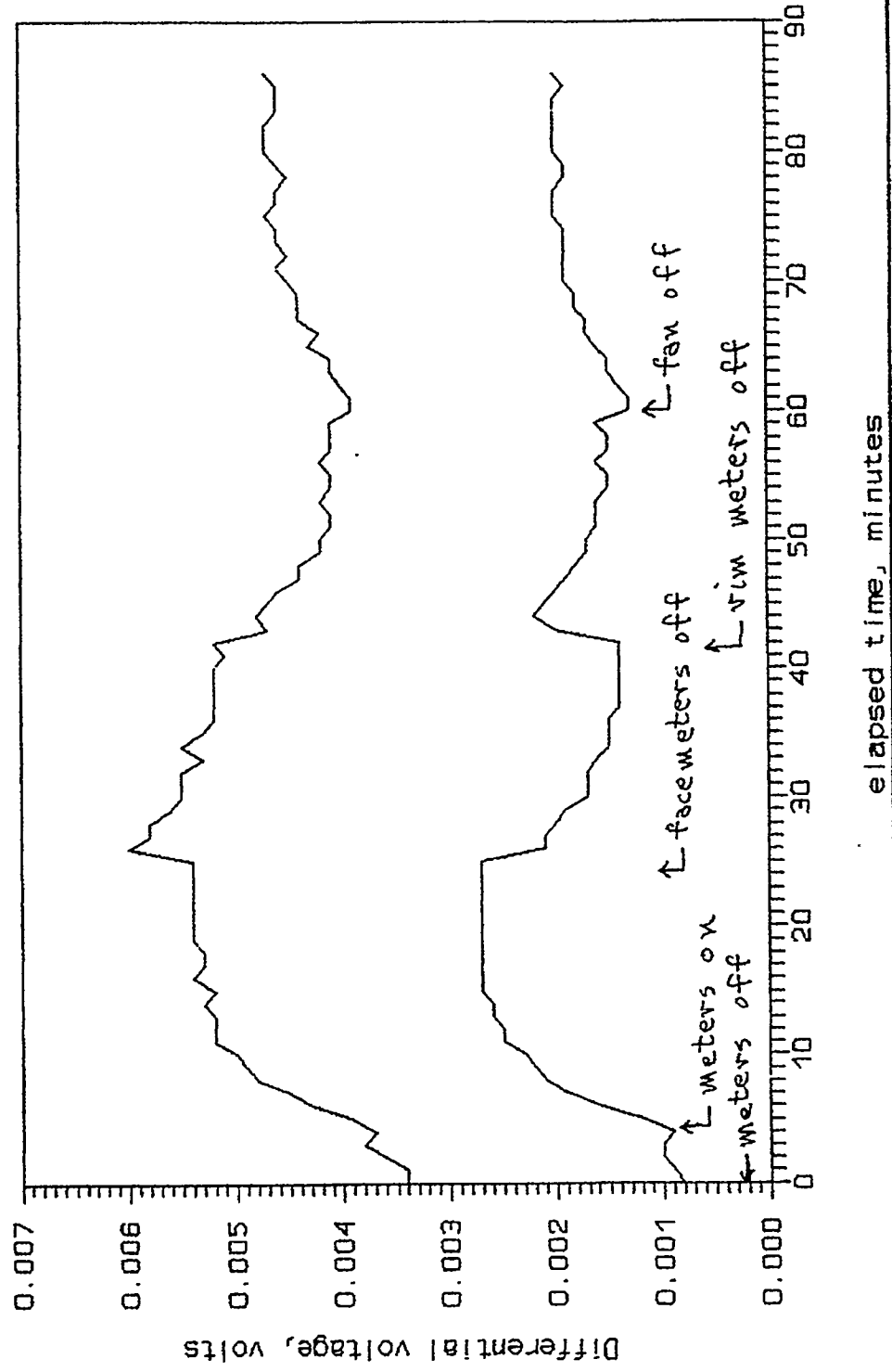


Figure 12

Drift Test, 3-6-95
BGE unit and probe

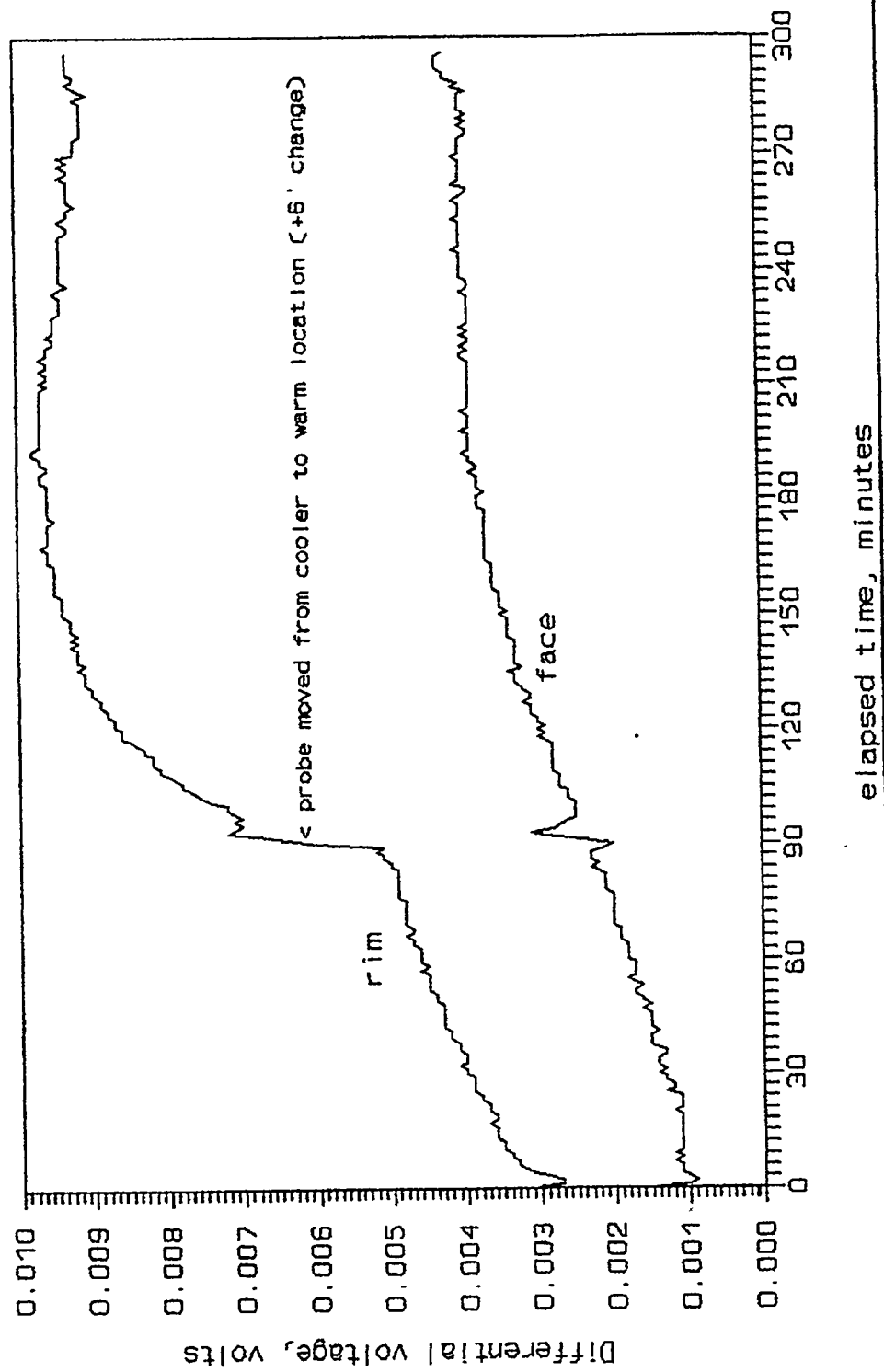


Figure 13

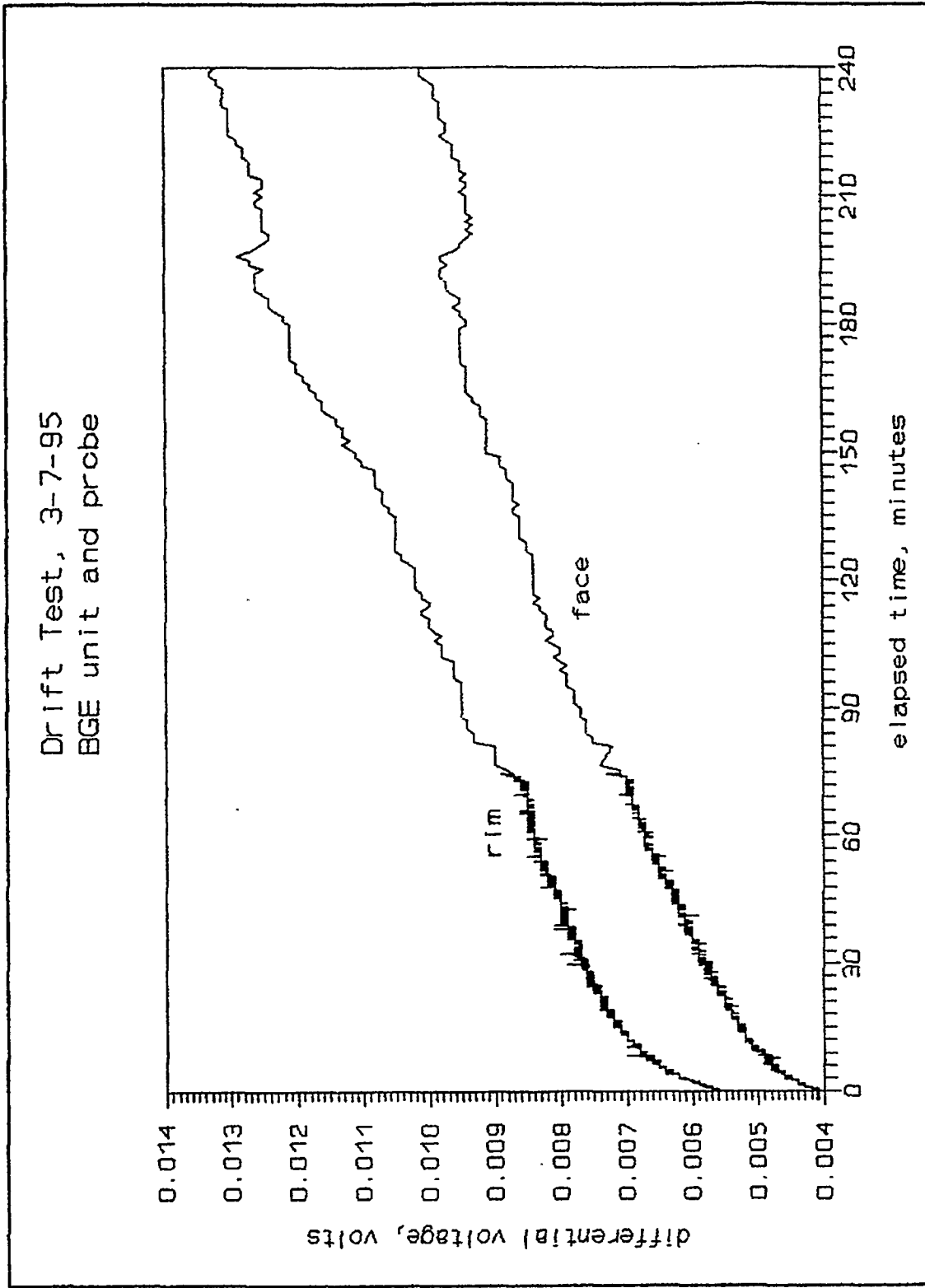


Figure 14

Drift Test, 3-8-95
BGE unit and probe

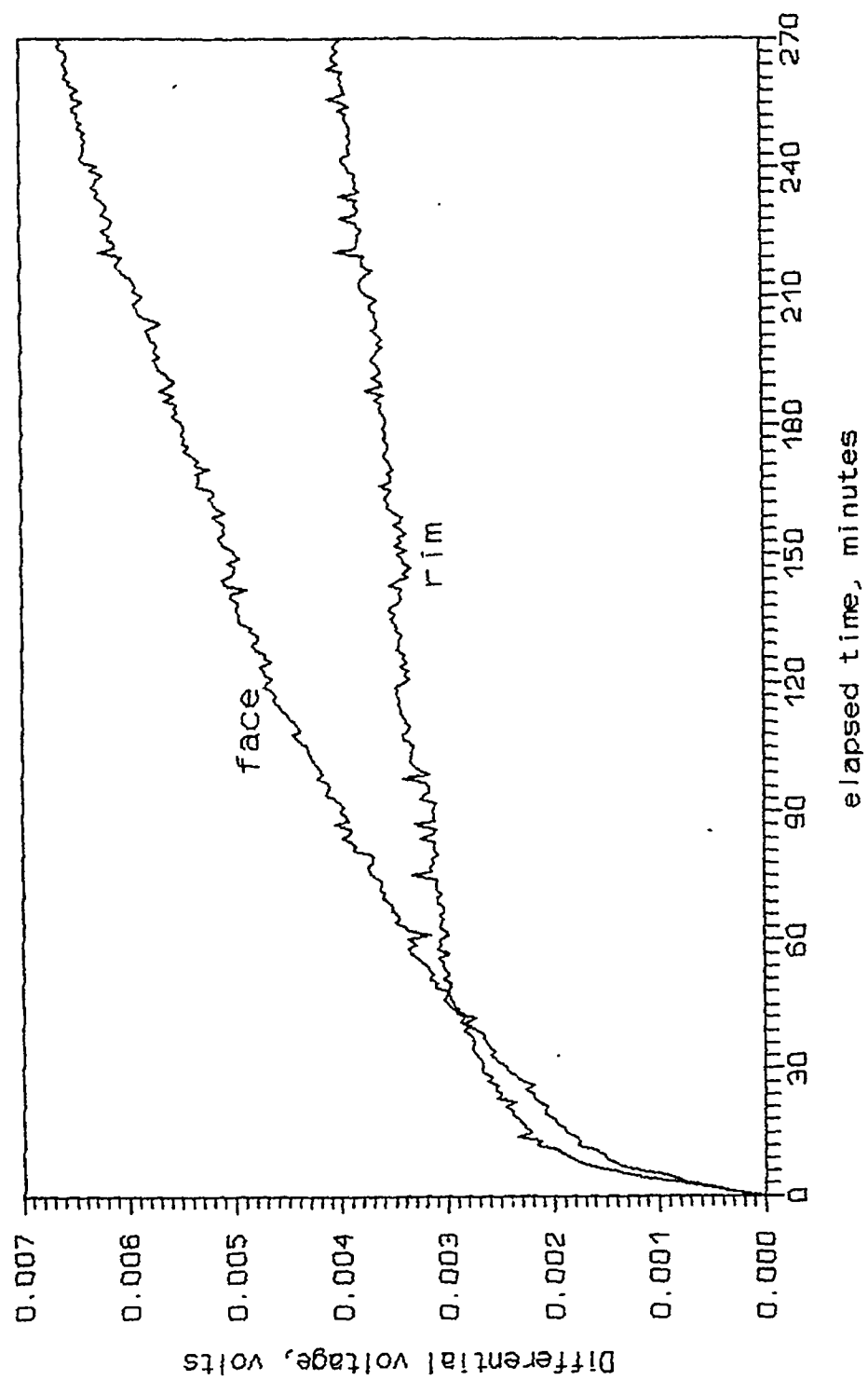
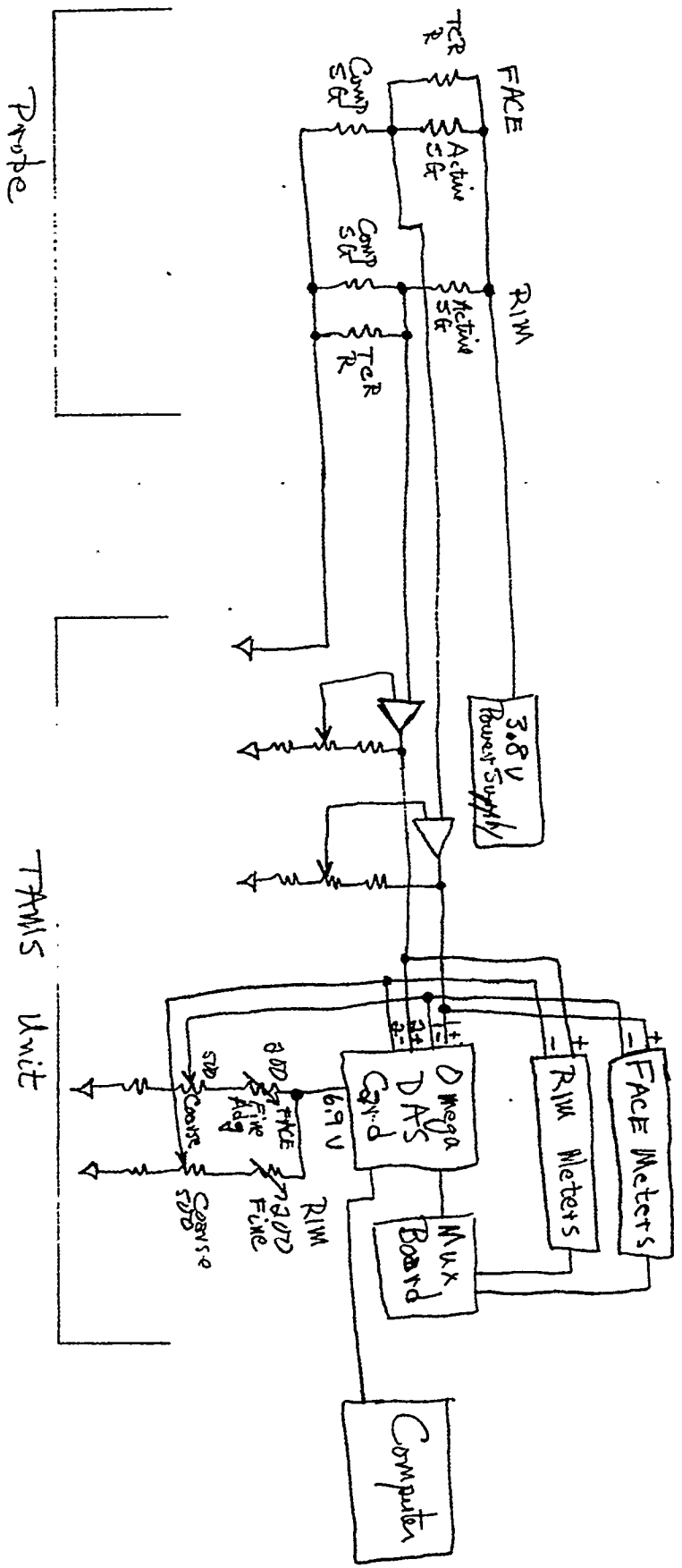


Figure 15

BGE TAMS system user notes

1. Handle the measurement assembly only by the rectangular mounting block and the locking sleeve, avoiding hand contact with the measurement tube. The temperature compensating network is in the connector end of the measurement tube while the displacement transducer is located in the measurement end.
2. Allow the measurement tube to stabilize at the test environment temperature for at least 30 minutes if it is different than that of the storage area.
3. Allow a warm up period for the computer and TAMS system of 15 minutes or more.
4. The rim measurement circuit is stable after approximately one hour of warm up, with approximately a 0.04 mils/min rate of change at 15 minutes and 0.02 mils/min change after 30 minutes.
5. Our tests show that the face measurement circuit takes as long as 2.5 hours to stabilize. However, the approximate rate of change at 15 minutes after startup is 0.05 mils/min and 0.03 mils/min after 30 minutes.
6. Connect the coupling sensor to connector port 1 only.
7. The face sensor has developed a hysteresis of approximately 2 mils. Overtravel the sensor approximately 5 mils and return to the final position before setting the zero lock and before recording displacement values.



TAMS System
BGE Unit

8-3-95

COMPAD, Inc.

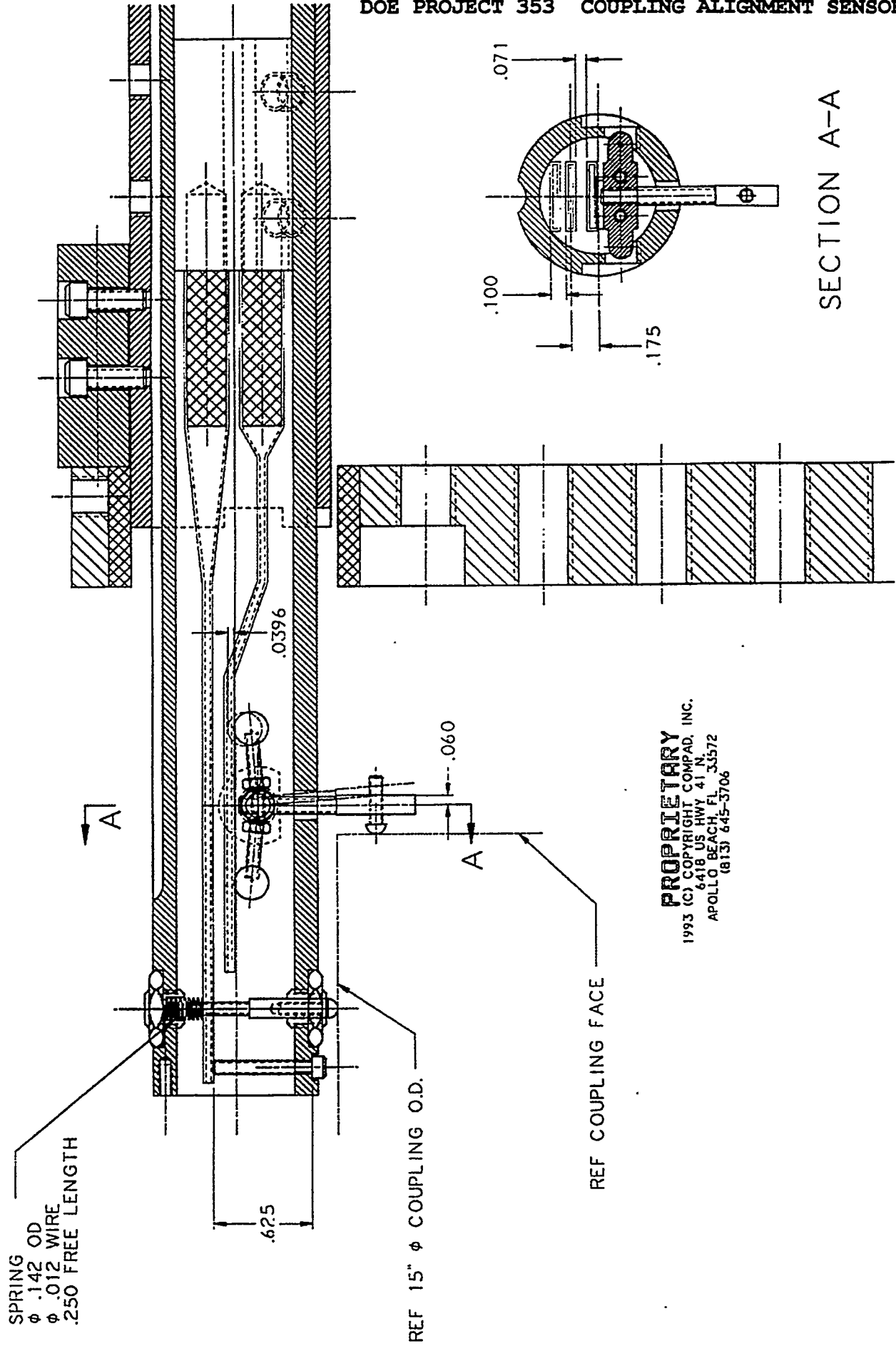
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Valrico, FL 33594

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DOE PROJECT 353

FINAL SENSOR DRAWINGS

DOE PROJECT 353 COUPLING ALIGNMENT SENSOR



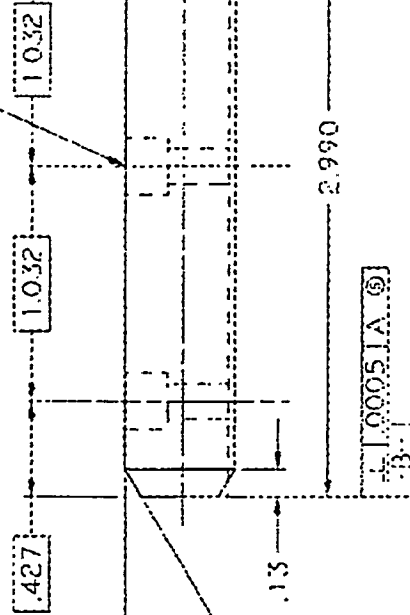
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REV	DATE	DESCRIPTION	APPROVED
1			

DRILL ϕ .156 THROUGH
 CBORE ϕ .250 X .187 DEEP
 3 HOLES

ϕ .0005 A @ .5



ϕ .500 STOCK

-A-

.047 REF

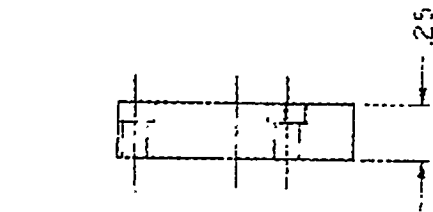
.391

ϕ .188

ϕ .0005 A @ .5

MECHANICAL PROPERTIES YF TS EL RA WH RP		PMIC UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE 3 PLACE $\pm$.03 $\pm$.005 MATERIAL - CRS MAKE FROM ϕ .500 DRILL ROD		CONTRACT NUMBER 931104 CONTRACTOR COMPAD DRAWN BY G.W.S. CHECKER DATE 11/10/93 ENGINEER		Precision Engineering 18950 U.S. 19 NW CLEARWATER FL 34624 (813) 530-3669	
NEXT: ASSY USED ON APPLICATION		MATL ENGR		DRAWING APPROVAL DESIGN APPROVAL		SIZE B CASE CODE 10-103-01	
				SCALE 2/1 UNIT WT		SHEET 1 OF 1	

SENSOR
 BOTTOM RAIL



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CS Precision Engineering
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CLEARWATER, FL 34624
(813) 530-3889

SENSOR TUBE
END COVER

SIZE	CAGE CODE
B	10-105-01

SCALE	2 1/2	UNIT	WT	SHEET	1 OF
-------	-------	------	----	-------	------

CONFIDENTIAL NUMBER

9:31:10%

CONTRACTOR

COM: AID

DRAWN BY _____ DATE _____

6.W.5. 11/17/93
CHECKED FOR FILE

ה'תשנ"א

DRAWING APPROVAL.

DESIGN APPROVAL:

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

2 PLACE 3 PLACE
TOLERANCES ON
± .03 ± .005

MATER:AL:
2024 AL ALLOY

MATL ENGR

DATE	TIME	TEST	TESTER	USED ON
11/11/11	14:30	100%	100%	100%

APPLICATION

Pfaff

MECHANICAL PROPERTIES

48

212	51
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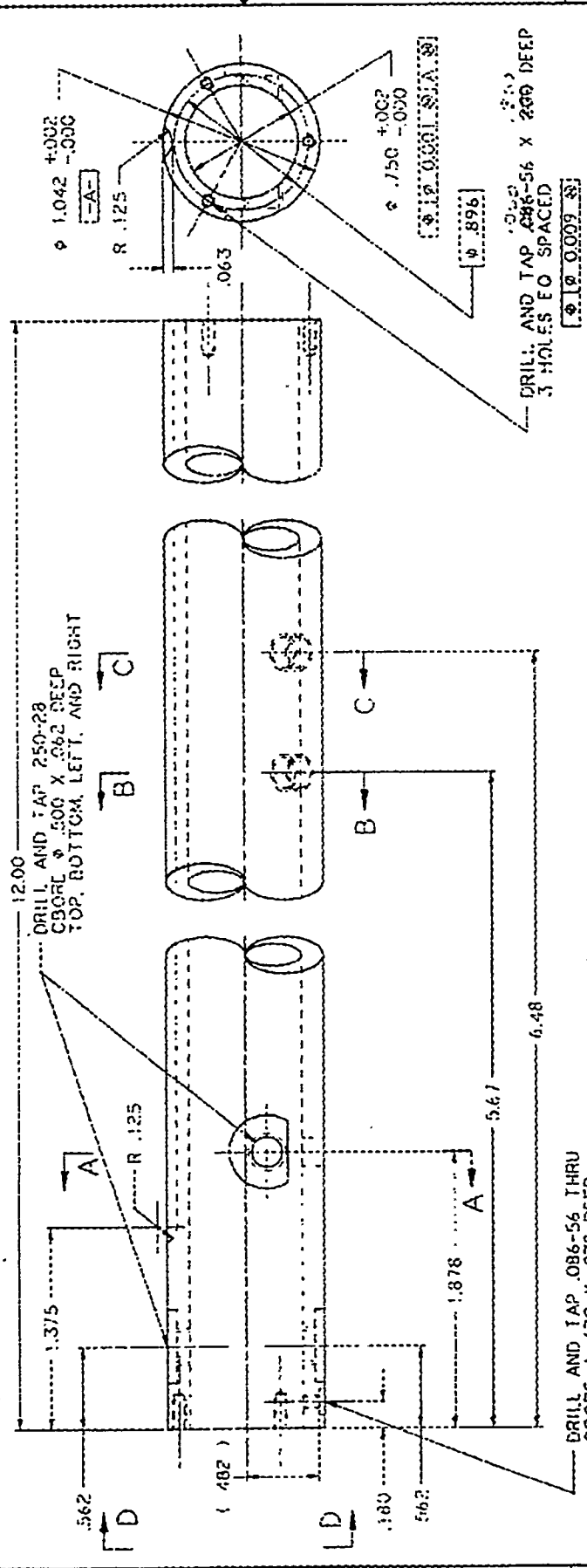
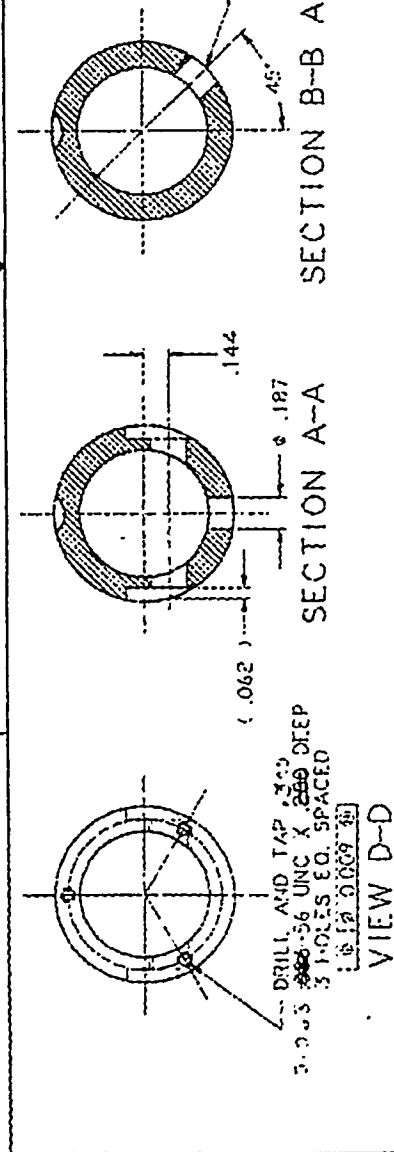
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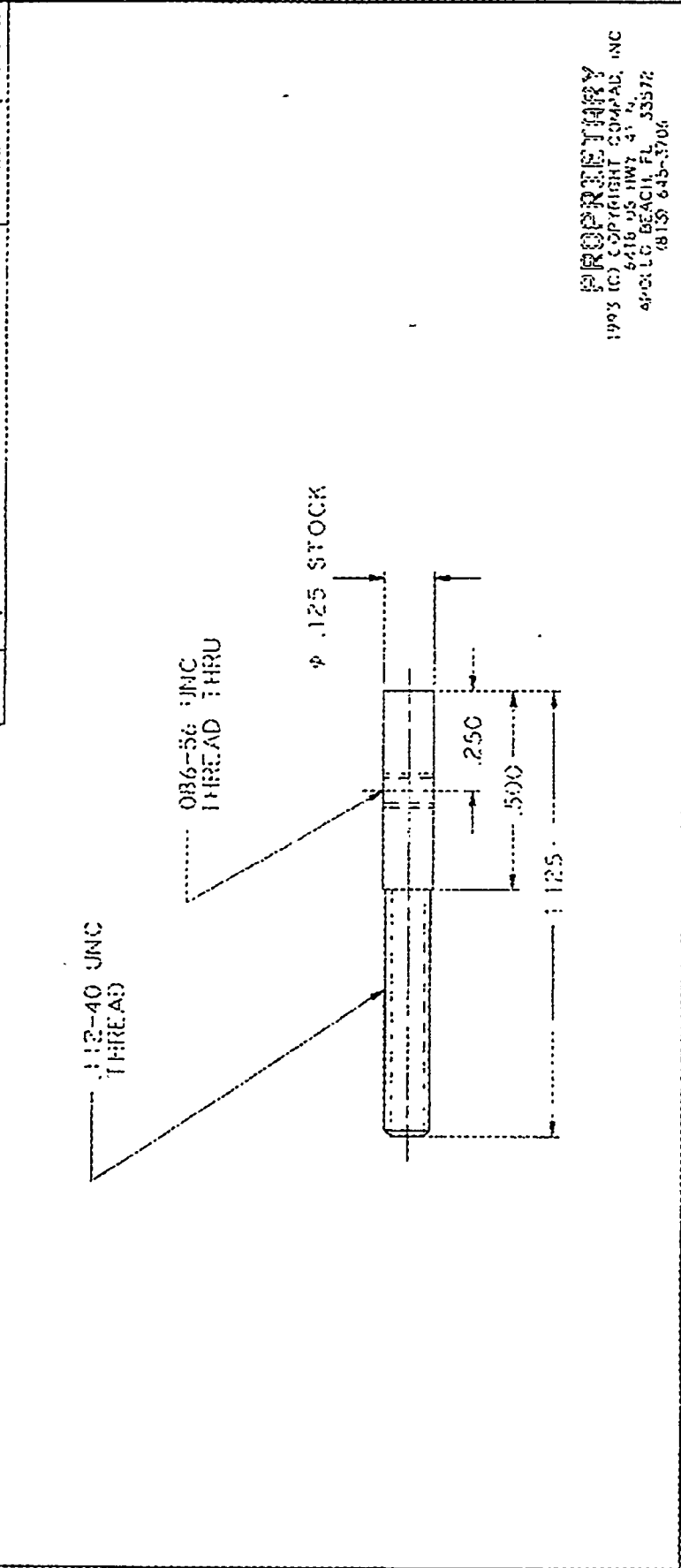
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ZONE	ITEM	DESCRIPTION	DATE	APPROVED



PROPRIETARY 1993 MCALISTER COMPANY, INC. 4010 US HWY 41 N APOLO BEACH, FL 33577 (813) 645-3700		CONTRACT NUMBER 931104		CONTRACTOR COMPAD		DRAWN BY G.W.S.		DATE 11/17/93		CHECKED BY G.W.S.		DATE 11/17/93		DESIGNED BY G.W.S.		DATE 11/17/93		SCALE 2:1		SHEET 1 OF 1	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		TOLERANCES ON 2 PLACE 3 PLACE 0.03 0.005		MATERIAL 2024 AL ALLOY		FINISH 100		PLANT ASSY USED ON		APPLICATION		MATERIAL 2024 AL ALLOY		FINISH 100		PLANT ASSY USED ON		APPLICATION			

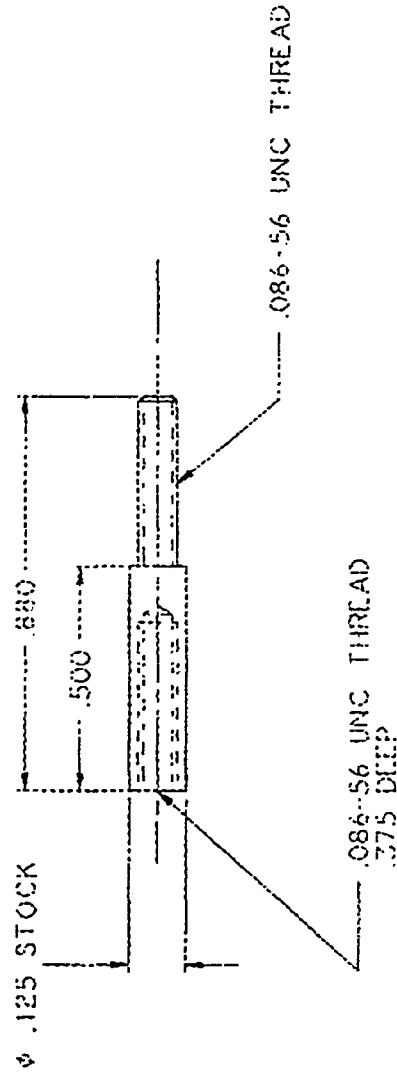
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ZONE	DESCRIPTION	DATE
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PROPERTY
1993 (C) COPYRIGHT COMPAD, INC
6416 US HWY 41 N
45-0110 BEACH, FL 33572
(813) 645-3706

MECHANICAL PROPERTIES		PMIC		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		CONTRACT NUMBER		Precision Engineering	
VP							931104	18850 U.S. 13 NORTH, #500 CLEARWATER, FL 34624 (813) 530-3589	
TS							CONTRACTOR	WISHBONE SHAFT	
EL2							COMPAD		
RA							DRAWN BY	SIZE	
WH							G.W.S.	B	
PH							CHECKER	CAGE CODE	
							ENGINEER	10-305-01	
							DRAWING APPROVAL	SCALE 4/1	
							DESIGN APPROVAL	SHEET 1 OF 1	
							MATERIAL		
							BRASS		
							MATL ENGR		
							USED ON		
							APPLICATION		

REVISIONS			
ZONE	LTR	DESCRIPTION	DATE
			APPROVED



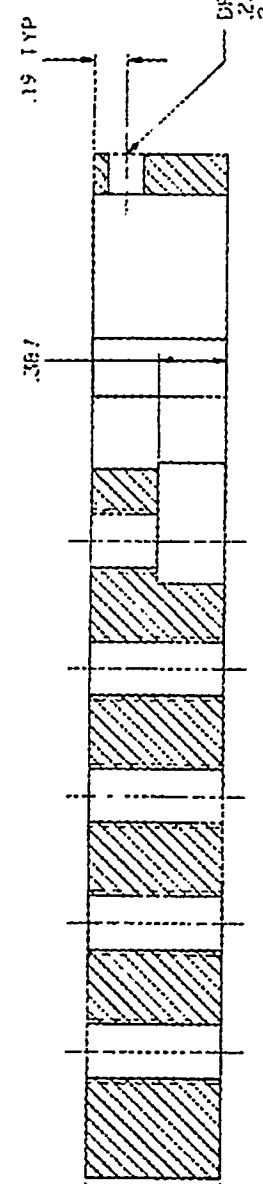
1973 (C) COPYRIGHT COMPAD, INC.
5419 US HWY 41 N
APOLEON BEACH FL 33572
(813) 643-3106

		1850 US 9 NORTH #500 CLEARWATER, FL 34624 (813) 530-3829	
CONTRACT NUMBER 931104		CONTRACTOR COMPAD	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE 3 PLACE * .03 * .005		DRAWN BY G.W.S. CHECKER ENGINEER	
MATERIAL BRASS		DATE 12/2/93	
NEXT ASSY APPLICATION		DRAWING APPROVAL DESIGN APPROVAL	
MECHANICAL PROPERTIES YP TS EL2 RA BH RH		MAIL ENGR USED ON	
SIZE B		CAGE CODE 10-110-01	
SCALE 4/1		SHEET 1 OF 1	

