

OPERATION & MAINTENANCE

3 COMPONENT SHORT PERIOD SEISMOMETER

MODEL S-6000

- I. The Sprengnether S-6000 Seismometer is a suspended coil, fixed magnet, detector. Annular suspensions constrain the seismic mass to respond as a translating pendulum.

The three orthogonal components are housed in a weather-proof cast aluminum case.

II. SPECIFICATIONS:

Serial No. 10406

1. Mechanical Constants

A. Components 3

B. Period (T_s)

T 0.52 Sec

V 0.46 Sec

L 0.54 Sec

C. Seismic Mass 500 gm

D. Mass Excursion ± 2 mm

2. Transducer

A. Type

Suspended Coil

B. Damping

Electromagnetic

C. Electrodynamic Constant (K) T 299.12 V/m/s

V 290.12 V/m/s

L 290.12 V/m/s

10406

- D. Thermal Response $-0.18\%/^{\circ}\text{C}$ ($0.1\%/^{\circ}\text{F}$)
- E. Number of turns (N) 11.9K Turns
- F. Coil Resistance (R_c) 10K Ohms
- G. Shunt Resistance for .6 damping 7.15K Ohms
- H. Location of Damping Resistor in seismometer
- I. Effective output across damping resistor
T 124.73 V/m/s
V 120.95 V/m/s
L 120.95 V/m/s
3. Calibrate Coil
T = 0.57
V = 0.52
L = 0.54 Newton/Amperes
- A. Motor Constant
- B. No of turns 20
- C. Resistance 3.7 ohms/coil
- D. Maximum Continuous Current 100 mA
4. Physical Dimensions:
- A. Total Weight 8.8 Kg
(19.5 Lbs)
- B. Dimensions 18 x 18 x 18 Cm
(7 x 7 x 7 in)
- C. Average Density 1.6 gm/cc
- D. Level Limit $\pm 2^{\circ}$

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II. SPECIFICATIONS:

Serial No.	<u>10330</u>
1. Mechanical Constants	
A. Components	<u>3</u>
B. Period (T_S)	T <u>0.50</u> Sec
	V <u>0.52</u> Sec
	L <u>0.60</u> Sec
C. Seismic Mass	<u>500</u> gm
D. Mass Excursion	<u>± 2</u> mm
2. Transducer	
A. Type	Suspended Coil
B. Damping	Electromagnetic
C. Electrodynamic Constant (K)	T <u>294.65</u> V/m/s
	V <u>290.12</u> V/m/s
	L <u>290.12</u> V/m/s

- D. Thermal Response -0.18%/°C (0.1%/°F)
 - E. Number of turns (N) 11.9K Turns
 - F. Coil Resistance (Rc) 10K Ohms
 - G. Shunt Resistance for .6 damping 7.15K Ohms
 - H. Location of Damping Resistor in sensor
 - I. Effective output across damping resistor
 - T 122.84 V/m/s
 - V 120.95 V/m/s
 - L 120.95 V/m/s
3. Calibrate Coil
- A. Motor Constant
 $T = 0.53$
 $V = 0.54$
 $L = 0.52$ Newton/
 Amperes
 - B. No of turns 20
 - C. Resistance 3.7 ohms/coil
 - D. Maximum Continuous Current 100 mA
4. Physical Dimensions:
- A. Total Weight 8.8 Kg
(19.5 Lbs)
 - B. Dimensions 18 x 18 x 18 Cm
(7 x 7 x 7 in)
 - C. Average Density 1.6 gm/cc
 - D. Level Limit $\pm 2^\circ$

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3 COMPONENT SHORT PERIOD SEISMOMETER

MODEL S-6000

- I. The Sprengnether S-6000 Seismometer is a suspended coil, fixed magnet, detector. Annular suspensions constrain the seismic mass to respond as a translating pendulum.

The three orthogonal components are housed in a weather-proof cast aluminum case.

II. SPECIFICATIONS:

Serial No.	<u>10407</u>
1. Mechanical Constants	
A. Components	<u>3</u>
B. Period (T_s)	T <u>0.56</u> Sec
	V <u>0.44</u> Sec
	L <u>0.56</u> Sec
C. Seismic Mass	<u>500</u> gm
D. Mass Excursion	<u>± 2 mm</u>
2. Transducer	
A. Type	Suspended Coil
B. Damping	Electromagnetic
C. Electrodynamic Constant (K)	T <u>281.05</u> V/m/s
	V <u>299.18</u> V/m/s
	L <u>303.72</u> V/m/s

D. Thermal Response	-0.18%/°C (0.1%/°F)
E. Number of turns (N)	<u>11.9K</u> Turns
F. Coil Resistance (Rc)	<u>10K</u> Ohms
G. Shunt Resistance for .6 damping	<u>7.15K</u> Ohms
H. Location of Damping Resistor	<u>in Dismometer</u>
I. Effective output across damping resistor	T <u>117.17</u> V/m/s
	V <u>124.73</u> V/m/s
	L <u>126.62</u> V/m/s
3. Calibrate Coil	T = 0.51 V = 0.48 L = 0.56
A. Motor Constant	<u>Newton/Amperes</u>
B. No of turns	20
C. Resistance	3.7 ohms/coil
D. Maximum Continuous Current	100 mA
4. Physical Dimensions:	
A. Total Weight	8.8 Kg (19.5 Lbs)
B. Dimensions	18 x 18 x 18 Cm (7 x 7 x 7 in)
C. Average Density	1.6 gm/cc
D. Level Limit	<u>± 2°</u>

III. INSTALLATION AND OPERATION:

1. Clamping:

The S-6000 Seismometer does not require clamping or other internal adjustment.

