Model 4999

Terminal Box

Instruction Manual

GEOKON®

Document Revision: E.1 | Release Date: 6/13/25

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1. INTRODUCTION

The GEOKON Model 4999 Terminal Box is intended for use with GEOKON vibrating wire (VW) sensors with or without thermistors. Various models are available:

- Model 4999-11-2S for up to 2 VW sensors with thermistors
- Model 4999-11-4S for up to 4 VW sensors with thermistors
- Model 4999-11-8S for up to 8 VW sensors with thermistors
- Model 4999-16VTS for up to 16 VW sensors with thermistors
- Model 4999-32VTS for up to 32VW sensors with thermistors
- Model 4999-32VWS for up to 32 VW sensors only (without thermistors)

The Terminal Box makes it easy to manually connect a Readout Box (GK-404 or GK-405), to a variety of vibrating wire sensors by means of color-coded terminal posts, mounted below the rotary switches on the face panel of the Terminal Box, to which the flying leads (patch cord) of the readout box can be clipped. The rotary switch is used to select which "channel" or sensor is being read by the Readout Box.

The cables from the sensors are passed into the Terminal Box interior through weather tight entries mounted on the bottom or side of the enclosure. It is important that any unused cable entries be sealed off by tightening the unused nylon cord grips onto the white plastic plugs provided for that purpose.

The sensors are protected from over-voltages by means of Gas Discharge Tubes mounted on the terminal boards. An earth ground lug is provided on the outside of the enclosure for connection to an earth ground rod.

The Terminal Box is a NEMA 4X style enclosure, environmentally protected (weatherproof) by means of a hinged cover that has a seamless "foamed-in-place" gasket that is pressed firmly against the enclosure when the two clamps holding the,cover are closed. The Terminal Box itself is made from fiberglass reinforced polyester.

Polyester mounting brackets with bolt-holes, on top and bottom of the Terminal Box, allow it to be bolted to any vertical surface.

2. INSTALLATION

2.1 MOUNTING THE TERMINAL BOX

The Terminal Box should be mounted to a flat vertical surface using the holes in the mounting brackets, or "feet", at the top and bottom of the enclosure. For the overvoltage surge protection to be effective the earth ground lug on the outside of the Terminal Box needs to be connected by a thick copper wire to an earth ground. This can be a copper rod driven into the ground or, metal objects, such as plumbing pipes, or electrical conduits, etc, which are themselves well grounded. Copper earth grounding rods and ground wire straps are available as accessories.

2.2 CONNECTING THE SENSORS TO THE TERMINAL BLOCKS

Pass the sensor cable through the water tight entry into the inside of the Terminal Box and connect to the appropriate 5-position, spring-loaded terminal block, following the instructions of the appropriate wiring diagram. Refer to the wiring diagram fixed to the inside of the cover, or as shown in Section 3. When using the spring type terminals to make the connection, depress the spring lever, poke the bare wire into the adjacent hole and then release the spring. Check that a good connection has been made by tugging on the lead wire. After the connections have been made, tighten the nut on the waterproof connector. **This must be done to ensure that water does not enter the enclosure.**

2.3 FRONT PANEL CONNECTION

Connect the patch cord (flying leads) of a GK-403 or GK-404 as follows:

Boot Color	Switch Panel Post
Red	Gauge+
Black	Gauge-
White	Thermistor
Green	Thermistor
Blue	Shield

TABLE 1: *Front Panel Connection*

3. TERMINAL BOARD WIRING DIAGRAMS

3.1 MODEL 4999-11-2S

2 Vibrating Wire Gauges with 2 Thermistors

Label	Gauge Number	Wire Color
1H	1	Red
1L		Black
2H		White
2L		Green
S		Shield
3H	2	Red
3L		Black
4H		White
4L		Green
S		Shield

TABLE 2: *Model 4999-11-2S Terminal Board Wiring*

3.2 MODEL 4999-11-4S

4 Vibrating Wire Gauges with 4 Thermistors

Label	Gauge Number	Wire Color
1H	1	Red
1L		Black
2H		White
2L		Green
S		Shield
3H	2	Red
3L		Black
4H		White
4L		Green
S		Shield
5H	3	Red
5L		Black
6H		White
6L		Green
S		Shield
7H	4	Red
7L		Black
8H		White
8L		Green
S		Shield