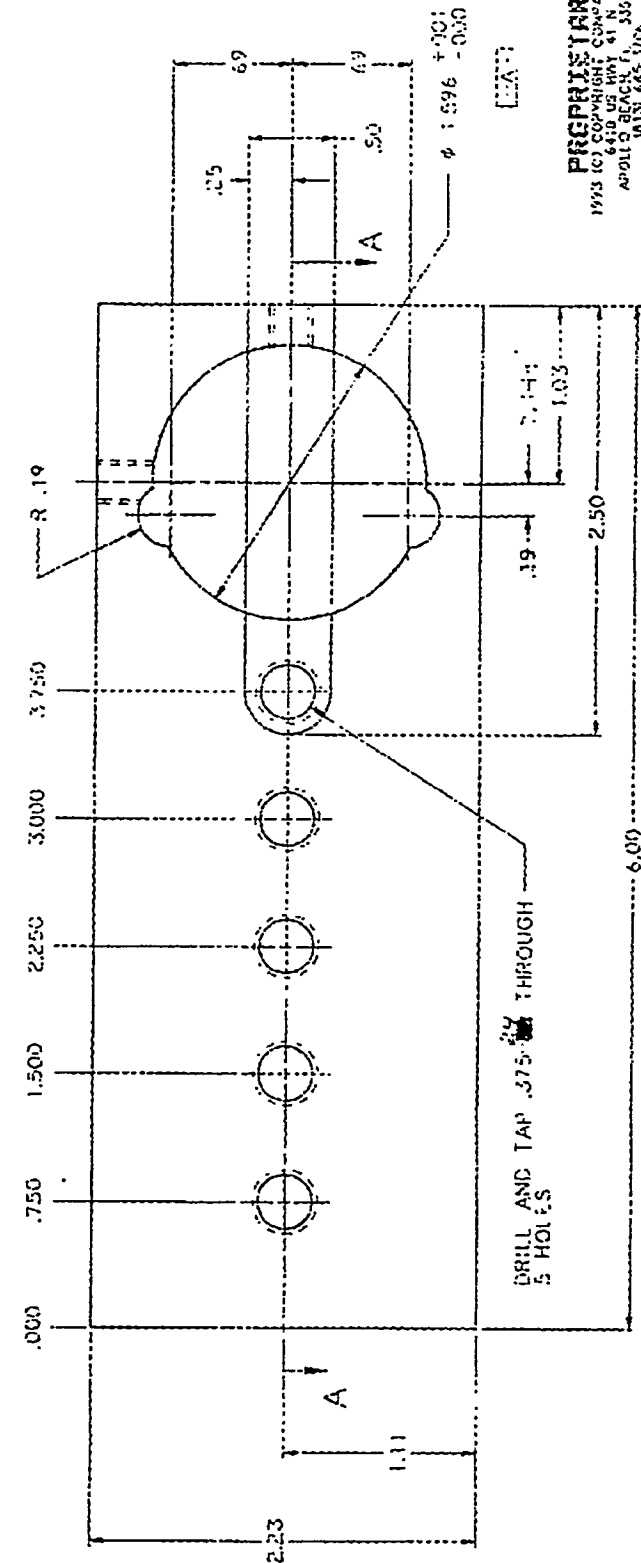
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REV	DESCRIPTION	DATE	APPROVED
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27.000025 1	27.000025 1
11.000025 1 A 0	11.000025 1 A 0



SECTION A-A

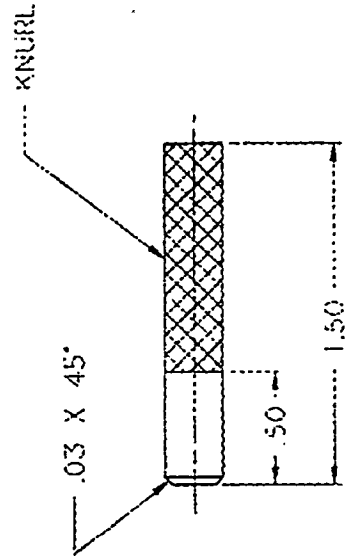


PROPRIETARY
 1973 (C) COPYRIGHT COMPAD, INC.
 6410 US HWY 41 N
 APOLEO BEACH, FL 33022
 (904) 445-3708

		PRECISION ENGINEERING 1850 US 9 NORTH, 3322 CLEARWATER, FL 34624 (813) 530-3181	
CONTRACT NUMBER 931104		CONTRACTOR COMPAD	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		DIMENSIONS ON 2 PLACES 3 PLACES 4 PLACES 5 PLACES 6 PLACES 7 PLACES 8 PLACES 9 PLACES 10 PLACES 11 PLACES 12 PLACES 13 PLACES 14 PLACES 15 PLACES 16 PLACES 17 PLACES 18 PLACES 19 PLACES 20 PLACES 21 PLACES 22 PLACES 23 PLACES 24 PLACES 25 PLACES 26 PLACES 27 PLACES 28 PLACES 29 PLACES 30 PLACES 31 PLACES 32 PLACES 33 PLACES 34 PLACES 35 PLACES 36 PLACES 37 PLACES 38 PLACES 39 PLACES 40 PLACES 41 PLACES 42 PLACES 43 PLACES 44 PLACES 45 PLACES 46 PLACES 47 PLACES 48 PLACES 49 PLACES 50 PLACES 51 PLACES 52 PLACES 53 PLACES 54 PLACES 55 PLACES 56 PLACES 57 PLACES 58 PLACES 59 PLACES 60 PLACES 61 PLACES 62 PLACES 63 PLACES 64 PLACES 65 PLACES 66 PLACES 67 PLACES 68 PLACES 69 PLACES 70 PLACES 71 PLACES 72 PLACES 73 PLACES 74 PLACES 75 PLACES 76 PLACES 77 PLACES 78 PLACES 79 PLACES 80 PLACES 81 PLACES 82 PLACES 83 PLACES 84 PLACES 85 PLACES 86 PLACES 87 PLACES 88 PLACES 89 PLACES 90 PLACES 91 PLACES 92 PLACES 93 PLACES 94 PLACES 95 PLACES 96 PLACES 97 PLACES 98 PLACES 99 PLACES 100 PLACES	
MATERIAL 2024 AL ALLOY		DATE 11/12/83	
NEXT ASSEY USED ON APPLICATION		DRAWING APPROVAL DESIG APPROVAL	
MECHANICAL PROPERTIES		PLATE	
10-201-01		10-201-01	
10-201-01		10-201-01	

4 3 2 1

REVISIONS		
NO	DATE	APPROVED



Ø .25 STOCK

PROPRIETARY
 1793 (C) COPYRIGHT COMPAG, INC.
 6418 US HWY 41 N
 APOLLO BEACH, FL 33622
 (813) 643-5786

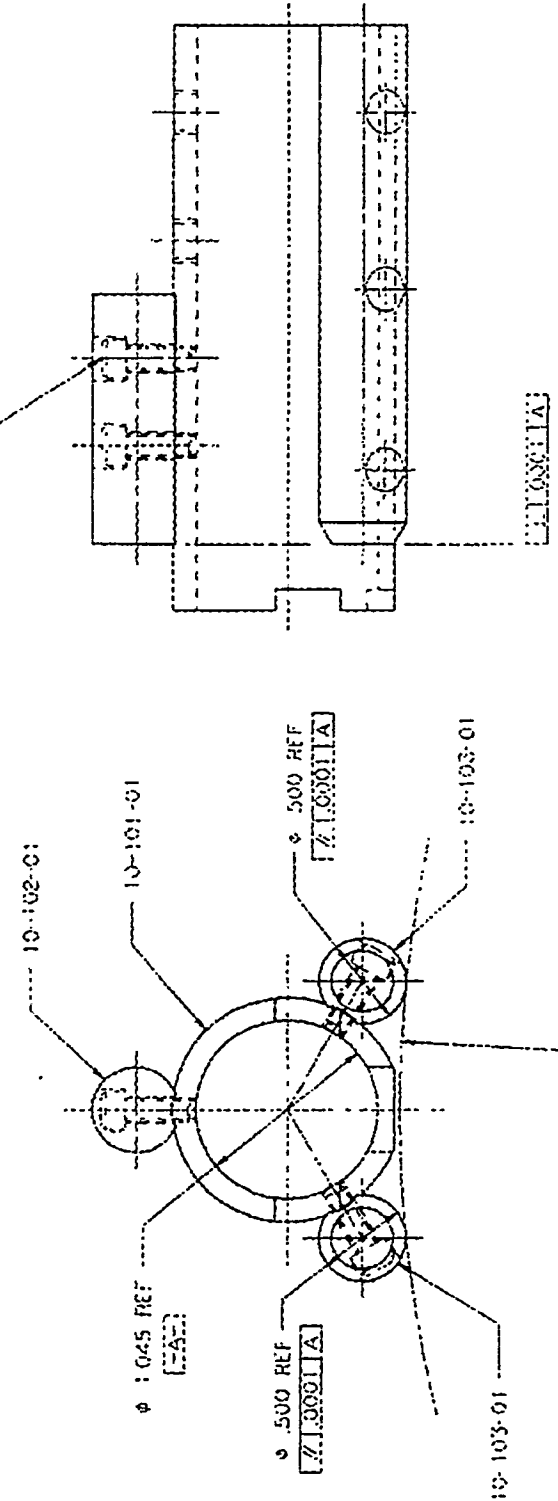
MECHANICAL PROPERTIES YP _____ TS _____ EL2 _____ RA _____ SH _____ RH _____		PMIC _____ NEXT ASSY _____ USED ON _____ APPLICATION _____		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE 3 PLACE ± .03 ± .005 MATERIAL: 2024 AL ALLOY MATL ENGR _____		CONTRACT NUMBER 931104 CONTRACTOR COMPAG DRAWN BY G.W.S. CHECKER _____ DATE 11/23/93 ENGINEER _____ DRAWING APPROVAL _____ DESIGN APPROVAL _____		 18850 US IS NORTH #500 CLEARWATER FL 34624 (813) 550-3883		ELEMENT MOUNT PIN SERIAL CODE B SCALE 2/1 UNIT WT 10-107-01 SHEET 1 OF 1	
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D C B A

ZONE	LINE	REVISION	DATE	APPROVED

6-32 X .75
SOCKET HD CAP SCREW
2 PLD.

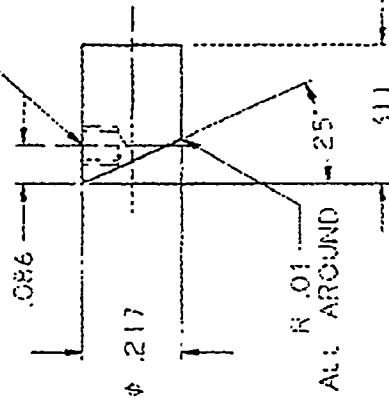


PROPERTY
1993 ICS COMPANY, INC.
6418 US HWY 41 N
APOLLO BEACH, FL 33557
813 645-5708

PRECISION Engineering		19930 US HWY 41 NORTH, #500 DUNBAR, FL 34426 813 530-3885	
SENSOR HOLDER		10-100-00	
C		SCALE 2/1	
C		UNIT WT	
C		SHEET 1 OF 1	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		TOLERANCES ON 2 PLACE 3 PLACE +.03 +.005	
DRAWN BY C. W. S. (CHECKED)		DATE 11/10/93 (ENGINEER)	
CONTRACTOR COMPAD		DRAWING APPROVAL PERSON APPROVAL	
951104		MAIL ENGR	
NEXT ASSY USED ON		APPLICATION	
MECHANICAL PROPERTIES		PMIC	
ST			
TS			
CS			
RP			
BH			

REVISIONS		
ZONE	DESCRIPTION	DATE
LTR		
		APPROVED

.086-56 UNC
THREAD X .078 DEEP
BREAK OUT NOT ALLOWED



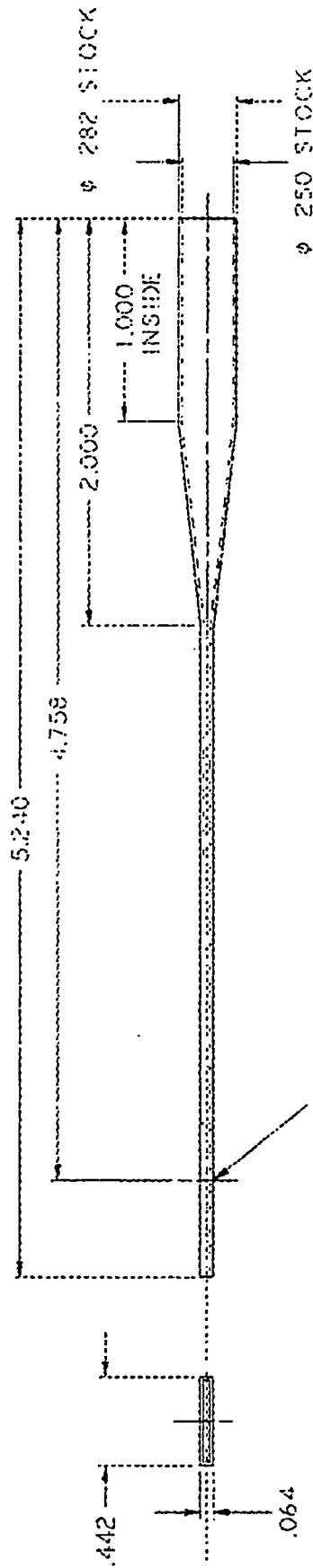
PROPERTY
1993 (C) COPYRIGHT COMPAD, INC
4018 US HWY 41 N
APOLEO BEACH, FL 33572
(813) 243-5796

MECHANICAL PROPERTIES		PMIC		UNLESS OT-CRIBSE SPECIFIED DIMENSIONS ARE IN INCHES		CONTRACT NUMBER 931104		CAGE CODE 10-302-01	
VP									
TS									
EL2									
PA									
DM									
RH									
NEXT ASSY USED ON APPLICATION				MATERIAL CARBON STEEL		DRAWN BY G.W.S.		DATE 11/23/93	
				MATERIAL ENGR		CHECKED G.E.C.		ENGINEER	
						DRAWING APPROVAL			
						DESIGN APPROVAL			
						SCALE 4/1		SHEET 1 OF 1	

WISHBONE
ROLLER



REVISIONS		DATE		APPROVED	
NO.	DESCRIPTION				



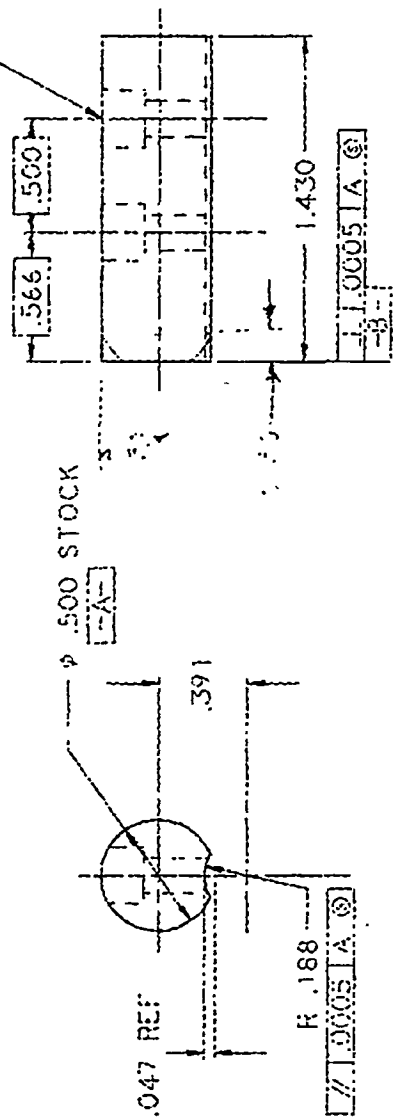
DRILL AND TAP .066-56 UNC THRU BOTH SIDES

PROPERTIES
1993 (C) COMPACT COMPAD INC.
6418 US HWY 41 N.
APOLLO BEACH, FL 33572
(813) 645-3794

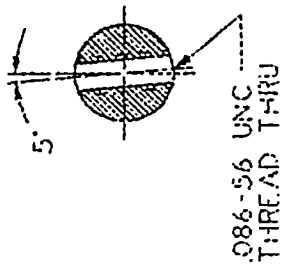
MECHANICAL PROPERTIES		PMIC		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		CONTRACT NUMBER		Precision Engineering		16950 U.S. 9 NORTH, #500 CLEARWATER, FL 34624 (813) 530-3885	
YP							931104				
TS							CONTRACTOR				
EL2							COMPAD				
RA											
BH											
TH											
				TOLERANCES ON 2 PLACE 3 PLACE + .03 ± .005		DRAWN BY DATE		UPPER ELEMENT TUBE		16950 U.S. 9 NORTH, #500 CLEARWATER, FL 34624 (813) 530-3885	
				MATERIAL 2024 AL ALLOY		G.W.S. 12/2/93					
						CHECKER					
						DRAWING APPROVAL					
						DESIGN APPROVAL					

REVISIONS				
ZONE	UTR	DESCRIPTION	DATE	APPROVED

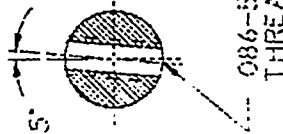
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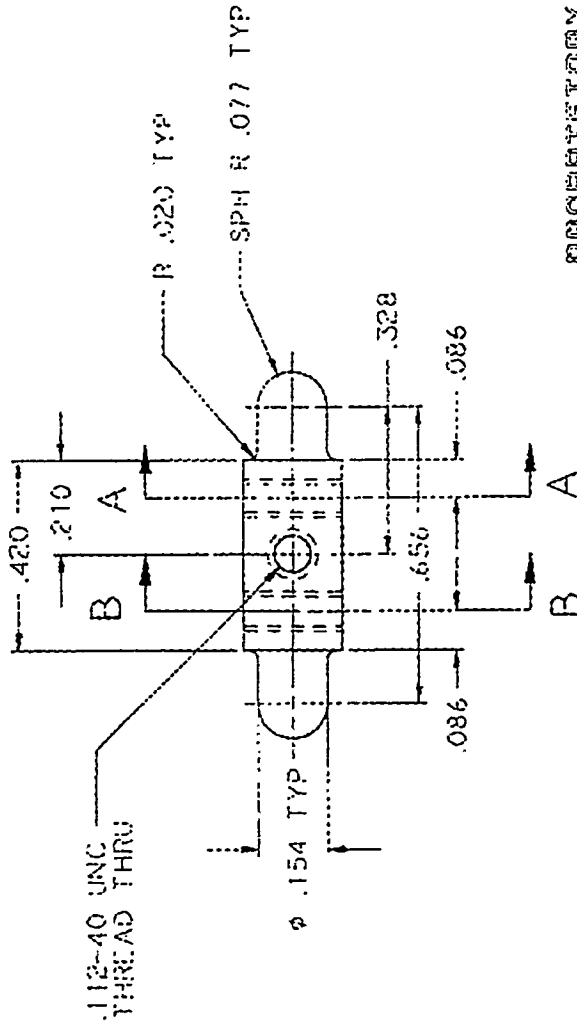
REVISIONS			DATE	APPROVED
ZONE	LTR	DESCRIPTION		



SECTION B-B



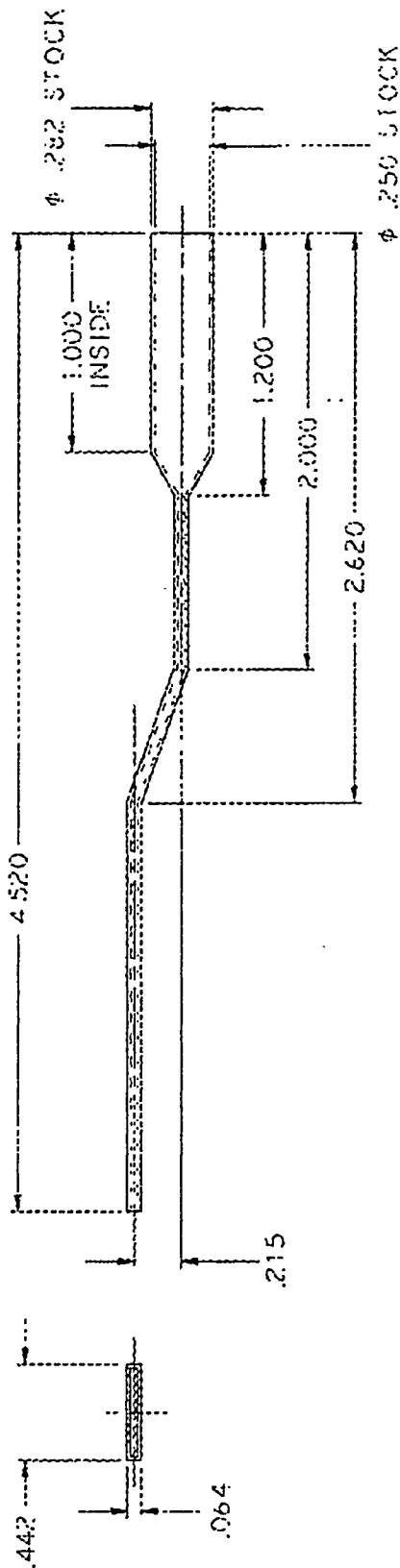
SECTION A-A



PROPERTY
1993 (C) COPYRIGHT COMPAG, INC.
6418 US HWY 41 N.
APOLLO BEACH, FL 33512
(813) 643-3706

		1850 US 18 NORTH, #500 CLEARWATER, FL 34624 (813) 532-3688	
CONTRACT NUMBER 931104		WISHBONE HUB	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE 3 PLACE $\pm .03$ $\pm .005$		DATE 11/23/93 DRAWN BY G.W.S. CHECKER ENGINEER DRAWING APPROVAL DESIGN APPROVAL	
MATERIAL CARBON STEEL		SCALE 4:1 UNIT WT SHEET 1 OF 1	
MECHANICAL PROPERTIES YP TS EL2 RA BH BH		NEXT ASSY USED ON APPLICATION	

REVISIONS			
ZONE	DATE	DESCRIPTION	APPROVED
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PROPERTY
1993 (C) COMPACT COMPAD, INC.
6408 US HWY 41 N.
APOLLO BEACH, FL 33572
(813) 644-3706

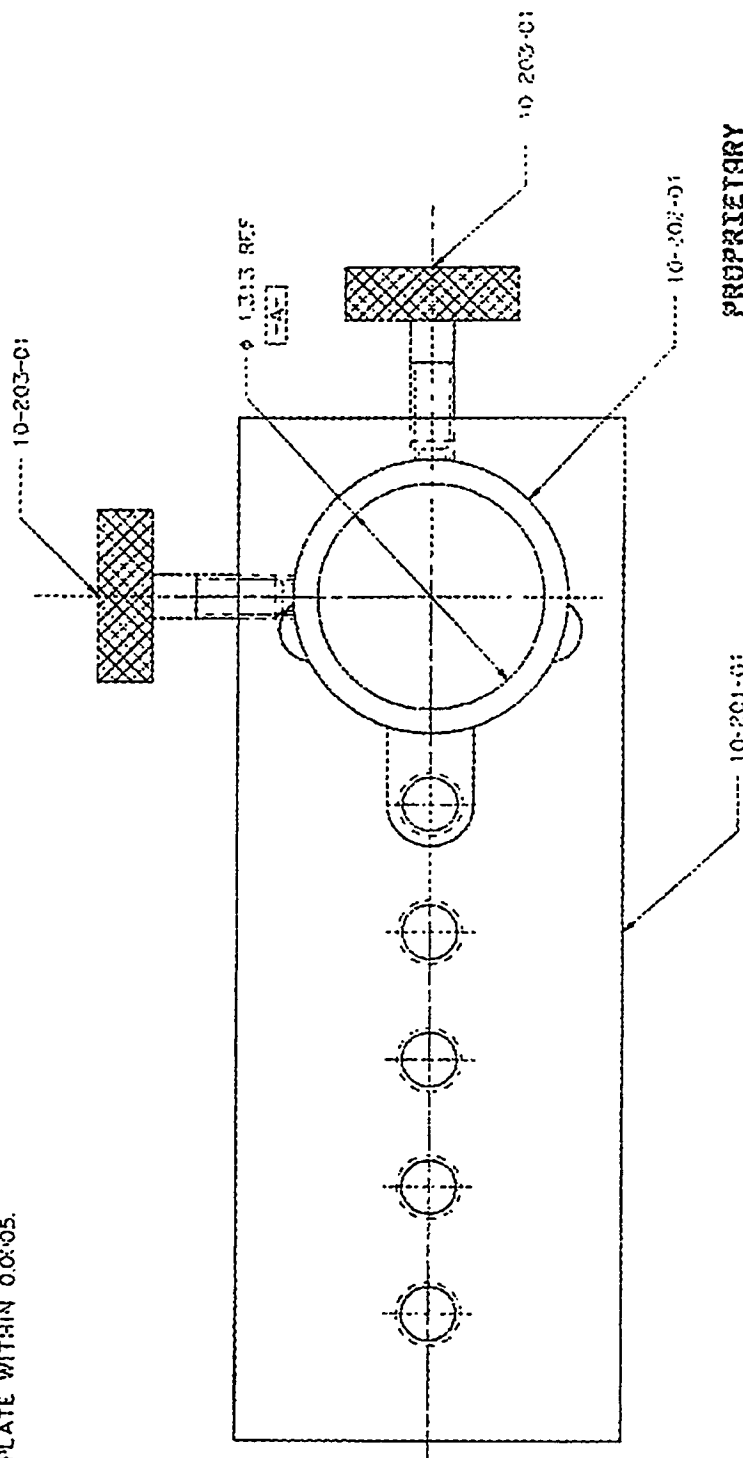
MECHANICAL PROPERTIES TC TS EL RA BH RH		PMIC _____ _____ _____ _____ _____ _____		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE 3 PLACE $\pm .03 \pm .005$ MATERIAL: 2024 AL ALLOY		CONTRACT NUMBER 93104 CONTRACTOR COMPAD		DRAWN BY G.W.S. CHECKER _____ DATE 12/2/93 ENGINEER _____		DRAWING APPROVAL _____ DESIGN APPROVAL _____		SCALE 2/1 UNIT WT 10-109-01 SHEET 1 OF 1	
NEXT ASSY _____ USED ON _____ APPLICATION _____		MATL ENGR _____		MATL ENGR _____		CONTRACT NUMBER 93104 CONTRACTOR COMPAD		DRAWN BY G.W.S. CHECKER _____ DATE 12/2/93 ENGINEER _____		DRAWING APPROVAL _____ DESIGN APPROVAL _____		SCALE 2/1 UNIT WT 10-109-01 SHEET 1 OF 1	

Precision Engineering
18850 US 19 NORTH #500
CLEARWATER, FL 34624
(813) 530-3823

LOWER
ELEMENT TUBE

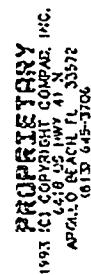
NOTES:

1. APPLY #470 LOCITE. PER MANUFACTURER'S INSTRUCTIONS PRIOR TO INSERTING INSULATOR IN PLATE
2. INSULATOR TO BE BONDED TO PLATE SUCH THAT DATUM -A- IS PERPENDICULAR TO NEAR-SIDE AND FAR-SIDE OF PLATE WITHIN 0.005.



PROPRIETARY
 1993 (C) COPYRIGHT COMPANY, INC.
 6400 US HWY 41 N.
 APO 11 C BEACH, FL 33512
 (813) 845-5706

MECHANICAL PROPERTIES TP TS EL RA BH PH		FINISH UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE 3 PLACE .03 .005 MATERIAL: 2024 AL ALLOY		CONTRACT NUMBER 931104 CONTRACTOR COMPAD DRAWN BY G.W.S. CHECKED DATE 11/17/93 INCHES DRAWING APPROVAL DESIGN APPROVAL		Precision Engineering 9820 US 19 NORTH, #500 CLEARWATER, FL 34624 (813) 530-5885	
REVISIONS DATE APPROVED		PLATE ASSY. C 10-200-00		SHEET 2/1 OF 1		SCALE 1 OF 1	

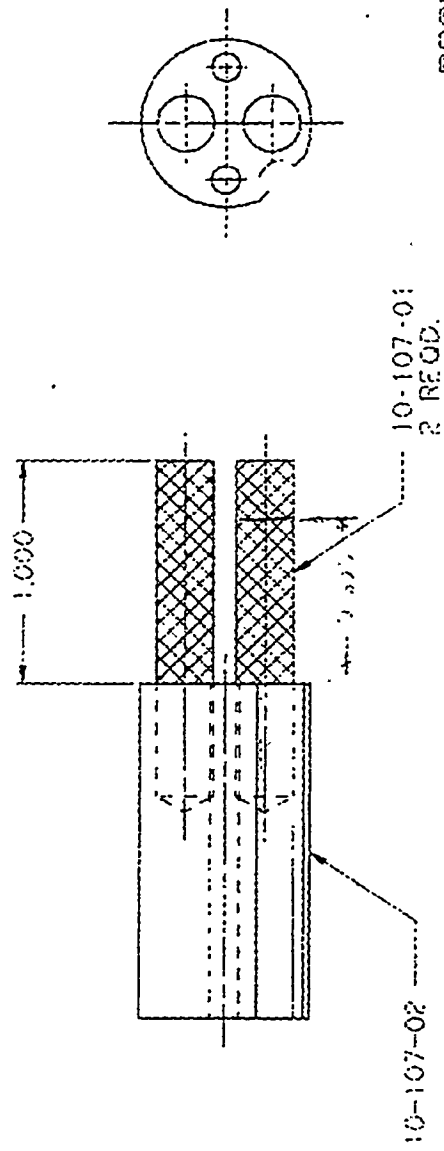


MECHANICAL PROPERTIES		PMIC	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	CONTRACT NUMBER 931104	 SENSE BASE SIZE 240.000 C 10-10-01 SHEET 1 OF 1
15			THICKNESS ON	CONTRACTOR	
12			7 PLACE	COMPAD	
612			*.03	*.005	
30A			MATERIAL: 2024 AL ALLOY	DATE OF 11/10/93 DESIGN# DESIGN APPROVAL DESIGN APPROVAL	
401			MATERIAL ENGR		
401			NEXT ASSEMBLY USED ON APPLICATION		

REVISIONS		
ZONE	LIST	DATE
		APPROVED

NOTES:

1. APPLY #470 LOCTITE PER MANUFACTURER'S INSTRUCTIONS PRIOR TO INSERTING PINS IN MOUNT.



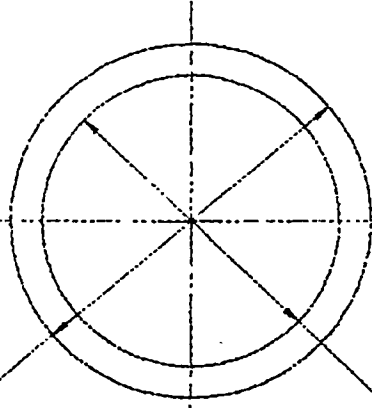
PROPERTY
 1993 (C) COPYRIGHT COMPAD, INC.
 4418 115 HWY 41 N.
 APOLLO BLANCH FL 33572
 (813) 645-3706

MECHANICAL PROPERTIES	PMIC	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE $\pm .03$ $\pm .005$	CONTRACT NUMBER 931104 CONTRACTOR COMPAD	DRAWN BY G.W.S. CHECKER DATE 11/23/93 ENGINEER DRAWING APPROVAL DESIGN APPROVAL	CSi Precision Engineering 18850 US 9 NORTH, #500 CRYSTALWATER, FL 34624 (813) 530-3889
	YP TS EL2 RA BH RH				
NEXT ASSY USED ON APPLICATION		MAIL ENCL		SIZE B CAGE CODE SCALE 2/1 UNIT WT 5-4FT 1 OF 1	ELEMENT MOUNT ASSY. 10-107-00

REVISIONS		DATE	APPROVED
ZONE	DESCRIPTION		

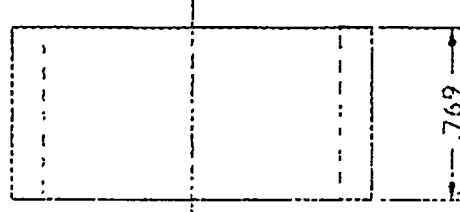
φ 1.595 +.000
-001

--A--



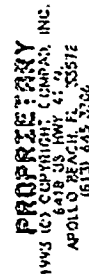
φ 1.313 +.001
-000

φ .0005 @ 1 A



PROPRIETARY
1993 © COMPAGNAT COMPAS INC.
6416 US HWY 41 N
APOLO BEACH, FL 33512
813 645-3705

MECHANICAL PROPERTIES	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		CONTRACT NUMBER 931104		18950 US 19 HIGHWAY 4500 CLEARWATER, FL 34624 (813) 530-3863
	TOLERANCES ON 2 PLACE 3 PLACE ± .03 ± .005		CONTRACTOR COMPAS		
TS	MATERIAL: MICA		DRAWN BY G.W.S.	DATE 11/12/93	INSULATOR
HA	NEMA GRADE 1		CHECKER	ENGINEER	
BH	NEXT ASSY		DRAWING APPROVAL		SIZE B
RH	USED ON		DESIGN APPROVAL		CAGE CODE
	APPLICATION				10-202-01
			MATERIAL ENGR		SCALE 2/1
					UNIT WT
					SHEET 1 OF 1

[illegible]

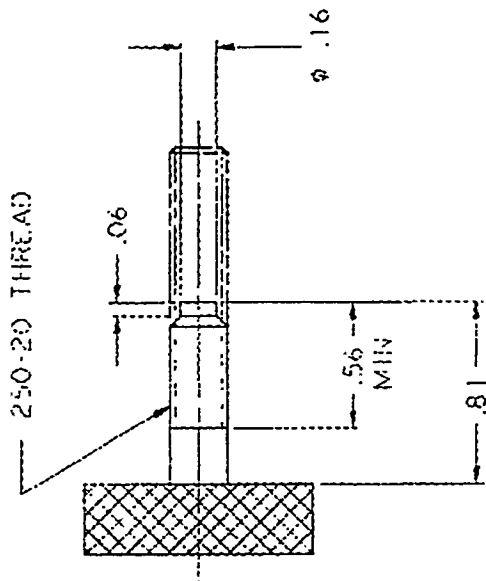
REVISIONS			DATE	APPROVED
ZONE	INTR	DESCRIPTION		

NOTES:

1. MAKE FROM:
 PART NO. 43904
 JERGENS, INC.
 19520 NOTTINGHAM ROAD
 CLEVELAND, OHIO 44110
 (216) 486-2100

OR:
 PART NO. KHS-2S
 REID TOOL SUPPLY CO.
 2265 BLACK CREEK ROAD
 MUSKEGON, MI 49444
 1-800-253-0421

OR EQUIVALENT.



PROPERTY
 1991 COPYRIGHT COMPAD, INC.
 6418 US HWY 41 N
 APOLEON BEACH, FL 33572
 (813) 645-3706

MECHANICAL PROPERTIES		PMIC	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		CONTRACT NUMBER	Precision Engineering		10850 US 9 NORTH, #500 CLEARWATER, FL 34624 (813) 530-3889	
YP			TOLERANCES ON		931104	CONTRACTOR		THUMB SCREW	
TS			2 PLACE 3 PLACE			COMPAD			
EL2			± .03 ± .005			DRAWN BY		SIZE CAGE CODE	
BP			MATERIAL: SEE NOTE 1			G.W.S.		B	
BH						CHECKER		10-203-01	
RH						DATE		SCALE 2/1	
						11/12/93		UNIT WT	
						ENGINEER		SHEET 1 OF 1	
						DRAWING APPROVAL			
						DESIGN APPROVAL			
						MATERIAL ENGR			
						USED ON			
						APPLICATION			

COMPAD, Inc.