However: Signal terminals must always be shorted during transit. A shorting plug is provided for this purpose - be sure that this is connected when the unit is not in use.

2. Installation:

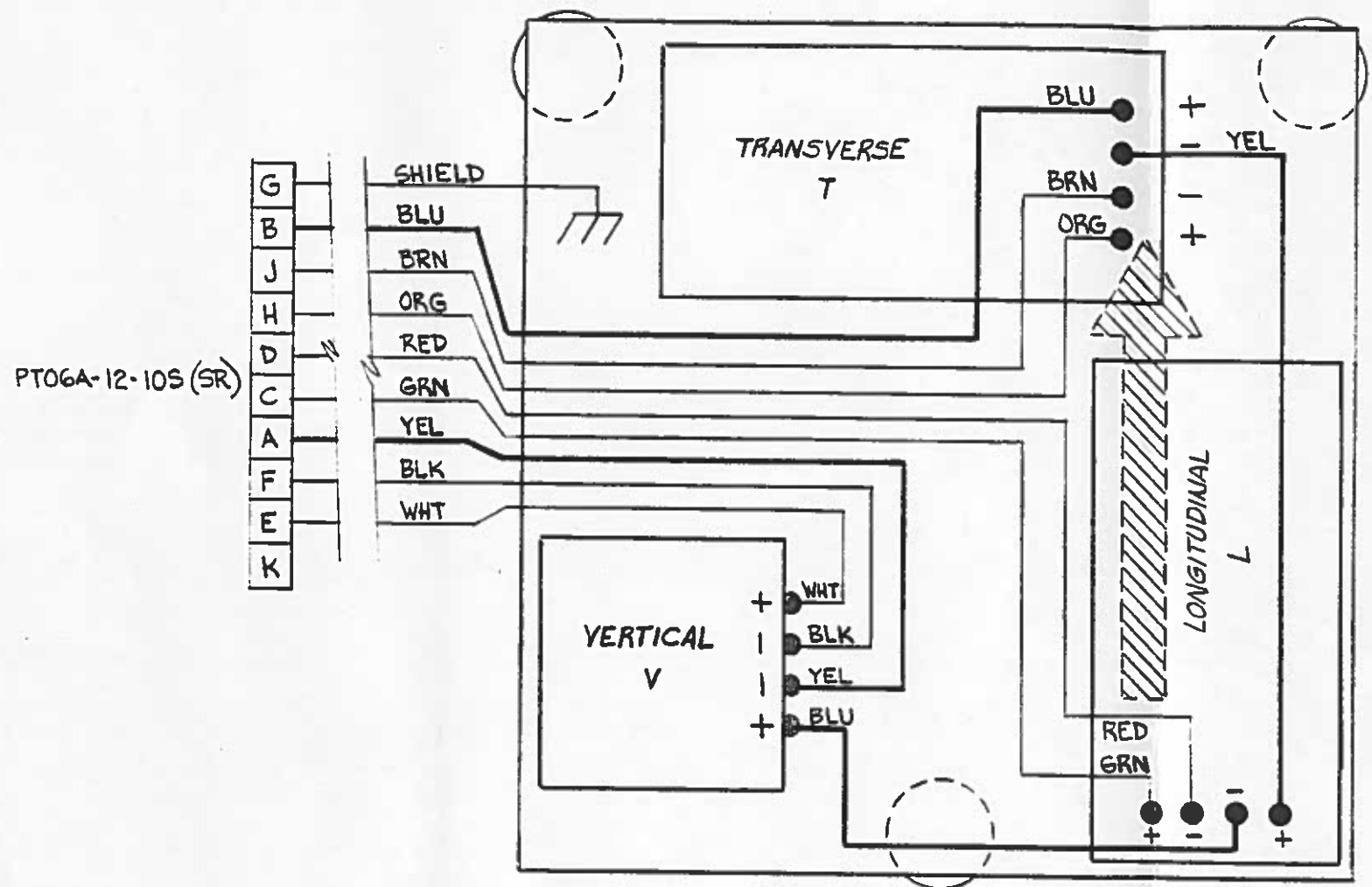
Set up seismometer with arrow pointing towards source of disturbance. The seismometer may be set directly upon the surface. If strong or high frequency motion is anticipated, the seismometer should be anchored to hard surfaces, or buried if on soil.

The unit is designed to match a soil of average density $1/6$ gm/cc to minimize ringing due to faulty coupling with the ground.

Leveling is accomplished by the bullseye level in the upper surface of the seismometer. Adjustment to within 1° of level is adequate for operation. Keeping at least half the level bubble within the circle maintains level to within 2° .

The standard seismometer unit is weatherproof only and should not be submerged in water. The seismometer can be made submersionproof, on request, by the addition of special gaskets.