TABLE 3: *Model 4999-11-4S Terminal Board Wiring*

3.3 MODEL 4999-11-8S

8 Vibrating Wire Gauges with 8 Thermistors

Label	Gauge Number	Wire Color	Label	Gauge Number	Wire Color
1H	1	Red	9H	5	Red
1L		Black	9L		Black
2H		White	10H		White
2L		Green	10L		Green
S		Shield	S		Shield
3H	2	Red	11H	6	Red
3L		Black	11L		Black
4H		White	12H		White
4L		Green	12L		Green
S		Shield	S		Shield
5H	3	Red	13H	7	Red
5L		Black	13L		Black
6H		White	14H		White
6L		Green	14L		Green
S		Shield	S		Shield
7H	4	Red	15H	8	Red
7L		Black	15L		Black
8H		White	16H		White
8L		Green	16L		Green
S		Shield	S		Shield

TABLE 4: *Model 4999-11-8S Terminal Board Wiring*

3.4 MODEL 4999-16VTS

16 Vibrating Wire Gauges with 16 Thermistors

Note: To read positions 9 through 16 the first switch on the face panel (1-8) must be set to "9-16".

Label	Gauge Number	Wire Color	Label	Gauge Number	Wire Color
1H	1	Red	17H	9	Red
1L		Black	17L		Black
2H		White	18H		White
2L		Green	18L		Green
S		Shield	S		Shield
3H	2	Red	19H	10	Red
3L		Black	19L		Black
4H		White	20H		White
4L		Green	20L		Green
S		Shield	S		Shield
5H	3	Red	21H	11	Red
5L		Black	21L		Black
6H		White	22H		White
6L		Green	22L		Green
S		Shield	S		Shield
7H	4	Red	23H	12	Red
7L		Black	23L		Black
8H		White	24H		White
8L		Green	24L		Green
S		Shield	S		Shield
9H	5	Red	25H	13	Red
9L		Black	25L		Black
10H		White	26H		White
10L		Green	26L		Green
S		Shield	S		Shield
11H	6	Red	27H	14	Red
11L		Black	27L		Black
12H		White	28H		White
12L		Green	28L		Green
S		Shield	S		Shield
13H	7	Red	29H	15	Red
13L		Black	29L		Black
14H		White	30H		White
14L		Green	30L		Green
S		Shield	S		Shield
15H	8	Red	31H	16	Red
15L		Black	31L		Black
16H		White	32H		White
16L		Green	32L		Green
S		Shield	S		Shield

TABLE 5: *Model 4999-16VTS Terminal Board Wiring*

3.5 MODEL 4999-32VTS

32 Vibrating Wire Gauges with 32 Thermistors

There are two terminal boards mounted to the lower plate. Wire gauges/thermistors 1-16 to Board 1. Wire gauges/thermistors 17-32 to Board 2.

Note: To read positions 9 through 16 the first switch (1-8) must be set to "9-16".

To read positions 17 through 24 the first switch must be set to "17-24".

To read positions 25 through 32 the first switch must be set to "25-32".

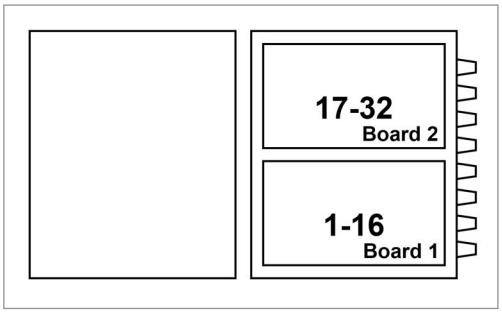

FIGURE 1: *Board Orientation*

Label	Gauge Number	Wire Color	Label	Gauge Number	Wire Color
1H	1 or 17	Red	17H	9 or 25	Red
1L		Black	17L		Black
2H		White	18H		White
2L		Green	18L		Green
S		Shield	S		Shield
3H	2 or 18	Red	19H	10 or 26	Red
3L		Black	19L		Black
4H		White	20H		White
4L		Green	20L		Green
S		Shield	S		Shield
5H	3 or 19	Red	21H	11 or 27	Red
5L		Black	21L		Black
6H		White	22H		White
6L		Green	22L		Green
S		Shield	S		Shield
7H	4 or 20	Red	23H	12 or 28	Red
7L		Black	23L		Black
8H		White	24H		White
8L		Green	24L		Green
S		Shield	S		Shield
9H	5 or 21	Red	25H	13 or 29	Red
9L		Black	25L		Black
10H		White	26H		White
10L		Green	26L		Green
S		Shield	S		Shield
11H	6 or 22	Red	27H	14 or 30	Red
11L		Black	27L		Black
12H		White	28H		White
12L		Green	28L		Green
S		Shield	S		Shield
13H	7 or 23	Red	29H	15 or 31	Red
13L		Black	29L		Black
14H		White	30H		White
14L		Green	30L		Green
S		Shield	S		Shield
15H	8 or 24	Red	31H	16 or 32	Red
15L		Black	31L		Black
16H		White	32H		White
16L		Green	32L		Green
S		Shield	S		Shield

TABLE 6: *Model 4999-32VTS Terminal Board Wiring*

3.6 MODEL 4999-32WVS

32 Vibrating Wire Gauges (no thermistors)

Note: Gauges connected to positions 1 through 16 on the terminal board are selected with the left hand rotary switch. Gauges connected to positions 17 through 32 on the terminal board are selected with the right hand rotary switch.