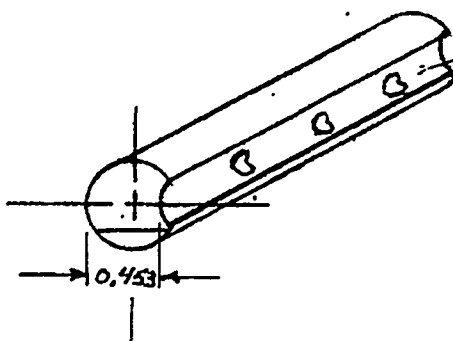
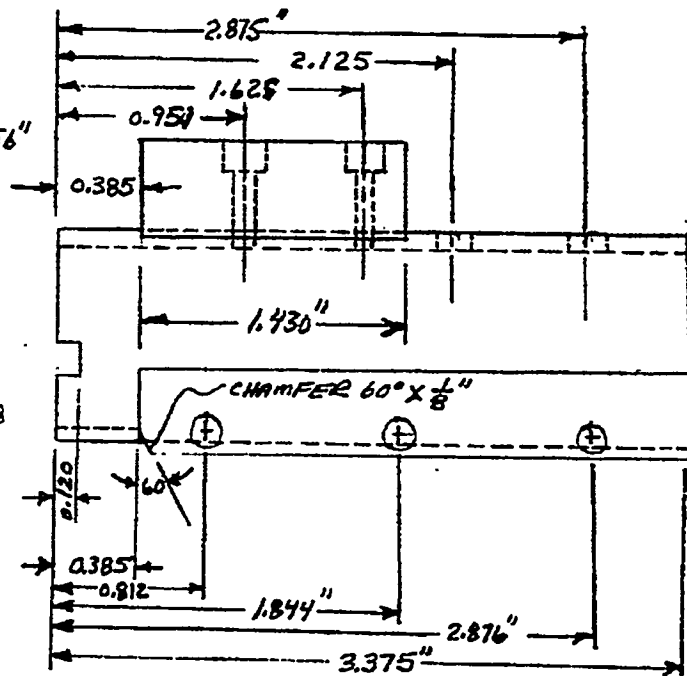
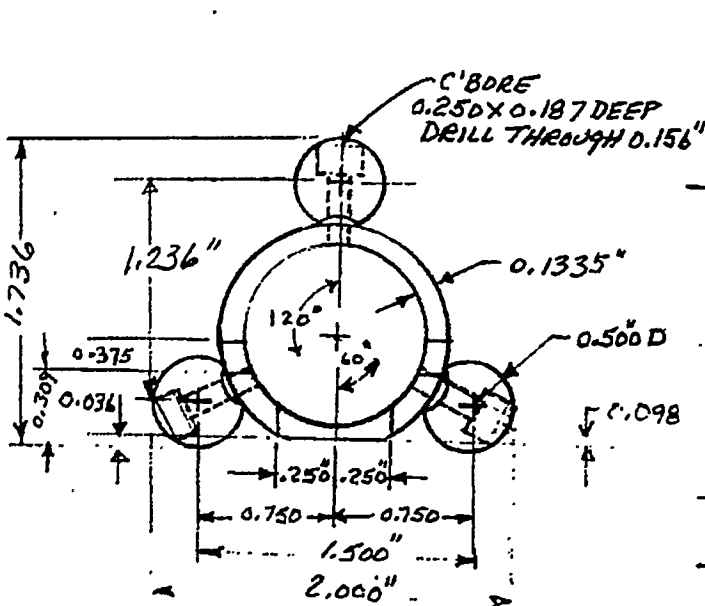
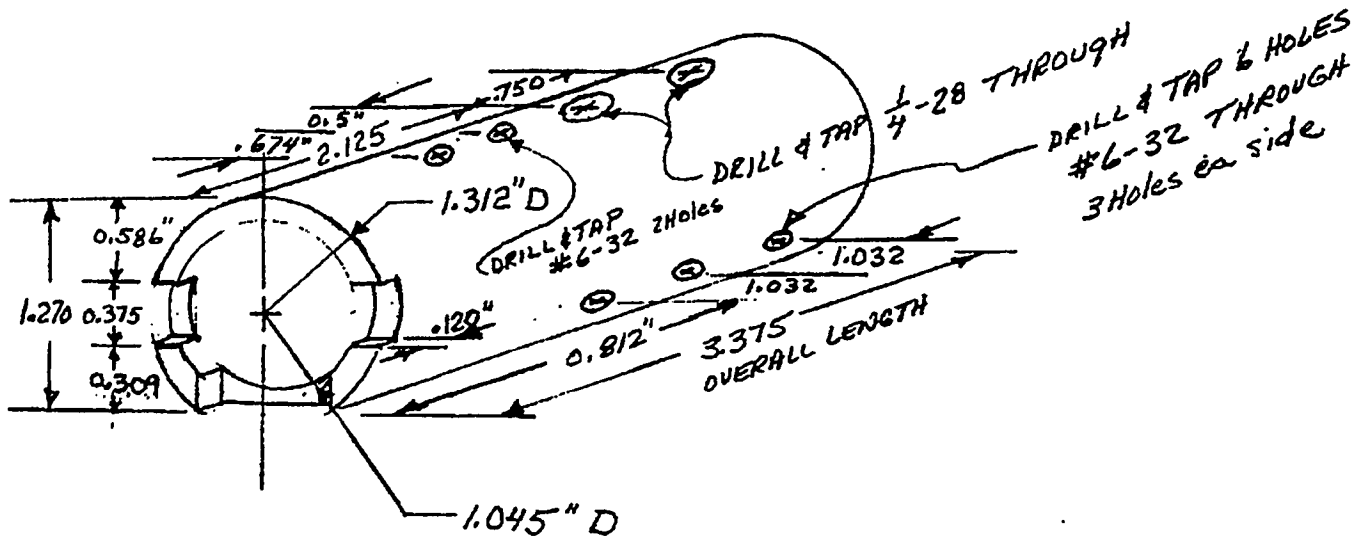
136 Hardwood Dr.
Valrico, FL 33594

Tele & Fax 813-654-3823
Pager 800-535-1135

DOE PROJECT 353

PRELIMINARY SENSOR DRAWINGS

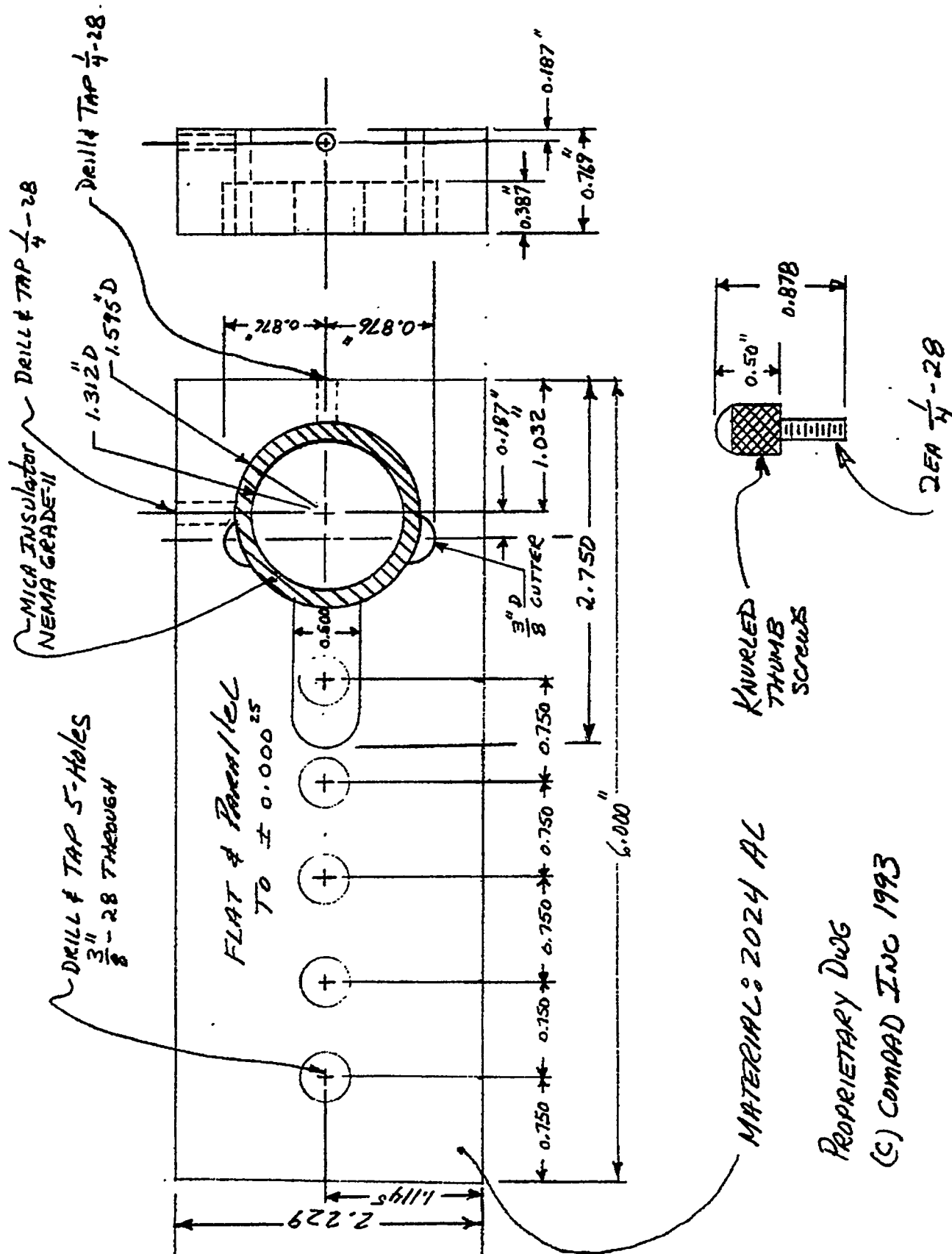
PRELIMINARY SENSOR SKETCHES

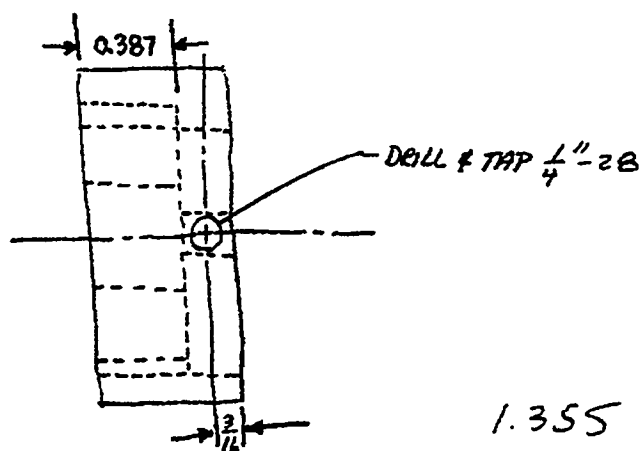


CUT w/ 0.375" BALL MILL 0.047" DEEP

COPYRIGHT COMPAD, INC 1993

PROPRIETARY SKETCH
SENSOR HOLDER





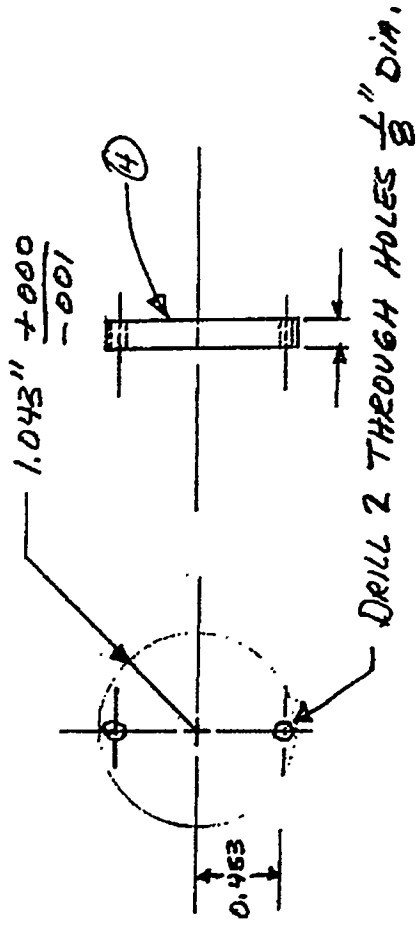
SECTION A-A

$$\begin{array}{r} 1.355 \\ 1.032 \\ \hline .323 \\ .161 \end{array}$$

COMPA VINC.
R.V. FIELDER
800-221-6557
813-645-3706

END COVE.

PROPRIETARY DWG 1 OF 4

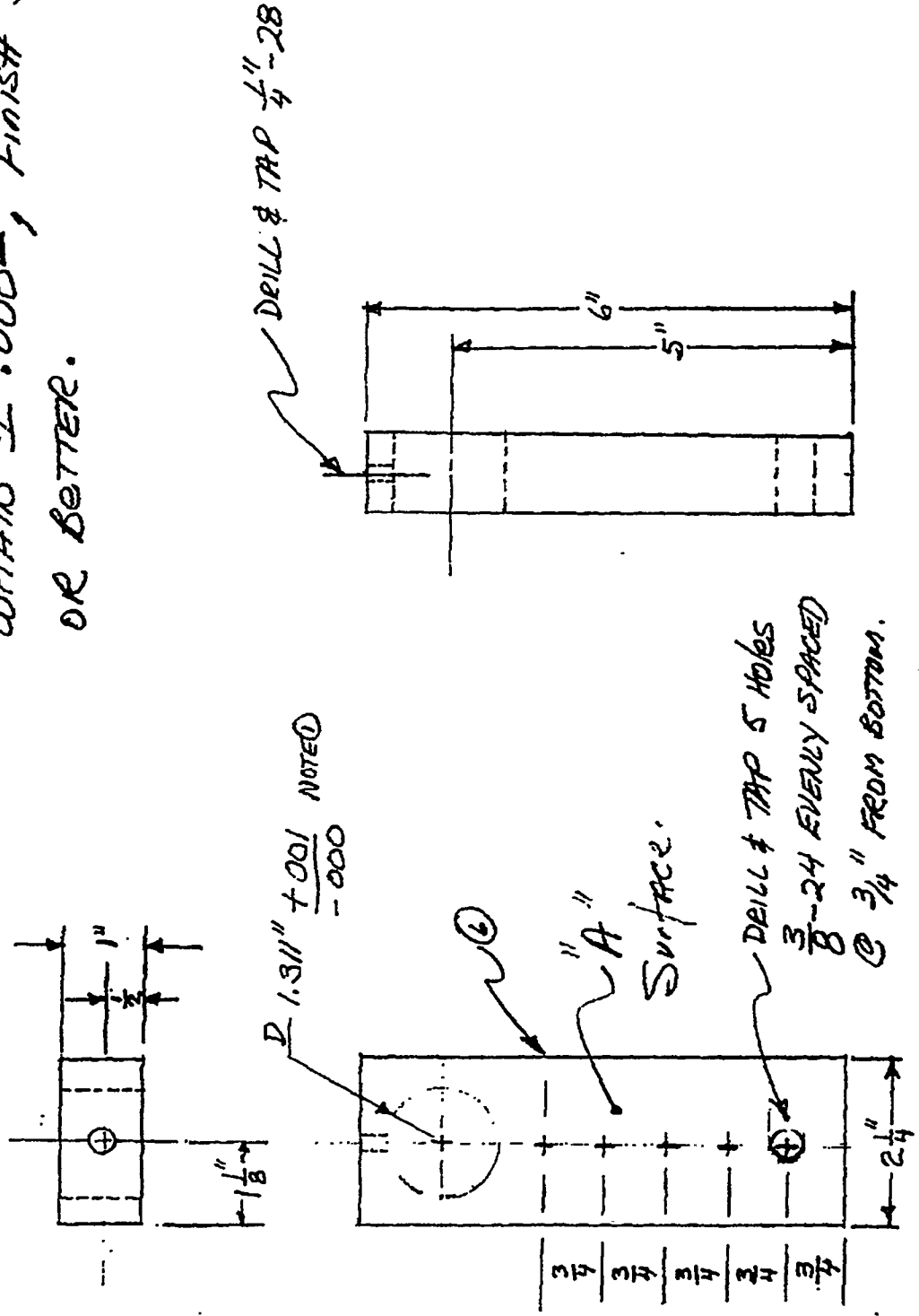


NOT TO SCALE

- NOTE ① QUANTITY REQUIRED - 2 EA, MAKE FROM ALUMINUM
② ALL SURFACES TO BE CHAMFERED, DEBURRED & FINISHED
TO $\sqrt{62}$ FINISH ON OUTSIDE SURFACES.

11-2790

GENERAL NOTE: ALL SURFACES TO BE CHAMFERED & DEBURRED
SURFACE "A" MUST BE FLAT & PARALLEL
WITHIN $\pm .00025"$, FINISH 32
OR BETTER.



NOTE D 1.311" HOLE MUST BE BORED PERPENDICULAR & SQUARE
TO SURFACE "A" WITHIN $.0002$ DEGREES.

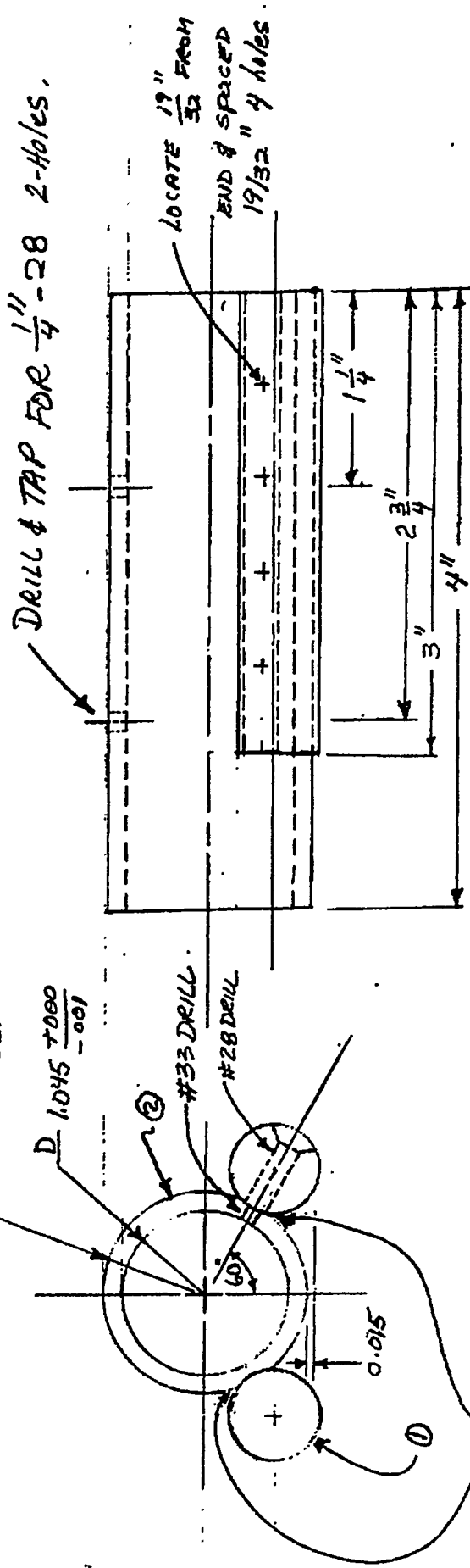
COMPARING
K.V. FIEDLER

PROPRIETARY DWG

4 OF 4

D 1.310 $\pm .001$
- .001

D 1.045 $\pm .000$
- .001



MILL 2 SLOTS $\frac{1}{32}$ " DEEP WITH $\frac{1}{2}$ " BALL END MILL IN PART ②.

DRILL & TAP PART ① FOR 4 SCREWS #6-40, COUNTER SINK 82° ANGLE, TAP DRILL #33. DRILL HOLE WITH #28 IN PART ①. PROVIDE 8 #6-40 SCREWS.

NOTES ① ALL PARTS TO BE POLISHED TO BETTER THAN

63 FINISH, ALL PARTS CHAMFERED $\frac{1}{32}$ " & DEBURRED.

NOT TO SCALE

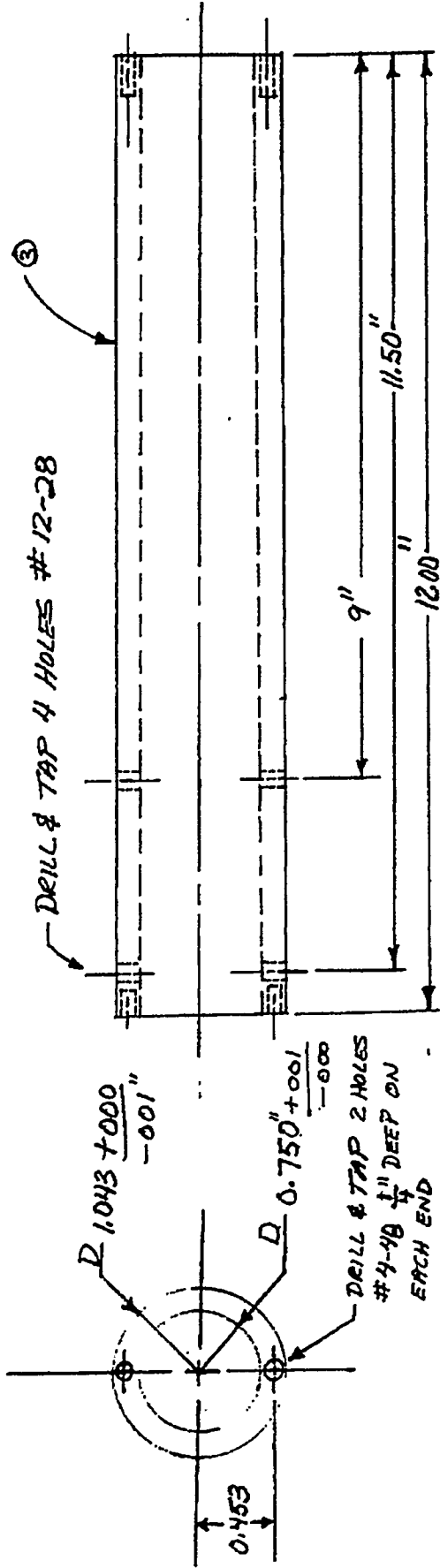
② PART ① MADE FROM $\frac{1}{2}$ " DRILL ROD. X 4" LONG

③ PART ② MADE FROM 1" SCH 40 STEEL PIPE (SEAMLESS) OR BAR STOCK.

④ QUANTITY REQ'D 1EA

⑤ FINISH BORE 1.045" DIMENSION AFTER WELDING IS COMPLETE

⑥ ALL PARTS TO BE DIMENSIONED WITHIN $\pm .001$ ON 4" LENGTH. IT-2, 1-90



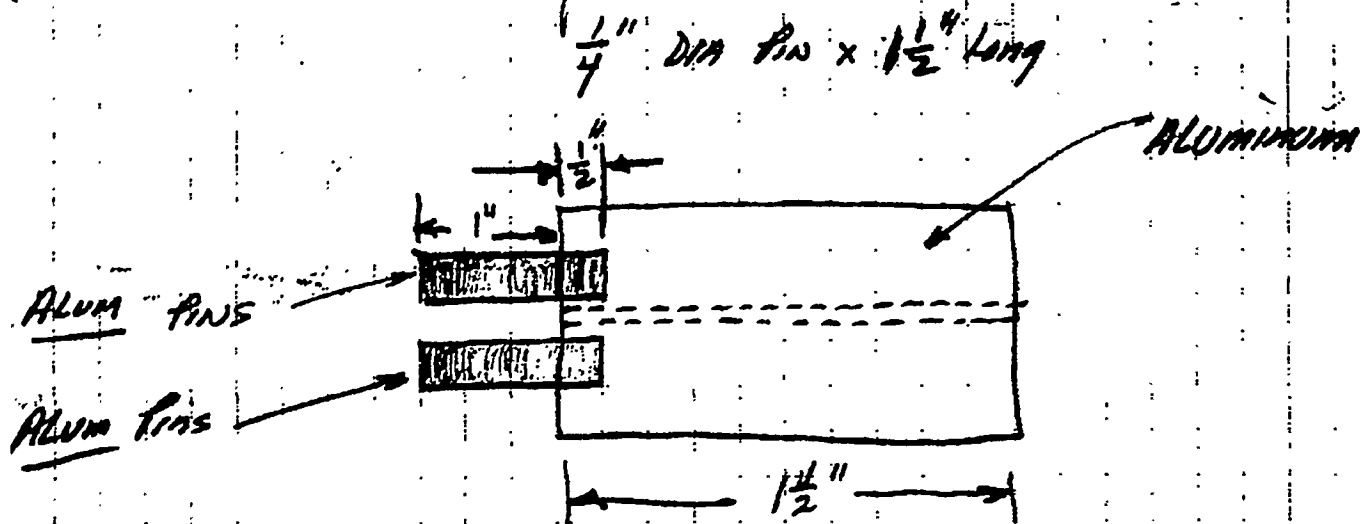
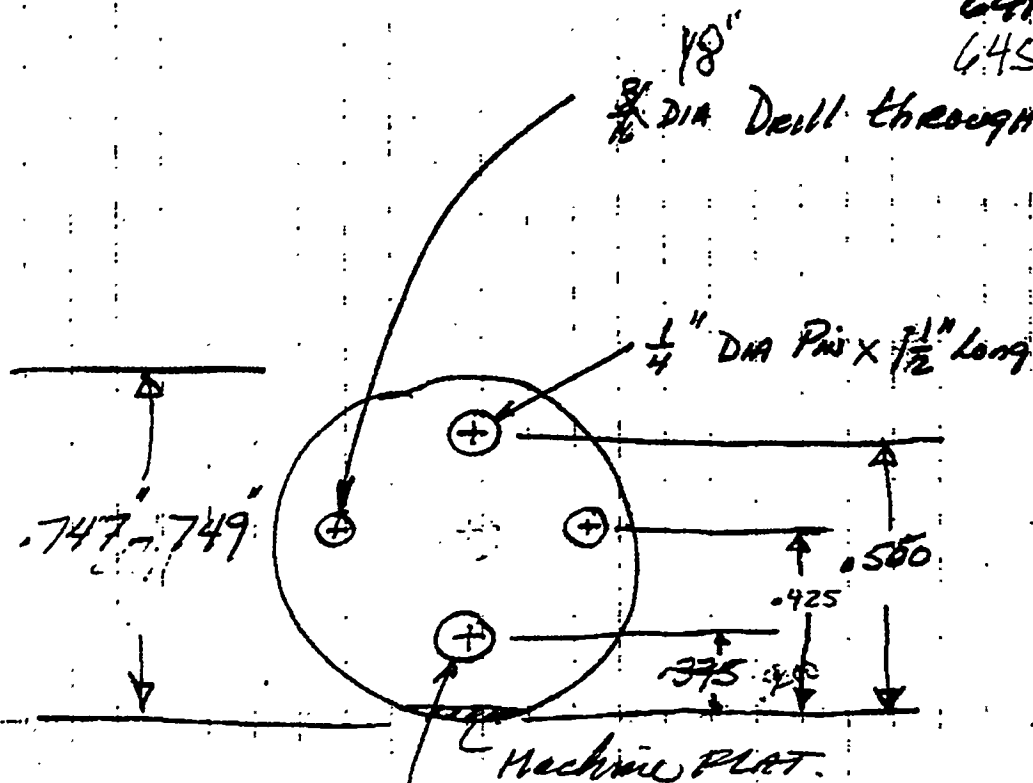
NOT TO SCALE

QUANTITY REQUIRED 1EA

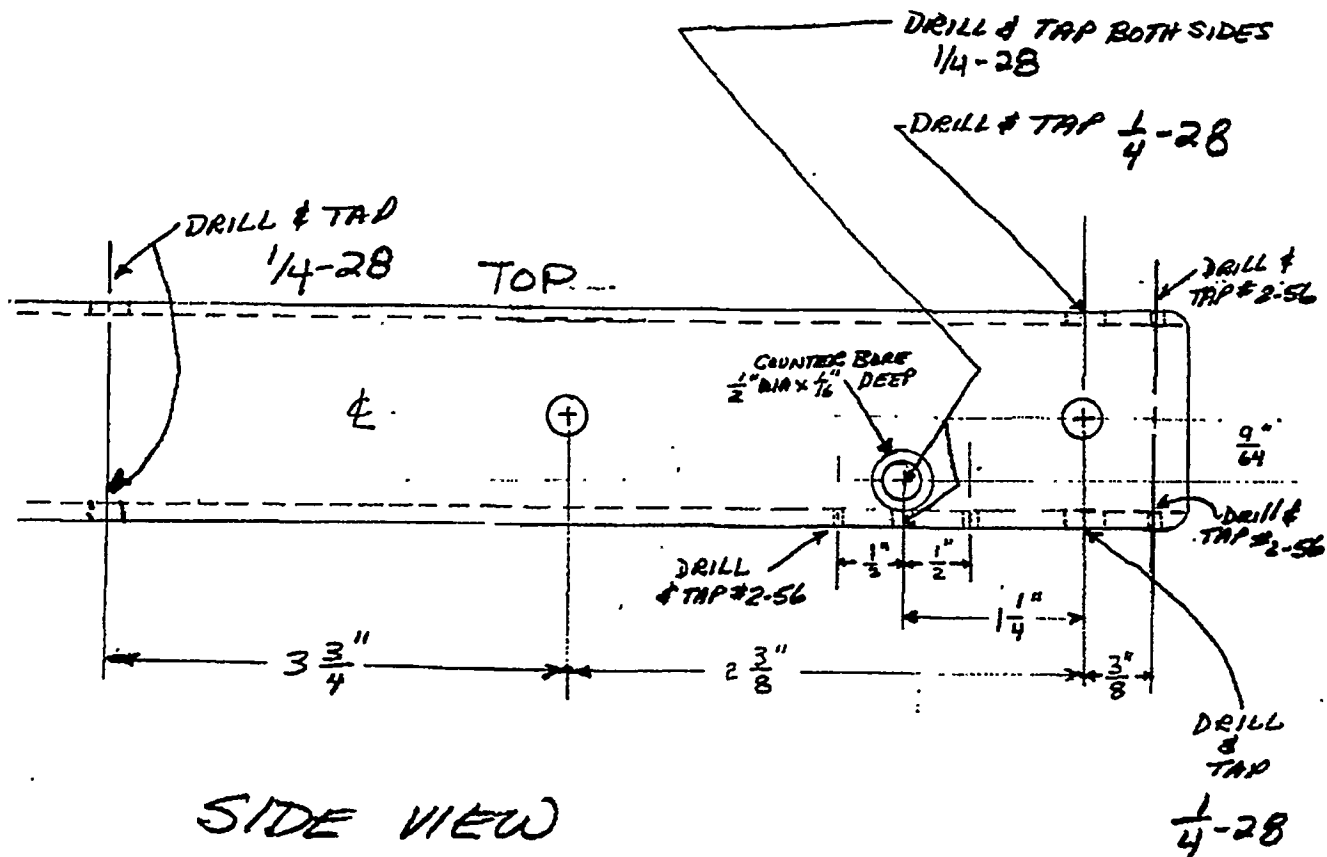
- NOTES
- ① MAKE PART FROM $\frac{3}{4}$ " -SCH 40 STEEL SEAMLESS PIPE
 - ② POLISH ALL EXTERIOR SURFACES TO $60\sqrt{\text{FINISH}}$ OR BETTER
 - ③ ALL EDGES AND CORNERS MUST HAVE $\frac{1}{32}$ " CHAMFER & DEBURRED.
 - ④ ID & OD OF PART MUST BE PARALLEL & CONCENTRIC WITH $\pm .001$ OVER THE ENTIRE LENGTH OF 12" LENGTH

11-27-90

KEN FIELD
641-2030. Office.
645-3706 Home

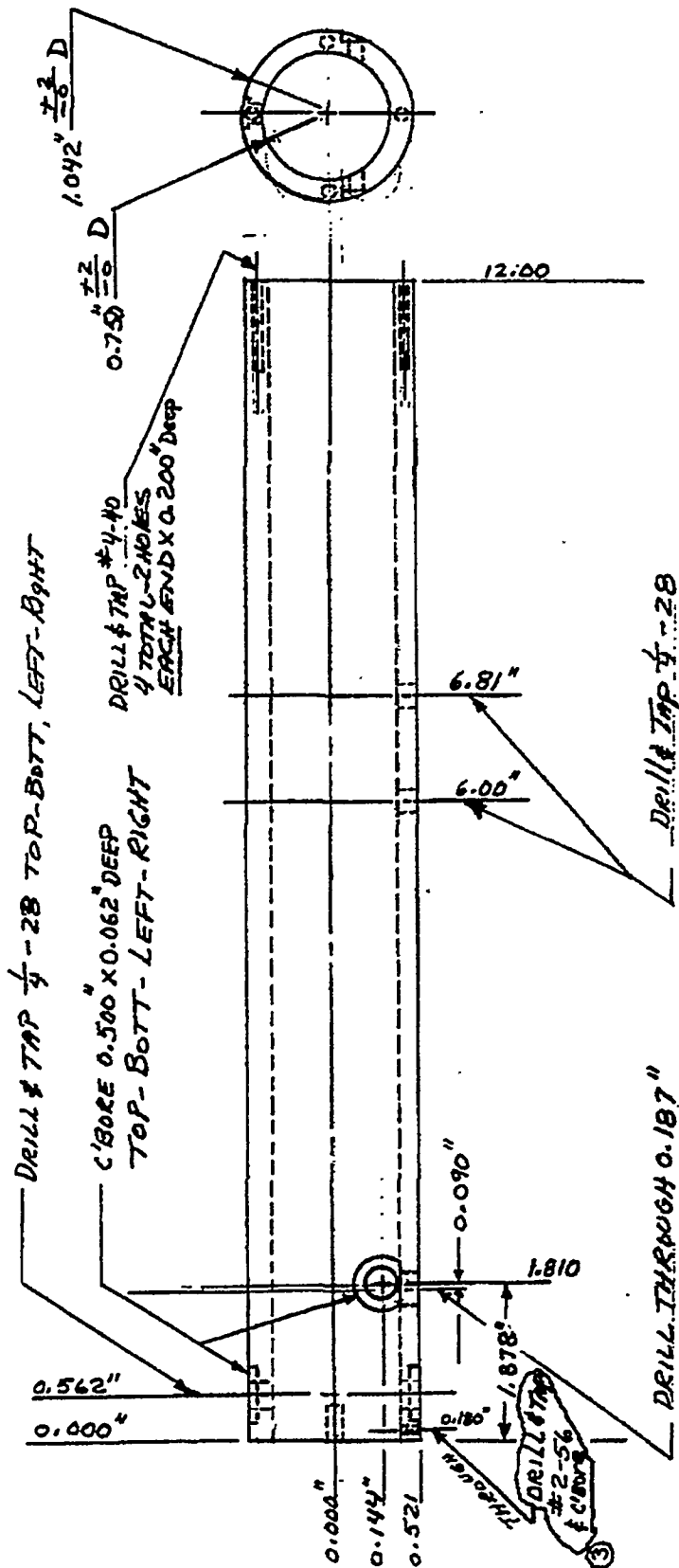


CHK 1042
\$ 100.25

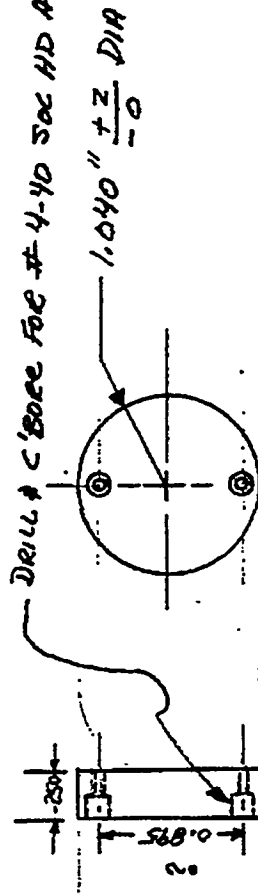


14/11

CUSTOMER:	SCALE:	TITLE:
COMPAD, INC.	DATE: 6/5/92	DRN BY: KUJ
		813-641-2030



DRILL & TAP #4-40 SOC HD ALLEN SCREWS



SENSOR TUBE END COVERS (2ea)

NOTE: ALL PARTS MADE FROM 2024 AL
ALL FINISHES 32μ OR BETTER.

DRILL & TAP FOR #2-56 SOC HD ALLEN SCREW C'BORE TO ACCOMMODATE

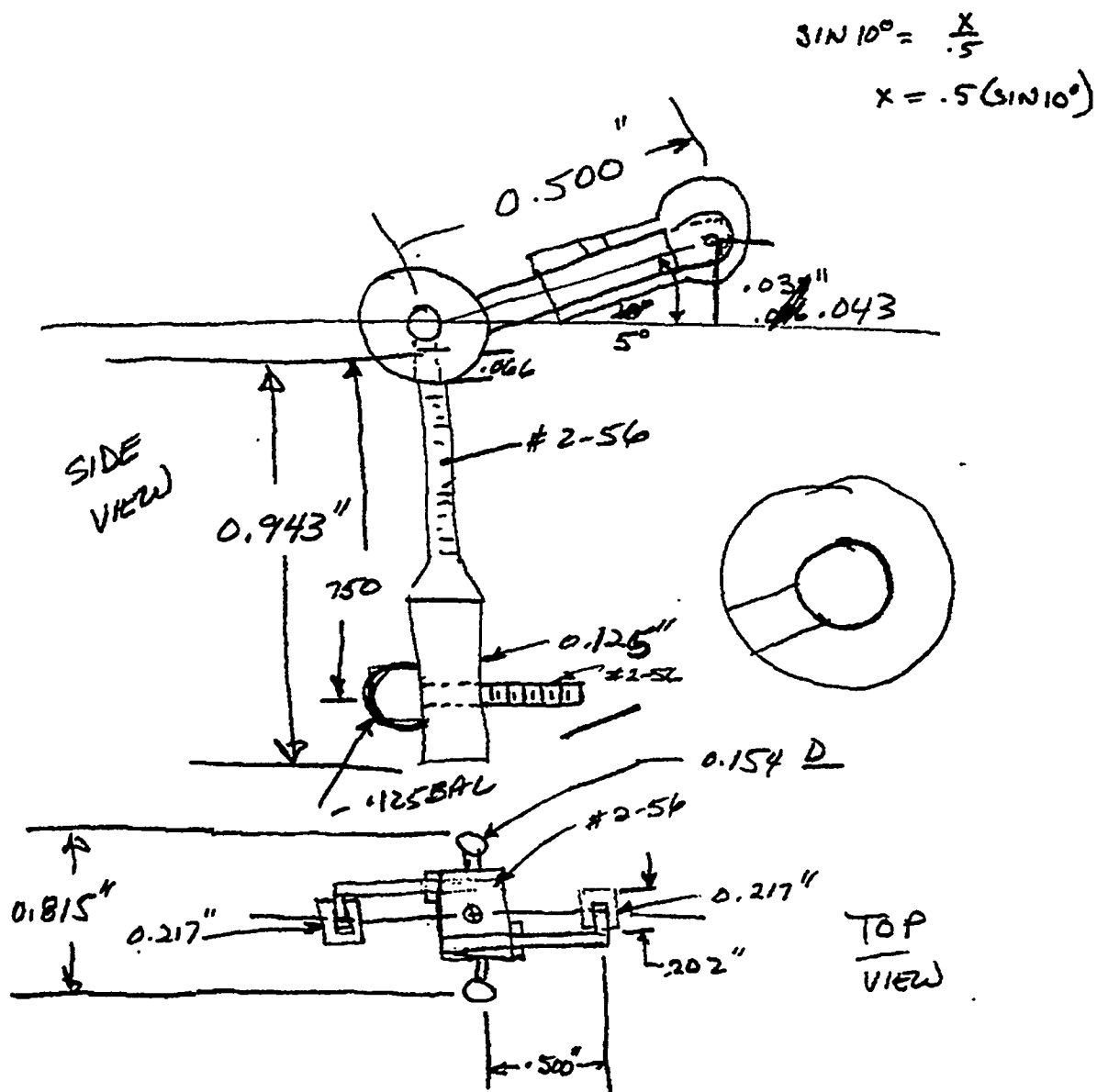
PROPRIETARY DWG. SENSOR TUBE
(C) COPYRIGHT COMPAD INC 1993
DWG
NTS

Q

COMPAD INC

6418 US HWY 41N. STE 205
APOLLO BEACH, FL 33572

813-645-3706 TELE
813-645-3706 FAX

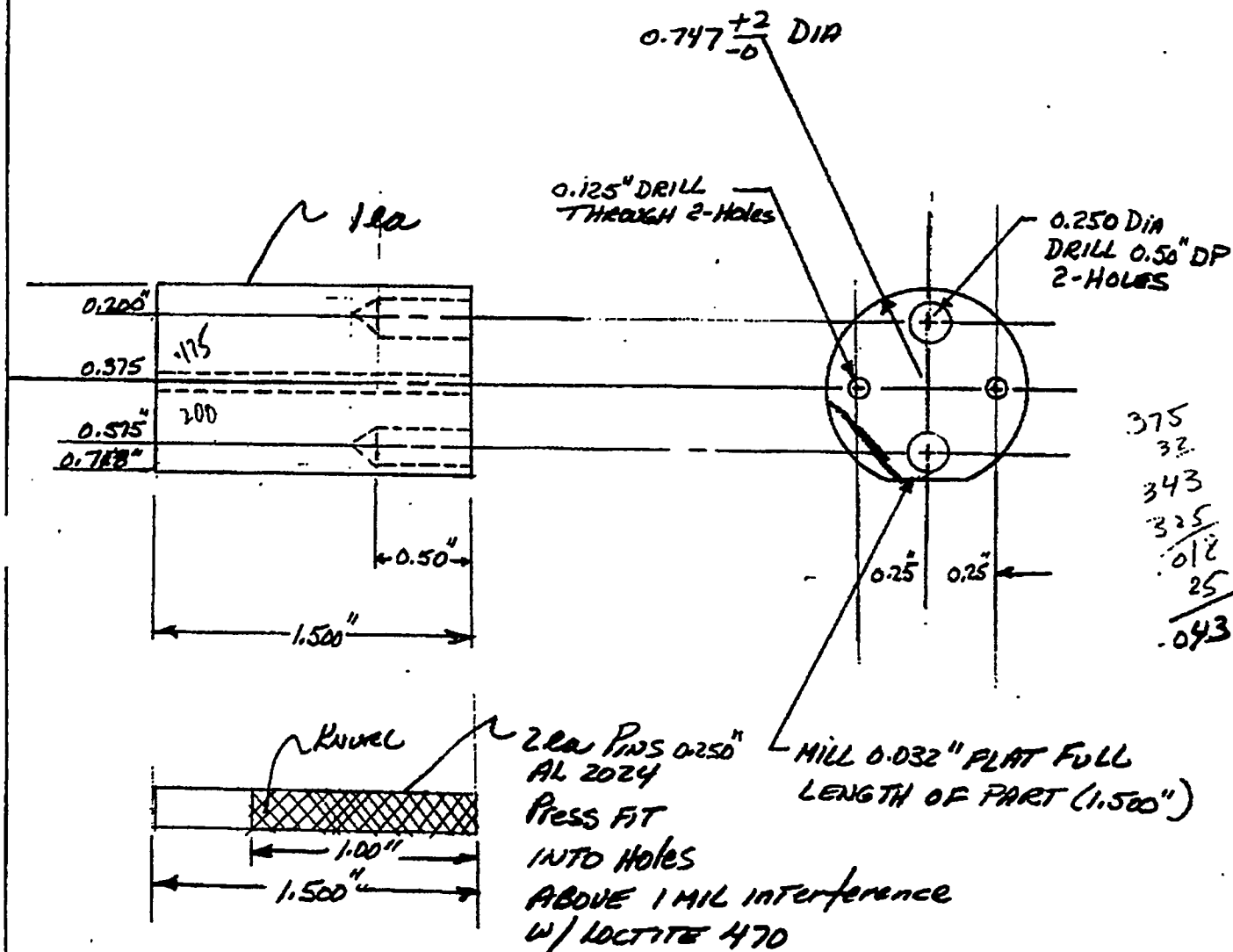


TURBINE INSPECTIONS 0 COMPUTER ALIGNMENT 0 OEM TRAINED ENGINEERS 0 CONTROLS 0 STARTUPS 0 BALANCING
GENERATOR TESTING 0 STEAM PATH EVALUATIONS 0 PROJECT MANAGEMENT

BOTTOM VIEW

GENERATOR TESTING & STEAM PATH EVALUATIONS - PROJECTS IN PROGRESS

(a)

COMPAD INC6418 US HWY 41N. STE 205
APOLLO BEACH, FL 33572813-645-3706 TELE
813-645-3706 FAX

TITLE: ELEMENT MOUNT & PINS

MTL: 2024 AL ALLOY

FINISH: 32 ✓

NOTE:

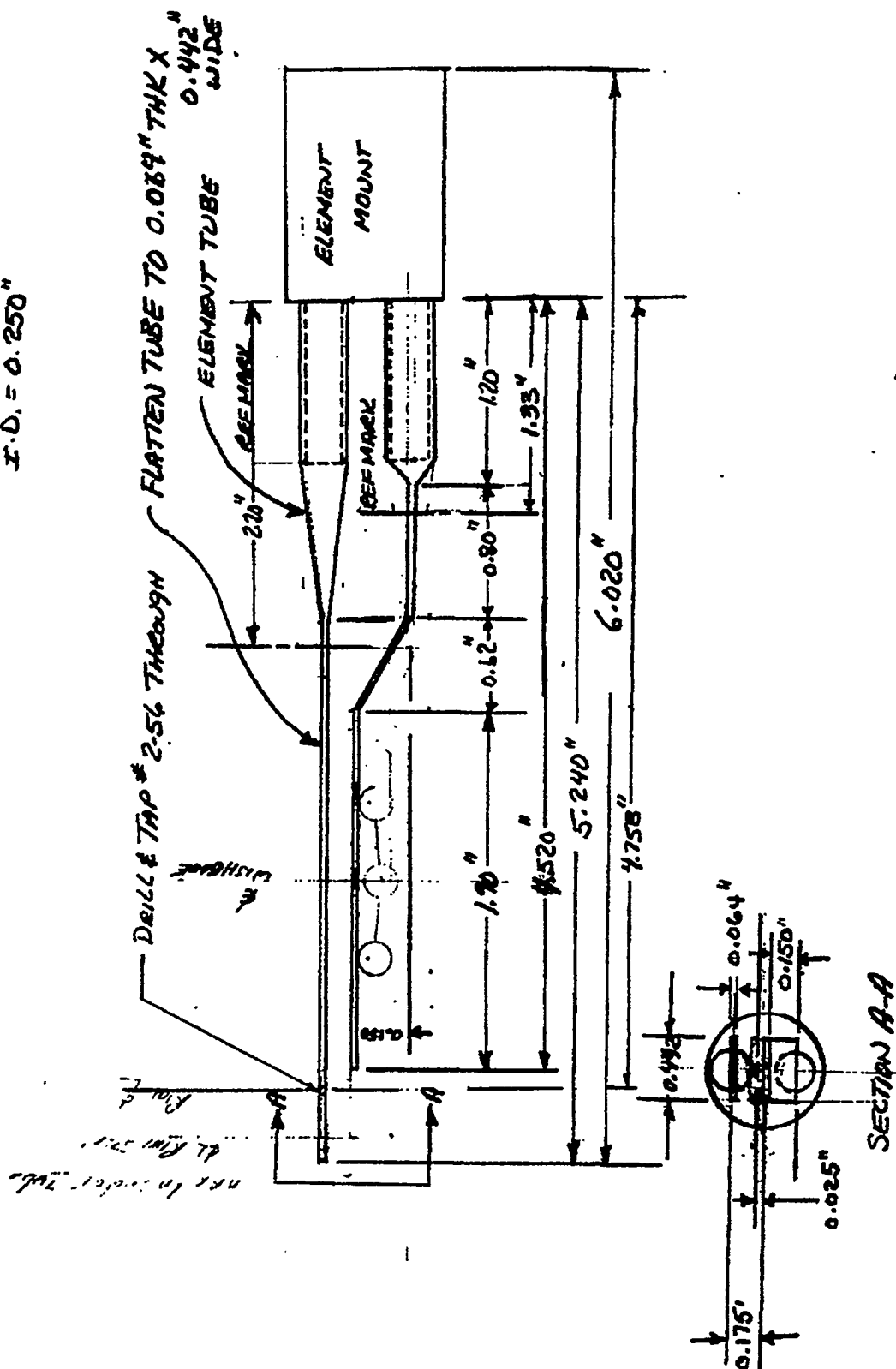
1993(C) COPYRIGHT COMPAD, INC PROPRIETARY SKETCH

11-19-93

TURBINE INSPECTIONS 0 COMPUTER ALIGNMENT 0 OEM TRAINED ENGINEERS 0 CONTROLS 0 STARTUPS 0 BALANCING

GENERATOR TESTING 0 STEAM PATH EVALUATIONS 0 PROJECT MANAGEMENT

**DIMENSIONS
ELEMENT TUBE**
O.D. = 0.282
I.D. = 0.250"



PROPRIETARY DWG

TIME: SENSOR ELEMENT & MOUNT.
(C) COOPERLIGHT COMPAD, INC 1993

COMPAD, Inc.