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
		POLARITY	1-10-79	



- NOTES:
 A. PINS A & B - CAL COIL.
 B. CAL COILS SERIES CONNECTED: 3.7 OHM/COIL.
 C. MAXIMUM CAL CURRENT = 100 mA.

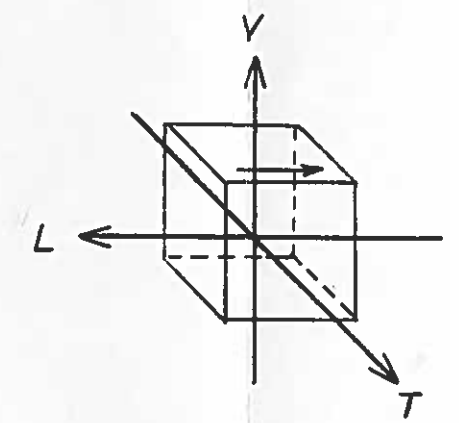


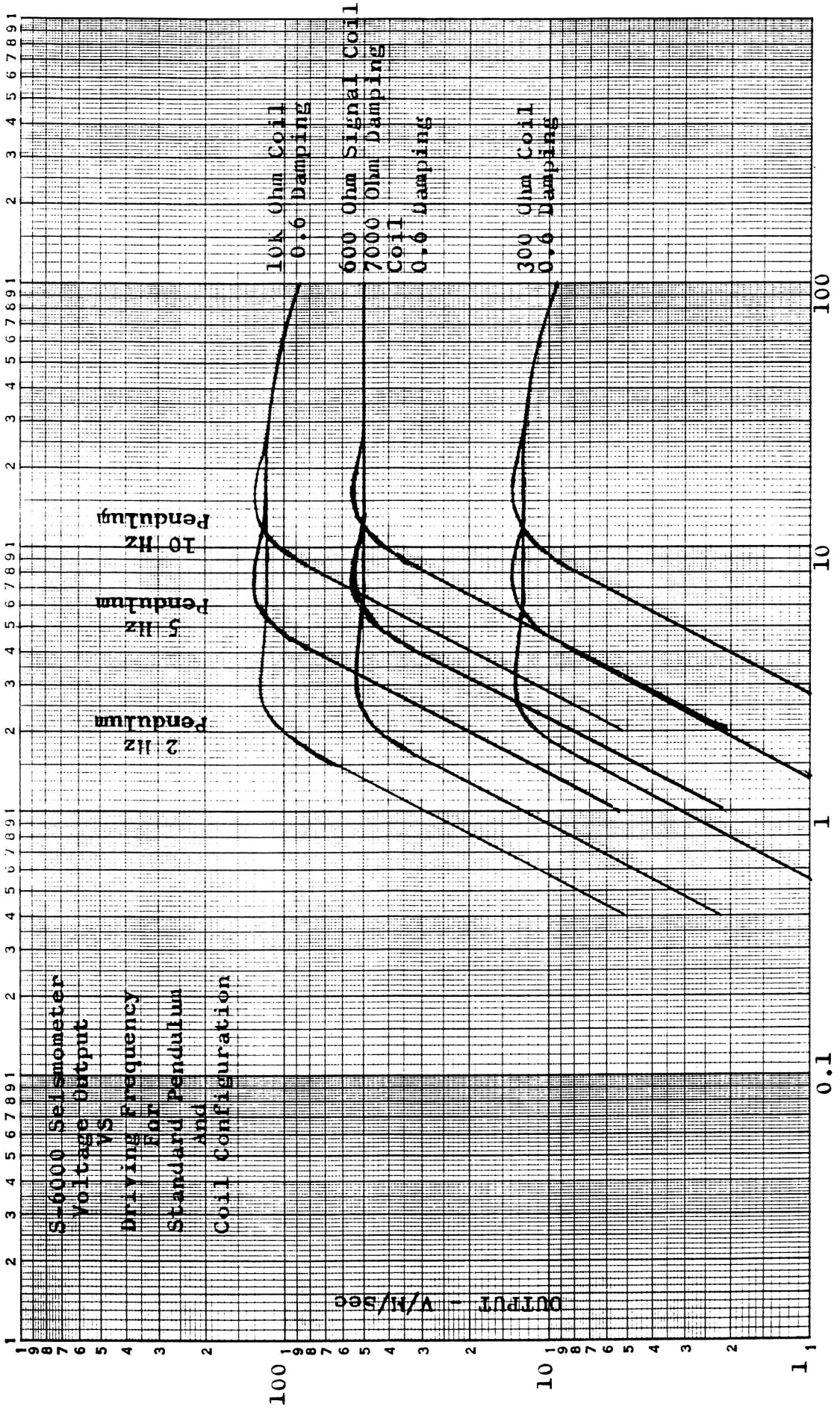
FIGURE DEFINING GROUND PARTICLE MOTIONS THAT CORRESPOND TO GIVEN SIGNAL OUTPUT POLARITIES.

SIGNAL POLARITY

- E+ VERTICAL - COMPRESSION
- F- VERTICAL - COMPRESSION
- H+ TRANSVERSE - GROUND MOVES TO RIGHT (FACING SOURCE)
- J- TRANSVERSE - GROUND MOVES TO RIGHT (FACING SOURCE)
- C+ LONGITUDINAL - COMPRESSION
- D- LONGITUDINAL - COMPRESSION

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX ± ± .XXX ±		CONTRACT NO.		Sprengnether Instruments, Inc.		
		MATERIAL		APPROVALS	DATE			
		FINISH		DRAWN <i>SK</i>	10-9-84	S-6000 SEISMOMETER WIRING DIAGRAM		
		DO NOT SCALE DRAWING		CHECKED <i>H. Tefan</i>	10/1/84			
104000	S-6000					SIZE	CODE IDENT NO.	DRAWING NO.
NEXT ASSY	USED ON					B		FIGURE 1
APPLICATION						SCALE		SHEET OF

7/13/72



DRIVING FREQUENCY - HZ

PART LIST REPORT
11-23-88

END PRODUCT ASSY #	DESCRIPTION	NEXT ASSY CONTROL #	NEXT ASSY MFG. PART #	NEXT ASSY REF. DESIG.
LINE #	QTY DESCRIPTION			
REV. LEVEL	REV. DATE			
S-6000	104000 S-6000 SEISMOMETER (3-CH)			
J	1 09/88 1 VS-1 CASTING	104000-1	104000-1	
C	2 08/86 1 VS-1A CASTING	104000-2	104000-2	
C	3 08/86 3 VS-2 CASTING	104000-3	104000-3	
C	4 08/86 3 MAGNET HOUSING	104000-4	104000-4	
C	5 08/86 3 MAGNET RINGS	104000-5	104000-5	
C	6 08/86 3 MAGNET POLE PIECES	104000-6	104000-6	
C	7 08/86 3 MAGNET, TUBULAR	59-001-5	CG 707 (PERMAG)	
C	8 08/86 3 MASS SUPPORT SLEEVES	104000-8	104000-8	
C	9 08/86 3 MASS BODY	104000-9	104000-9	
C	10 08/86 3 MASS END PLATE, FRONT	104000-10	104000-10	
C	11 08/86 3 MASS END PLATE, REAR	104000-11	104000-11	
C	12 08/86 60 CLAMP PADS	104000-12	104000-12	
C	13 08/86 6 DOWEL PIN	104000-13	104000-13	1/16 X 3/8"
C	14 08/86 6 DOWEL PIN	104000-14	104000-14	1/16 X 1/4"
C	15 08/86 6 NEDPRENE BUMPERS	104000-15	104000-15	
C	16 08/86 3 COIL FORMS	104000-16	104000-16	
C	17 08/86 3 COIL MOUNTING TUBES	104000-17	104000-17	
C	18 08/86 2 COUNTERWEIGHT, HORIZ	104000-18	104000-18	
C	19 08/86 1 COUNTERWEIGHT, VERT	104000-19	104000-19	
C	20 08/86 4 HINGE RING, .0095	104000-20	104000-20	
C	21 08/86 2 HINGE RING, .006	104000-21	104000-21	
C	22 08/86 1 VERTICAL YOKE	104000-22	104000-22	
C	23 08/86 1 VERT. SUPPORT LOOP	104000-23	104000-23	
C	24 08/86 1 VERT. SUPPORT SPRING	104000-24	104000-24	
C	25 08/86 1 ROCKER BASE	104000-25	104000-25	