136 Hardwood Dr.
Valrico, FL 33594

Tele & Fax 813-654-3823
Pager 800-535-1135

DOE PROJECT 353

FRONT AND REAR PRODUCTION PANELS FOR TAMS UNIT

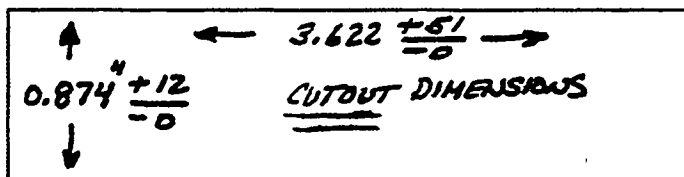
0.224" D

COMPAD INC

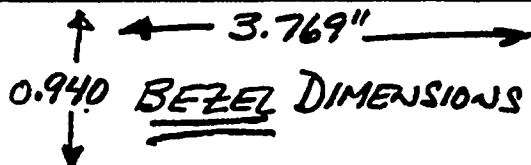
MODEL 934

0.224" D

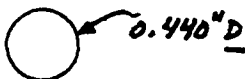
TAMS - TRUELINE AUTOMATED MEASUREMENT SYSTEM



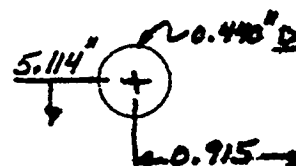
METER ON/OFF



SENSOR ADJUST
COARSE

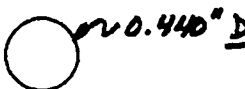


SENSOR ADJUST
FINE



RIM ALIGNMENT

FACE ALIGNMENT

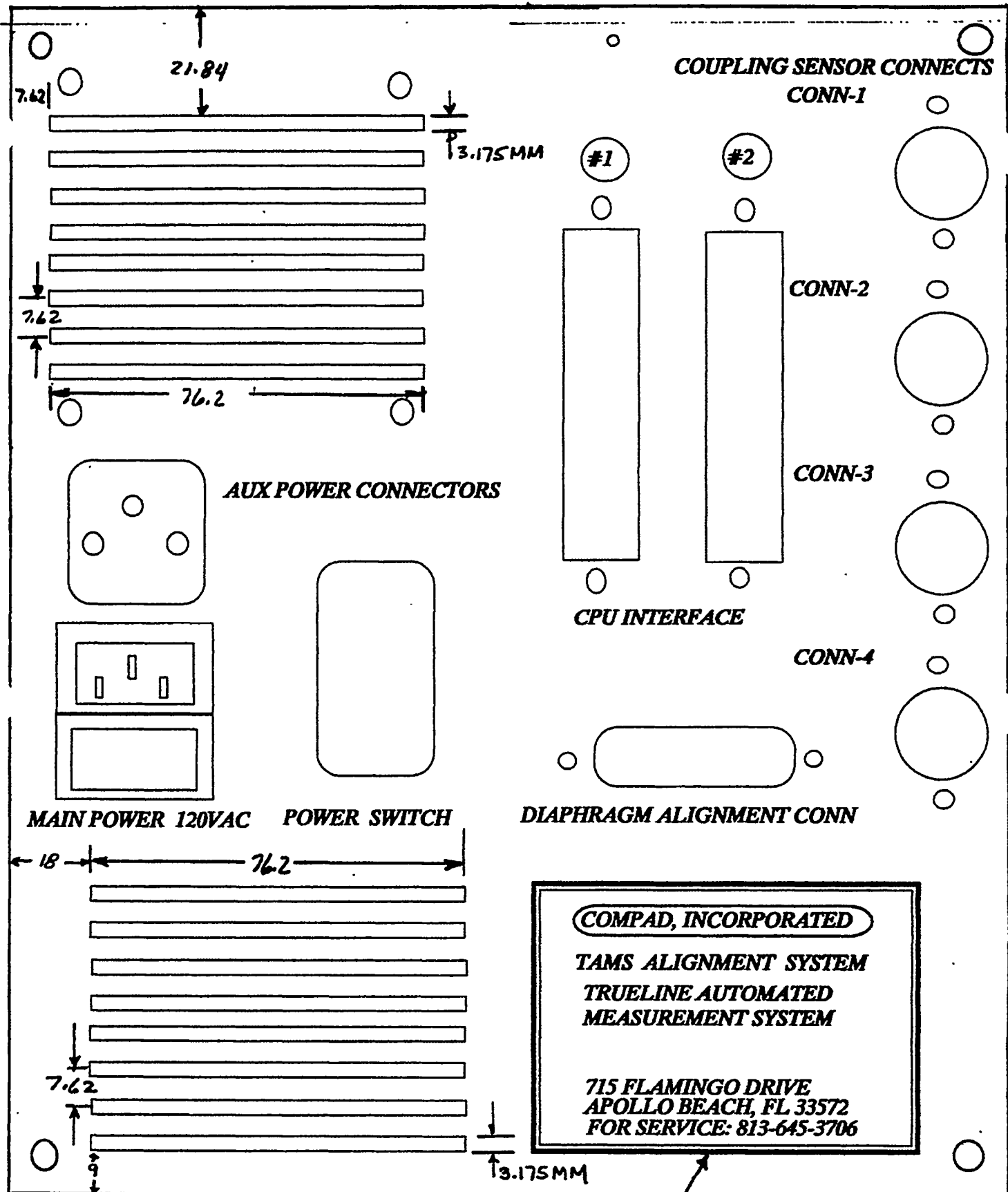


METER ON/OFF



0.224" D

7.250"
(7.930")



CARL MAGNUSON

12-6-93

NOTE: CHANGES MADE Added SQUARE PATTERN FAN INTAKE & EXHAUST.
 ALSO Added COMPAD, INC etc.
 ALL OTHER DIMENSION TO PREVIOUS DRAWING SENT. K.U.F.

COMPAD, Inc.

136 Hardwood Dr.
Valrico, FL 33594

Tele & Fax 813-654-3823
Pager 800-535-1135

DOE PROJECT 353

SENSOR CALIBRATION PROCEDURE

COMPAD, INC. (PROPREITARY)

DATE: 2-9-95

SUBJECT: SENSOR CALIBRATION PROCEDURE

1) TURN COMPUTER & TAMS UNIT ON AND LET THEM WARM UP UNTIL MINIMUM DRIFT IS MAINTAINED

2) EXIT TAMS SOFTWARE TO TAMS DIRECTORY.

SENSOR CALIBRATION PROGRAM IS CALLED CALIB.EXE

TO START CALIBRATION OF THE PROBE PROCEED WITH-

(A) C:\TAMS> CALIB.EXE (ENTER)

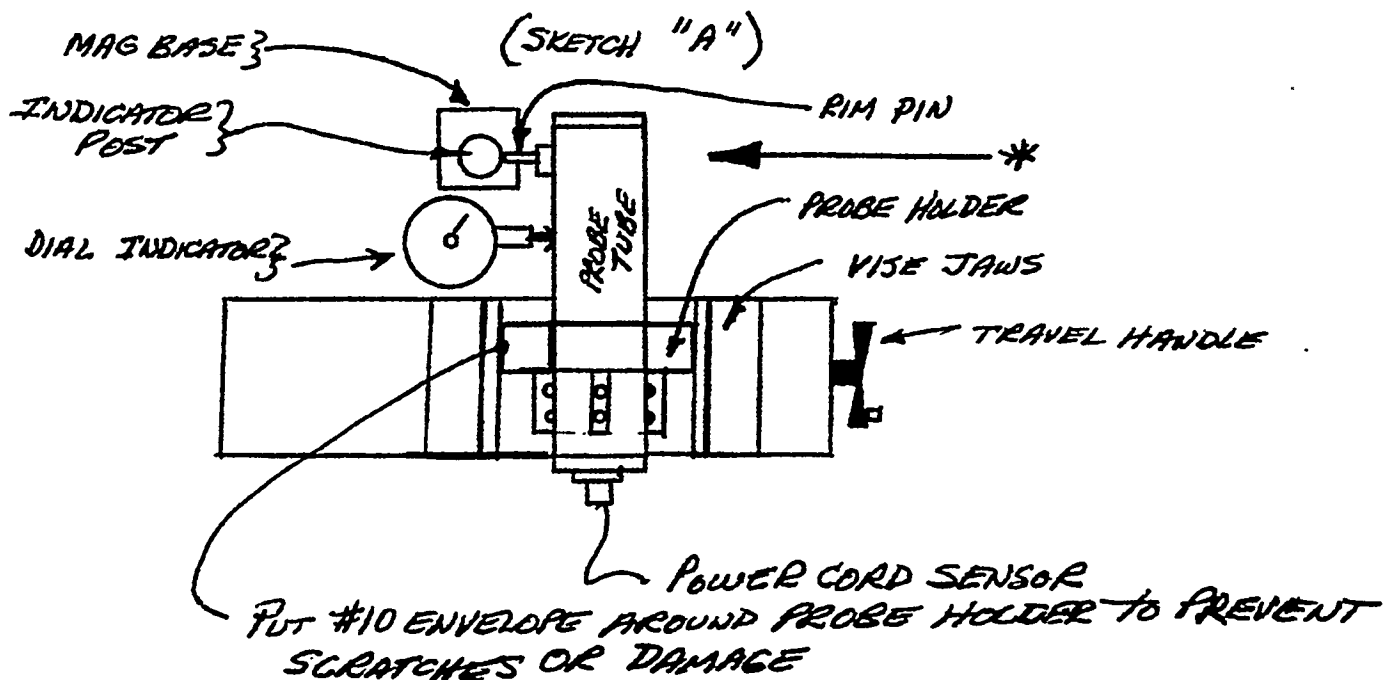
(B) SELECT CALIBRATION OF RIM OR FACE.

(C) SET SENSOR IN THE 2 WAY (AXIS) VISE AS SHOWN IN SKETCH "A" AND MOVE SENSOR TOWARD POST *

UNTIL IT JUST TOUCHES THE POST, SET METER

OUTPUT TO +49.0 MILS, LOCK FRICTION GRIP ON

■ ADJUSTMENT KNOB.

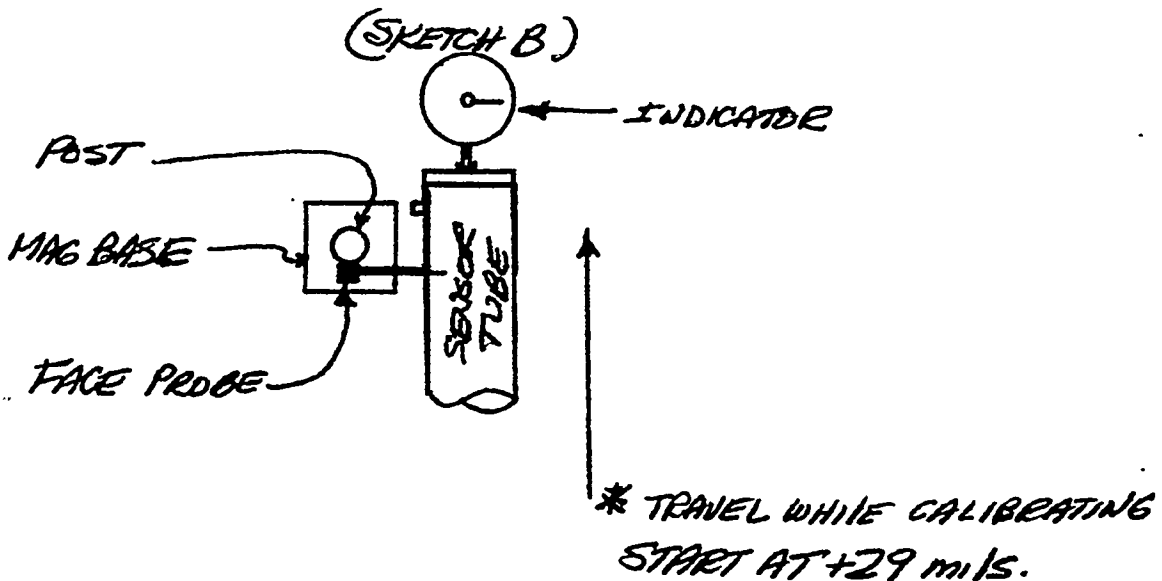


(PROPRIETARY)

PROBE CALIBRATION CONT. -

PAGE
#2

- d) Now Press ENTER ON THE KEYBOARD - THE FIRST VALUE WILL BE RECORDED IN THE CALIBRATION TABLE.
- e) ADVANCE PROBE TOWARD POST 1 mil @ A TIME ON THE INDICATOR & HIT ENTER UNTIL YOU HAVE DONE ALL POSITIONS.
- f) NEXT PERFORM FACE CALIBRATION IN A SIMILAR MANNER. (SKETCH B)



NOTE: WHEN CALIBRATING (PIM) INDICATOR WILL RUN OUT #1 OF TRAVEL AND MUST BE RESET DURING CALIBRATION PROCEDURE AT ABOUT 56 mils OF TRAVEL.

G) SAVE CALIBRATION FILE TO DISK.

NOTE: DO NOT OVERTIGHTEN JAWS
#2

(PROPRIETARY)

PROBE CALIBRATION CONT -

Page
#3

NOTE: DO NOT TRAVEL RIM PIN MORE THAN
#3 0.100" (100 MILS).

DO NOT TRAVEL FACE PIN MORE THAN
0.060" (60 MILS).

NOTE: BE SURE INDICATOR IS PERPENDICULAR
#4 AND PARALLEL TO THE PROBE TUBE
BEFORE CALIBRATING.

NOTE: RECORD THE BEFORE AND AFTER
#5 INITIAL STARTING MILS OR METER
READINGS. IF START & END VALUES ARE > 1 mil, ^{THEN} RECAL

NOTE: PLOT DIAL INDICATOR VS STORED VALUE
#6 IN CALIBRATION TABLE

③ CAREFULLY PACK SENSOR PROBE IN CARRYING
CASE OR BOX TO PREVENT ANY DAMAGE.

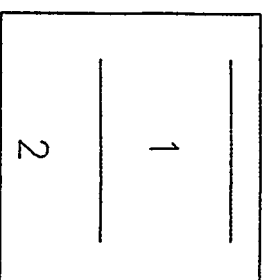
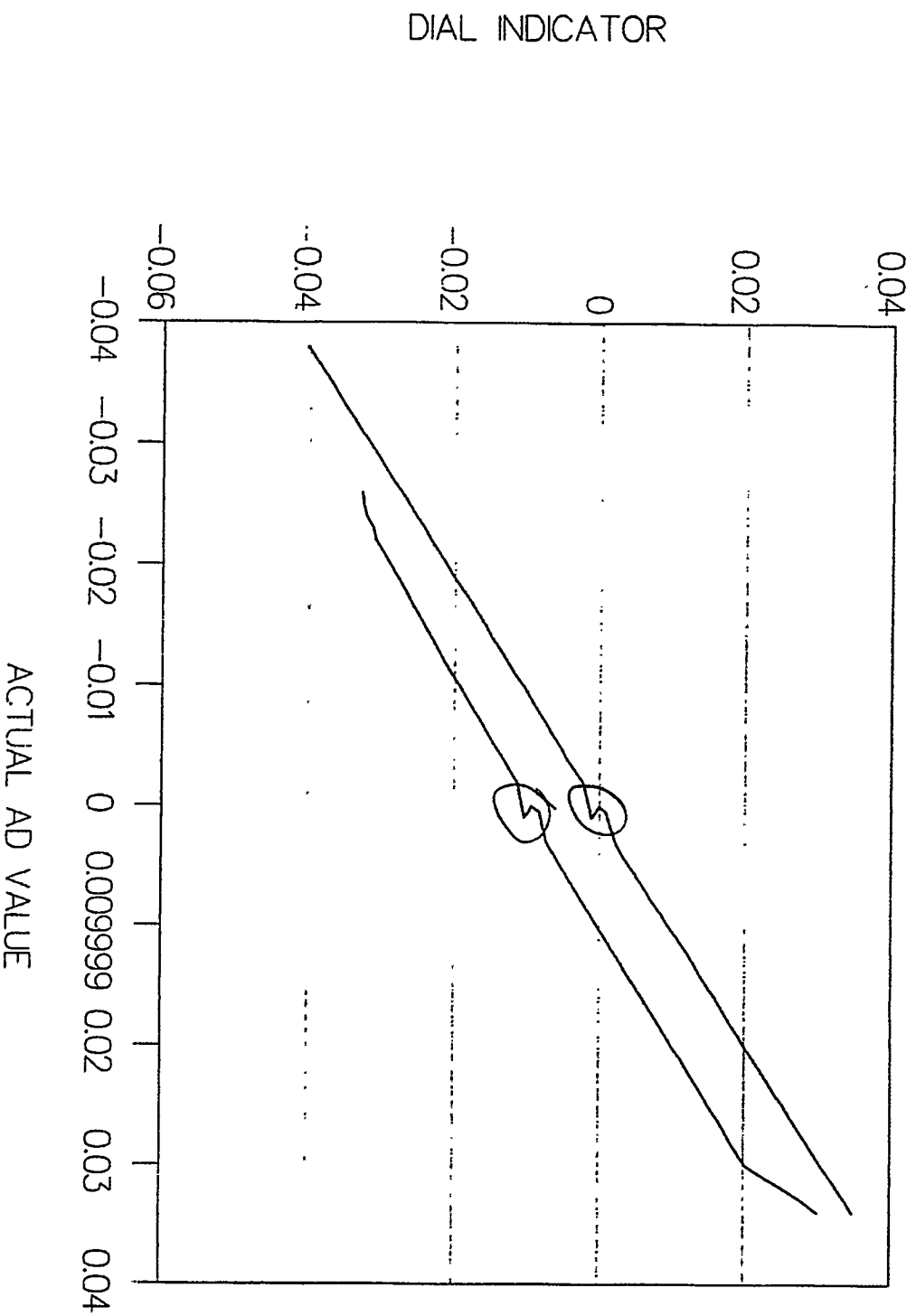
NOTE: THE TAMS DEMO UNIT STARTS
#7 CALIBRATION AT - VALUES

ie. -49 & -29 ON THE METERS.

THE SOFTWARE CAN INTERPRET THE
NEGATIVE VALUES

TAMS SENSOR CALIBRATION CURVE

SENSOR PROTOTYPE 1993



COMPAD, Inc.

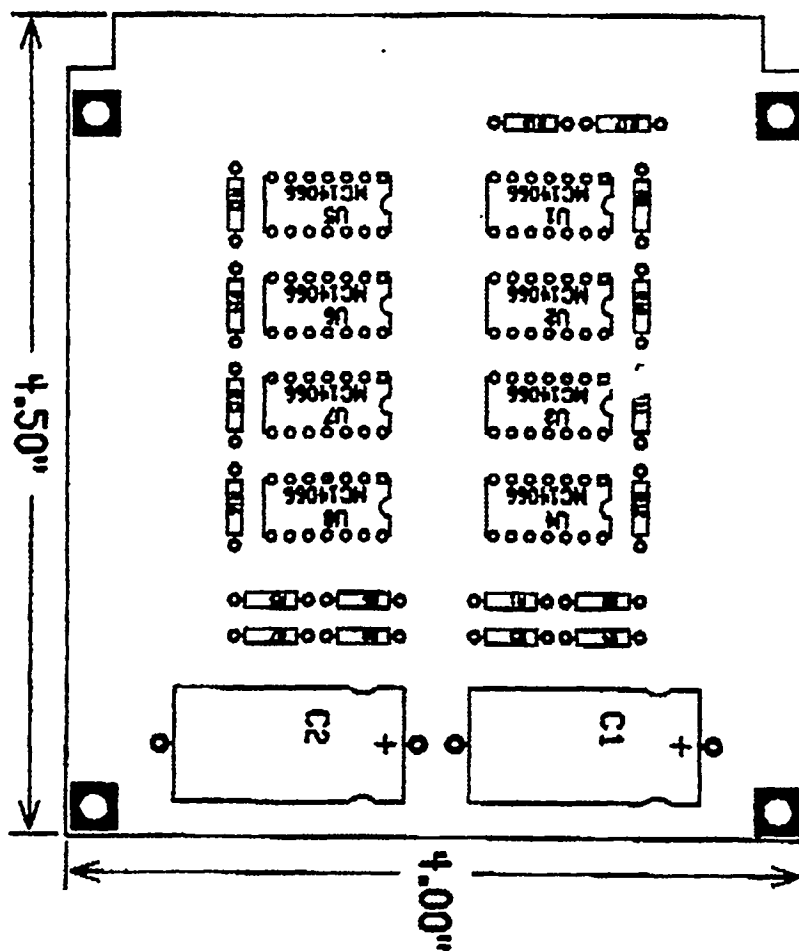
136 Hardwood Dr.
Valrico, FL 33594

Tele & Fax 813-654-3823
Pager 800-535-1135

DOE PROJECT 353

_RODUCTION CIRCUIT BOARDS AND SENSOR SKETCHE

TOP SIDE TAMS RIM & FACE MULTIPLEXER AND SIGNAL CONDITIONING BOARD



Drill tape data			
Tool	Hole	Sym	Hole
Code	Size	bol	Count

Board type: FR4
 Board thickness: .062"
 Copper weight: 2oz
 All dimensions are in inches.
 Board should have green solder mask over solder with white silk screening on top.
 View is from top side of the board.

Co: Compad Inc

Title: ?

Board: CP2

Revision: A

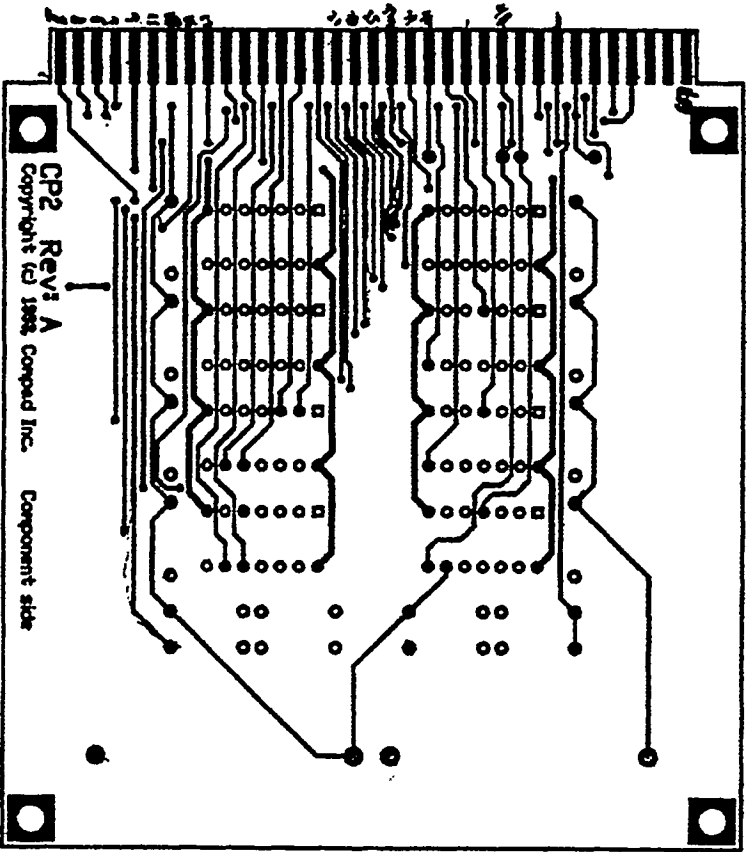
Drawn: Carl Magnuson

Size: A

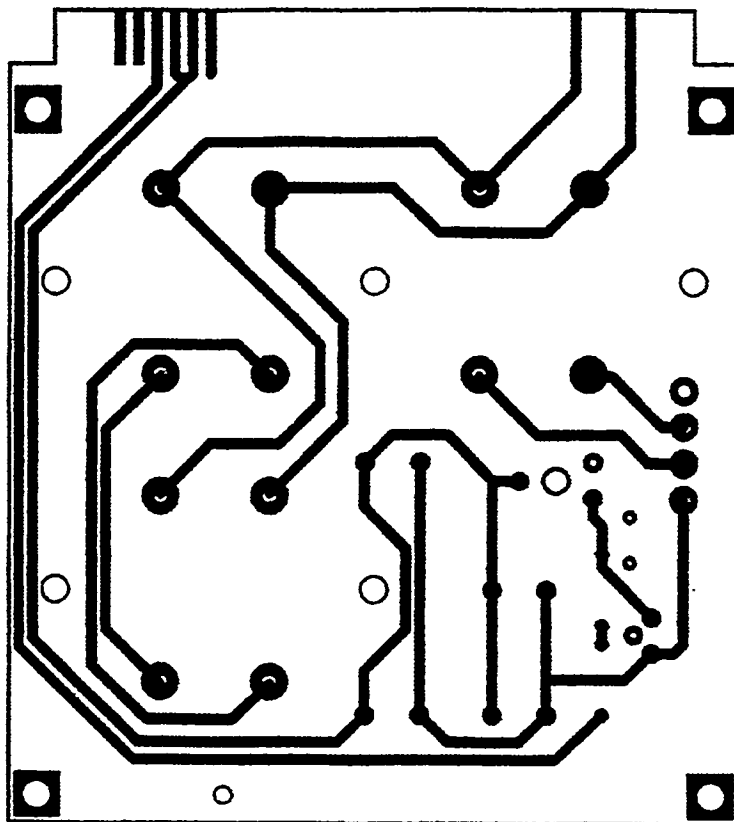
Date: October 12, 1993

Sheet 1 of 1

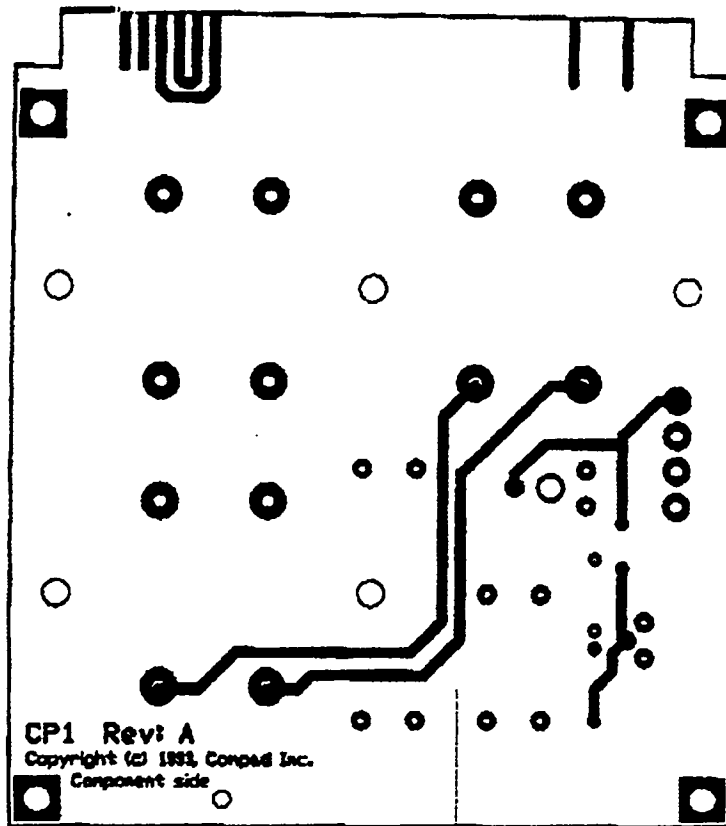
BACKSIDE OF RIM & FACE MULTIPLEXER AND SIGNAL CONDITIONING BOARD



BACK SIDE OF TAMS UNIT POWER SUPPLY



TOP SIDE OF TAMS UNIT POWER SUPPLY

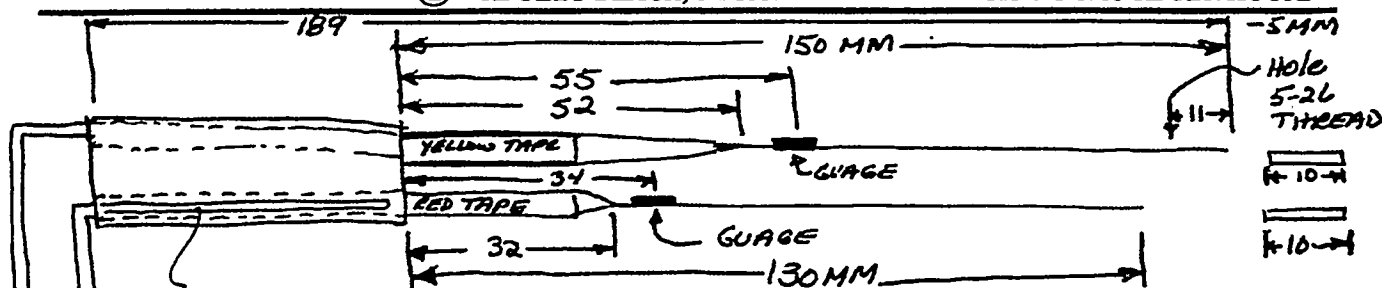


COMPAD

INC.

6418 US HWY 41N STE 205
APOLLO BEACH, FL 33572

8-18-92

813-641-2030 TELE & FAX
813-645-3706 AFTER HOURS

WIRE FOLDED & PRESSED
IN TO ACT AS A STRAIN
RELIEF

YELLOW (FACE) GAUGE Bonded Resistance = 1022 Ω . TEMP 72°F
WHITE (FACE)

BLUE (RIM) GAUGE Bonded Resistance = 1026 Ω . TEMP 72°F
Green (RIM)

NOTES ① SENSOR element FINISHED 8:45AM (EASTERN) 8-18-92.

CONSTRUCTION NOTES:

SOLDERING TIP: ① WHEN SOLDERING GOLD WIRES OF THE GAUGE TO THE LEADOUT WIRES, FIRST HEAT SOLDER ON THE LEAD WIRE & THEN PUSH THE GOLD LEAD INTO THE SOLDER & IMMEDIATELY REMOVE THE SOLDER IRON.

SWITCHCRAFT PLUG



- ① Green
- ② Black
- ③ WHITE.
- ④ RED

DC VOLTAGES 5.0DC Meters
7.5 ENERGIZE Probe

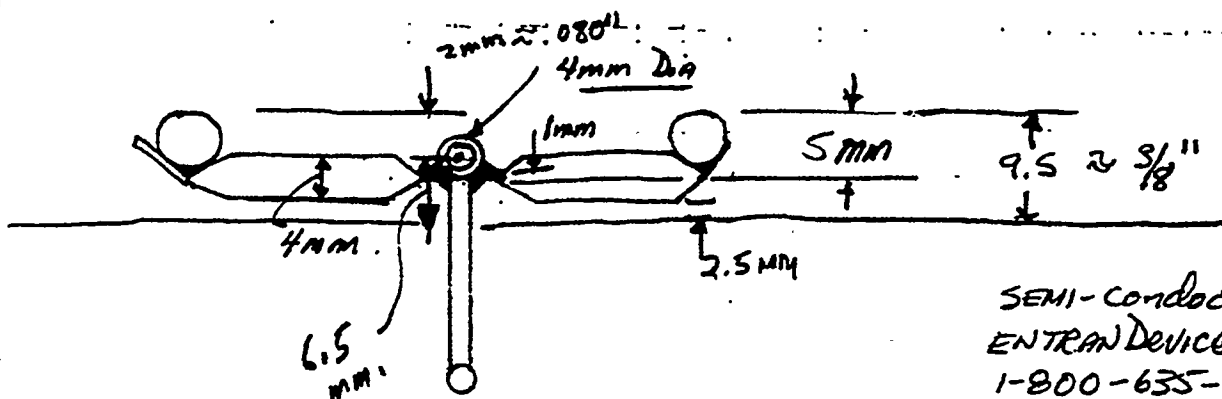
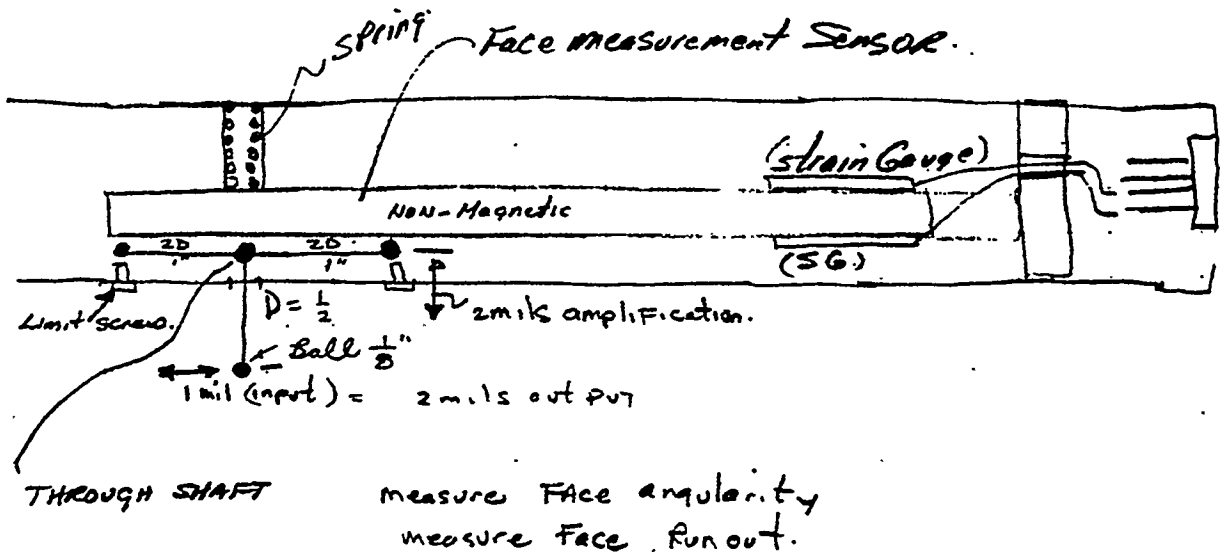
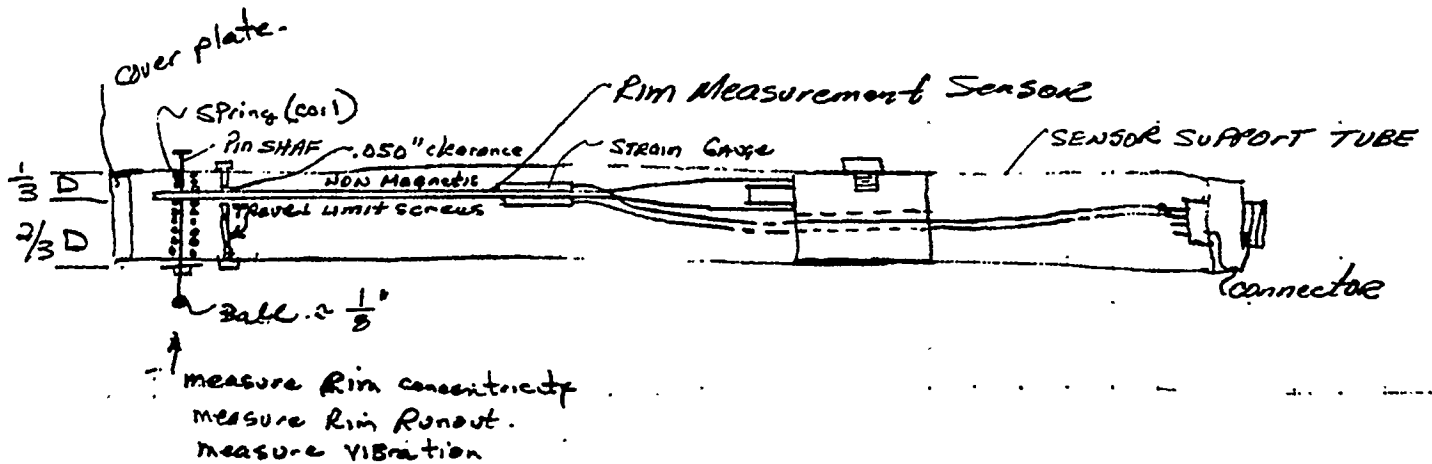
TURBINE INSPECTIONS 0 COMPUTER ALIGNMENT 0 OEM TRAINED ENGINEERS 0 CONTROLS 0 STARTUPS 0 BALANCING

GENERATOR TESTING 0 STEAM PATH EVALUATIONS 0 PROJECT MANAGEMENT

6-3-92

SENSOR

9:21AM EDT
Kenneth V. Field
KENNETH V FIELD



SEMI-conductor Strain gage.
ENTRAN DEVICES
1-800-635-0650
10-T WASHINGTON Ave
FAIRFIELD, NJ 07004.
Bob Leavy

SMD 803-235-9330 MMP 919-365-3900
HBM 508-624-4500 TRANSICOR 800-323-7115

Kulite
A.I.T.
Mueser, Inc.
805-522-4676

COMPAD, Inc.

136 Hardwood Dr.
Valrico, FL 33594

Tele & Fax 813-654-3823
Pager 800-535-1135

DOE PROJECT 353

COMPUTER SOFTWARE CODE

```

rem
rem This program free's the meters on the TAMS box.
rem Wand #1 is activated and all meters are left on
%include TAMS1.INC

    A% = SetupA2D
    if A% <> 0 then stop

    call SetWandOn(1)      rem Turn wand #1 on
    call SetAllMetersOn    rem Turn all meters on
    stop

```

```

REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> Copyright (C) COMPAD Incorporated 1984,5,6
REM> ALL RIGHTS RESERVED
REM>
REM> TITLE: C2-TURBINE GENERATOR ALIGNMENT SYSTEM
REM> VERSION: 86.1
REM> REVISION: a)1-15-86
REM> FILE: C2 - C2 BEGINS
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> SETUP.

%include COMMON

%include FUNC

    chain "C2A"

```

```

REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> Copyright (C) COMPAD Incorporated 1984,5,6
REM> ALL RIGHTS RESERVED
REM>
REM> TITLE: C2-TURBINE GENERATOR ALIGNMENT SYSTEM
REM> VERSION: 86.1
REM> REVISION: a)1-15-86
REM> FILE: C2G - CURRENT ALIGNMENT
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> SETUP.

%include COMMON

def fn.RCS(RNUM,FS) external
fend
def fn.CHK% external
fend
def fn.EMPTY%(ENT$) external
fend
def fn.DISPN%(MT%,ROW%,COL%,SS) external
fend
def fn.DISPR%(MT%,ROW%,COL%,SS) external
fend
def fn.DISPC%(MT%,CL%,ROW%,COL%,SS) external
fend
def fn.DISUC%(MT%,CL%,ROW%,COL%,FS,NUM) external
fend
def fn.CLS%(MT%,CL%) external
fend
def fn.FSCR%(MT%,CL%,UNITS,COMPS,R%,SS) external
fend
def fn.BUC%(MT%,ROW%,COL%,SS,MAX%) external
fend
def fn.YNINP%(MT%,ROW%,COL%) external
fend
def fn.MESG%(MT%,CL%,MR%,MFILLS,MS) external
fend
def fn.INPUTS(MT%,CL%,ROW%,COL%,ENTS,EP%,MIN%,MAX%,TYPES,IFS,MR%,MFILLS) external
fend
def STRIP(AS) external
string STRIP
fend
def sn(rnum,lo,hi)
real rnum
string sn, lo, hi
if rnum=0 then sn=" " else if rnum<0 then sn=lo else sn=hi
return
fend

EQUALS=\
"====F1:PrevEntry==F2:NextEntry====<Esc>:ToMenu====F3:PrevScr==F4:NextScr===="
gosub 81.0

if ROUTE%>20 then goto 1000.0
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> DISPLAY SCREEN # 405 - CURRENT ALIGNMENT TOLERANCE.
405.0 if ROUTE%=2 then gosub 2406.0 else gosub 2405.0
gosub 60.0
dim DATAS(BN%)
if ROUTE%=1 then read# 10,53:D1$,D2$,D3$,D4$,D5$,D6$,DATAS(1)\
else read# 10,75:D1$,D2$,D3$,D4$,F1,F2,DATAS(1)
call fn.DISPC%(MT%,CL%,24,6,\
USERS=", fill in the information above. ")
gosub 60.5
SR%=1

405.3 DATAS(SR%)=fn.INPUTS(MT%,CL%,BR%(SR%),BC%(SR%),DATAS(SR%),1,BMIN%(SR%),\
BMAX%(SR%),BTYPES(SR%),"",22,EQUALS)
if mid$(DATAS(SR%),3,2)="%" then KEY%=int(val(left$(DATAS(SR%),2))) \
:DATAS(SR%)=mid$(DATAS(SR%),5,BMAX%(SR%))
%include TOGGLE1.TGL
if ROUTE%=1 then print# 10,53:D1$,D2$,D3$,D4$,D5$,D6$,DATAS(1)\
else print# 10,75:D1$,D2$,D3$,D4$,F1,F2,DATAS(1)
TOL$=DATAS(1)
gosub 60.98 :gosub 60.99
if KEY%=5 then ROUTE%=5 :chain "C2C"
if ROUTE%=2 then goto 420.0
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> DISPLAY SCREEN # 410 - CURRENT COUPLING ALIGNMENT.
410.0 gosub 2410.0
dim DATAS(BN%), F(8)
SH%=SSH%
410.1 if SH% 1t SSH% then SH%=SSH%
gosub 60.0
call fn.DISPN%(MT%,9, 6,SN$(SH%))
call fn.DISPN%(MT%,9,29-LEN(SN$(SH%+1)),SN$(SH%+1))
call fn.DISPN%(MT%,20,28,\
"The "+SN$(SH%)+"-"+SN$(SH%+1)+" (or "+CHR$(64+SH%)+") Coupling")
read# 10,51+(4*(SH%-1));DATAS(3),DATAS(4),DATAS(5),DATAS(6),\
DATAS(7),DATAS(8),DATAS(9),DATAS(10)
read# 10,52+(4*(SH%-1));DATAS(11),DATAS(12),DATAS(13),DATAS(14),\
DATAS(15),DATAS(16),DATAS(17),DATAS(18)
read# 10,53+(4*(SH%-1));DATAS(19),DATAS(20),DATAS(21),DATAS(22),\
DATAS(1),DATAS(2)
call fn.DISPC%(MT%,CL%,3,69,TOL$)
410.2 call fn.DISPC%(MT%,CL%,24,6,\
USERS=", fill in the information above. ")
gosub 60.5
SR%=1
410.3 if SR% le 0 then SR%=1
DATAS(SR%)=fn.INPUTS(MT%,CL%,BR%(SR%),BC%(SR%),DATAS(SR%),1,BMIN%(SR%),\
BMAX%(SR%),BTYPES(SR%),"",22,EQUALS)
if mid$(DATAS(SR%),3,2)="%" then KEY%=int(val(left$(DATAS(SR%),2))) \
:DATAS(SR%)=mid$(DATAS(SR%),5,BMAX%(SR%))
if SR% NE 1 then goto 410.31
DATAS(1)=STRIP(DATAS(1))
call fn.BUC%(MT%,BR%(1),BC%(1),DATAS(1),BMAX%(1))
if DATAS(1)=SN$(SH%) or DATAS(1)=SN$(SH%+1) then goto 410.31
call fn.MESG%(MT%,CL%,22,EQUALS,"INCORRECT SHAFT NAME.")
goto 410.3
410.31 if SR% NE 2 then goto 410.32
DATAS(2)=STRIP(DATAS(2))
call fn.BUC%(MT%,BR%(2),BC%(2),DATAS(2),BMAX%(2))
if DATAS(2)="CW" or DATAS(2)="CCW" then goto 410.32
call fn.MESG%(MT%,CL%,22,EQUALS,"INCORRECT ROTATION, USE CW OR CCW.")
goto 410.3
410.32 if KEY%=1 then SR%=SR%-1 :goto 410.3
if KEY% ge 5 and KEY% le 7 then goto 410.33
SR%=SR%+1
if SR% le BN% then goto 410.3

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```

410.33 L%=1
      I%=2
410.34 J%=1
      K%=0
      if fn.EMPTY%(DATAS(I%+1)) then J%=J%+1 :K%=1
      if fn.EMPTY%(DATAS(I%+2)) then J%=J%+1 :K%=2
      if fn.EMPTY%(DATAS(I%+3)) then J%=J%+1 :K%=3
      if fn.EMPTY%(DATAS(I%+4)) then J%=J%+1 :K%=4
      on J% goto 410.35, 410.36, 410.37, 410.37, 410.38
410.35 if abs(val(TOL$)) gt abs((val(DATAS(I%+1))-val(DATAS(I%+2)))-\
      (val(DATAS(I%+3))+val(DATAS(I%+4)))) then goto 410.39
      call fn.MESG$(MT%,CL%,22,EQUAL$, "FACE READINGS OUT OF TOLERANCE.")
      SR%=I%+1
      goto 410.3
410.36 if K%=1 then DATAS(I%+1)=fn.RCS(val(DATAS(I%+3))-val(DATAS(I%+4)) \
      -val(DATAS(I%+2)),"###.#####")
      if K%=2 then DATAS(I%+2)=fn.RCS(val(DATAS(I%+3))+val(DATAS(I%+4)) \
      -val(DATAS(I%+1)),"###.#####")
      if K%=3 then DATAS(I%+3)=fn.RCS(val(DATAS(I%+1))+val(DATAS(I%+2)) \
      -val(DATAS(I%+4)),"###.#####")
      if K%=4 then DATAS(I%+4)=fn.RCS(val(DATAS(I%+1))+val(DATAS(I%+2)) \
      -val(DATAS(I%+3)),"###.#####")
      call fn.DISPR$(MT%,BR%(I%+K%),BC%(I%+K%),DATAS(I%+K%))
      goto 410.39
410.37 call fn.MESG$(MT%,CL%,22,EQUAL$, "MINIMUM OF 3 FACE READINGS REQUIRED.")
      SR%=I%+1
      goto 410.3
410.38 L%=L%-1
410.39 if I% lt 17 then I%=I%+5 :goto 410.34

      J%=1
      K%=0
      if fn.EMPTY%(DATAS( 7)) then J%=J%+1 :K%=1
      if fn.EMPTY%(DATAS(12)) then J%=J%+1 :K%=2
      if fn.EMPTY%(DATAS(17)) then J%=J%+1 :K%=3
      if fn.EMPTY%(DATAS(22)) then J%=J%+1 :K%=4
      on J% goto 410.41, 410.42, 410.43, 410.43, 410.44
410.41 if abs(val(TOL$)) gt abs((val(DATAS(7))+val(DATAS(17)))-\
      (val(DATAS(12))+val(DATAS(22)))) then goto 410.44
      call fn.MESG$(MT%,CL%,22,EQUAL$, "RIM READINGS OUT OF TOLERANCE.")
      SR%=7
      goto 410.3
410.42 if K%=1 then DATAS( 7)=fn.RCS(val(DATAS(12))+val(DATAS(22)) \
      -val(DATAS(17)),"###.#####")
      if K%=2 then DATAS(12)=fn.RCS(val(DATAS( 7))+val(DATAS(17)) \
      -val(DATAS(22)),"###.#####")
      if K%=3 then DATAS(17)=fn.RCS(val(DATAS(12))+val(DATAS(22)) \
      -val(DATAS( 7)),"###.#####")
      if K%=4 then DATAS(22)=fn.RCS(val(DATAS( 7))+val(DATAS(17)) \
      -val(DATAS(12)),"###.#####")
      call fn.DISPR$(MT%,BR%((K%*5)+2),BC%((K%*5)+2),DATAS((K%*5)+2))
      goto 410.44
410.43 call fn.MESG$(MT%,CL%,22,EQUAL$, "MINIMUM OF 3 RIM READINGS REQUIRED.")
      SR%=7
      goto 410.3
410.44 if L%=0 then TOP=0 :BOTT=0 :LEFT=0 :RIGHT=0 \
      :VFACE=0 :HFACE=0 :goto 410.45
      TOP=(val(DATAS(3))-val(DATAS(8))-val(DATAS(13))+val(DATAS(18)))/L%
      BOTT=(val(DATAS(4))+val(DATAS(9))-val(DATAS(14))+val(DATAS(19)))/L%
      LEFT=(val(DATAS(5))-val(DATAS(10))-val(DATAS(15))+val(DATAS(20)))/L%
      RIGHT=(val(DATAS(6))+val(DATAS(11))+val(DATAS(16))+val(DATAS(21)))/L%
      VFACE=BOTT-TOP
      HFACE=RIGHT-LEFT
410.45 if DATAS(1)=SNS$(SH%) then goto 410.47
      VRIM=(val(DATAS(17))-val(DATAS(7)))/2

      if DATAS(2)="CCW" then goto 410.46
      HRIM=(val(DATAS(12))-val(DATAS(22)))/2
      goto 410.49
410.46 HRIM=(val(DATAS(22))-val(DATAS(12)))/2
      goto 410.49
410.47 VRIM=(val(DATAS(7))-val(DATAS(17)))/2
      if DATAS(2)="CCW" then goto 410.48
      HRIM=(val(DATAS(22))-val(DATAS(12)))/2
      goto 410.49
410.48 HRIM=(val(DATAS(12))-val(DATAS(22)))/2
410.49 F(1)=TOP
      call fn.DISUC$(MT%,CL%,15,37,"###.#####",F(1))
      F(2)=BOTT
      call fn.DISUC$(MT%,CL%,15,45,"###.#####",F(2))
      F(3)=LEFT
      call fn.DISUC$(MT%,CL%,15,53,"###.#####",F(3))
      F(4)=RIGHT
      call fn.DISUC$(MT%,CL%,15,61,"###.#####",F(4))
      F(5)=VRIM
      call fn.DISUC$(MT%,CL%,18,47,"###.#####",F(5))
      call fn.DISPC$(MT%,CL%,18,54,sn(F(5),"L","H"))
      F(6)=HRIM
      call fn.DISUC$(MT%,CL%,18,65,"###.#####",F(6))
      call fn.DISPC$(MT%,CL%,18,72,sn(F(6),"R","L"))
      F(7)=VFACE
      call fn.DISUC$(MT%,CL%,19,47,"###.#####",F(7))
      call fn.DISPC$(MT%,CL%,19,54,sn(F(7),"C","O"))
      F(8)=HFACE
      call fn.DISUC$(MT%,CL%,19,65,"###.#####",F(8))
      call fn.DISPC$(MT%,CL%,19,72,sn(F(8),"C","O"))

      if KEY% ge 5 and KEY% le 7 then goto 410.4
      call fn.DISPC$(MT%,CL%,24,6,\
      USERS=" is this data correct (Y/N)? ")
      KEY%=fn.YNINP$(MT%,24,55)
      if KEY%=1 then goto 410.2
      call fn.DISPC$(MT%,CL%,24,59,"====> THANKS.")

410.4 rem
%include TOGGLE1.TGL
      print# 10,51+(4*(SH%-1));DATAS(3),DATAS(4),DATAS(5),DATAS(6),\
      DATAS(7),DATAS(8),DATAS(9),DATAS(10)
%include TOGGLE1.TGL
      print# 10,52+(4*(SH%-1));DATAS(11),DATAS(12),DATAS(13),DATAS(14),\
      DATAS(15),DATAS(16),DATAS(17),DATAS(18)
%include TOGGLE1.TGL
      print# 10,53+(4*(SH%-1));DATAS(19),DATAS(20),DATAS(21),DATAS(22),\
      DATAS(1),DATAS(2),TOLS
%include TOGGLE1.TGL
      print# 10,54+(4*(SH%-1));F(1),F(2),F(3),F(4),F(5),F(6),F(7),F(8)
      if KEY%=5 then goto 410.5
      if KEY%=6 then SH%=SH%-1 :goto 410.1
      SH%=SH%+1
      if SH% le FSH%-1 then goto 410.1
      close 10
      gosub 60.98 :gosub 60.99 :dim F(0)
      gosub 61.99
      ROUTE%=5

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chain "C2C"
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> DISPLAY SCREEN # 420 - CURRENT OIL & GLAND BORE ALIGNMENT.
420.0 SH%=SSH%
420.1 if SH% lt SSH% then SH%=SSH%
if left$(SNS$(SH%),3)="GEN" then gosub 2421.0 :goto 420.11
if left$(SNS$(SH%),3)="EXC" then gosub 2422.0 :goto 420.11
gosub 2420.0
420.11 gosub 60.0
call fn.DISPN$(MT%,20,30,\
"The "SNS$(SH%)+" (or #)"STR$(SH%)+" Shaft")
dim DATAS(BN%)
dim F(8)
read# 10,75+(4*(SH%-1));DATAS(1),DATAS(2),DATAS(3),DATAS(4),F(1),F(2)
read# 10,76+(4*(SH%-1));DATAS(5),DATAS(6),DATAS(7),DATAS(8),F(3),F(4)
read# 10,77+(4*(SH%-1));DATAS(9),DATAS(10),DATAS(11),DATAS(12),F(5),F(6)
read# 10,78+(4*(SH%-1));DATAS(13),DATAS(14),DATAS(15),DATAS(16),F(7),F(8)
read# 10,75:D1$,D2$,D3$,D4$,F1,F2,TOLS
call fn.DISPC$(MT%,CL%,3,69,TOLS)
420.2 call fn.DISPC$(MT%,CL%,24,6,USERS+", fill in the information above.")
gosub 60.5
SR%=1
420.3 if SR% le 0 then SR%=1
DATAS(SR%)=fn.INPUT$(MT%,CL%,BR$(SR%),BC$(SR%),DATAS(SR%),1,BMIN$(SR%),\
BMAX$(SR%),BTYPES$(SR%),"",22,EQUALS)
if mid$(DATAS(SR%),3,2)="" then KEY%=int(val(left$(DATAS(SR%),2))) \
:DATAS(SR%)=mid$(DATAS(SR%),5,BMAX$(SR%))
if KEY%=1 then SR%=SR%-1 :goto 420.3
if KEY% ge 5 and KEY% le 7 then goto 420.31
SR%=SR%+1
if SR% le BN% then goto 420.3
420.31 I%=0
420.32 J%=1
K%=0
if fn.EMPTY$(DATAS(I%-1)) then J%=J%+1 :K%=1
if fn.EMPTY$(DATAS(I%-2)) then J%=J%+1 :K%=2
if fn.EMPTY$(DATAS(I%-3)) then J%=J%+1 :K%=3
if fn.EMPTY$(DATAS(I%-4)) then J%=J%+1 :K%=4
on J% goto 420.33, 420.34, 420.35, 420.36, 420.36
420.33 if abs(val(TOLS)) ge abs((val(DATAS(I%-1))+val(DATAS(I%+3)))-\
(val(DATAS(I%-2))+val(DATAS(I%+4)))) then goto 420.36
call fn.MESG$(MT%,CL%,22,EQUALS,"BORE READINGS OUT OF TOLERANCE.")
SR%=I%-1
goto 420.3
420.34 if K%=1 then DATAS(I%+1)=fn.RCS(val(DATAS(I%+2))+val(DATAS(I%+4)) \
-val(DATAS(I%+3)),"###.####")
if K%=2 then DATAS(I%+2)=fn.RCS(val(DATAS(I%+1))+val(DATAS(I%+3)) \
-val(DATAS(I%+4)),"###.####")
if K%=3 then DATAS(I%+3)=fn.RCS(val(DATAS(I%+2))+val(DATAS(I%+4)) \
-val(DATAS(I%+1)),"###.####")
if K%=4 then DATAS(I%+4)=fn.RCS(val(DATAS(I%+1))+val(DATAS(I%+3)) \
-val(DATAS(I%+2)),"###.####")
call fn.DISPR$(MT%,BR%(I%+K%),BC%(I%+K%),DATAS(I%+K%))
goto 420.36
420.35 call fn.MESG$(MT%,CL%,22,EQUALS,"MINIMUM OF 3 READINGS REQUIRED.")
SR%=I%+1
goto 420.3
420.36 if I% lt 12 then I%=I%+4 :goto 420.32
420.37 F(1)=(val(DATAS(3))-val(DATAS(1)))/2
call fn.DISUC$(MT%,CL%,17,13,"###.####",F(1))
call fn.DISPC$(MT%,CL%,17,21,sn(F(1),"L","H"))
F(2)=(val(DATAS(2))-val(DATAS(4)))/2
call fn.DISUC$(MT%,CL%,18,13,"###.####",F(2))
call fn.DISPC$(MT%,CL%,18,21,sn(F(2),"R","L"))
F(3)=(val(DATAS(7))-val(DATAS(5)))/2
call fn.DISUC$(MT%,CL%,17,25,"###.####",F(3))
call fn.DISPC$(MT%,CL%,17,33,sn(F(3),"L","H"))
F(4)=(val(DATAS(6))-val(DATAS(8)))/2
call fn.DISUC$(MT%,CL%,18,25,"###.####",F(4))
call fn.DISPC$(MT%,CL%,18,33,sn(F(4),"R","L"))
F(5)=(val(DATAS(11))-val(DATAS(9)))/2
call fn.DISUC$(MT%,CL%,17,49,"###.####",F(5))
call fn.DISPC$(MT%,CL%,17,57,sn(F(5),"L","H"))
F(6)=(val(DATAS(10))-val(DATAS(12)))/2
call fn.DISUC$(MT%,CL%,18,49,"###.####",F(6))
call fn.DISPC$(MT%,CL%,18,57,sn(F(6),"R","L"))
F(7)=(val(DATAS(15))-val(DATAS(13)))/2
call fn.DISUC$(MT%,CL%,17,61,"###.####",F(7))
call fn.DISPC$(MT%,CL%,17,69,sn(F(7),"L","H"))
F(8)=(val(DATAS(14))-val(DATAS(16)))/2
call fn.DISUC$(MT%,CL%,18,61,"###.####",F(8))
call fn.DISPC$(MT%,CL%,18,69,sn(F(8),"R","L"))
if KEY% ge 5 and KEY% le 7 then goto 420.4
call fn.DISPC$(MT%,CL%,24,6,\
USERS+", is this data correct (Y/N)? ")
KEY%=fn.YNINP$(MT%,24,55)
if KEY%=1 then goto 420.2
call fn.DISPC$(MT%,CL%,24,59,"====> THANKS.")
420.4 rem
%include TOGGLE1.TGL
print# 10,75+(4*(SH%-1));DATAS(1),DATAS(2),DATAS(3),DATAS(4),F(1),F(2),TOLS
%include TOGGLE1.TGL
print# 10,76+(4*(SH%-1));DATAS(5),DATAS(6),DATAS(7),DATAS(8),F(3),F(4)
%include TOGGLE1.TGL
print# 10,77+(4*(SH%-1));DATAS(9),DATAS(10),DATAS(11),DATAS(12),F(5),F(6)
%include TOGGLE1.TGL
print# 10,78+(4*(SH%-1));DATAS(13),DATAS(14),DATAS(15),DATAS(16),F(7),F(8)
gosub 60.98 :gosub 60.99 :dim F(0)
if KEY%=5 then goto 420.5
if KEY%=6 then SH%=SH%-1 :goto 420.1
SH%=SH%+1
if SH% le FSH% then goto 420.1
420.5 close 10
gosub 61.99
ROUTE%=5
chain "C2C"
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> PRINT REPORT.
1000.0 call fn.DISPN$(MT%,10,37,"PRINTING")
call fn.DISPN$(MT%,17,27,"Press <ESC> to Stop Printing")
print
lprinter
print PVBS;
gosub 67.0
ALL%=1
if ROUTE%<30 then ROUTE%=ROUTE%-20 :on ROUTE% goto 1410.0, 1420.0
if ROUTE%=90 then ALL%=2 :goto 1410.0
if ROUTE% ge 91 and ROUTE% le 97 then ALL%=3 \
:SSH%=ROUTE%-90 :FSH%=SSH% :goto 1420.0
if ROUTE% ge 101 and ROUTE% le 106 then ALL%=4 \
:SSH%=ROUTE%-100 :FSH%=SSH%-1 :goto 1410.0

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if ROUTE% ge 171 and ROUTE% le 177 then \
:SSH%=ROUTE%-170 :FSH%=SSH%+1 :goto 1410.0
if ROUTE% ge 181 and ROUTE% le 187 then \
:SSH%=ROUTE%-180 :FSH%=SSH% :goto 1420.0
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> PRINT SCREEN # 410 - CURRENT COUPLING ALIGNMENT.
1410.0 gosub 2410.0
dim DATAS(BN%), F(8)
gosub 68.5
for SH%=SSH% to FSH%-1
read# 10,51+(4*(SH%-1));DATAS(3),DATAS(4),DATAS(5),DATAS(6),\
DATAS(7),DATAS(8),DATAS(9),DATAS(10)
read# 10,52+(4*(SH%-1));DATAS(11),DATAS(12),DATAS(13),DATAS(14),\
DATAS(15),DATAS(16),DATAS(17),DATAS(18)
read# 10,53+(4*(SH%-1));DATAS(19),DATAS(20),DATAS(21),DATAS(22),\
DATAS(1),DATAS(2),TOLS
read# 10,54+(4*(SH%-1));F(1),F(2),F(3),F(4),F(5),F(6),F(7),F(8)
if SH%-SSH%=3 or SH%-SSH%=6 then gosub 68.0
gosub 65.0
print using "###.#### ##.#### ##.#### ##.####!";#10,10;\
chr$(34),F(1),F(2),F(3),F(4),chr$(34)
read# 10,10; D1$
print using "Rim= ##.####! Rim= ##.####!";#10,10;\
chr$(34),F(5),sn(F(5),"L","H"),F(6),sn(F(6),"R","L"),chr$(34)
read# 10,10; D2$
print using "Face= ##.####! Face= ##.####!";#10,10;\
chr$(34),F(7),sn(F(7),"C","O"),F(8),sn(F(8),"C","O"),chr$(34)
read# 10,10; D3$
print# 10,10; "BLANK"
SCR$(3)=left$(SCR$(3),68)+TOLS+mid$(SCR$(3),69+len(TOLS),80)
SCR$(9)=left$(SCR$(9),5)+SNS(SH%)+mid$(SCR$(9),6+len(SNS(SH%)),80)
SCR$(9)=left$(SCR$(9),28-len(SNS(SH%+1))+SNS(SH%+1)+mid$(SCR$(9),29,52)
SCR$(15)=left$(SCR$(15),36)+D1$
SCR$(18)=left$(SCR$(18),40)+D2$
SCR$(19)=left$(SCR$(19),40)+D3$
SCR$(20)=left$(SCR$(20),27)+\
"The "+SNS(SH%)+"-"+SNS(SH%+1)+" (or "+chr$(64+SH%)+") Coupling"
gosub 66.0
print AST$
gosub 66.99
next SH%
print BOTS
if FSH%-SSH%-1=0 or FSH%-SSH%-1=3 then J%=60
if FSH%-SSH%-1=1 or FSH%-SSH%-1=4 then J%=38
if FSH%-SSH%-1=2 or FSH%-SSH%-1=5 then J%=16
for I%=1 to J% :print :next I%
gosub 60.98 :gosub 60.99 :dim F(0)
if ALL% ne 2 then goto 1499.1
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> PRINT SCREEN # 420 - CURRENT OIL & GLAND BORE ALIGNMENT.
1420.0 gosub 68.5
for SH%=SSH% to FSH%
if left$(SNS(SH%),3)="GEN" then gosub 2421.0 :goto 1420.1
if left$(SNS(SH%),3)="EXC" then gosub 2422.0 :goto 1420.1
gosub 2420.0
1420.1 dim DATAS(BN%), F(8)
read# 10,75+(4*(SH%-1));DATAS(1),DATAS(2),DATAS(3),DATAS(4),F(1),F(2),TOLS
read# 10,76+(4*(SH%-1));DATAS(5),DATAS(6),DATAS(7),DATAS(8),F(3),F(4)
read# 10,77+(4*(SH%-1));DATAS(9),DATAS(10),DATAS(11),DATAS(12),F(5),F(6)
read# 10,78+(4*(SH%-1));DATAS(13),DATAS(14),DATAS(15),DATAS(16),F(7),F(8)
if SH%-SSH%=3 or SH%-SSH%=6 then gosub 68.0
gosub 65.0
print using \
"###.####! ###.####! <--VERT-----> ###.####! ###.####!";\
#10,10;chr$(34),F(1),sn(F(1),"L","H"),F(3),sn(F(3),"L","H"), \
F(5),sn(F(5),"L","H"),F(7),sn(F(7),"L","H"),chr$(34)

read# 10,10; D1$
print using \
"###.####! ###.####! <--HORZ-----> ###.####! ###.####!";\
#10,10;chr$(34),F(2),sn(F(2),"R","L"),F(4),sn(F(4),"R","L"), \
F(6),sn(F(6),"R","L"),F(8),sn(F(8),"R","L"),chr$(34)

read# 10,10; D2$
print# 10,10; "BLANK"
SCR$(3)=left$(SCR$(3),68)+TOLS+mid$(SCR$(3),69+len(TOLS),80)
SCR$(17)=left$(SCR$(17),12)+D1$
SCR$(18)=left$(SCR$(18),12)+D2$
SCR$(20)=left$(SCR$(20),29)+\
"The "+SNS(SH%)+"(or "+str$(SH%)+") Shaft"
gosub 66.0
print AST$
gosub 66.99
gosub 60.98 :gosub 60.99 :dim F(0)
next SH%
print BOTS
if FSH%-SSH%=0 or FSH%-SSH%=3 or FSH%-SSH%=6 then J%=60
if FSH%-SSH%=1 or FSH%-SSH%=4 then J%=38
if FSH%-SSH%=2 or FSH%-SSH%=5 then J%=16
for I%=1 to J% :print :next I%
1499.1 close 10
gosub 61.99
ROUTE%=7
call fn.DISPH%(MT%,17,27," Returning to Report Menu ")
chain "C2C"
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM>-----1-----2-----3-----4-----5-----6-----7-----
%include SUB80
%include SUB81
%include SUB85
%include SUB86
%include SUB87
%include SUB88
%include SUB81
%include SUB2405
%include SUB2410
%include SUB2420

```

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REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> Copyright (C) COMPAD Incorporated 1984,5,6
REM> ALL RIGHTS RESERVED
REM>
REM> TITLE: C2-TURBINE GENERATOR ALIGNMENT SYSTEM
REM> VERSION: 86.1
REM> REVISION: a)1-15-86
REM> FILE: C2H - CALCULATIONS: READ DATA
REM>
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> SETUP.

%include COMMON

      def fn.DISPN%(MT%,ROW%,COL%,S$) external
      fend
      def fn.CLS%(MT%,CL%) external
      fend

      call fn.CLS%(1,7)
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> CALCULATION BEGINS.
REM> START COMMENTS.
      call fn.DISPN%(1,1,1,UNITS)
      call fn.DISPN%(1,1,80-len(COMPS),COMPS)
REM> READ NUMBER OF SHAFTS
20.00 open DDD$ recl 81 as 10
      read# 10,6;MFR$
      MFR$=ucase$(MFR$)
      dim SNS$(7)
      read# 10,8;NSH%,SNS$(1),SNS$(2),SNS$(3),SNS$(4),SNS$(5),SNS$(6),SNS$(7)
      read# 10,9;SSH%,FSH%,REF%,DDS,AUTOS
      call fn.DISPN%(1,7,16,"CALCULATIONS BEGIN. Positioning to "+DDS+" Alignment")
      SG%=REF%-1
      SC%=REF%+1
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> VARIABLE NAMING CONVENTION.
REM>
REM> 1 2 3 4 5
REM> - - - - -
REM> | | | +-----> C=Coupling, B=Bearing, O=Oil, S=casing Shim, G=Gland
REM> | | | +-----> G=Governor end, C=Collector end
REM> | | | +-----> V=Vertical, H=Horizontal
REM> | +-----> D=Design, C=Current, M=Move, Projected
REM> +-----> S=relative Shaft position, C=shaft position in Casing
REM>
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> INITIALIZE & DIMENSION VARIABLES.
      I%=NSH%
      dim RD(I%,8),CD(I%)
      dim XCC(I%),XCB(I%),XCO(I%),XCG(I%)
      dim XGC(I%),XGB(I%),XGO(I%),XGG(I%),XT(I%)

      dim DVG(I%-1),DHG(I%-1),PDVG(I%-1),PDHG(I%-1),DVE(I%-1),DHE(I%-1)
      dim SDVCC(I%),SDVCB(I%),SDVCO(I%),SDVCG(I%)
      dim SDHCC(I%),SDHCB(I%),SDHCO(I%),SDHCG(I%)
      dim SDVGC(I%),SDVGB(I%),SDVGO(I%),SDVGG(I%)
      dim SDHGC(I%),SDHGB(I%),SDHGO(I%),SDHGG(I%)

      dim CVG(I%-1),CHG(I%-1),PCVG(I%-1),PCHG(I%-1),CVE(I%-1),CHE(I%-1)
      dim SCVCC(I%),SCVCB(I%),SCVCO(I%),SCVCG(I%)
      dim SCHCC(I%),SCHCB(I%),SCHCO(I%),SCHCG(I%)
      dim SCVGC(I%),SCVGB(I%),SCVGO(I%),SCVGG(I%)
      dim SCHGC(I%),SCHGB(I%),SCHGO(I%),SCHGG(I%)

      dim PVG(I%-1),PHG(I%-1),PVE(I%-1),PHE(I%-1)

      dim MVG(I%-1),MHG(I%-1),MVE(I%-1),MHE(I%-1)

      dim SMVCC(I%),SMVCB(I%),SMVCO(I%),SMVCG(I%)
      dim SMHCC(I%),SMHCB(I%),SMHCO(I%),SMHCG(I%)
      dim SMVGC(I%),SMVGB(I%),SMVGO(I%),SMVGG(I%)
      dim SMHGC(I%),SMHGB(I%),SMHGO(I%),SMHGG(I%)

      dim SLV(I%),SMVGF(I%),SMVCF(I%),SLH(I%),SMHGF(I%),SMHCF(I%)

      dim CDVCO(I%),CDVCG(I%)
      dim CDHCO(I%),CDHCG(I%)
      dim CDVGO(I%),CDVGG(I%)
      dim CDHGO(I%),CDHGG(I%)

      dim CCVCO(I%),CCVCG(I%)
      dim CCHCO(I%),CCHCG(I%)
      dim CCVGO(I%),CCVGG(I%)
      dim CCHGO(I%),CCHGG(I%)

      dim CPVCO(I%),CPVCG(I%)
      dim CPHCO(I%),CPHCG(I%)
      dim CPVGO(I%),CPVGG(I%)
      dim CPHGO(I%),CPHGG(I%)

      dim CMVCO(I%),CMVCG(I%)
      dim CMHCO(I%),CMHCG(I%)
      dim CMVGO(I%),CMVGG(I%)
      dim CMHGO(I%),CMHGG(I%)

      dim CMHGS(I%),CMHCS(I%)
      dim CMVGS(I%),CMVCS(I%)
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> READ DATA.
REM> DISPLAY MESSAGE.
      call fn.DISPN%(1,9,16,"READING DATA...")
REM> READ ROTOR GEOMETRY (RD=ROTOR DIMENSION).
      dim DATAS(16)
      for I%=SSH% to FSH%
      read# 10,10+I%;DATAS(1),DATAS(2),DATAS(3),DATAS(4),\
          DATAS(5),DATAS(6),DATAS(7),DATAS(8)
      RD(I%,1)=VAL(DATAS(1))
      RD(I%,2)=VAL(DATAS(2))
      RD(I%,3)=VAL(DATAS(3))
      RD(I%,4)=VAL(DATAS(4))
      RD(I%,5)=VAL(DATAS(5))
      RD(I%,6)=VAL(DATAS(6))
      RD(I%,7)=VAL(DATAS(7))
      RD(I%,8)=VAL(DATAS(8))
      next I%
REM> READ DESIGN/DESIRED COUPLINGS.
      for I%=SSH% to FSH%-1
      read# 10,30+I%;DATAS(1),DATAS(2),DATAS(3),DATAS(4),\
          DATAS(5),DATAS(6),DATAS(7),DATAS(8)
      if UDS="Desired" then goto 20.01
      DVE(I%)=VAL(DATAS(1))
      DVG(I%)=VAL(DATAS(3))
      DHE(I%)=VAL(DATAS(5))
      DHG(I%)=VAL(DATAS(7))
      goto 20.02

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20.01  if DATAS(2)="" then DVE(I%)=VAL(DATAS(1)) else DVE(I%)=VAL(DATAS(2))
      if DATAS(4)="" then DVG(I%)=VAL(DATAS(3)) else DVG(I%)=VAL(DATAS(4))
      if DATAS(6)="" then DHE(I%)=VAL(DATAS(5)) else DHE(I%)=VAL(DATAS(6))
      if DATAS(8)="" then DHG(I%)=VAL(DATAS(7)) else DHG(I%)=VAL(DATAS(8))
20.02  next I%
REM> READ DESIGN/DESIRED OIL & GLAND BORES.
      for I%=SSH% to FSH%
20.03  read# 10,37+(2*(I%-1));DATAS(1),DATAS(2),DATAS(3),DATAS(4),\
      DATAS(5),DATAS(6),DATAS(7),DATAS(8)
      read# 10,38+(2*(I%-1));DATAS(9),DATAS(10),DATAS(11),DATAS(12),\
      DATAS(13),DATAS(14),DATAS(15),DATAS(16)
      if DDS="Desired" then goto 20.04
      CDVGO(I%)=VAL(DATAS(1))
      CDHGO(I%)=VAL(DATAS(3))
      CDVGG(I%)=VAL(DATAS(5))
      CDHGG(I%)=VAL(DATAS(7))
      CDVCG(I%)=VAL(DATAS(9))
      CDHCG(I%)=VAL(DATAS(11))
      CDVCO(I%)=VAL(DATAS(13))
      CDHCO(I%)=VAL(DATAS(15))
      goto 20.05
20.04  if DATAS(2)="" then CDVGO(I%)=VAL(DATAS(1)) else CDVGO(I%)=VAL(DATAS(2))
      if DATAS(4)="" then CDHGO(I%)=VAL(DATAS(3)) else CDHGO(I%)=VAL(DATAS(4))
      if DATAS(6)="" then CDVGG(I%)=VAL(DATAS(5)) else CDVGG(I%)=VAL(DATAS(6))
      if DATAS(8)="" then CDHGG(I%)=VAL(DATAS(7)) else CDHGG(I%)=VAL(DATAS(8))
      if DATAS(10)="" then CDVCG(I%)=VAL(DATAS(9)) else CDVCG(I%)=VAL(DATAS(10))
      if DATAS(12)="" then CDHCG(I%)=VAL(DATAS(11)) else CDHCG(I%)=VAL(DATAS(12))
      if DATAS(14)="" then CDVCO(I%)=VAL(DATAS(13)) else CDVCO(I%)=VAL(DATAS(14))
      if DATAS(16)="" then CDHCO(I%)=VAL(DATAS(15)) else CDHCO(I%)=VAL(DATAS(16))
20.05  next I%
REM> READ CURRENT COUPLINGS.
      dim DA(8)
      for I%=SSH% to FSH%-1
      read# 10,54+(4*(I%-1));DA(1),DA(2),DA(3),DA(4),\
      CVE(I%),CHE(I%),CVG(I%),CHG(I%)
      next I%
REM> READ CURRENT OIL & GLAND BORES.
      for I%=SSH% to FSH%
20.06  read# 10,75+(4*(I%-1));D1$,D2$,D3$,D4$,CCVGO(I%),CCHGO(I%)
      read# 10,76+(4*(I%-1));D1$,D2$,D3$,D4$,CCVGG(I%),CCHGG(I%)
      read# 10,77+(4*(I%-1));D1$,D2$,D3$,D4$,CCVCG(I%),CCHCG(I%)
      read# 10,78+(4*(I%-1));D1$,D2$,D3$,D4$,CCVCO(I%),CCHCO(I%)
      next I%

      for I%=1 to 16
      DATAS(I%)=NULLS
      next I%
      dim DATAS(0), DA(0)
      CLOSE 10
      CN%=(38*NSH%)+(8*(NSH%-1))+32
      call fn.DISPN%(1,9,33,str$(CN%)+ " READ")
REM>-----1-----2-----3-----4-----5-----6-----7-----
%include C2H1