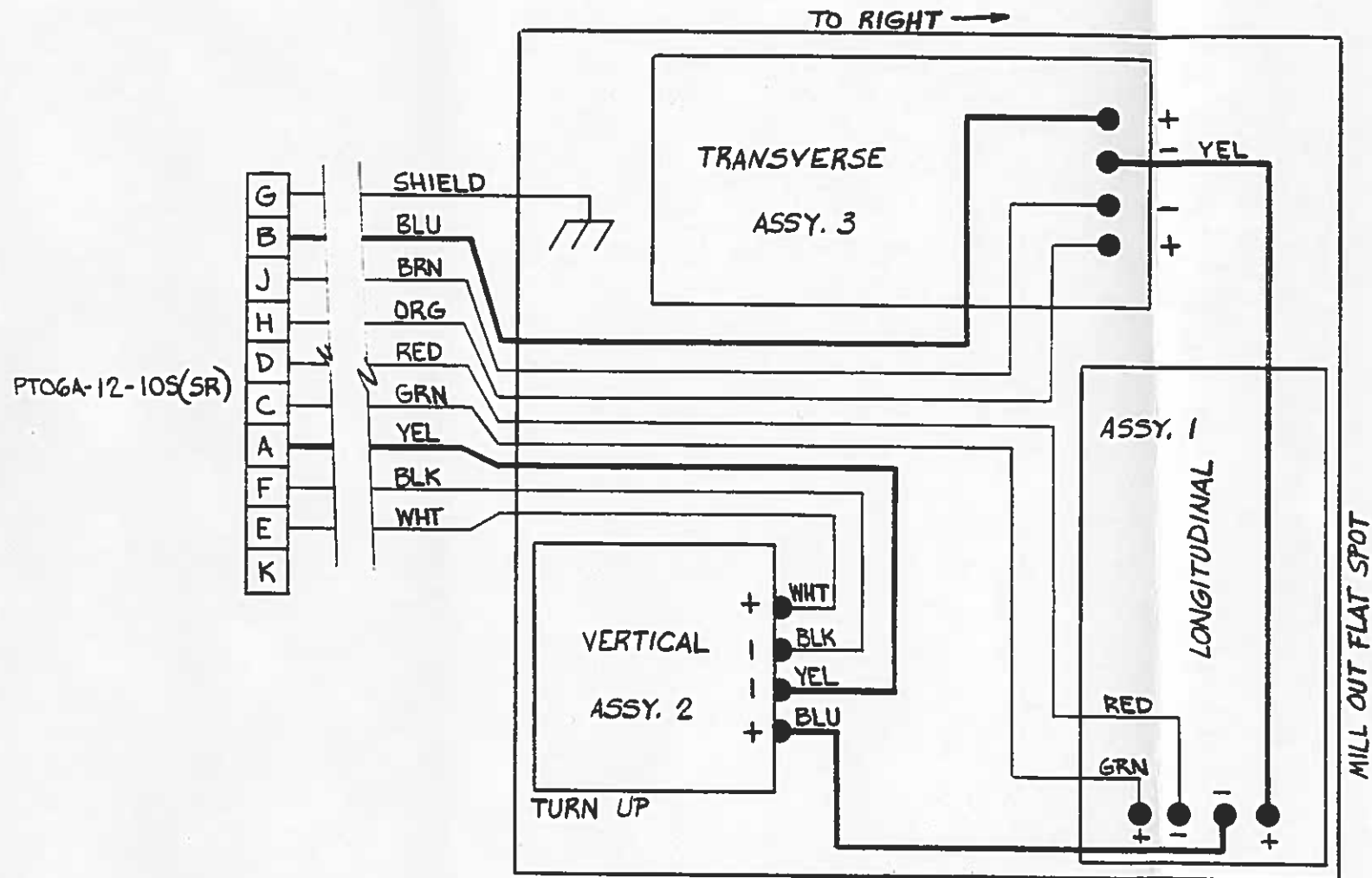
PART LIST REPORT
11-23-88

END PRODUCT	ASSY #	DESCRIPTION	NEXT ASSY	NEXT ASSY	NEXT ASSY	NEXT ASSY	NEXT ASSY
LINE #	QTY	DESCRIPTION	CONTROL #	MFG. PART #	REF.	DESIG.	
REV. LEVEL	REV. DATE						
C	26	1 ROCKER CAP	104000-26	104000-26			
	08/86						
C	27	1 ROCKER	104000-27	104000-27			
	08/86						
C	28	1 SPRING CLAMP	104000-28	104000-28			
	08/86						
C	29	3 ROCKER SCREW	104000-29	104000-29			
	08/86						
	30	0 DELETE					
E	10/86						
	31	0 DELETE					
E	10/86						
	32	0 DELETE					
E	10/86						
	33	0 DELETE					
E	10/86						
	34	1 HANDLE	46-001-0	2062-01-02			
C	08/86						
	35	2 SEAL, HANDLE	42-104-0	2-012			
D	10/86						
	36	1 LEVEL VIAL	47-016-7	1-9000			
C	08/86						
	37	0 DELETE					
F	10/86						
	38	1 'O' RING SEAL	42-111-2	26 3/8" L. x .139 DIA.			
J	09/88						
	39	0 DELETE					
F	10/86						
	40	0 MAGNET WIRE		SSE-36			3'
C	08/86						
	41	3 WIRE INSULATORS	91-005-0	PVC-105/14			
C	08/86						
	42	12 SCREW, S.S.		1/4 - 20 X 1 1/2" SH			
C	08/86						
	43	14 SCREW, S.S.		1/4 - 20 X 1/2" BUTTON HD			
C	08/86						
	44	14 SEAL, SCREW	42-101-0	GR0-10			
C	08/86						
	45	12 SCREW, S.S.		6-32 X 1/2" SH			
C	08/86						
	46	32 SCREW, S.S.		4-40 X 1/4" RH			
C	08/86						
	47	12 SCREW, S.S.		4-40 X 1/2" RH			
C	08/86						
	48	0 DELETE					
E	10/86						
	49	3 SCREW, S.S.		6-32 X 3/8" PH			
C	08/86						
	50	1 TERMINAL, SOLDER	85-016-5	1497			
C	08/86						
	51	0 DELETE					
F	10/86						