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REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> Copyright (C) COMPAD Incorporated 1984,5,6
REM> ALL RIGHTS RESERVED
REM>
REM> TITLE: C2-TURBINE GENERATOR ALIGNMENT SYSTEM
REM> VERSION: 89.1
REM> REVISION: a)2-21-89
REM> FILE: C2H1 - CALCULATIONS: CALCULATE
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> REFERENCE SHAFT CALCULATIONS.
20.10  I%=REF%
REM> CHECK AUTO POSITIONING.
      if AUTOS="O11" then goto 20.11
      if AUTOS="Gland" then goto 20.12
      goto 20.20
REM> AUTO POSITION USING OIL BORES.
REM> DISPLAY MESSAGE.
20.11  call fn.DISPN%(1,11,16,"REFERENCE SHAFT CALCULATIONS....")
      call fn.DISPN%(1,12,16,"AUTO POSITION USING OIL BORES")
REM> CALCULATE MOVES AT THE OIL BORES.
      SMHGO(I%)=CDHGO(I%)-CCHGO(I%)
      SMVGO(I%)=CDVGO(I%)-CCVGO(I%)
      SMHCO(I%)=CDHCO(I%)-CCHCO(I%)
      SMVCO(I%)=CDVCO(I%)-CCVCO(I%)
REM> CALCULATE X POSITIONS RELATIVE TO GOVERNOR END OIL BORE (GO).
      XGO(I%)=0
      if left$(SNS(I%),3)="GEN" or left$(SNS(I%),3)="EXC" then goto 20.111
      XGC(I%)=-RD(I%,5)-RD(I%,2)
      XGB(I%)=-RD(I%,5)
      XGG(I%)=-RD(I%,5)+RD(I%,7)
      XCG(I%)=-RD(I%,5)+RD(I%,3)-RD(I%,8)
      XCO(I%)=-RD(I%,5)+RD(I%,3)-RD(I%,6)
      XCB(I%)=-RD(I%,5)+RD(I%,3)
      XCC(I%)=-RD(I%,5)+RD(I%,3)+RD(I%,4)
      goto 20.112
20.111 XGC(I%)=RD(I%,5)-RD(I%,2)
      XGB(I%)=RD(I%,5)
      XGG(I%)=RD(I%,5)+RD(I%,7)
      XCG(I%)=RD(I%,5)+RD(I%,3)-RD(I%,8)
      XCO(I%)=RD(I%,5)+RD(I%,3)+RD(I%,6)
      XCB(I%)=RD(I%,5)+RD(I%,3)
      XCC(I%)=RD(I%,5)+RD(I%,3)+RD(I%,4)
REM> CALCULATE HORIZONTAL MOVES.
20.112 if XCO(I%)=0 then SLH(I%)=0 else SLH(I%)=(SMHCO(I%)-SMHGO(I%))/XCO(I%)
      SMHCC(I%)=(SLH(I%)*XCC(I%))+SMHGO(I%)
      SMHCB(I%)=(SLH(I%)*XCB(I%))+SMHGO(I%)
      SMHCG(I%)=(SLH(I%)*XCG(I%))+SMHGO(I%)
      SMHGG(I%)=(SLH(I%)*XGG(I%))+SMHGO(I%)
      SMHGB(I%)=(SLH(I%)*XGB(I%))+SMHGO(I%)
      SMHGC(I%)=(SLH(I%)*XGC(I%))+SMHGO(I%)
REM> CALCULATE VERTICAL MOVES.
      if XCO(I%)=0 then SLV(I%)=0 else SLV(I%)=(SMVCO(I%)-SMVGO(I%))/XCO(I%)
      SMVCC(I%)=(SLV(I%)*XCC(I%))+SMVGO(I%)
      SMVCB(I%)=(SLV(I%)*XCB(I%))+SMVGO(I%)
      SMVCG(I%)=(SLV(I%)*XCG(I%))+SMVGO(I%)
      SMVGG(I%)=(SLV(I%)*XGG(I%))+SMVGO(I%)
      SMVGB(I%)=(SLV(I%)*XGB(I%))+SMVGO(I%)
      SMVGC(I%)=(SLV(I%)*XGC(I%))+SMVGO(I%)

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```

call fn.DISPN%(1,11,49," 26 COMPLETED")
CNT%=26
goto 20.20
REM> AUTO POSITION USING GLAND BORES.
REM> DISPLAY MESSAGE.
20.12 call fn.DISPN%(1,11,16,"REFERENCE SHAFT CALCULATIONS....")
call fn.DISPN%(1,12,16,"AUTO POSITION USING GLAND BORES")
REM> CALCULATE MOVES AT THE GLAND BORES.
SMHGG(I%)=CDHGG(I%)-CCHGG(I%)
SMVGG(I%)=CDVGG(I%)-CCVGG(I%)
SMHCG(I%)=CDHCG(I%)-CCHCG(I%)
SMVCG(I%)=CDVCG(I%)-CCVCG(I%)
REM> CALCULATE X POSITIONS RELATIVE TO GOVERNOR END GLAND BORE (GG).
XGC(I%)=-RD(I%,7)-RD(I%,2)
XGB(I%)=-RD(I%,7)
XGG(I%)=0
XCG(I%)=-RD(I%,7)+RD(I%,3)-RD(I%,8)
XCB(I%)=-RD(I%,7)+RD(I%,3)
XCC(I%)=-RD(I%,7)+RD(I%,3)+RD(I%,4)
if left$(SNS(I%),3)="GEN" or left$(SNS(I%),3)="EXC" \
then XGO(I%)=-RD(I%,7)-RD(I%,5) :XCO(I%)=-RD(I%,7)-RD(I%,3)-RD(I%,6) \
else XGO(I%)=-RD(I%,7)+RD(I%,5) :XCO(I%)=-RD(I%,7)-RD(I%,3)-RD(I%,6)
REM> CALCULATE HORIZONTAL MOVES.
if XCG(I%)=0 then SLH(I%)=0 else SLH(I%)=(SMHCG(I%)-SMHGG(I%))/XCG(I%)
SMHCC(I%)=(SLH(I%)*XCC(I%))-SMHGG(I%)
SMHCB(I%)=(SLH(I%)*XCB(I%))-SMHGG(I%)
SMHCO(I%)=(SLH(I%)*XCO(I%))-SMHGG(I%)
SMHGO(I%)=(SLH(I%)*XGO(I%))-SMHGG(I%)
SMHGB(I%)=(SLH(I%)*XGB(I%))-SMHGG(I%)
SMHGC(I%)=(SLH(I%)*XGC(I%))-SMHGG(I%)
REM> CALCULATE VERTICAL MOVES.
if XCG(I%)=0 then SLV(I%)=0 else SLV(I%)=(SMVCG(I%)-SMVGG(I%))/XCG(I%)
SMVCC(I%)=(SLV(I%)*XCC(I%))-SMVGG(I%)
SMVCB(I%)=(SLV(I%)*XCB(I%))-SMVGG(I%)
SMVCO(I%)=(SLV(I%)*XCO(I%))-SMVGG(I%)
SMVGO(I%)=(SLV(I%)*XGO(I%))-SMVGG(I%)
SMVGB(I%)=(SLV(I%)*XGB(I%))-SMVGG(I%)
SMVGC(I%)=(SLV(I%)*XGC(I%))-SMVGG(I%)
call fn.DISPN%(1,11,49," 26 COMPLETED")
CNT%=26
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> GOVERNOR SIDE CALCULATIONS.
REM> CHECK if REFERENCE SHAFT IS FIRST SHAFT.
20.20 if REF% LE SSH% then goto 20.30
REM> DISPLAY MESSAGE.
call fn.DISPN%(1,14,16,"GOVERNOR SIDE CALCULATIONS.....")
REM> CALCULATE X DIMENSIONS & COUPLING DIAMETER.
for I%=SG% to SSH% STEP -1
CD(I%)=RD(I%,1)
XCB(I%)=RD(I%,4)
if left$(SNS(I%),3)="GEN" or left$(SNS(I%),3)="EXC" \
then XCO(I%)=RD(I%,4)-RD(I%,6) \
else XCO(I%)=RD(I%,4)+RD(I%,6)
XCG(I%)=RD(I%,4)-RD(I%,8)
XGG(I%)=RD(I%,4)+RD(I%,3)-RD(I%,7)
if left$(SNS(I%),3)="GEN" or left$(SNS(I%),3)="EXC" \
then XGO(I%)=RD(I%,4)+RD(I%,3)+RD(I%,5) \
else XGO(I%)=RD(I%,4)+RD(I%,3)-RD(I%,5)
XGB(I%)=RD(I%,4)-RD(I%,3)
XT(I%)=RD(I%,4)+RD(I%,3)+RD(I%,2)
next I%
REM> CALCULATE DESIGN VERTICAL & HORIZONTAL POSITIONS.
for I%=SG% to SSH% STEP -1
if I% lt SG% then goto 20.21
SDVCC(I%)=DVE(I%) :SDHCC(I%)=DHE(I%)
if CD(I%)=0 then PDVG(I%)=0 :PDHG(I%)=0 \
else PDVG(I%)=DVG(I%)/CD(I%) :PDHG(I%)=DHG(I%)/CD(I%)
goto 20.22
20.21 SDVCC(I%)=SDVGC(I%+1)+DVE(I%) :SDHCC(I%)=SDHGC(I%+1)+DHE(I%)
if CD(I%)=0 then PDVG(I%)=PDVG(I%+1) :PDHG(I%)=PDHG(I%+1) \
else PDVG(I%)=DVG(I%)/CD(I%)+PDVG(I%+1) \
:PDHG(I%)=DHG(I%)/CD(I%)+PDHG(I%+1)
20.22 SDVCB(I%)=PDVG(I%)*XCB(I%)-SDVCC(I%)
SDVCO(I%)=PDVG(I%)*XCO(I%)-SDVCC(I%)
SDVCG(I%)=PDVG(I%)*XCG(I%)-SDVCC(I%)
SDVGG(I%)=PDVG(I%)*XGG(I%)-SDVCC(I%)
SDVGO(I%)=PDVG(I%)*XGO(I%)-SDVCC(I%)
SDVGB(I%)=PDVG(I%)*XGB(I%)-SDVCC(I%)
SDVGC(I%)=PDVG(I%)*XT(I%)-SDVCC(I%)
SDHCB(I%)=PDHG(I%)*XCB(I%)-SDHCC(I%)
SDHCO(I%)=PDHG(I%)*XCO(I%)-SDHCC(I%)
SDHCG(I%)=PDHG(I%)*XCG(I%)-SDHCC(I%)
SDHGG(I%)=PDHG(I%)*XGG(I%)-SDHCC(I%)
SDHGO(I%)=PDHG(I%)*XGO(I%)-SDHCC(I%)
SDHGB(I%)=PDHG(I%)*XGB(I%)-SDHCC(I%)
SDHGC(I%)=PDHG(I%)*XT(I%)-SDHCC(I%)
next I%
REM> CALCULATE CURRENT VERTICAL & HORIZONTAL POSITIONS.
for I%=SG% to SSH% STEP -1
if I% lt SG% then goto 20.23
SCVCC(I%)=CVE(I%)-SMVGC(I%+1) :SCHCC(I%)=CHE(I%)-SMHGC(I%+1)
if CD(I%)=0 then PCVG(I%)=SLV(I%+1) :PCHG(I%)=SLH(I%+1) \
else PCVG(I%)=CVG(I%)/CD(I%)+SLV(I%+1) \
:PCHG(I%)=CHG(I%)/CD(I%)+SLH(I%+1)
goto 20.24
20.23 SCVCC(I%)=SCVGC(I%+1)+CVE(I%) :SCHCC(I%)=SCHGC(I%+1)+CHE(I%)
if CD(I%)=0 then PCVG(I%)=PCVG(I%+1) :PCHG(I%)=PCHG(I%+1) \
else PCVG(I%)=CVG(I%)/CD(I%)+PCVG(I%+1) \
:PCHG(I%)=CHG(I%)/CD(I%)+PCHG(I%+1)
20.24 SCVCB(I%)=PCVG(I%)*XCB(I%)-SCVCC(I%)
SCVCO(I%)=PCVG(I%)*XCO(I%)-SCVCC(I%)
SCVCG(I%)=PCVG(I%)*XCG(I%)-SCVCC(I%)
SCVGG(I%)=PCVG(I%)*XGG(I%)-SCVCC(I%)
SCVGO(I%)=PCVG(I%)*XGO(I%)-SCVCC(I%)
SCVGB(I%)=PCVG(I%)*XGB(I%)-SCVCC(I%)
SCVGC(I%)=PCVG(I%)*XT(I%)-SCVCC(I%)
SCHCB(I%)=PCHG(I%)*XCB(I%)-SCHCC(I%)
SCHCO(I%)=PCHG(I%)*XCO(I%)-SCHCC(I%)
SCHCG(I%)=PCHG(I%)*XCG(I%)-SCHCC(I%)
SCHGG(I%)=PCHG(I%)*XGG(I%)-SCHCC(I%)
SCHGO(I%)=PCHG(I%)*XGO(I%)-SCHCC(I%)
SCHGB(I%)=PCHG(I%)*XGB(I%)-SCHCC(I%)
SCHGC(I%)=PCHG(I%)*XT(I%)-SCHCC(I%)
next I%
CN%=36*(SG%-SSH%+1)
if CN%<100 then call fn.DISPN%(1,14,49," "+str$(CN%)+ " COMPLETED") \
else call fn.DISPN%(1,14,49,str$(CN%)+ " COMPLETED")
CNT%=CNT%+CN%
CN%=0
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> COLLECTOR SIDE CALCULATIONS.
REM> CHECK if REFERENCE SHAFT IS THE LAST SHAFT.
20.30 if REF% GE FSH% then goto 20.35
REM> DISPLAY MESSAGE.
call fn.DISPN%(1,16,16,"COLLECTOR SIDE CALCULATIONS.....")

```

```

REM> CALCULATE X DIMENSIONS & COUPLING DIAMETER.
CD(SC%-1)=RD(SC%-1,1)
for I%=SC% to FSH%
  CD(I%)=RD(I%,1)
  XGB(I%)=RD(I%,2)
  if left$(SNS(I%),3)="GEN" or left$(SNS(I%),3)="EXC" \
  then XGO(I%)=RD(I%,2)+RD(I%,5) \
  else XGO(I%)=RD(I%,2)+RD(I%,5)
  XGG(I%)=RD(I%,2)+RD(I%,7)
  XCG(I%)=RD(I%,2)+RD(I%,3)+RD(I%,8)
  if left$(SNS(I%),3)="GEN" or left$(SNS(I%),3)="EXC" \
  then XCO(I%)=RD(I%,2)+RD(I%,3)+RD(I%,6) \
  else XCO(I%)=RD(I%,2)+RD(I%,3)+RD(I%,6)
  XCB(I%)=RD(I%,2)+RD(I%,3)
  XT(I%)=RD(I%,2)+RD(I%,3)+RD(I%,4)
next I%

REM> CALCULATE DESIGN VERTICAL & HORIZONTAL POSITIONS.
for I%=SC% to FSH%
  if I% gt SC% then goto 20.31
  SDVGC(I%)=-DVE(I%-1) : SDHGC(I%)=-DHE(I%-1)
  if CD(I%-1)=0 then PDVG(I%-1)=0 : PDHG(I%-1)=0 \
  else PDVG(I%-1)=DVG(I%-1)/CD(I%-1) : PDHG(I%-1)=DHG(I%-1)/CD(I%-1)
  goto 20.32
20.31 SDVGC(I%)=SDVCC(I%-1)-DVE(I%-1) : SDHGC(I%)=SDHCC(I%-1)-DHE(I%-1)
  if CD(I%-1)=0 then PDVG(I%-1)=PDVG(I%-2) : PDHG(I%-1)=PDHG(I%-2) \
  else PDVG(I%-1)=DVG(I%-1)/CD(I%-1)+PDVG(I%-2) \
  : PDHG(I%-1)=DHG(I%-1)/CD(I%-1)+PDHG(I%-2)
20.32 SDVGB(I%)=PDVG(I%-1)*XGB(I%)+SDVGC(I%)
  SDVGO(I%)=PDVG(I%-1)*XGO(I%)+SDVGC(I%)
  SDVGG(I%)=PDVG(I%-1)*XGG(I%)+SDVGC(I%)
  SDVCG(I%)=PDVG(I%-1)*XCG(I%)+SDVGC(I%)
  SDVCO(I%)=PDVG(I%-1)*XCO(I%)+SDVGC(I%)
  SDVCB(I%)=PDVG(I%-1)*XCB(I%)+SDVGC(I%)
  SDVCC(I%)=PDVG(I%-1)*XT(I%)+SDVGC(I%)
  SDHGB(I%)=PDHG(I%-1)*XGB(I%)+SDHGC(I%)
  SDHGO(I%)=PDHG(I%-1)*XGO(I%)+SDHGC(I%)
  SDHGG(I%)=PDHG(I%-1)*XGG(I%)+SDHGC(I%)
  SDHCG(I%)=PDHG(I%-1)*XCG(I%)+SDHGC(I%)
  SDHCO(I%)=PDHG(I%-1)*XCO(I%)+SDHGC(I%)
  SDHCB(I%)=PDHG(I%-1)*XCB(I%)+SDHGC(I%)
  SDHCC(I%)=PDHG(I%-1)*XT(I%)+SDHGC(I%)
next I%

REM> CALCULATE CURRENT VERTICAL & HORIZONTAL POSITIONS.
for I%=SC% to FSH%
  if I% gt SC% then goto 20.33
  SCVGC(I%)=-CVE(I%-1)-SMVCC(I%-1)
  SCHGC(I%)=-CHE(I%-1)-SMHCC(I%-1)
  if CD(I%-1)=0 then PCVG(I%-1)=-SLV(I%-1) : PCHG(I%-1)=-SLH(I%-1) \
  else PCVG(I%-1)=CVG(I%-1)/CD(I%-1)-SLV(I%-1) \
  : PCHG(I%-1)=CHG(I%-1)/CD(I%-1)-SLH(I%-1)
  goto 20.34
20.33 SCVGC(I%)=SCVCC(I%-1)-CVE(I%-1) : SCHGC(I%)=SCHCC(I%-1)-CHE(I%-1)
  if CD(I%-1)=0 then PCVG(I%-1)=PCVG(I%-2) : PCHG(I%-1)=PCHG(I%-2) \
  else PCVG(I%-1)=CVG(I%-1)/CD(I%-1)+PCVG(I%-2) \
  : PCHG(I%-1)=CHG(I%-1)/CD(I%-1)+PCHG(I%-2)
20.34 SCVGB(I%)=PCVG(I%-1)*XGB(I%)+SCVGC(I%)
  SCVGO(I%)=PCVG(I%-1)*XGO(I%)+SCVGC(I%)
  SCVGG(I%)=PCVG(I%-1)*XGG(I%)+SCVGC(I%)
  SCVCG(I%)=PCVG(I%-1)*XCG(I%)+SCVGC(I%)
  SCVCO(I%)=PCVG(I%-1)*XCO(I%)+SCVGC(I%)
  SCVCB(I%)=PCVG(I%-1)*XCB(I%)+SCVGC(I%)
  SCVCC(I%)=PCVG(I%-1)*XT(I%)+SCVGC(I%)
  SCHGB(I%)=PCHG(I%-1)*XGB(I%)+SCHGC(I%)
  SCHGO(I%)=PCHG(I%-1)*XGO(I%)+SCHGC(I%)
  SCHGG(I%)=PCHG(I%-1)*XGG(I%)+SCHGC(I%)
  SCHCG(I%)=PCHG(I%-1)*XCG(I%)+SCHGC(I%)

  SCHCO(I%)=PCHG(I%-1)*XCO(I%)+SCHGC(I%)
  SCHCB(I%)=PCHG(I%-1)*XCB(I%)+SCHGC(I%)
  SCHCC(I%)=PCHG(I%-1)*XT(I%)+SCHGC(I%)
next I%
CN%=36*(FSH%-SC%+1)
if CN%<100 then call fn.DISPN%(1,16,49," "+str$(CN%)+ " COMPLETED") \
else call fn.DISPN%(1,16,49,str$(CN%)+ " COMPLETED")
CNT%=CNT%+CN%

REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> CALCULATE VERTICAL & HORIZONTAL MOVES.
20.35 call fn.DISPN%(1,16,16,"COMPLETING CALCULATIONS.....")
CN%=0
for I%=SSH% to FSH%
  if I%=REF% then goto 20.351
  SMVGC(I%)=SDVGC(I%)-SCVGC(I%)
  SMVGB(I%)=SDVGB(I%)-SCVGB(I%)
  SMVGO(I%)=SDVGO(I%)-SCVGO(I%)
  SMVGG(I%)=SDVGG(I%)-SCVGG(I%)
  SMVCG(I%)=SDVCG(I%)-SCVCG(I%)
  SMVCO(I%)=SDVCO(I%)-SCVCO(I%)
  SMVCB(I%)=SDVCB(I%)-SCVCB(I%)
  SMVCC(I%)=SDVCC(I%)-SCVCC(I%)
  SMHGC(I%)=SDHGC(I%)-SCHGC(I%)
  SMHGB(I%)=SDHGB(I%)-SCHGB(I%)
  SMHGO(I%)=SDHGO(I%)-SCHGO(I%)
  SMHGG(I%)=SDHGG(I%)-SCHGG(I%)
  SMHCG(I%)=SDHCG(I%)-SCHCG(I%)
  SMHCO(I%)=SDHCO(I%)-SCHCO(I%)
  SMHCB(I%)=SDHCB(I%)-SCHCB(I%)
  SMHCC(I%)=SDHCC(I%)-SCHCC(I%)
  if RD(I%,2)+RD(I%,3)+RD(I%,4)=0 then SLV(I%)=0 : SLH(I%)=0 \
  else SLV(I%)=(SMVCC(I%)-SMVGC(I%))/(RD(I%,2)+RD(I%,3)+RD(I%,4)) \
  : SLH(I%)=(SMHCC(I%)-SMHGC(I%))/(RD(I%,2)+RD(I%,3)+RD(I%,4))
20.351 SMVCF(I%)=SLV(I%)*CD(I%)
  SMHCF(I%)=SLH(I%)*CD(I%)
  CN%=CN%+20 : call fn.DISPN%(1,16,49,str$(CN%))
  if I%=SSH% then goto 20.352
  SMVGF(I%)=SLV(I%)*CD(I%-1)
  SMHGF(I%)=SLH(I%)*CD(I%-1)
  PVE(I%-1)=SMVCC(I%-1)-SMVGC(I%)+CVE(I%-1)
  MVE(I%-1)=PVE(I%-1)-DVE(I%-1)
  PHE(I%-1)=SMHCC(I%-1)-SMHGC(I%)+CHE(I%-1)
  MHE(I%-1)=PHE(I%-1)-DHE(I%-1)
  PVG(I%-1)=SMVGF(I%) - SMVCF(I%-1)+CVG(I%-1)
  MVG(I%-1)=PVG(I%-1)-DVG(I%-1)
  PHG(I%-1)=SMHGF(I%) - SMHCF(I%-1)+CHG(I%-1)
  MHG(I%-1)=PHG(I%-1)-DHG(I%-1)
  CN%=CN%+10 : call fn.DISPN%(1,16,49,str$(CN%))

20.352 if left$(SNS(I%),3)="GEN" then goto 20.362
  if left$(SNS(I%),3)="EXC" then goto 20.362

REM> CALCULATE OIL & GLAND BORE VALUES, HP,IP,LP.
CPHCO(I%)=CCHCO(I%)+SMHCO(I%)
CPVCO(I%)=CCVCO(I%)+SMVCO(I%)
CMHCO(I%)=CPHCO(I%)-CDHCO(I%)
CMVCU(I%)=CPVCO(I%)-CDVCU(I%)
CPHCG(I%)=CCHCG(I%)+SMHCG(I%)
CPVCG(I%)=CCVCG(I%)+SMVCG(I%)

```

```

CMHCG(I%)=CPHCG(I%)-CDHCG(I%)
CMVCG(I%)=CPVCG(I%)-CDVCG(I%)
CPHGO(I%)=CCHGO(I%)+SMHGO(I%)
CPVGO(I%)=CCVGO(I%)+SMVGO(I%)
CMHGO(I%)=CPHGO(I%)-CDHGO(I%)
CMVGO(I%)=CPVGO(I%)-CDVGO(I%)
CPHGG(I%)=CCHGG(I%)+SMHGG(I%)
CPVGG(I%)=CCVGG(I%)+SMVGG(I%)
CMHGG(I%)=CPHGG(I%)-CDHGG(I%)
CMVGG(I%)=CPVGG(I%)-CDVGG(I%)
CN%=CN%+16 :call fn.DISPN%(1,18,49,str$(CN%))
goto 20.38

```

REM> ALL GENERATORS & EXCITORS.

REM> CALCULATE OIL & GLAND BORE VALUES.

```

20.382 CPHCO(I%)=CCHCO(I%)
CPVCO(I%)=CCVCO(I%)
CMHCO(I%)=CPHCO(I%)-CDHCO(I%)
CMVCO(I%)=CPVCO(I%)-CDVCO(I%)
CPHCG(I%)=CCHCG(I%)
CPVCG(I%)=CCVCG(I%)
CMHCG(I%)=CPHCG(I%)-CDHCG(I%)
CMVCG(I%)=CPVCG(I%)-CDVCG(I%)
CPHGO(I%)=CCHGO(I%)
CPVGO(I%)=CCVGO(I%)
CMHGO(I%)=CPHGO(I%)-CDHGO(I%)
CMVGO(I%)=CPVGO(I%)-CDVGO(I%)
CPHGG(I%)=CCHGG(I%)
CPVGG(I%)=CCVGG(I%)
CMHGG(I%)=CPHGG(I%)-CDHGG(I%)
CMVGG(I%)=CPVGG(I%)-CDVGG(I%)
CN%=CN%+16 :call fn.DISPN%(1,18,49,str$(CN%))

```

20.38 next I%

REM>-----1-----2-----3-----4-----5-----6-----7-----

REM> WRITE TO WORK FILE.

```

create "WORK.DDD" rec1 80 as 5
print# 5,1;CNT%,CN%
J%=1
FBS="###.###.###.###.###.###.###.###.###.###.###.###.###.###.###.###"
for I%=SSH% to FSH%
print using FBS;# 5, 1+J%;SMVGB(I%),SMVCB(I%),SMHGB(I%),SMHCB(I%),SMVGC(I%),SMVCC(I%),SMHGC(I%),SMHCC(I%)
print using FBS;# 5, 2+J%;CMVGO(I%),CMVGG(I%),CMVCO(I%),CMHGO(I%),CMHGG(I%),CMHCG(I%),CMHCO(I%)
print using FBS;# 5, 3+J%;CPVGO(I%),CPVGG(I%),CPVCG(I%),CPVCO(I%),CPHGO(I%),CPHGG(I%),CPHCG(I%),CPHCO(I%)
print using FBS;# 5, 4+J%;SMVGF(I%),SMVCF(I%),SMHGF(I%),SMHCF(I%),0,0,0,0
J%=J%+4
next I%
for I%=SSH% to FSH%-1
print using FBS;# 5,1+J%;PVE(I%),MVE(I%),PVG(I%),MVG(I%),PHE(I%),MHE(I%),PHG(I%),MHG(I%)
J%=J%+1
next I%
close 5
chain "C2J"

```

REM>-----1-----2-----3-----4-----5-----6-----7-----

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REM> TITLE: C2-TURBINE GENERATOR ALIGNMENT SYSTEM

REM> VERSION: 89.1

REM> REVISION: a)2-21-89

REM> FILE: C2I - SHAFT POSITIONER

REM>-----1-----2-----3-----4-----5-----6-----7-----

REM> SETUP.

%include COMMON

```

def fn.CLS%(MT%,CL%) external
fend
def fn.RCS%(RNUM,FS) external
fend
def fn.DISPN%(MT%,ROW%,COL%,S$) external
fend
def fn.DISPC%(MT%,CL%,ROW%,COL%,S$) external
fend
def fn.DISUC%(MT%,CL%,ROW%,COL%,FS,NUM) external
fend
def fn.FSCR%(MT%,CL%,UNITS,COMPS,R,S$) external
fend
def fn.BUC%(MT%,ROW%,COL%,S$,MAX%) external
fend
def fn.INPUT$(MT%,CL%,ROW%,COL%,ENTS,EP%,MIN%,MAX%,TYPES,IFS,MR%,MFILLS) external
fend
def sn(rnum,lo,hi)
real rnum
string sn, lo, hi
if rnum=0 then sn=" " else if rnum<0 then sn=lo else sn=hi
return
fend

```

EQUALS=\

"=====F1:PrevEntry==F2:NextEntry====<Esc>:ToMenu=====F3:PrevScr==F4:NextScr====="

```

REM> F1,F2,Esc,F3,F4,F5,F6,Up,Down,CR,+
IFS=chr$(186)+chr$(187)+chr$(27)+chr$(188)+chr$(189)+chr$(190)+ \
chr$(191)+chr$(199)+chr$(207)+chr$(13)+chr$(43)
gosub 81.0

```

REM>-----1-----2-----3-----4-----5-----6-----7-----

```

read# 10,6;MFR$
MFR$=ucase$(MFR$)
I%=NSH%
dim RD(I%,8),CD(I%)
dim XCC(I%),XCB(I%),XCO(I%),XCG(I%)
dim XGC(I%),XGO(I%),XGG(I%)

```

```

dim DVG(I%-1),DHG(I%-1),DVE(I%-1),DHE(I%-1)
dim PVG(I%-1),PHG(I%-1),PVE(I%-1),PHE(I%-1)
dim CVG(I%-1),CHG(I%-1),CVE(I%-1),CHE(I%-1)

```

```

dim PVG(I%-1),PHG(I%-1),PVE(I%-1),PHE(I%-1)
dim MVG(I%-1),MHG(I%-1),MVE(I%-1),MHE(I%-1)

```

```

dim SMVCC(1%),SMVCB(1%),SMVCO(1%),SMVCG(1%)
dim SMHCC(1%),SMHCB(1%),SMHCO(1%),SMHCG(1%)
dim SMVGC(1%),SMVGB(1%),SMVGO(1%),SMVGG(1%)
dim SMHGC(1%),SMHGB(1%),SMHGO(1%),SMHGG(1%)

dim SLV(1%),SMVGF(1%),SMVCF(1%),SLH(1%),SMHGF(1%),SMHCF(1%)

dim CDVCO(1%),CDVCG(1%)
dim CDHCO(1%),CDHCG(1%)
dim CDVGO(1%),CDVGG(1%)
dim CDHGO(1%),CDHGG(1%)

dim CCVCO(1%),CCVCG(1%)
dim CCHCO(1%),CCHCG(1%)
dim CCVGO(1%),CCVGG(1%)
dim CCHGO(1%),CCHGG(1%)

dim CPVCO(1%),CPVCG(1%)
dim CPHCO(1%),CPHCG(1%)
dim CPVGO(1%),CPVGG(1%)
dim CPHGO(1%),CPHGG(1%)

dim CMVCO(1%),CMVCG(1%)
dim CMHCO(1%),CMHCG(1%)
dim CMVGO(1%),CMVGG(1%)
dim CMHGO(1%),CMHGG(1%)
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> READ DATA.
dim DATAS(16)
REM> READ ROTOR GEOMETRY.
for I%=SSH% to FSH%
read# 10,10+I%;DATAS(1),DATAS(2),DATAS(3),DATAS(4),\
DATAS(5),DATAS(6),DATAS(7),DATAS(8)
RD(I%,1)=VAL(DATAS(1))
RD(I%,2)=VAL(DATAS(2))
RD(I%,3)=VAL(DATAS(3))
RD(I%,4)=VAL(DATAS(4))
RD(I%,5)=VAL(DATAS(5))
RD(I%,6)=VAL(DATAS(6))
RD(I%,7)=VAL(DATAS(7))
RD(I%,8)=VAL(DATAS(8))
next I%
REM> READ DESIGN COUPLINGS.
for I%=SSH% to FSH%-1
read# 10,30+I%;DATAS(1),DATAS(2),DATAS(3),DATAS(4),\
DATAS(5),DATAS(6),DATAS(7),DATAS(8)
DVE(I%)=VAL(DATAS(1))
DVG(I%)=VAL(DATAS(3))
DHE(I%)=VAL(DATAS(5))
DHG(I%)=VAL(DATAS(7))
next I%
REM> READ DESIGN OIL & GLAND BORES.
for I%=SSH% to FSH%
read# 10,37+(2*(I%-1));DATAS(1),DATAS(2),DATAS(3),DATAS(4),\
DATAS(5),DATAS(6),DATAS(7),DATAS(8)
read# 10,38+(2*(I%-1));DATAS(9),DATAS(10),DATAS(11),DATAS(12),\
DATAS(13),DATAS(14),DATAS(15),DATAS(16)
CDVGO(I%)=VAL(DATAS(1))
CDHGO(I%)=VAL(DATAS(3))
CDVGG(I%)=VAL(DATAS(5))
CDHGG(I%)=VAL(DATAS(7))
CDVCG(I%)=VAL(DATAS(9))
CDHCG(I%)=VAL(DATAS(11))
CDVCO(I%)=VAL(DATAS(13))
CDHCO(I%)=VAL(DATAS(15))
next I%

REM> READ CURRENT COUPLINGS.
dim DA(8)
for I%=SSH% to FSH%-1
read# 10,54+(4*(I%-1));DA(1),DA(2),DA(3),DA(4),\
CVE(I%),CHE(I%),CVG(I%),CHG(I%)
next I%
REM> READ CURRENT OIL & GLAND BORES.
for I%=SSH% to FSH%
read# 10,75+(4*(I%-1));DATAS(1),DATAS(2),DATAS(3),DATAS(4),CCVGO(I%),CCHGO(I%)
read# 10,76+(4*(I%-1));DATAS(1),DATAS(2),DATAS(3),DATAS(4),CCVGG(I%),CCHGG(I%)
read# 10,77+(4*(I%-1));DATAS(1),DATAS(2),DATAS(3),DATAS(4),CCVCG(I%),CCHCG(I%)
read# 10,78+(4*(I%-1));DATAS(1),DATAS(2),DATAS(3),DATAS(4),CCVCO(I%),CCHCO(I%)
next I%

for I%=1 to 16
DATAS(I%)=NULL$
next I%
dim DATAS(0), DA(0)
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> CALCULATE X POSITIONS RELATIVE TO GOVERNOR END BEARING (GB).
for SH%=SSH% to FSH%
CD(SH%)=RD(SH%,1)
XGO(SH%)=RD(SH%,5)
XGG(SH%)=RD(SH%,7)
XCG(SH%)=RD(SH%,3)-RD(SH%,8)
XCO(SH%)=RD(SH%,3)-RD(SH%,6)
XGC(SH%)=-RD(SH%,2)
XCB(SH%)=RD(SH%,3)
XCC(SH%)=RD(SH%,3)+RD(SH%,4)
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> SET PROJECTED VALUES EQUAL TO CURRENT VALUES.
REM> VERTICAL BORES
CPVCO(SH%)=CCVCO(SH%)
CPVCG(SH%)=CCVCG(SH%)
CPVGG(SH%)=CCVGG(SH%)
CPVGO(SH%)=CCVGO(SH%)
REM> HORIZONTAL BORES
CPHCO(SH%)=CCHCO(SH%)
CPHCG(SH%)=CCHCG(SH%)
CPHGG(SH%)=CCHGG(SH%)
CPHGO(SH%)=CCHGO(SH%)
next SH%
for SH%=SSH% to FSH%-1
REM> VERTICAL RIM & FACE
PVE(SH%)=CVE(SH%)
PVG(SH%)=CVG(SH%)
REM> HORIZONTAL RIM & FACE
PHE(SH%)=CHE(SH%)
PHG(SH%)=CHG(SH%)
next SH%
dim RD(0)
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> DISPLAY SCREEN # 610 - SHAFT POSTIONER.
gosub 2610.0
dim DATAS(BH%)

REM> INITILIZE RESULTS.
for SH%=SSH% to FSH%
read# 10,102-SH%;DATAS(1),DATAS(2),DATAS(3),DATAS(4),BORES

```

```

        if BORE$="" then BORE$="G"
        if left$(SN$(SH%),3)="GEN" or left$(SN$(SH%),3)="EXC" then BORE$=""
        SMVGB(SH%)=val(DATAS(1))
        SMVCB(SH%)=val(DATAS(2))
        SMHGB(SH%)=val(DATAS(3))
        SMHCB(SH%)=val(DATAS(4))
        NG%=1
        gosub 610.82
        gosub 610.85
        gosub 610.91
        gosub 610.94
        next SH%

        NG%=0
        SH%=SSH%
610.1 read# 10,102+SH%;DATAS(1),DATAS(2),DATAS(3),DATAS(4),BORES
        if BORE$="" then BORE$="G"
        gosub 60.0
        if SH% ne SSH% \
        then call fn.DISPC$(MT%,12,13-(len(SN$(SH%-1))-1)/2,SN$(SH%-1))
        call fn.DISPC$(MT%,12,41-(len(SN$(SH%))+1)/2,SN$(SH%))
        if SH% ne FSH% \
        then call fn.DISPC$(MT%,12,69-(len(SN$(SH%+1))-1)/2,SN$(SH%+1))

        if left$(SN$(SH%),3)="GEN" or left$(SN$(SH%),3)="EXC" \
        then goto 610.2
        call fn.DISPC$(MT%,CL%, 4,17,"C=Coupling, X=Bearing, G=Gland Bore, O=Oil Bore")
        BRGS$="X" :FBRGS$="#"+str$(2*SH%-1)+" " :BBRGS$="#"+str$(2*SH%)-" "
        goto 610.21
610.2 call fn.DISPC$(MT%,CL%, 4,30,"C=Coupling, X=Bearing")
        BRGS$="X" :FBRGS$=" " :BBRGS$=" " :BORES=""