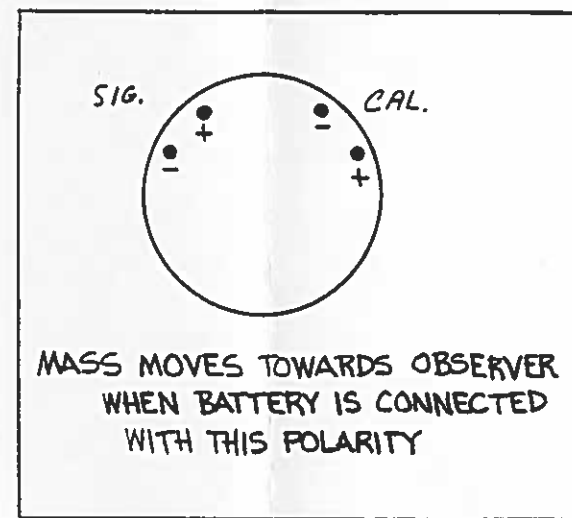
PART LIST REPORT
11-23-88

END PRODUCT ASSY #	DESCRIPTION	NEXT ASSY	NEXT ASSY	NEXT ASSY	NEXT ASSY	NEXT ASSY
LINE #	QTY DESCRIPTION	CONTROL #	MFG. PART #			REF. DESIG.
REV. LEVEL	REV. DATE					
C	52 08/86	1 S-6000 CABLE ASSY	104002	104002		
C	53 08/86	1 SHORTING PLUG ASSY.	104003	104003		
C	54 08/86	1 CONNECTOR, CORD	22-300-0	SHC1017		
C	56 08/86	24 TERMINAL, STANDOFF	85-012-0	013-2004-00-0-479		
C	57 08/86	3 COIL WINDING	104000-57	104000-57		
G	58 02/87	3 LEVELING LEG ASSY.	104004	104004		
H	59 08/88	1 INSTRUCTION MANUAL	80-025-0			I.M.
I	60 08/88	4 TERMINAL	85-020-0	ZERICK #75H		

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



NOTES:
 A. PINS A & B - CAL COIL.
 B. CAL COILS SERIES CONNECTED; 3.7 OHM/COIL.
 C. MAXIMUM CAL CURRENT = 100mA.



SIGNAL POLARITY

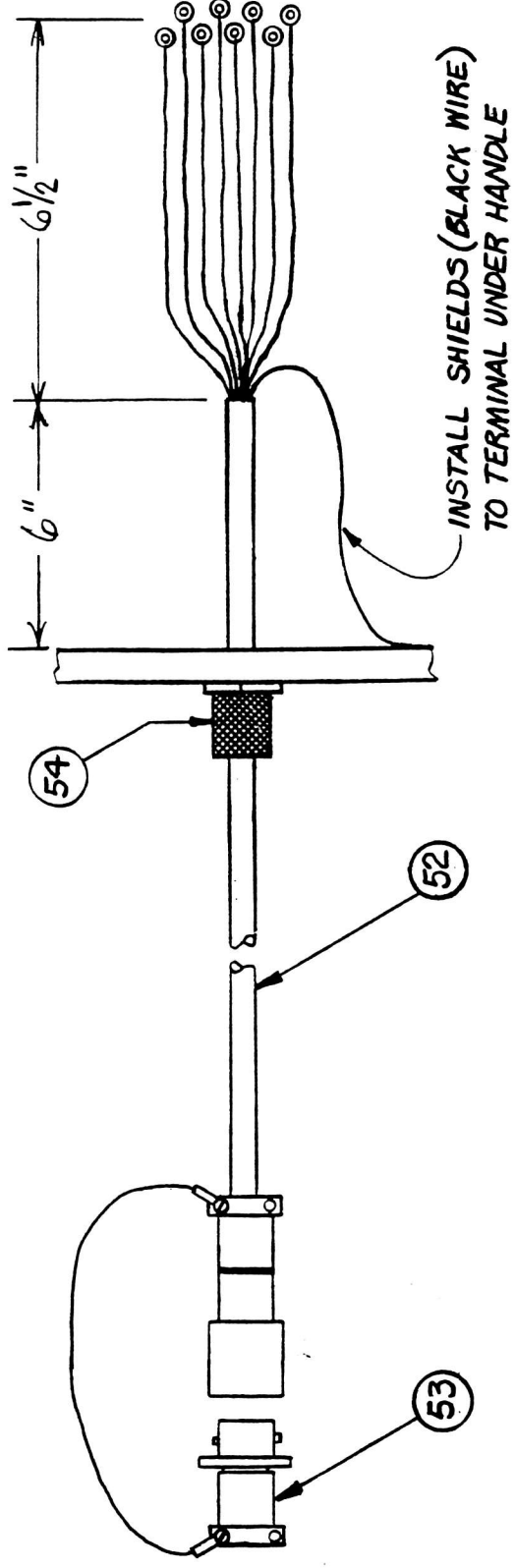
E+
 F- VERTICAL - COMPRESSION

H+
 J- TRANSVERSE - GROUND MOVES TO RIGHT (FACING SOURCE)

C+
 D- LONGITUDINAL - COMPRESSION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX ± ± .XXX ±		CONTRACT NO.		Sprengnether Instruments, Inc.	
MATERIAL		APPROVALS	DATE		
FINISH		DRAWN <i>SK</i>	10-10-84	S-6000 SEISMOMETER WIRING DIAGRAM	
104000 NEXT ASSY		CHECKED <i>W. Taylor</i>	10/10/84		
S-6000 USED ON		SCALE B		CODE IDENT NO.	DRAWING NO. 104000
APPLICATION		DO NOT SCALE DRAWING		SCALE	SHEET OF

REVISIONS		
LTR	DESCRIPTION	DATE
A-E	ECN #929,949,1015,1028,1040	10-15-86
		SK



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	DATE
± .XX ±	ANGLES ±	APPROVALS	3-11-83
± .XXX ±		DRAWN	9-26-83
		CHECKED	
MATERIAL			
FINISH			
DO NOT SCALE DRAWING			
APPLICATION			
NEXT ASSY	USED ON		

W.F. Sprengnether Instrument Co., Inc.	
S-6000 SEISMOMETER CABLE-LID ASSY,	
SIZE	DRAWING NO.
A	104000
SCALE	SHEET OF

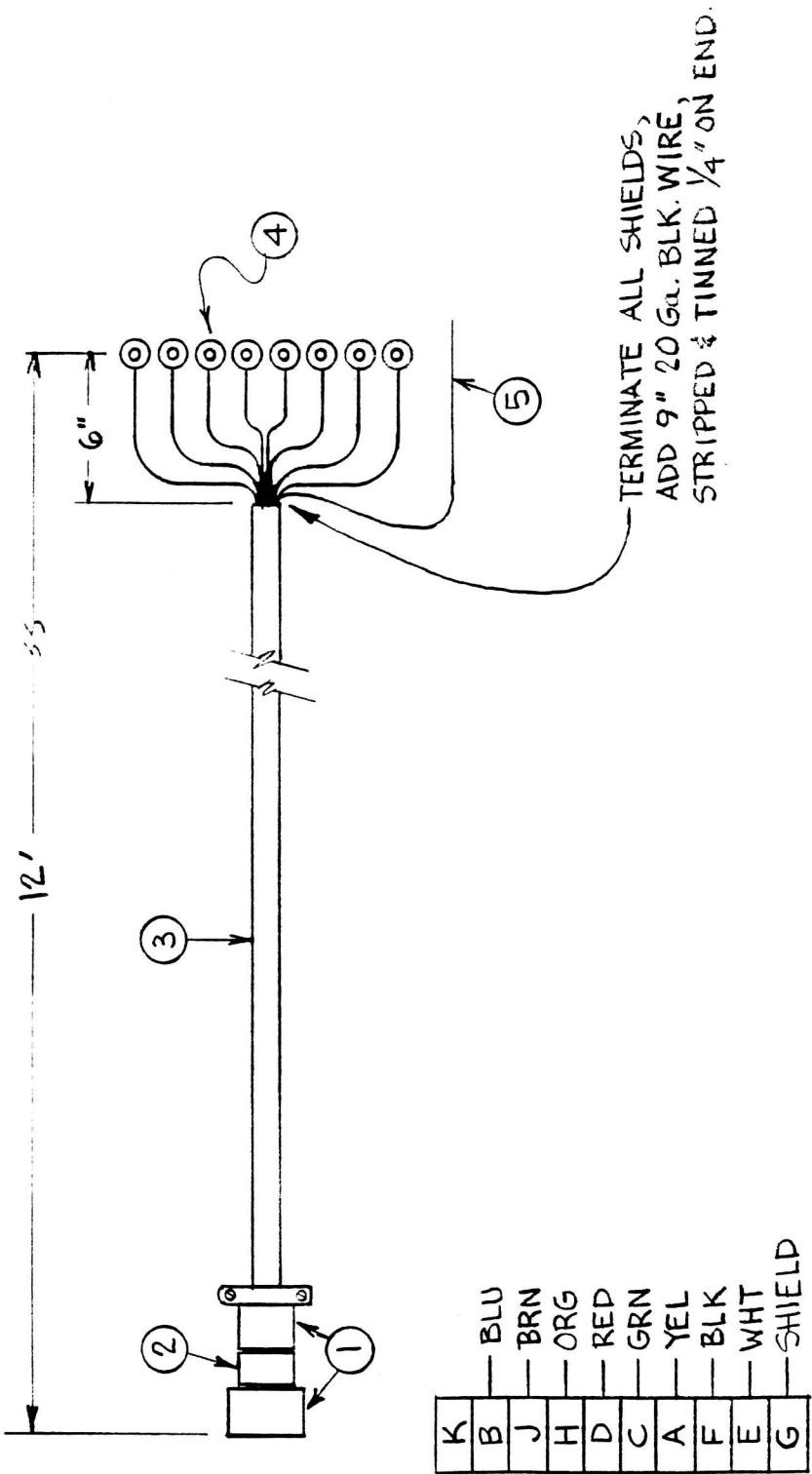
PART LIST REPORT
11-23-88

END PRODUCT ASSY #	DESCRIPTION	NEXT ASSY CONTROL #	NEXT ASSY MFG. PART #	NEXT ASSY REF. DESIG.
LINE #	QTY DESCRIPTION			
REV. LEVEL	REV. DATE			

S-6000	104002	S-6000	CABLE ASSEMBLY	104000		
	1		1 CONNECTOR	22-330-0	PT06A-12-10S (SR)	
		04/84				
	2		1 CONNECTOR, ADAPTOR	22-750-0	22-750-0	
		04/84				
	3		0 CABLE	94-010-0	YR16605	12 FT.
		04/84				
	4		8 TERMINAL	85-020-0	75 H .093	
		04/84				
	5		0 WIRE	94-013-0	20 AWG, BLACK	9"
		04/84				
	6		0 TUBING, SHRINK	91-011-5	RFN 100 - 3/16"	A/R
		04/84				