610.21 call fn.DISPC$(MT%,CL%,13,31,BRGS$)
        call fn.DISPC$(MT%,CL%,14,30,FBRGS$)
        call fn.DISPC$(MT%,CL%,13,50,BRGS$)
        call fn.DISPC$(MT%,CL%,14,49,BBRGS$)
        call fn.DISPC$(MT%,CL%,24,6,USERS$," enter moves at Bearings. Press Return to Calculate.")
        gosub 610.80

        gosub 60.5
        SR%=1
        SMVGB(SH%)=val(DATAS(1))
        SMVCB(SH%)=val(DATAS(2))
        SMHGB(SH%)=val(DATAS(3))
        SMHCB(SH%)=val(DATAS(4))
        call fn.DISPC$(MT%,CL%,BR%(1),BC%(1)+BMAX%(1)+1,sn(SMVGB(SH%),"D","U"))
        call fn.DISPC$(MT%,CL%,BR%(2),BC%(2)+BMAX%(2)+1,sn(SMVCB(SH%),"D","U"))
        call fn.DISPC$(MT%,CL%,BR%(3),BC%(3)+BMAX%(3)+1,sn(SMHGB(SH%),"R","L"))
        call fn.DISPC$(MT%,CL%,BR%(4),BC%(4)+BMAX%(4)+1,sn(SMHCB(SH%),"R","L"))
        gosub 610.82
        gosub 610.85
        gosub 610.91
        gosub 610.94

610.3 if SR% le 0 then SR%=1
        NEWDATAS=fn.INPUT$(MT%,CL%,BR%(SR%),BC%(SR%),DATAS(SR%),1,BMIN%(SR%),\
        BMAX%(SR%),BTYPES$(SR%),IFS,22,EQUALS)
        if mid$(NEWDATAS,3,2)="" \
        then KEY%=int(val(left$(NEWDATAS,2))) \
        :NEWDATAS=mid$(NEWDATAS,5,BMAX%(SR%))

        if KEY%=8 then BV=val(NEWDATAS)+0.0005 :goto 610.31
        if KEY%=9 then BV=val(NEWDATAS)-0.0005 :goto 610.31
        if NEWDATAS=DATAS(SR%) then goto 610.35
        BV=val(NEWDATAS)

610.31 DATAS(SR%)=fn.RCS(BV,"###.#####")
        dm1%=fn.BUC$(MT%,BR%(SR%),BC%(SR%),DATAS(SR%),BMAX%(SR%))
        SMVGB(SH%)=val(DATAS(1))
        SMVCB(SH%)=val(DATAS(2))
        SMHGB(SH%)=val(DATAS(3))
        SMHCB(SH%)=val(DATAS(4))
        call fn.DISPC$(MT%,CL%,BR%(1),BC%(1)+BMAX%(1)+1,sn(SMVGB(SH%),"D","U"))
        call fn.DISPC$(MT%,CL%,BR%(2),BC%(2)+BMAX%(2)+1,sn(SMVCB(SH%),"D","U"))
        call fn.DISPC$(MT%,CL%,BR%(3),BC%(3)+BMAX%(3)+1,sn(SMHGB(SH%),"R","L"))
        call fn.DISPC$(MT%,CL%,BR%(4),BC%(4)+BMAX%(4)+1,sn(SMHCB(SH%),"R","L"))

        if SR%=1 or SR%=2 \
        then gosub 610.82 :gosub 610.85 \
        else gosub 610.91 :gosub 610.94

610.35 if KEY%=1 then SR%=SR%-1 :goto 610.3
        if KEY%=2 then SR%=SR%+1 :goto 610.39
        if KEY%=3 then goto 610.4
        if KEY%=4 then goto 610.4
        if KEY%=5 then goto 610.4
        if KEY%=6 \
        then if BORE$="G" \
        then BORE$="O" :gosub 610.80 :gosub 610.85 :gosub 610.94 :goto 610.3 \
        else if BORE$="O" \
        then BORE$="G" :gosub 610.80 :gosub 610.85 :gosub 610.94 :goto 610.3 \
        else goto 610.3
        if KEY%=7 then goto 610.4

610.39 if SR% gt BN% then SR%=BN%
        goto 610.3

610.4 rem
        print# 10,102+SH%;DATAS(1),DATAS(2),DATAS(3),DATAS(4),BORES
        if KEY%=3 or KEY%=7 then goto 610.5
        if KEY%=4 \
        then if SH%=SSH% \
        then goto 610.3 \
        else SH%=SH%-1 :goto 610.1
        if SH%=FSH% then goto 610.3 else SH%=SH%+1 :goto 610.1
610.5 close 10
        if KEY%=7 then goto 610.99
        ROUTE%=6
        chain "C2C"

REM>-----1-----2-----3-----4-----5-----6-----7-----
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> DISPLAY TEMPLATE - BORES
610.80 if BORE$="" then goto 610.81
        if BORE$="G" \
        then OB$="" :GB$="G" :FBORES="Gland" :BBORES="Gland" \
        else OB$="O" :GB$="" :FBORES="Oil" :BBORES="Oil "
        call fn.DISPC$(MT%,CL%, 8,6,FBORES)
        call fn.DISPC$(MT%,CL%, 8,71,BBORES)
        call fn.DISPC$(MT%,CL%,20,6,FBORES)
        call fn.DISPC$(MT%,CL%,20,71,BBORES)
        call fn.DISPC$(MT%,CL%,13,33,OB$)
        call fn.DISPC$(MT%,CL%,13,35,GB$)
        call fn.DISPC$(MT%,CL%,13,46,GB$)
        call fn.DISPC$(MT%,CL%,13,48,OB$)
610.81 return
REM> VERTICAL RIM & FACE

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610.82 if XCB(SH%)=0 then SLV(SH%)=0 else SLV(SH%)=(SMVGB(SH%)-SMVGB(SH%))/XCB(SH%)
if SH%=SSH% then goto 610.83
SMVGB(SH%)=(SLV(SH%)*XGC(SH%))+SMVGB(SH%)
PVE(SH%-1)=SMVCC(SH%-1)-SMVGC(SH%)+CVE(SH%-1)
MVE(SH%-1)=PVE(SH%-1)-DVE(SH%-1)
SMVGF(SH%)=SLV(SH%)*CD(SH%-1)
PVG(SH%-1)=SMVGF(SH%)-SMVCF(SH%-1)+CVG(SH%-1)
MVG(SH%-1)=PVG(SH%-1)-DVG(SH%-1)
if NG%=1 then goto 610.83
call fn.DISPC(MT%,CL%, 6,12," ")
print using "###.####! ###.####! ###.####!"; \
DVE(SH%-1),sn(DVE(SH%-1),"L","H"), \
PVE(SH%-1),sn(PVE(SH%-1),"L","H"),MVE(SH%-1);
call fn.DISPC(MT%,CL%, 7,12," ")
print using "###.####! ###.####! ###.####!"; \
DVG(SH%-1),sn(DVG(SH%-1),"C","O"), \
PVG(SH%-1),sn(PVG(SH%-1),"C","O"),MVG(SH%-1);
610.83 if SH%=FSH% then goto 610.84
SMVCC(SH%)=(SLV(SH%)*XCC(SH%))+SMVGB(SH%)
PVE(SH%)=SMVCC(SH%)-SMVGC(SH%+1)+CVE(SH%)
MVE(SH%)=PVE(SH%)-DVE(SH%)
SMVCF(SH%)=SLV(SH%)*CD(SH%)
PVG(SH%)=SMVGF(SH%+1)-SMVCF(SH%)+CVG(SH%)
MVG(SH%)=PVG(SH%)-DVG(SH%)
if NG%=1 then goto 610.84
call fn.DISPC(MT%,CL%, 6,45," ")
print using "###.####! ###.####! ###.####!"; \
MVE(SH%),PVE(SH%),sn(PVE(SH%),"L","H"), \
DVE(SH%),sn(DVE(SH%),"L","H");
call fn.DISPC(MT%,CL%, 7,45," ")
print using "###.####! ###.####! ###.####!"; \
MVG(SH%),PVG(SH%),sn(PVG(SH%),"C","O"), \
DVG(SH%),sn(DVG(SH%),"C","O");
610.84 return
REM> VERTICAL BORES
610.85 if BORE$="" then goto 610.86
SMVCO(SH%)=(SLV(SH%)*XCO(SH%))+SMVGB(SH%)
SMVCG(SH%)=(SLV(SH%)*XCG(SH%))+SMVGB(SH%)
SMVGG(SH%)=(SLV(SH%)*XGG(SH%))+SMVGB(SH%)
SMVGO(SH%)=(SLV(SH%)*XGO(SH%))+SMVGB(SH%)
CPVCO(SH%)=CCVCO(SH%)+SMVCO(SH%) : CMVCO(SH%)=CPVCO(SH%)-CDVCO(SH%)
CPVCG(SH%)=CCVCG(SH%)+SMVCG(SH%) : CMVCG(SH%)=CPVCG(SH%)-CDVCG(SH%)
CPVGG(SH%)=CCVGG(SH%)+SMVGG(SH%) : CMVGG(SH%)=CPVGG(SH%)-CDVGG(SH%)
CPVGO(SH%)=CCVGO(SH%)+SMVGO(SH%) : CMVGO(SH%)=CPVGO(SH%)-CDVGO(SH%)
if NG%=1 then goto 610.86
call fn.DISPC(MT%,CL%, 8,12," ")
if BORE$="G" \
then print using "###.####! ###.####! ###.####!"; \
CDVCG(SH%),sn(CDVCG(SH%),"L","H"), \
CPVGG(SH%),sn(CPVGG(SH%),"L","H"),CMVGG(SH%); \
else print using "###.####! ###.####! ###.####!"; \
CDVGO(SH%),sn(CDVGO(SH%),"L","H"), \
CPVGO(SH%),sn(CPVGO(SH%),"L","H"),CMVGO(SH%);
call fn.DISPC(MT%,CL%, 8,45," ")
if BORE$="G" \
then print using "###.####! ###.####! ###.####!"; \
CMVCG(SH%),CPVCG(SH%),sn(CPVCG(SH%),"L","H"), \
CDVCG(SH%),sn(CDVCG(SH%),"L","H"); \
else print using "###.####! ###.####! ###.####!"; \
CMVCO(SH%),CPVCO(SH%),sn(CPVCO(SH%),"L","H"), \
CDVCO(SH%),sn(CDVCO(SH%),"L","H");
610.86 return
REM> HORIZONTAL RIM & FACE
610.91 if XCB(SH%)=0 then SLH(SH%)=0 else SLH(SH%)=(SMHCB(SH%)-SMHGB(SH%))/XCB(SH%)
if SH%=SSH% then goto 610.92
SMHGC(SH%)=(SLH(SH%)*XGC(SH%))+SMHGB(SH%)

PHE(SH%-1)=SMHCC(SH%-1)-SMHGC(SH%)+CHE(SH%-1)
MHE(SH%-1)=PHE(SH%-1)-DHE(SH%-1)
SMHGF(SH%)=SLH(SH%)*CD(SH%-1)
PHG(SH%-1)=SMHGF(SH%)-SMHCF(SH%-1)+CHG(SH%-1)
MHG(SH%-1)=PHG(SH%-1)-DHG(SH%-1)
if NG%=1 then goto 610.92
call fn.DISPC(MT%,CL%,18,12," ")
print using "###.####! ###.####! ###.####!"; \
DHE(SH%-1),sn(DHE(SH%-1),"R","L"), \
PHE(SH%-1),sn(PHE(SH%-1),"R","L"),MHE(SH%-1);
call fn.DISPC(MT%,CL%,19,12," ")
print using "###.####! ###.####! ###.####!"; \
DHG(SH%-1),sn(DHG(SH%-1),"C","O"), \
PHG(SH%-1),sn(PHG(SH%-1),"C","O"),MHG(SH%-1);
610.92 if SH%=FSH% then goto 610.94
SMHCC(SH%)=(SLH(SH%)*XCC(SH%))+SMHGB(SH%)
PHE(SH%)=SMHCC(SH%)-SMHGC(SH%+1)+CHE(SH%)
MHE(SH%)=PHE(SH%)-DHE(SH%)
SMHCF(SH%)=SLH(SH%)*CD(SH%)
PHG(SH%)=SMHGF(SH%+1)-SMHCF(SH%)+CHG(SH%)
MHG(SH%)=PHG(SH%)-DHG(SH%)
if NG%=1 then goto 610.93
call fn.DISPC(MT%,CL%,18,45," ")
print using "###.####! ###.####! ###.####!"; \
MHE(SH%),PHE(SH%),sn(PHE(SH%),"R","L"), \
DHE(SH%),sn(DHE(SH%),"R","L");
call fn.DISPC(MT%,CL%,19,45," ")
print using "###.####! ###.####! ###.####!"; \
MHG(SH%),PHG(SH%),sn(PHG(SH%),"C","O"), \
DHG(SH%),sn(DHG(SH%),"C","O");
610.93 return
REM> HORIZONTAL BORES
610.94 if BORE$="" then goto 610.95
SMHCO(SH%)=(SLH(SH%)*XCO(SH%))+SMHGB(SH%)
SMHCG(SH%)=(SLH(SH%)*XCG(SH%))+SMHGB(SH%)
SMHGG(SH%)=(SLH(SH%)*XGG(SH%))+SMHGB(SH%)
SMHGO(SH%)=(SLH(SH%)*XGO(SH%))+SMHGB(SH%)
CPHCO(SH%)=CCHCO(SH%)+SMHCO(SH%) : CMHCO(SH%)=CPHCO(SH%)-CDHCO(SH%)
CPHCG(SH%)=CCHCG(SH%)+SMHCG(SH%) : CMHCG(SH%)=CPHCG(SH%)-CDHCG(SH%)
CPHGG(SH%)=CCHGG(SH%)+SMHGG(SH%) : CMHGG(SH%)=CPHGG(SH%)-CDHGG(SH%)
CPHGO(SH%)=CCHGO(SH%)+SMHGO(SH%) : CMHGO(SH%)=CPHGO(SH%)-CDHGO(SH%)
if NG%=1 then goto 610.95
call fn.DISPC(MT%,CL%,20,12," ")
if BORE$="G" \
then print using "###.####! ###.####! ###.####!"; \
CDHGG(SH%),sn(CDHGG(SH%),"R","L"), \
CPHGG(SH%),sn(CPHGG(SH%),"R","L"),CMHGG(SH%); \
else print using "###.####! ###.####! ###.####!"; \
CDHGO(SH%),sn(CDHGO(SH%),"R","L"), \
CPHGO(SH%),sn(CPHGO(SH%),"R","L"),CMHGO(SH%);
call fn.DISPC(MT%,CL%,20,45," ")
if BORE$="G" \
then print using "###.####! ###.####! ###.####!"; \
CMHCG(SH%),CPHCG(SH%),sn(CPHCG(SH%),"R","L"), \
CDHCG(SH%),sn(CDHCG(SH%),"R","L"); \
else print using "###.####! ###.####! ###.####!"; \
CMHCO(SH%),CPHCO(SH%),sn(CPHCO(SH%),"R","L"), \
CDHCO(SH%),sn(CDHCO(SH%),"R","L");
610.95 return

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REM>-----1-----2-----3-----4-----5-----6-----7-----
010,00 call fn.CLS%(1,15)
call fn.DISPN%(1,1,1,UNIT%)
call fn.DISPN%(1,1,80-len(COMPS),COMPS)
call fn.DISPN%(1,7,16,"SHAFT POSITIONING COMPLETE")
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> WRITE TO WORK FILE,
create "WORK.ODD" recl 80 as 5
print# 5,1;0,0
J%=1
F8$="###.###.###.###.###.###.###.###.###.###.###.###.###.###.###.###"
for I%=SSH% to FSH%
print using F8$;# 5, 1+J%;SMVGB(I%),SMVCB(I%),SMHGB(I%),SMHCB(I%),SMVCC(I%),SMVCC(I%),SMHCC(I%),SMHCC(I%)
print using F8$;# 5, 2+J%;CMVGO(I%),CMVGG(I%),CMVCG(I%),CMVCO(I%),CMHGO(I%),CMHGG(I%),CMHCG(I%),CMHCO(I%)
print using F8$;# 5, 3+J%;CPVGO(I%),CPVGG(I%),CPVCG(I%),CPVCO(I%),CPHGO(I%),CPHGG(I%),CPHCG(I%),CPHCO(I%)
print using F8$;# 5, 4+J%;SMVGF(I%),SMVCF(I%),SMHGF(I%),SMHCF(I%),0,0,0,0
J%=J%+4
next I%
for I%=SSH% to FSH%-1
print using F8$;# 5,1+J%;PVE(I%),MVE(I%),PVG(I%),MVG(I%),PHE(I%),MHE(I%),PHG(I%),MHG(I%)
J%=J%+1
next I%
close 5
chain "C2J"
REM>-----1-----2-----3-----4-----5-----6-----7-----
%include SUB00
%include SUB01
%include SUB2010

```

```

REM> Copyright (C) COMPAD Incorporated 1984,5,6
REM> ALL RIGHTS RESERVED
REM>
REM> TITLE: C2-TURBINE GENERATOR ALIGNMENT SYSTEM
REM> VERSION: 89.1
REM> REVISION: a)2-21-89
REM> FILE: C2J - CALCULATIONS: FINISH CALCULATIONS
REM>
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> SETUP,
%include COMMON
def fn.DISPN%(MT%,ROW%,COL%,SS) external
fend
def fn.CLS%(MT%,CL%) external
fend
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> READ NUMBER OF SHAFTS
open ODD$ recl 81 as 10
read# 10,6;MFR$
MFR$=ucase$(MFR$)
dim SNS(7)
read# 10,8;NSH%,SNS(1),SNS(2),SNS(3),SNS(4),SNS(5),SNS(6),SNS(7)
read# 10,9;SSH%,FSH%,REF%,DD$,AUTOS$
SG%=(REF%-1)
SC%=(REF%+1)
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> INITIALIZE & DIMENSION VARIABLES.
I%=NSH%
dim RD(I%,8)
dim RDC(I%,2),RDG(16),RDE(16)
dim XGS(I%),XCS(I%),XG(14),XE(14)
dim SMVCB(I%),SMHCB(I%),SMVGB(I%),SMHGB(I%)
dim SLV(I%),SLH(I%)
dim PACB(I%,5),PAGB(I%,5)
dim SVCB(I%,5),SVGB(I%,5)
dim SHCB(I%,5),SHGB(I%,5)
dim STCB(I%,5),STGB(I%,5)
dim CMVCO(I%),CMVCG(I%)
dim CMHCO(I%),CMHCG(I%)
dim CMVGO(I%),CMVGG(I%)
dim CMHGO(I%),CMHGG(I%)
dim SLVC(I%),SLHC(I%)
dim CMVCS(I%),CMVGS(I%)
dim CMHCS(I%),CMHGS(I%)
dim MG(14),ME(14)
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> READ DATA.
REM> READ ROTOR GEOMETRY (RD=ROTOR DIMENSION).
dim DATAS(16)
for I%=SSH% to FSH%
read# 10,10-I%,DATAS(1),DATAS(2),DATAS(3),DATAS(4)

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        DATAS(5),DATAS(6),DATAS(7),DATAS(8)
RD(I%,1)=VAL(DATAS(1))
RD(I%,2)=VAL(DATAS(2))
RD(I%,3)=VAL(DATAS(3))
RD(I%,4)=VAL(DATAS(4))
RD(I%,5)=VAL(DATAS(5))
RD(I%,6)=VAL(DATAS(6))
RD(I%,7)=VAL(DATAS(7))
RD(I%,8)=VAL(DATAS(8))
next I%
REM> READ BEARING GEOMETRY (PAGB=PAD ANGLE GOV. SIDE BEARING, PACB=COL. SIDE).
for I%=SSH% to FSH%
read# 10,17+I%;DATAS(1),DATAS(2),DATAS(3),DATAS(4),DATAS(5),\
    DATAS(6),DATAS(7),DATAS(8),DATAS(9),DATAS(10)

if DATAS(1)="" then PAGB(I%,1)=99.1234 else PAGB(I%,1)=VAL(DATAS(1))
if DATAS(2)="" then PAGB(I%,2)=99.1234 else PAGB(I%,2)=VAL(DATAS(2))
if DATAS(3)="" then PAGB(I%,3)=99.1234 else PAGB(I%,3)=VAL(DATAS(3))
if DATAS(4)="" then PAGB(I%,4)=99.1234 else PAGB(I%,4)=VAL(DATAS(4))
if DATAS(5)="" then PAGB(I%,5)=99.1234 else PAGB(I%,5)=VAL(DATAS(5))

if DATAS(6)="" then PACB(I%,1)=99.1234 else PACB(I%,1)=VAL(DATAS(6))
if DATAS(7)="" then PACB(I%,2)=99.1234 else PACB(I%,2)=VAL(DATAS(7))
if DATAS(8)="" then PACB(I%,3)=99.1234 else PACB(I%,3)=VAL(DATAS(8))
if DATAS(9)="" then PACB(I%,4)=99.1234 else PACB(I%,4)=VAL(DATAS(9))
if DATAS(10)="" then PACB(I%,5)=99.1234 else PACB(I%,5)=VAL(DATAS(10))
next I%
REM> READ CASING GEOMETRY.
read# 10,25;DATAS(1),DATAS(2),DATAS(3),DATAS(4),\
    DATAS(5),DATAS(6),DATAS(7),DATAS(8)
read# 10,26;DATAS(9),DATAS(10),DATAS(11),DATAS(12),\
    DATAS(13),DATAS(14)
for I%=SSH% to FSH%
if DATAS(I%*2-1)="" then RDC(I%,1)=99.1234 else RDC(I%,1)=VAL(DATAS(I%*2-1))
if DATAS(I%*2)="" then RDC(I%,2)=99.1234 else RDC(I%,2)=VAL(DATAS(I%*2))
next I%
read# 10,27;DATAS(1),DATAS(2),DATAS(3),DATAS(4),\
    DATAS(5),DATAS(6),DATAS(7),DATAS(8)
read# 10,28;DATAS(9),DATAS(10),DATAS(11),DATAS(12),\
    DATAS(13),DATAS(14),DATAS(15),DATAS(16)
for I%=1 to 16
if DATAS(I%)="" then RDG(I%)=99.1234 else RDG(I%)=VAL(DATAS(I%))
next I%
read# 10,29;DATAS(1),DATAS(2),DATAS(3),DATAS(4),\
    DATAS(5),DATAS(6),DATAS(7),DATAS(8)
read# 10,30;DATAS(9),DATAS(10),DATAS(11),DATAS(12),\
    DATAS(13),DATAS(14),DATAS(15),DATAS(16)
for I%=1 to 16
if DATAS(I%)="" then RDE(I%)=99.1234 else RDE(I%)=VAL(DATAS(I%))
next I%

for I%=1 to 16
DATAS(I%)=NULL$
next I%
dim DATAS(0), DA(0)
close 10
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> READ WORK FILE.
open "WORK.DDD" rec1 80 as 5
read# 5,1;CNT%,CN%
J%=1
for I%=SSH% to FSH%
read# 5, 1+J%;SMVGB(I%),SMVCB(I%),SMHGB(I%),SMHCB(I%)
read# 5, 2+J%;CMVGO(I%),CMVGG(I%),CMVCG(I%),CMVCO(I%),CMHGO(I%),CMHGG(I%),CMHCG(I%),CMHCO(I%)
J%=J%+4
next I%

close 5
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> CALCULATE VERTICAL & HORIZONTAL MOVES.
20.35 call fn.DISPN%(1,18,16,"COMPLETING CALCULATIONS.....")
for I%=SSH% to FSH%
if left$(SNS(I%),3)="GEN" then goto 20.36
if left$(SNS(I%),3)="EXC" then goto 20.36
REM> CALCULATE BEARING SHIM MOVES.
for L%=1 to 5
if PACB(I%,L%)=99.1234 then SHCB(I%,L%)=0 :SVCB(I%,L%)=0 :goto 20.351
SHCB(I%,L%)=SMHCB(I%)*SIN(PACB(I%,L%)*3.1415926/180)
SVCB(I%,L%)=-SMVCB(I%)*COS(PACB(I%,L%)*3.1415926/180)
20.351 STCB(I%,L%)=SHCB(I%,L%)+SVCB(I%,L%)
if PAGB(I%,L%)=99.1234 then SHGB(I%,L%)=0 :SVGB(I%,L%)=0 :goto 20.352
SHGB(I%,L%)=SMHGB(I%)*SIN(PAGB(I%,L%)*3.1415926/180)
SVGB(I%,L%)=-SMVGB(I%)*COS(PAGB(I%,L%)*3.1415926/180)
20.352 STGB(I%,L%)=SHGB(I%,L%)+SVGB(I%,L%)
next L%
CN%=CN%+30 :call fn.DISPN%(1,18,49,str$(CN%))

if left$(SNS(I%),3)="EXC" then goto 20.37
if left$(SNS(I%),2)="HP" or left$(SNS(I%),2)="IP" then goto 20.353
goto 20.38
REM> HP OR IP, CALCULATE CASING SHIM MOVES.
20.353 if -RD(I%,7)+RD(I%,3)-RD(I%,8)=0 then SLVC(I%)=0 :SLHC(I%)=0 \
    else SLVC(I%)=(CMVCG(I%)-CMVGG(I%))/(-RD(I%,7)+RD(I%,3)-RD(I%,8)) \
    :SLHC(I%)=(CMHCG(I%)-CMHGG(I%))/(-RD(I%,7)+RD(I%,3)-RD(I%,8))

if RDC(I%,1)=99.1234 then CMVGS(I%)=99.1234 \
    else XGS(I%)=-RD(I%,7)+RDC(I%,1) \
    :CMVGS(I%)=SLVC(I%)*XGS(I%)+CMVGG(I%)

if RDC(I%,2)=99.1234 then CMVCS(I%)=99.1234 \
    else XCS(I%)=-RD(I%,7)-RD(I%,3)-RDC(I%,2) \
    :CMVCS(I%)=SLVC(I%)*XCS(I%)+CMVGG(I%)
CN%=CN%+6 :call fn.DISPN%(1,18,48,str$(CN%))
goto 20.38
REM> GENERATORS & EXCITORS.
REM> CALCULATE FRAME SHIM MOVES.
20.36 if RD(I%,3)=0 then SLVC(I%)=0 :SLHC(I%)=0 \
    else SLVC(I%)=(SMVCB(I%)-SMVGB(I%))/RD(I%,3) \
    :SLHC(I%)=(SMHCB(I%)-SMHGB(I%))/RD(I%,3)
CN%=CN%+2 :call fn.DISPN%(1,18,49,str$(CN%))

if left$(SNS(I%),3)="EXC" then goto 20.37
if match("WEST",MFR$,1) ne 0 then goto 20.365
REM> GE - GENERATOR.
if RDG(1)=99.1234 then CMHGS(I%)=99.1234 \
    else XGS(I%)=-RDG(1) \
    :CMHGS(I%)=SLHC(I%)*XGS(I%)+SMHGB(I%)

if RDG(2)=99.1234 or RDG(1)=99.1234 then MG(1)=99.1234 \

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else XG(1)=XGS(I%)+RDG(2)/2 \
      :MG(1)=SLVC(I%)*XG(1)+SMVGB(I%)

for J%=2 to 7
if RDG(J%+1)=99.1234 or RDG(1)=99.1234 then MG(J%)=99.1234 :goto 20.361
XG(J%)=XGS(I%)+RDG(J%+1)/2
for K%=2 to J%
if RDG(K%) ne 99.1234 then XG(J%)=XG(J%)+RDG(K%)
next K%
MG(J%)=SLVC(I%)*XG(J%)+SMVGB(I%)
20.361 next J%

if RDG(9)=99.1234 then CMHCS(I%)=99.1234 \
else XCS(I%)=RD(I%,3)+RDG(9) \
      :CMHCS(I%)=SLHC(I%)*XCS(I%)+SMHGB(I%)

if RDG(16)=99.1234 or RDG(9)=99.1234 then MG(14)=99.1234 \
else XG(14)=XCS(I%)-RDG(16)/2 \
      :MG(14)=SLVC(I%)*XG(14)+SMVGB(I%)

for J%=13 to 8 step -1
if RDG(J%+2)=99.1234 or RDG(9)=99.1234 then MG(J%)=99.1234 :goto 20.362
XG(J%)=XCS(I%)-RDG(J%+2)/2
for K%=16 to J%+3 step -1
if RDG(K%) ne 99.1234 then XG(J%)=XG(J%)-RDG(K%)
next K%
MG(J%)=SLVC(I%)*XG(J%)+SMVGB(I%)
20.362 next J%
CN%=CN%+20 :call fn.DISPN$(1,18,49,str$(CN%))
goto 20.38

REM> WEST - GENERATOR.
20.365

if RDG(1)=99.1234 \
then CMHCS(I%)=99.1234 \
else XCS(I%)=RD(I%,3)+RDG(1) \
      :CMHCS(I%)=SLHC(I%)*XCS(I%)+SMHGB(I%)

if RDG(15)=99.1234 or RDG(1)=99.1234 \
then MG(14)=99.1234 \
else XG(14)=XCS(I%)-RDG(15)/2 \
      :MG(14)=SLVC(I%)*XG(14)+SMVGB(I%)

for J%=13 to 1 step -1
if RDG(J%+1)=99.1234 or RDG(1)=99.1234 \
then MG(J%)=99.1234 \
      :goto 20.366
XG(J%)=XCS(I%)-RDG(J%+1)/2
for K%=15 to J%+2 step -1
if RDG(K%) ne 99.1234 \
then XG(J%)=XG(J%)-RDG(K%)
next K%
MG(J%)=SLVC(I%)*XG(J%)+SMVGB(I%)
20.366 next J%

if RDG(1)=99.1234 \
then CMHGS(I%)=99.1234 \
      :goto 20.38
XGS(I%)=XCS(I%)
for K%=15 to 2 step -1
if RDG(K%) ne 99.1234 \
then XGS(I%)=XGS(I%)-RDG(K%)
next K%
CMHGS(I%)=SLHC(I%)*XGS(I%)+SMHGB(I%)

CN%=CN%+22 :call fn.DISPN$(1,18,49,str$(CN%))

goto 20.38

REM> ALL EXCITORS.
20.37

if RDE(1)=99.1234 \
then CMHCS(I%)=99.1234 \
else XCS(I%)=RD(I%,3)+RDE(1) \
      :CMHCS(I%)=SLHC(I%)*XCS(I%)+SMHGB(I%)

if RDE(15)=99.1234 or RDE(1)=99.1234 \
then ME(14)=99.1234 \
else XE(14)=XCS(I%)-RDE(15)/2 \
      :ME(14)=SLVC(I%)*XE(14)+SMVGB(I%)

for J%=13 to 1 step -1
if RDE(J%+1)=99.1234 or RDE(1)=99.1234 \
then ME(J%)=99.1234 \
      :goto 20.371
XE(J%)=XCS(I%)-RDE(J%+1)/2
for K%=15 to J%+2 step -1
if RDE(K%) ne 99.1234 \
then XE(J%)=XE(J%)-RDE(K%)
next K%
ME(J%)=SLVC(I%)*XE(J%)+SMVGB(I%)
20.371 next J%

if RDE(1)=99.1234 \
then CMHGS(I%)=99.1234 \
      :goto 20.38
XGS(I%)=XCS(I%)
for K%=15 to 2 step -1
if RDE(K%) ne 99.1234 \
then XGS(I%)=XGS(I%)-RDE(K%)
next K%
CMHGS(I%)=SLHC(I%)*XGS(I%)+SMHGB(I%)

CN%=CN%+22 :call fn.DISPN$(1,18,49,str$(CN%))

20.38

next I%
if CN%<100 then call fn.DISPN$(1,18,49," "+str$(CN%)+ " COMPLETED") \
else call fn.DISPN$(1,18,49,str$(CN%)+ " COMPLETED")
CNT%=CNT%+CN%

REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> WRITE TO WORK FILE.
create "WORK1.DDD" rec1 80 as 6
J%=0
F7$=""###.###.###.####.###.###.###.####.###.####.###.####.###.####
for I%=SSH% to FSH%
print using F7$;# 6, 1+J%;STGB(I%,1),STGB(I%,2),STGB(I%,3),STGB(I%,4),ST
print using F7$;# 6, 2+J%;STCB(I%,1),STCB(I%,2),STCB(I%,3),STCB(I%,4),ST
print using F7$;# 6, 3+J%;CMVGS(I%),CMVCS(I%),CMHGS(I%),CMHCS(I%),0,0,0
J%=J%+3
next I%
print using F7$;# 6,1+J%;MG(1),MG(2),MG(3),MG(4),MG(5),MG(6),MG(7)
print using F7$;# 6,2+J%;MG(8),MG(9),MG(10),MG(11),MG(12),MG(13),MG(14)
print using F7$;# 6,3+J%;ME(1),ME(2),ME(3),ME(4),ME(5),ME(6),ME(7)
print using F7$;# 6,4+J%;ME(8),ME(9),ME(10),ME(11),ME(12),ME(13),ME(14)
```

```

close 6
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> PRINT COMPLETE MESSAGE.
REM> call fn.DISPN%(1,20,16,"CALCULATIONS COMPLETE, "+str$(CNT%)+ " TOTAL")
REM> call fn.DISPN%(1,24,10,"Reading Calculation Reports. Just a moment, please...")
REM> chain "C2K"

```

```

REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> Copyright (C) COMPAD Incorporated 1984,5,6
REM> ALL RIGHTS RESERVED
REM>
REM> TITLE: C2-TURBINE GENERATOR ALIGNMENT SYSTEM
REM> VERSION: 86.1
REM> REVISION: a)1-15-86
REM> FILE: C2K - CALCULATIONS: BEARING PAD SHIM REPORT
REM>
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> SETUP.

```

```
%include COMMON
```

```

def fn.INP% external
fend
def fn.RCS(RNUM,FORM%) external
fend
def fn.DISPN%(MT%,ROW%,COL%,S%) external
fend
def fn.CLS%(MT%,CL%) external
fend
def fn.HOME% external
fend
def fn.DEL% external
fend
def fn.CLW%(MT%,CL%,WTR%,WTC%,WBR%,WBC%) external
fend

```

```

REM> READ NUMBER OF SHAFTS
open DDD$ rec1 81 as 10
read# 10,1;NAME$
read# 10,6;MFR$
MFR$=ucase$(MFR$)
dim SNS(7)
read# 10,8;NSH%,SNS(1),SNS(2),SNS(3),SNS(4),SNS(5),SNS(6),SNS(7)
read# 10,9;SSH%,FSH%,REF%,DD$,AUTOS
if DD$="Desired" then DESS="Desired" else DESS="Design"

```

```

REM> SET UP REPORT TOP & BOTTOM.
DS=DATE$
MONTHS="JANFEBMARAPRPMAYJUNJULAUGSEPOCTNOVDEC"
I%=val(mid$(DS,3,2))
DATS=mid$(DS,5,2)+mid$(MONTHS,(I%*3)-2,3)+mid$(DS,1,2)
TS=TIME$
I%=val(left$(TS,2))
if I% gt 11 then I%=I%-12 :MS="PM" else MS="AM"
if I%=0 then I%=12
if I% gt 9 then SHRS=str$(I%) else SHRS=" " +str$(I%)
TIMS=SHRS+"."+mid$(TS,3,2)+MS
NLEN%=len(NAME$)+len(DATS)+len(TIMS)
UNDERS="-----"
EQUALS="=====
BLANKS=\\

TOPS=\\
Prepared by - "+NAME$+left$(BLANKS,54-NLEN%)+TIMS+" "+DATS
ASTS=\\
*****

```

```

"      BOTS=\
      Copyright (C) COMPAD Incorporated 1984,5,6
      "+SER$

      NLEN% = len(SN$(REF%)) + len(DD$)
      if DD$ = "Manually" \
      then DTOP1$ = \
      Reference Shaft: "+SN$(REF%) + left$(BLANK$, 34 - NLEN%) + "Positioned "+DD$+" by User" \
      else DTOP1$ = \
      Reference Shaft: "+SN$(REF%) + left$(BLANK$, 29 - NLEN%) + "Positioned To "+DD$+" Alignment"
      if AUTOS = "Off" \
      then DTOP2$ = "Auto-Position: "+AUTOS \
      else DTOP2$ = "Auto-Position: Using "+AUTOS+" Bores"
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> VARIABLE NAMING CONVENTION.
REM>
REM> 1 2 3 4 5
REM> - - - - -
REM> | | | | +----> C=Coupling, B=Bearing, O=Oil, S=casing Shim, G=Gland
REM> | | | | +----> G=Governor end, C=Collector end
REM> | | | | +----> V=Vertical, H=Horizontal
REM> | | | | +----> D=Design, C=Current, M=Move, Projected
REM> | | | | +----> S=relative Shaft position, C=shaft position in Casing
REM>
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> INITIALIZE & DIMENSION VARIABLES.
      I% = NSH%
      dim DVG(I% - 1), DHG(I% - 1), DVE(I% - 1), DHE(I% - 1)
      dim CVG(I% - 1), CHG(I% - 1), CVE(I% - 1), CHE(I% - 1)
      dim PVG(I% - 1), PHG(I% - 1), PVE(I% - 1), PHE(I% - 1)
      dim MVG(I% - 1), MHG(I% - 1), MVE(I% - 1), MHE(I% - 1)

      dim SMVCC(I%), SMVCB(I%)
      dim SMHCC(I%), SMHCB(I%)
      dim SMVGC(I%), SMVGB(I%)
      dim SMHGC(I%), SMHGB(I%)
      dim SMVGF(I%), SMVCF(I%), SMHGF(I%), SMHCF(I%)

      dim PACB(I%, 5), PAGB(I%, 5), RD(I%, 4)
      dim STCB(I%, 5), STGB(I%, 5)

      dim CDVCO(I%), CDVCG(I%)
      dim CDHCO(I%), CDHCG(I%)
      dim CDVGO(I%), CDVGG(I%)
      dim CDHGO(I%), CDHGG(I%)

      dim CCVCO(I%), CCVCG(I%)
      dim CCHCO(I%), CCHCG(I%)
      dim CCVGO(I%), CCVGG(I%)
      dim CCHGO(I%), CCHGG(I%)

      dim CPVCO(I%), CPVCG(I%)
      dim CPHCO(I%), CPHCG(I%)
      dim CPVGO(I%), CPVGG(I%)
      dim CPHGO(I%), CPHGG(I%)

      dim CMVCO(I%), CMVCG(I%)
      dim CMHCO(I%), CMHCG(I%)
      dim CMVGO(I%), CMVGG(I%)
      dim CMHGO(I%), CMHGG(I%)

      dim CMVCS(I%), CMVGS(I%)
      dim CMHCS(I%), CMHGS(I%)
      dim MG(14), ME(14)
REM>-----1-----2-----3-----4-----5-----6-----7-----
      dim DATAS(16)

REM> READ ROTOR GEOMETRY (RD=ROTOR DIMENSION).
      for I% = SSH% to FSH%
      read# 10, 10 + I%; DATAS(1), DATAS(2), DATAS(3), DATAS(4), \
      DATAS(5), DATAS(6), DATAS(7), DATAS(8)
      RD(I%, 2) = VAL(DATAS(2))
      RD(I%, 4) = VAL(DATAS(4))
      next I%
REM> READ BEARING GEOMETRY (PAGB=PAD ANGLE GOV. SIDE BEARING, PACB=COL. SIDE).
      for I% = SSH% to FSH%
      read# 10, 17 + I%; DATAS(1), DATAS(2), DATAS(3), DATAS(4), DATAS(5), \
      DATAS(6), DATAS(7), DATAS(8), DATAS(9), DATAS(10)

      if DATAS(1) = "" then PAGB(I%, 1) = 99.1234 else PAGB(I%, 1) = VAL(DATAS(1))
      if DATAS(2) = "" then PAGB(I%, 2) = 99.1234 else PAGB(I%, 2) = VAL(DATAS(2))
      if DATAS(3) = "" then PAGB(I%, 3) = 99.1234 else PAGB(I%, 3) = VAL(DATAS(3))
      if DATAS(4) = "" then PAGB(I%, 4) = 99.1234 else PAGB(I%, 4) = VAL(DATAS(4))
      if DATAS(5) = "" then PAGB(I%, 5) = 99.1234 else PAGB(I%, 5) = VAL(DATAS(5))

      if DATAS(6) = "" then PACB(I%, 1) = 99.1234 else PACB(I%, 1) = VAL(DATAS(6))
      if DATAS(7) = "" then PACB(I%, 2) = 99.1234 else PACB(I%, 2) = VAL(DATAS(7))
      if DATAS(8) = "" then PACB(I%, 3) = 99.1234 else PACB(I%, 3) = VAL(DATAS(8))
      if DATAS(9) = "" then PACB(I%, 4) = 99.1234 else PACB(I%, 4) = VAL(DATAS(9))
      if DATAS(10) = "" then PACB(I%, 5) = 99.1234 else PACB(I%, 5) = VAL(DATAS(10))
      next I%
REM> READ DESIGN/DESIRED COUPLINGS.
      for I% = SSH% to FSH% - 1
      read# 10, 30 + I%; DATAS(1), DATAS(2), DATAS(3), DATAS(4), \
      DATAS(5), DATAS(6), DATAS(7), DATAS(8)
      if DD$ = "Desired" then goto 20.01
      DVE(I%) = VAL(DATAS(1))
      DVG(I%) = VAL(DATAS(3))
      DHE(I%) = VAL(DATAS(5))
      DHG(I%) = VAL(DATAS(7))
      goto 20.02
20.01 if DATAS(2) = "" then DVE(I%) = VAL(DATAS(1)) else DVE(I%) = VAL(DATAS(2))
      if DATAS(4) = "" then DVG(I%) = VAL(DATAS(3)) else DVG(I%) = VAL(DATAS(4))
      if DATAS(6) = "" then DHE(I%) = VAL(DATAS(5)) else DHE(I%) = VAL(DATAS(6))
      if DATAS(8) = "" then DHG(I%) = VAL(DATAS(7)) else DHG(I%) = VAL(DATAS(8))
20.02 next I%
REM> READ DESIGN/DESIRED OIL & GLAND BORES.
      for I% = SSH% to FSH%
      read# 10, 37 + (2 * (I% - 1)); DATAS(1), DATAS(2), DATAS(3), DATAS(4), \
      DATAS(5), DATAS(6), DATAS(7), DATAS(8)
      read# 10, 38 + (2 * (I% - 1)); DATAS(9), DATAS(10), DATAS(11), DATAS(12), \
      DATAS(13), DATAS(14), DATAS(15), DATAS(16)
      if DD$ = "Desired" then goto 20.04
      CDVGO(I%) = VAL(DATAS(1))
      CDHGO(I%) = VAL(DATAS(3))
      CDVGG(I%) = VAL(DATAS(5))
      CDHGG(I%) = VAL(DATAS(7))
      CDVCG(I%) = VAL(DATAS(9))
      CDHCG(I%) = VAL(DATAS(11))
      CDVCO(I%) = VAL(DATAS(13))
      CDHCO(I%) = VAL(DATAS(15))
      goto 20.05
20.04 if DATAS(2) = "" then CDVGO(I%) = VAL(DATAS(1)) else CDVGO(I%) = VAL(DATAS(2))
      if DATAS(4) = "" then CDHGO(I%) = VAL(DATAS(3)) else CDHGO(I%) = VAL(DATAS(4))
      if DATAS(6) = "" then CDVGG(I%) = VAL(DATAS(5)) else CDVGG(I%) = VAL(DATAS(6))

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```

if DATA$(8)="" then CDHGG(I%)=VAL(DATA$(7)) else CDHGG(I%)=VAL(DATA$(8))
if DATA$(10)="" then CDVCG(I%)=VAL(DATA$(9)) else CDVCG(I%)=VAL(DATA$(10))
if DATA$(12)="" then CDHCG(I%)=VAL(DATA$(11)) else CDHCG(I%)=VAL(DATA$(12))
if DATA$(14)="" then CDVCO(I%)=VAL(DATA$(13)) else CDVCO(I%)=VAL(DATA$(14))
if DATA$(16)="" then CDHCO(I%)=VAL(DATA$(15)) else CDHCO(I%)=VAL(DATA$(16))
20.05 next I%
REM> READ CURRENT COUPLINGS.
dim DA(8)
for I%=SSH% to FSH%-1
read# 10,54+(4*(I%-1));DA(1),DA(2),DA(3),DA(4),\
CVE(I%),CHE(I%),CVG(I%),CHG(I%)
next I%
REM> READ CURRENT OIL & GLAND BORES.
for I%=SSH% to FSH%
20.08 read# 10,75+(4*(I%-1));D1$,D2$,D3$,D4$,CCVGO(I%),CCHGO(I%)
read# 10,76+(4*(I%-1));D1$,D2$,D3$,D4$,CCVGG(I%),CCHGG(I%)
read# 10,77+(4*(I%-1));D1$,D2$,D3$,D4$,CCVCG(I%),CCHCG(I%)
read# 10,78+(4*(I%-1));D1$,D2$,D3$,D4$,CCVCO(I%),CCHCO(I%)
next I%

for I%=1 to 16
DATA$(I%)=NULL$
next I%
dim DATA$(0), DA(0)
close 10
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> READ WORK FILE.
open "WORK.DDD" recl 80 as 5
J%=1
for I%=SSH% to FSH%
read# 5, 1+J%;SMVGB(I%),SMVCB(I%),SMHGB(I%),SMHCB(I%),SMVGC(I%),SMVCC(I%),SMHGC(I%),SMHCC(I%)
read# 5, 2+J%;CMVGO(I%),CMVGG(I%),CMVCG(I%),CMVCO(I%),CMHGO(I%),CMHGG(I%),CMHCG(I%),CMHCO(I%)
read# 5, 3+J%;CPVGO(I%),CPVGG(I%),CPVCG(I%),CPVCO(I%),CPHGO(I%),CPHGG(I%),CPHCG(I%),CPHCO(I%)
read# 5, 4+J%;SMVGF(I%),SMVCF(I%),SMHGF(I%),SMHCF(I%)
J%=J%+4
next I%
for I%=SSH% to FSH%-1
read# 5,1+J%;PVE(I%),MVE(I%),PVG(I%),MVG(I%),PHE(I%),MHE(I%),PHG(I%),MHG(I%)
J%=J%+1
next I%
delete 5
open "WORK1.DDD" recl 80 as 6
J%=0
for I%=SSH% to FSH%
read# 6, 1+J%;STGB(I%,1),STGB(I%,2),STGB(I%,3),STGB(I%,4),STGB(I%,5)
read# 6, 2+J%;STCB(I%,1),STCB(I%,2),STCB(I%,3),STCB(I%,4),STCB(I%,5)
read# 6, 3+J%;CMVGS(I%),CMVCS(I%),CMHGS(I%),CMHCS(I%)
J%=J%+3
next I%
read# 6,1+J%;MG(1),MG(2),MG(3),MG(4),MG(5),MG(6),MG(7)
read# 6,2+J%;MG(8),MG(9),MG(10),MG(11),MG(12),MG(13),MG(14)
read# 6,3+J%;ME(1),ME(2),ME(3),ME(4),ME(5),ME(6),ME(7)
read# 6,4+J%;ME(8),ME(9),ME(10),ME(11),ME(12),ME(13),ME(14)
delete 6
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> PRINT BEARING PAD SHIM CHANGE REPORT.
REM> DISPLAY MESSAGE.
20.401 call fn.DISPN$(1,24,5,\
"DO YOU WANT TO DISPLAY OR PRINT THE RESULTS? (D/P/ESC) ")
call fn.DISPN$(1,24,62," ")
20.402 I%=fn.INP%
if I%=68 OR I%=100 then print chr$(I%); :DIS%=1 :goto 20.404
if I%=60 OR I%=112 then print chr$(I%); \
:call fn.DISPN$(1,24,64,"====> PRINTING") :DIS%=0 :goto 20.403
if I%=27 then ROUTE%=1 :chain "C2C"
goto 20.402

REM> ACTIVATE PRINTER.
20.403 lprinter width 0
print PH10$;
print PV8$;
REM> SETUP FOR REPORT.
20.404 dim PR$(32)
open DDD$ recl 81 as 10

REM> BEGIN REPORT.
20.405 I%=SSH%
20.406 if I% lt SSH% then I%=SSH%
if I%>1 and RD(I%,2)=0 then PAG%=1 else PAG%=0
if I%<NSH% and RD(I%,4)=0 then PAC%=1 else PAC%=0

if DIS%=0 then gosub 20.91 else gosub 20.92
print " BEARING PAD SHIM CHANGE REPORT"
print " ====="
if DIS%=0 then \
print " Required bearing shim changes to align unit"
if I%=REF% AND AUTOS="Off" or I% ne REF% then print else \
print " Note: Auto Position is active using "+AUTOS+" Bores"
if DIS%=0 then print
if DIS%=0 then print
J%=len(SN$(I%))+14
print left$(BLANK$,40-J%/2)+SN$(I%)+ (or "#"+str$(I%)+) SHAFT"
print left$(BLANK$,40-J%/2)+left$(EQUAL$,J%)
print

20.407 if DIS%=0 then print
print " Bearing #"+str$(I%*2-1)
print " Governor End Pad# Angle Shim Change"
print " -----"
F1$= " # ### & ##.####"
F2$= " # ### NONE"
F3$= " NO PADS DEFINED"
if PAG%=1 then print :print :goto 20.408
for J%=1 to 5
if PAGB(I%,J%) ne 99.1234 then goto 20.41
next J%
print
print F3$
20.408 for J%=1 to 8 :print :next J%
goto 20.43
20.41 for J%=1 to 5
print
if PAGB(I%,J%)=99.1234 then print :goto 20.42
if abs(STGB(I%,J%))<0.00005 \
then print using F2$,J%,PAGB(I%,J%) :goto 20.42
if STGB(I%,J%)>0 \
then print using F1$,J%,PAGB(I%,J%), " Add",STGB(I%,J%) \
else print using F1$,J%,PAGB(I%,J%),"Remove",abs(STGB(I%,J%))
next J%
20.42 next J%
print
print
gosub 20.95
if DIS%=0 then goto 20.431
if PNT%=6 then I%=FSH%
if PNT%=3 then I%=I%-2

```

```

on PNT% goto 20.406, 20.431, 20.49, 20.49, 20.49, 20.49
20.431 if DIS%=1 then call fn.CLW%(MT%,78,9,1,23,80)
print "
print " Bearing #"+str$(I%*2)
print " Collector End Pad# Angle Shm Change"
print "
if PAC%=1 then print :print :goto 20.432
for J%=1 to 5
if PACB(I%,J%) ne 99.1234 then goto 20.44
next J%
print
print F3$
20.432 for J%=1 to 8 :print :next J%
goto 20.46
20.44 for J%=1 to 5
print
if PACB(I%,J%)=99.1234 then print :goto 20.45
if abs(STCB(I%,J%))<0.00005 \
then print using F2$;J%,PACB(I%,J%) :goto 20.45
if STCB(I%,J%)>0 \
then print using F1$;J%,PACB(I%,J%)," Add",STCB(I%,J%) \
else print using F1$;J%,PACB(I%,J%),"Remove",abs(STCB(I%,J%))
20.45 next J%
print
20.46 print
gosub 20.95
if DIS%=0 then goto 20.461
if PNT%=6 then I%=FSH%
if PNT%=3 then I%=I%-2
on PNT% goto 20.406, 20.461, 20.49, 20.49, 20.49, 20.49
20.461 if DIS%=1 then call fn.CLW%(MT%,78,9,1,23,80)
if DIS%=0 then print :print AST$ :print :print
if PAC%=1 then goto 20.462
if SMVGB(I%)=0 then PR$(1)=" None" :goto 20.462
if SMVGB(I%) gt 0 then PR$(1)=fn.RC$(SMVGB(I%),"#.####") :PR$(2)="Up" \
:PR$(3)="-" :goto 20.462
if SMVGB(I%) lt 0 then PR$(8)="v" \
:PR$(9)=fn.RC$(abs(SMVGB(I%)), "#.####") :PR$(10)="Down"
20.462 if PAC%=1 then goto 20.47
if SMVCB(I%)=0 then PR$(11)=" None" :goto 20.47
if SMVCB(I%) gt 0 then PR$(11)=fn.RC$(SMVCB(I%),"#.####") :PR$(12)="Up" \
:PR$(13)="-" :goto 20.47
if SMVCB(I%) lt 0 then PR$(18)="v" \
:PR$(19)=fn.RC$(abs(SMVCB(I%)), "#.####") :PR$(20)="Down"
20.47 if PAC%=1 then goto 20.471
if SMHGB(I%)=0 then PR$(4)="None" :goto 20.471
if SMHGB(I%) gt 0 then PR$(4)=fn.RC$(SMHGB(I%),"#.####") :PR$(5)="Left" :goto 20.471
if SMHGB(I%) lt 0 then PR$(6)=fn.RC$(abs(SMHGB(I%)), "#.####") :PR$(7)="Right"
20.471 if PAC%=1 then goto 20.48
if SMHCB(I%)=0 then PR$(14)="None" :goto 20.48
if SMHCB(I%) gt 0 then PR$(14)=fn.RC$(SMHCB(I%),"#.####") :PR$(15)="Left" :goto 20.48
if SMHCB(I%) lt 0 then PR$(16)=fn.RC$(abs(SMHCB(I%)), "#.####") :PR$(17)="Right"
20.48 if DIS%=1 then goto 20.481
print "
print "
20.481 print "
print "
print "
print using " .###/ // .###/ // ;PR$(1),PR$(2),PR$(11),PR$(12)
print using " ! ! " ;PR$(3), PR$(13)
CALCULATED SHAFT MOVE AT BEARINGS"
=====
C=Coupling, X=Bearing"
print using " .###/ // .###/ // ;PR$(4),PR$(5),PR$(14),PR$(15)
print using " ** | / .###/ /ef/ **" ;PR$(4),PR$(5),PR$(14),PR$(15)
print using " ** | \ /2345 Shaf/ | \ **" ;SNS(I%)+ " Shaft"
print using " C*=====X=====C"
print using " ** \ /1/12 Bearin/ \ /1/12 Bearin/ **" ;"#" +str$(I%*2-1)+ " Bearing", "#"+str$(I%*2)+
Bearing"
print using " ** .###/ /igh/ | .###/ /igh/ | **" ;PR$(6),PR$(7),PR$(16),PR$(17)
print using " | | | | " ;PR$(8), PR$(18)
print using " .###/ /ow/ .###/ /ow/ " ;PR$(9),PR$(10),PR$(19),PR$(20)
print
if DIS%=0 then print
gosub 20.95
if DIS%=0 then goto 20.49
if PNT%=8 then I%=FSH%
if PNT%=3 then I%=I%-2
on PNT% goto 20.431, 20.49, 20.49, 20.49, 20.49, 20.49
20.49 for J%=1 to 20 :PR$(J%)=NULL$ :next J%
if DIS%=1 then if PNT%=5 then goto 20.405
I%=I%+1
if I% le FSH% then goto 20.408
if DIS%=1 then goto 20.50
print AST$
print BOT$
for IN%=1 to 16
print
next IN%
REM>-----1-----2-----3-----4-----5-----6-----7-----
%include C2K1

```

```

REM>-----1-----2-----3-----4-----5-----6-----7-----8-----9-----10-----11-----12-----13-----14-----15-----16-----17-----18-----19-----20-----21-----22-----23-----24-----25-----26-----27-----28-----29-----30-----31-----32-----33-----34-----35-----36-----37-----38-----39-----40-----41-----42-----43-----44-----45-----46-----47-----48-----49-----50-----51-----52-----53-----54-----55-----56-----57-----58-----59-----60-----61-----62-----63-----64-----65-----66-----67-----68-----69-----70-----71-----72-----73-----74-----75-----76-----77-----78-----79-----80-----81-----82-----83-----84-----85-----86-----87-----88-----89-----90-----91-----92-----93-----94-----95-----96-----97-----98-----99-----100-----
REM> Copyright (C) COMPAD Incorporated 1984,5,6
REM> ALL RIGHTS RESERVED
REM>
REM> TITLE: C2-TURBINE GENERATOR ALIGNMENT SYSTEM
REM> VERSION: 89.1
REM> REVISION: a)2-21-89
REM> FILE: C2K2 - CALCULATIONS: OIL & GLAND BORE REPORT
REM>
REM>-----1-----2-----3-----4-----5-----6-----7-----8-----9-----10-----11-----12-----13-----14-----15-----16-----17-----18-----19-----20-----21-----22-----23-----24-----25-----26-----27-----28-----29-----30-----31-----32-----33-----34-----35-----36-----37-----38-----39-----40-----41-----42-----43-----44-----45-----46-----47-----48-----49-----50-----51-----52-----53-----54-----55-----56-----57-----58-----59-----60-----61-----62-----63-----64-----65-----66-----67-----68-----69-----70-----71-----72-----73-----74-----75-----76-----77-----78-----79-----80-----81-----82-----83-----84-----85-----86-----87-----88-----89-----90-----91-----92-----93-----94-----95-----96-----97-----98-----99-----100-----
REM> PRINT OIL AND GLAND BORE REPORT.
20.80 I%=SSH%
20.61 if I% lt SSH% then I%=SSH%

if DIS%=0 then gosub 20.91 else gosub 20.92
print " OIL & GLAND BORE REPORT"
print " ====="
if DIS%=0 then \
print " Shaft position High or Left is Positive"
if I%=REF% and AUTO$="Off" or I% ne REF% then print else \
print " Note: Auto Position is active using "+AUTO$+" Bores"
if DIS%=0 then print :print
J%=len(SN$(I%))+14
print left$(BLANK$,40-J%/2)+SN$(I%)+ " (or #" +str$(I%)+") SHAFT"
print left$(BLANK$,40-J%/2)+left$(EQUAL$,J%)
print

if CMVGO(I%) gt 0 then PR$(1)="High" :goto 20.611
if CMVGO(I%) lt 0 then PR$(1)="Low " :goto 20.611
PR$(1)="None"
20.611 if CMVGG(I%) gt 0 then PR$(2)="High" :goto 20.612
if CMVGG(I%) lt 0 then PR$(2)="Low " :goto 20.612
PR$(2)="None"
20.612 if CMVCG(I%) gt 0 then PR$(3)="High" :goto 20.613
if CMVCG(I%) lt 0 then PR$(3)="Low " :goto 20.613
PR$(3)="None"
20.613 if CMVCO(I%) gt 0 then PR$(4)="High" :goto 20.614
if CMVCO(I%) lt 0 then PR$(4)="Low " :goto 20.614
PR$(4)="None"

20.614 if left$(SN$(I%),3)="GEN" then \
print " O1l H2 Gland H2 Gland O1l" \
:print " ===== " \
:goto 20.615
if left$(SN$(I%),3)="EXC" then \
print " Outboard Oil Inboard Oil Inboard Oil Outboard Oil" \
:print " ===== " \
:goto 20.615
print " O1l Steam Gland Steam Gland O1l "
print " ===== "

20.615 if DIS%=0 then print
print "-----VERTICAL-----"

print
print using " ##.#### ##.#### Current ##.#### ##.####";CCVGO(I%),CCVGG(I%),CCVCG(I%),CCVCO(I%)
print using " ##.#### ##.#### Projected ##.#### ##.####";CPVGO(I%),CPVGG(I%),CPVCG(I%),CPVCO(I%)

```

```

REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> Copyright (C) COMPAD Incorporated 1984,5,6
REM> ALL RIGHTS RESERVED
REM>
REM> TITLE: C2-TURBINE GENERATOR ALIGNMENT SYSTEM
REM> VERSION: 89.1
REM> REVISION: a)2-21-89
REM> FILE: C2K1 - CALCULATIONS: COUPLING REPORT
REM>-----1-----2-----3-----4-----5-----6-----7-----
REM> PRINT COUPLING REPORT.
20,50 I%=SSH%

20,51 if I% lt SSH% then I%=SSH%

      if DIS%=0 then gosub 20.91 else gosub 20.92
      print "                                COUPLING REPORT"
      print "                                ====="
      if DIS%=0 then \
      print "                                Governor End High or Left is Positive" \
      print "                                Open Bottom or Right is Positive" \
      else print
      if DIS%=0 then print :print
      J%=len(SNS(I%)+SNS(I%+1))+17
      print left$(BLANK$,40-J%/2)+SNS(I%)+ "-" + SNS(I%+1) + " (or " + chr$(84+I%) + ") COUPLING"
      print left$(BLANK$,40-J%/2)+left$(EQUAL$,J%)
      print

      if MVE(I%) gt 0 then PR$(1)=SNS(I%)+ " is High" :goto 20.511
      if MVE(I%) lt 0 then PR$(1)=SNS(I%)+ " is Low" :goto 20.511
      PR$(1)=" OK"
20,511 if MVG(I%) gt 0 then PR$(2)=" Bottom is Open" :goto 20.512
      if MVG(I%) lt 0 then PR$(2)="Bottom is Closed" :goto 20.512
      PR$(2)=" OK"

20,512 print "                                Rim                                Face"
      print "                                =====                                ====="
      if DIS%=0 then print
      print "                                -----VERTICAL-----"
      print
      print using "                                ##.#### Current ##.####;CVE(I%),CVG(I%)
      print
      print using "                                ##.#### Projected ##.####;PVE(I%),PVG(I%)
      print
      print using "                                ##.#### /esign/ ##.####;DVE(I%),DESS$,DVG(I%)
      print
      print using "                                ##.#### Variance ##.####;MVE(I%),MVG(I%)
      print using "                                /p is High / /ottom is Close/";PR$(1),PR$(2)
      print
      if DIS%=0 then print
      gosub 20.95
      if DIS%=0 then goto 20.52
      if PNT%=6 then I%=FSH%-1
      if PNT%=3 then I%=I%-2
      on PNT% goto 20.51, 20.52, 20.59, 20.59, 20.59, 20.59

20,52 if DIS%=1 then call fn.CLW%(MT%,78,9,1,23,80)
      if MHE(I%) gt 0 then PR$(1)=SNS(I%)+ " is Left" :goto 20.521
      if MHE(I%) lt 0 then PR$(1)=SNS(I%)+ " is Right" :goto 20.521
      PR$(1)=" OK"
20,521 if MHG(I%) gt 0 then PR$(2)=" Right is Open" :goto 20.522
      if MHG(I%) lt 0 then PR$(2)="Right is Closed" :goto 20.522
      PR$(2)=" OK"

20,522 if DIS%=1 then \
      print "                                Rim                                Face" \
      print "                                =====                                ====="
      print "                                -----HORIZONTAL-----"
      print
      print using "                                ##.#### Current ##.####;CHE(I%),CHG(I%)
      print
      print using "                                ##.#### Projected ##.####;PHE(I%),PHG(I%)
      print
      print using "                                ##.#### /esign/ ##.####;DHE(I%),DESS$,DHG(I%)
      print
      print using "                                ##.#### Variance ##.####;MHE(I%),MHG(I%)
      print using "                                /p is Right / /ight is Close/";PR$(1),PR$(2)
      print
      if DIS%=0 then print :print
      print
      gosub 20.95
      if DIS%=0 then goto 20.53
      if PNT%=6 then I%=FSH%-1
      if PNT%=3 then I%=I%-2
      on PNT% goto 20.51, 20.53, 20.59, 20.59, 20.59, 20.59

20,53 if DIS%=1 then call fn.CLW%(MT%,78,9,1,23,80)
      if DIS%=0 then print AST$:print :print

      PR$(1)=NULL$:PR$(2)=NULL$
      if SMHCC(I%)=0 then PR$(4)="None" :goto 20.531
      if SMHCC(I%)>0 then PR$(4)=fn.RCS(SMHCC(I%)),"#.####":PR$(5)="Left" :goto 20.531
      PR$(6)=fn.RCS(abs(SMHCC(I%)),"#.####"):PR$(7)="Right"
20,531 if SMHGC(I%+1)=0 then PR$(20)="None" :goto 20.532
      if SMHGC(I%+1)>0 then PR$(20)=fn.RCS(SMHGC(I%+1)),"#.####":PR$(21)="Left" :goto 20.532
      PR$(22)=fn.RCS(abs(SMHGC(I%+1)),"#.####"):PR$(23)="Right"

20,532 if SMVCC(I%)=0 then PR$(1)="None" :goto 20.533
      if SMVCC(I%)>0 then PR$(1)=fn.RCS(SMVCC(I%)),"#.####":PR$(2)="Up":PR$(3)=" " :goto 20.533
      PR$(11)="v":PR$(12)=fn.RCS(abs(SMVCC(I%)),"#.####"):PR$(13)="Down"
20,533 if SMVGC(I%+1)=0 then PR$(17)="None" :goto 20.54
      if SMVGC(I%+1)>0 then PR$(17)=fn.RCS(SMVGC(I%+1)),"#.####":PR$(18)="Up":PR$(19)=" " :goto 20.54
      PR$(27)="v":PR$(28)=fn.RCS(abs(SMVGC(I%+1)),"#.####"):PR$(29)="Down"

20,54 if SMHCF(I%)=0 then PR$(9)="None":PR$(10)="--" :goto 20.541
      if SMHCF(I%)>0 then PR$(9)=fn.RCS(SMHCF(I%)),"#.####":PR$(9)="Close":PR$(10)="->" :goto 20.541
      PR$(8)=fn.RCS(abs(SMHCF(I%)),"#.####"):PR$(9)="Open":PR$(10)="-<"
20,541 if SMHGF(I%+1)=0 then PR$(25)="None":PR$(26)="--" :goto 20.542
      if SMHGF(I%+1)>0 then PR$(24)=fn.RCS(SMHGF(I%+1)),"#.####":PR$(25)="Open":PR$(26)="->" :goto 20.542
      PR$(24)=fn.RCS(abs(SMHGF(I%+1)),"#.####"):PR$(25)="Close":PR$(26)="-<"

20,542 if SMVCF(I%)=0 then PR$(14)="--":PR$(15)="None" :goto 20.543
      if SMVCF(I%)>0 then PR$(14)="->":PR$(15)=fn.RCS(SMVCF(I%)),"#.####":PR$(16)="Close" :goto 20.543
      PR$(14)="-<":PR$(15)=fn.RCS(abs(SMVCF(I%)),"#.####"):PR$(16)="Open"
20,543 if SMVGF(I%+1)=0 then PR$(30)="--":PR$(31)="None" :goto 20.55
      if SMVGF(I%+1)>0 then PR$(30)="->":PR$(31)=fn.RCS(SMVGF(I%+1)),"#.####":PR$(32)="Open" :goto 20.55
      PR$(30)="-<":PR$(31)=fn.RCS(abs(SMVGF(I%+1)),"#.####"):PR$(32)="Close"

20,55 if DIS%=0 then \
      print "                                CALCULATED COUPLING MOVES" \
      print "                                ====="

```

```

print using "      ##.####   ##.####   /esign/   ##.####   ##.####";CDVGO(1),CDVGG(1),DESS,CDVCG(1),CDVCO(1)
print
print
print using "      ##.####   ##.####   Variance   ##.####   ##.####";CMVGO(1),CMVGG(1),CMVCG(1),CMVCO(1)
print using "      /on/      /ig/      /ow/      /on/ ";PR$(1),PR$(2),PR$(3),PR$(4)

print
if DIS%=0 then print
gosub 20.95
if DIS%=0 then goto 20.62
if PNT%=6 then I%=FSH%
if PNT%=3 then I%=I%-2
on PNT% goto 20.61, 20.62, 20.86, 20.86, 20.86, 20.86

20.62 if DIS%=1 then call fn.CLW%(MT%,78,9,1,23,80)
if CMHGO(1%) gt 0 then PR$(5)="Left " :goto 20.621
if CMHGO(1%) lt 0 then PR$(5)="Right" :goto 20.621
PR$(5)="None "
20.621 if CMHGG(1%) gt 0 then PR$(6)="Left " :goto 20.622
if CMHGG(1%) lt 0 then PR$(6)="Right" :goto 20.622
PR$(6)="None "
20.622 if CMHCG(1%) gt 0 then PR$(7)="Left " :goto 20.623
if CMHCG(1%) lt 0 then PR$(7)="Right" :goto 20.623
PR$(7)="None "
20.623 if CMHCO(1%) gt 0 then PR$(8)="Left " :goto 20.624
if CMHCO(1%) lt 0 then PR$(8)="Right" :goto 20.624
PR$(8)="None "

20.624 if DIS%=0 then goto 20.625
if left$(SNS(1%),3)="GEN" then \
print "      Oil      H2 Gland      H2 Gland      Oil" \
:print "      =====      =====      =====      ===== \
:goto 20.625
if left$(SNS(1%),3)="EXC" then \
print "      Outboard Oil Inboard Oil      Inboard Oil Outboard Oil" \
:print "      =====      =====      =====      ===== \
:goto 20.625
print "      Oil      Steam Gland      Steam Gland      Oil "
print "      =====      =====      =====      ===== "
20.625 print "      -----HORIZONTAL-----"

print
print using "      ##.####   ##.####   Current   ##.####   ##.####";CCHGO(1),CCHGG(1),CCHCG(1),CCHCO(1)
print
print using "      ##.####   ##.####   Projected   ##.####   ##.####";CPHGO(1),CPHGG(1),CPHCG(1),CPHCO(1)
print
print using "      ##.####   ##.####   /esign/   ##.####   ##.####";CDHGO(1),CDHGG(1),DESS,CDHCG(1),CDHCO(1)
print
print using "      ##.####   ##.####   Variance   ##.####   ##.####";CMHGO(1),CMHGG(1),CMHCG(1),CMHCO(1)
print using "      /one/      /eft/      /igh/      /one/";PR$(5),PR$(6),PR$(7),PR$(8)

20.627 if DIS%=0 then print :\
print "      ----Governor End-----      ----Collector End----"
print
gosub 20.95
if DIS%=0 then goto 20.628
if PNT%=6 then I%=FSH%
if PNT%=3 then I%=I%-2
on PNT% goto 20.61, 20.628, 20.86, 20.86, 20.86, 20.86

20.628 if DIS%=1 then call fn.CLW%(MT%,78,9,1,23,80)
if DIS%=0 then print AST$:print :print

if left$(SNS(1%),2)="HP" then goto 20.63
if left$(SNS(1%),2)="IP" then goto 20.63
if left$(SNS(1%),3)="GEN" then goto 20.64
if left$(SNS(1%),3)="EXC" then goto 20.64
goto 20.8

20.63 if CMHGG(1%)=0 then PR$(9)="None" :goto 20.631
if CMHGG(1%)>0 then PR$(9)=fn.RCS(CMHGG(1%)),"#.####":PR$(10)="Left" :goto 20.631
PR$(11)=fn.RCS(abs(CMHGG(1%)),"#.####"):PR$(12)="Right"
20.631 if CMHCG(1%)=0 then PR$(16)="None" :goto 20.632
if CMHCG(1%)>0 then PR$(16)=fn.RCS(CMHCG(1%)),"#.####":PR$(16)="Left" :goto 20.632
PR$(17)=fn.RCS(abs(CMHCG(1%)),"#.####"):PR$(18)="Right"

20.632 if CMVGS(1%)=99.1234 then goto 20.633
if CMVGS(1%)=0 then PR$(13)="None" :goto 20.633
if CMVGS(1%)>0 then PR$(13)="Add" :PR$(14)=fn.RCS(CMVGS(1%)),"#.####":goto 20.633
PR$(13)="Remove" :PR$(14)=fn.RCS(abs(CMVGS(1%)),"#.####")
20.633 if CMVCS(1%)=99.1234 then goto 20.634
if CMVCS(1%)=0 then PR$(19)="None" :goto 20.634
if CMVCS(1%)>0 then PR$(19)="Add" :PR$(20)=fn.RCS(CMVCS(1%)),"#.####":goto 20.634
PR$(19)="Remove" :PR$(20)=fn.RCS(abs(CMVCS(1%)),"#.####")

20.634 if match("WEST",MFR$,1) > 0 then goto 20.635
if left$(SNS(1%),2)="HP" then goto 20.71 else goto 20.72
20.635 if left$(SNS(1%),2)="HP" then goto 20.75 else goto 20.76

20.64 if CMHGS(1%)=99.1234 then goto 20.641
if CMHGS(1%)=0 then PR$(9)="None" :goto 20.641
if CMHGS(1%)>0 then PR$(9)=fn.RCS(CMHGS(1%)),"#.####":PR$(10)="Left" :goto 20.641
PR$(11)=fn.RCS(abs(CMHGS(1%)),"#.####"):PR$(12)="Right"
20.641 if CMHCS(1%)=99.1234 then goto 20.642
if CMHCS(1%)=0 then PR$(16)="None" :goto 20.642
if CMHCS(1%)>0 then PR$(16)=fn.RCS(CMHCS(1%)),"#.####":PR$(16)="Left" :goto 20.642
PR$(17)=fn.RCS(abs(CMHCS(1%)),"#.####"):PR$(18)="Right"

20.642 if left$(SNS(1%),3)="EXC" then goto 20.644

dim PR$(14), PRB$(14)
for J%=1 to 14
if MG(J%)=99.1234 then goto 20.643
if MG(J%)=0 then PRAS(J%)="None" :goto 20.643
if MG(J%)>0 then PRB$(J%)=fn.RCS(MG(J%)),"#.####":PRAS(J%)="Add" :goto 20.643
PRB$(J%)=fn.RCS(abs(MG(J%)),"#.####"):PRAS(J%)="Remove"
20.643 next J%
if match("WEST",MFR$,1) > 0 then goto 20.77
goto 20.73

20.644 dim PRAS(14), PRB$(14)
for J%=1 to 14
if ME(J%)=99.1234 then goto 20.645
if ME(J%)=0 then PRAS(J%)="None" :goto 20.645
if ME(J%)>0 then PRB$(J%)=fn.RCS(ME(J%)),"#.####":PRAS(J%)="Add" :goto 20.645
PRB$(J%)=fn.RCS(abs(ME(J%)),"#.####"):PRAS(J%)="Remove"
20.645 next J%
if match("WEST",MFR$,1) > 0 then goto 20.78
goto 20.74

REM> GE - HP.

```

```
REM> WEST - GEN.
20.77  if DISK=0 then \
```

```

print "
:print "
print " Governor C=Coupling, X=Bearing, F=Frame Edge Collector"
print " End"
print "
print " H2 Cooler"
print using " 1) /emov/ /.###/ 8) /emov/ /.###/ " ;PRAS(1),PRBS(1),PRAS( 8),PRBS( 8)
print using " **/.###/ /ef/ 2) /emov/ /.###/ 9) /Add / /.###/ /ef/ \**" ;PRS(9),PRS(10),PRAS(2),PRBS(2),PRAS( 9),P
RBS( 9),PRS(15),PRS(16)
print using " ** \ 3) /emov/ /.###/ 10) /Add / /.###/ \ \**" ;PRAS(3),PRBS(3),PRAS(10),PRBS(10)
print using " C=====X 4) /emov/ /.###/ 11) /Add / /.###/ X=====C" ;PRAS(4),PRBS(4),PRAS(11),PRBS(11)
print using " ** \ 5) /emov/ /.###/ 12) /Add / /.###/ \ \**" ;PRAS(5),PRBS(5),PRAS(12),PRBS(12)
print using " **/.###/ /igh/ 6) /emov/ /.###/ 13) /Add / /.###/ /igh/ \**" ;PRS(11),PRS(12),PRAS(6),PRBS(6),PRAS(13),
PRBS(13),PRS(17),PRS(18)
print using " 7) /emov/ /.###/ 14) /Add / /.###/ " ;PRAS(7),PRBS(7),PRAS(14),PRBS(14)
print using "
print "
print " Shim Packs
print "
print " < 1>< 2>< 3>< 4>< 5>< 6>< 7>< 8>< 9><10><11><12><13><14>|"
goto 20.78

```

```

REM> WEST - EXC.
20.78 if DIS=0 then \
print "
:print "
print " Governor C=Coupling, X=Bearing, F=Frame Edge Collector"
print " End"
print "
print " Air Cooler"
print using " 1) /emov/ /.###/ 8) /emov/ /.###/ " ;PRAS(1),PRBS(1),PRAS( 8),PRBS( 8)
print using " **/.###/ /ef/ 2) /emov/ /.###/ 9) /Add / /.###/ /ef/ \**" ;PRS(9),PRS(10),PRAS(2),PRBS(2),PRAS( 9),P
RBS( 9),PRS(15),PRS(16)
print using " ** \ 3) /emov/ /.###/ 10) /Add / /.###/ \ \**" ;PRAS(3),PRBS(3),PRAS(10),PRBS(10)
print using " C=====F===== 4) /emov/ /.###/ 11) /Add / /.###/ X=====C" ;PRAS(4),PRBS(4),PRAS(11),PRBS(11)
print using " ** \ 5) /emov/ /.###/ 12) /Add / /.###/ \ \**" ;PRAS(5),PRBS(5),PRAS(12),PRBS(12)
print using " **/.###/ /igh/ 6) /emov/ /.###/ 13) /Add / /.###/ /igh/ \**" ;PRS(11),PRS(12),PRAS(6),PRBS(6),PRAS(13),
PRBS(13),PRS(17),PRS(18)
print using " 7) /emov/ /.###/ 14) /Add / /.###/ " ;PRAS(7),PRBS(7),PRAS(14),PRBS(14)
print using "
print "
print " Shim Packs
print "
print " < 1>< 2>< 3>< 4>< 5>< 6>< 7>< 8>< 9><10><11><12><13><14>|"
20.79 for J%=1 to 14
PRAS(J%)=NULL$ :PRBS(J%)=NULL$
next J%
dim PRAS(0), PRBS(0)
goto 20.85

```

```

REM> NO CASING.
20.8 if DIS=1 then goto 20.86
for J%=1 to 16
print
next J%
20.85 print
if DIS=0 then print
gosub 20.95
if DIS=0 then goto 20.86
if PNT=6 then I=FSH%
if PNT=3 then I=I-2
on PNT% goto 20.62, 20.86, 20.86, 20.86, 20.86

```

```

20.86 for J%=1 to 20 :PRBS(J%)=NULL$ :next J%
if DIS=1 then if PNT=5 then goto 20.50
I=I+1
if I is FSH% then goto 20.61
close 10
if DIS=1 then call fn.CLS%(1,7) :goto 20.401

```

```

print AST$
print BOT$
for IN%=1 to 16
print
next IN%
console
call fn.CLS%(1,7)
goto 20.401

```

```

REM>-----1-----2-----3-----4-----5-----6-----7-----

```

```

REM> PRINT PAGE HEADER.

```

```

20.91 if I=SSH% then goto 20.915

```

```

print AST$
print BOT$

```

```

for IN%=1 to 16 :print :next IN%

```

```

20.915 print tab(24);"C2-TURBINE GENERATOR ALIGNMENT SYSTEM"

```

```

print
print tab(6);UNITS+left$(BLANK$,70-len(UNITS+COMPS))+COMPS
print TOP$
print AST$
print DTOP1$
print DTOP2$
print
return

```

```

REM>-----1-----2-----3-----4-----5-----6-----7-----

```

```

REM> DISPLAY SCREEN HEADER.

```

```

20.92 call fn.CLS%(1,7) :call fn.CLW%(MT%,78,9,1,23,80) :call fn.HOME%
print DTOP1$
print DTOP2$+left$(BLANK$,72-len(DTOP2$+TIMS+DAT$))+TIMS+" "+DAT$
return

```

```

REM>-----1-----2-----3-----4-----5-----6-----7-----

```

```

REM> PRINT CONTINUE? ON SCREEN.

```

```

20.95 if DIS=0 then return
print
print "Press F1:PrvScr, F2:NxtScr, F3:PrvPg, F4:NxtPg, F5:PrvRpt, F6:NxtRpt or ESC";
20.951 IN%=fn.INP%
if IN%=27 then PNT%=0 :I=FSH% :goto 20.86
if IN% lt 186 or IN% gt 191 then goto 20.951
PNT%=IN%-185
for IN%=1 to 75
call fn.DEL%
next IN%
return

```