REVISIONS

LTR	DESCRIPTION	DATE	APPROVED



K	—	BLU
B	—	BRN
J	—	ORG
H	—	RED
D	—	GRN
A	—	YEL
F	—	BLK
E	—	WHT
G	—	SHIELD

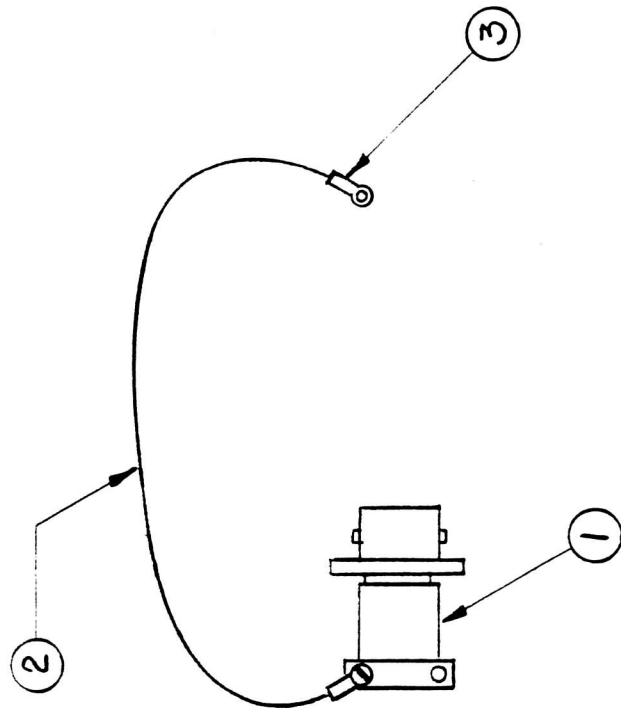
<p>Sprengnether Instruments, Inc.</p> <p>REPLACEMENT CABLE ASSY. S-6000 REPAIR</p>		<p>CONTRACT NO.</p>
<p>UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:</p> <p>± .XX ±</p> <p>± .XXX ±</p>	<p>APPROVALS</p> <p>DRAWN <i>S. KLING</i></p> <p>CHECKED <i>S. Taylor</i></p>	<p>DATE</p> <p>4-10-84</p> <p>4-15-84</p>
<p>MATERIAL</p>	<p>SIZE</p> <p>A</p>	<p>DRAWING NO.</p> <p>104002</p>
<p>FINISH</p>	<p>SCALE</p>	<p>SHEET</p> <p>OF</p>
<p>APPLICATION</p>	<p>DO NOT SCALE DRAWING</p>	
<p>NEXT ASSY</p>	<p>USED ON</p>	

PART LIST REPORT
11-23-88

END PRODUCT ASSY #	DESCRIPTION	NEXT ASSY	NEXT ASSY	NEXT ASSY	NEXT ASSY	NEXT ASSY
LINE #	QTY DESCRIPTION	CONTROL #	MFG. PART #			REF. DESIG.
REV. LEVEL	REV. DATE					

S-6000	104003	S-6000	SHORTING PLUG ASSEMBLY	104000		
A	1		1 CONNECTOR	22-318-0	PT02E-12-10P	
A	08/86					
A	2		0 CABLE, SHORTING PLUG	94-011-0	CL-1-C	6"
A	08/86					
A	3		2 TERMINAL, RING	85-015-0	B14-6	
A	08/86					

REVISIONS		
LTR	DESCRIPTION	DATE
A	ECN #1017	10-15-86
		APPROVED
		<i>SK</i>



NOTE: DOUBLE CABLE OVER BEFORE INSERTING IN TERMINAL.

CONTRACT NO.		SPRENGNETHER INSTRUMENTS, INC.	
APPROVALS	DATE	SIZE	CODE IDENT NO.
<i>SK</i>	10-15-86	A	104003
DRAWN	CHECKED	SCALE	DRAWING NO.
			A
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		S-6000 SHORTING PLUG ASSY.	
± .XX ±	±		
± .XXX ±	±		
MATERIAL			
FINISH			
104000	S-6000		
NEXT ASSY	USED ON		
APPLICATION			
		SHEET	OF

PART LIST REPORT
11-23-88

END PRODUCT ASSY #	DESCRIPTION	NEXT ASSY	NEXT ASSY	NEXT ASSY	NEXT ASSY	NEXT ASSY
LINE #	QTY DESCRIPTION	CONTROL #	MFG. PART #			REF. DESIG.
REV. LEVEL	REV. DATE					

S-6000	104004	LEVELING LEG ASSY.	104000			
B	1	02/87 1 LEVELING SCREW SHAFT	104004-1	104004-1		
B	2	02/87 1 LEVEL. SCREW BUSHING	104004-2	104004-2		
B	3	02/87 1 LEVELING SCREW KNOB	104004-3	104004-3		
B	4	02/87 2 LEVELING SCREW SEALS	42-102-0	GR011		
B	5	02/87 1 SCREW, S.S. HEX HD.		1/4-20 x 1		