To read positions 1 through 8: Connect patch cord clip leads to the posts labeled "1-8."

To read positions 9 through 16: Connect patch cord clip leads to the posts labeled "9-16."

To read positions 17 through 24: Connect patch cord clip leads to the posts labeled "17-24."

To read positions 25 through 32: Connect patch cord clip leads to the posts labeled "25-32."

Label	Gauge Number	Wire Color	Label	Gauge Number	Wire Color
1H	1	Red	17H	17	Red
1L		Black	17L		Black
2H	2	White	18H	18	White
2L		Green	18L		Green
S	1 & 2	Shield	S	17 & 18	Shield
3H	3	Red	19H	19	Red
3L		Black	19L		Black
4H	4	White	20H	20	White
4L		Green	20L		Green
S	3 & 4	Shield	S	19 & 20	Shield
5H	5	Red	21H	21	Red
5L		Black	21L		Black
6H	6	White	22H	22	White
6L		Green	22L		Green
S	5 & 6	Shield	S	21 & 22	Shield
7H	7	Red	23H	23	Red
7L		Black	23L		Black
8H	8	White	24H	24	White
8L		Green	24L		Green
S	7 & 8	Shield	S	23 & 24	Shield
9H	9	Red	25H	25	Red
9L		Black	25L		Black
10H	10	White	26H	26	White
10L		Green	26L		Green
S	9 & 10	Shield	S	25 & 26	Shield
11H	11	Red	27H	27	Red
11L		Black	27L		Black
12H	12	White	28H	28	White
12L		Green	28L		Green
S	11 & 12	Shield	S	27 & 28	Shield
13H	13	Red	29H	29	Red
13L		Black	29L		Black
14H	14	White	30H	30	White
14L		Green	30L		Green
S	13 & 14	Shield	S	29 & 30	Shield
15H	15	Red	31H	31	Red
15L		Black	31L		Black
16H	16	White	32H	32	White
16L		Green	32L		Green
S	15 & 16	Shield	S	31 & 32	Shield

TABLE 7: *Model 4999-32VWS Terminal Board Wiring*

APPENDIX A. SPECIFICATIONS

A.1 MODEL 4999 TERMINAL BOARD

Switching Current	0.25 A typical, 4 A maximum
Contact Resistance	50 mΩ (maximum)
Insulation Resistance	> 10,000 MΩ
Switch Life	Table Specs: Body
Enclosure Type	NEMA 4X fiberglass
Temperature Range	-20 to +80 °C
Enclosure Dimensions[1]	4999-11-4S: 188 x 198 x 110 mm (7.4 x 7.8 x 4.3") 4999-11-8S: 290 x 249 x 160 mm (11.4 x 9.8 x 6.3") 4999-16VTS: 342 x 301 x 160 mm (13.5 x 11.9 x 6.3") 4999-32VTS and 4999-32VWS: 616 x 514 x 203 mm (24.3 x 20.2 x 8")

TABLE 8: *Model 4999 Terminal Board Specifications*

Note:

[1] Does not include mounting brackets

A.2 TRIPOLAR PLASMA SURGE ARRESTOR

Nominal DC Breakdown Voltage	230 V
Surge Life	400 (10/1000 ms pulse @ 500 A)
Maximum Surge Current	10 kA per side (8/20 μ s pulse)
Insulation Resistance	10000 MΩ
Operating Temperature	-65 to +125 °C

TABLE 9: *Tripolar Plasma Surge Arrestor Specifications*

A.3 BIPOLAR PLASMA SURGE ARRESTOR

Nominal DC Breakdown Voltage	300 V
Surge Life	1000 (10/1000 μ s pulse @ 500 A)
Maximum Surge Current	20 kA (8/20 μ s pulse)
Insulation Resistance	10000 MΩ
Operating Temperature	-65 to +125 °C

TABLE 10: *Bipolar Plasma Surge Arrestor Specifications*

APPENDIX B. MODEL 8032-27 AND LOAD CELL WIRING

Connect the "common" VW- conductor from the load cell to the 8032-27 by lifting up on the orange tab located on the opposite side of the six black conductors, inserting the common conductor fully into the 8032-27 (Figure 2), and then pushing down on the orange tab until it snaps into place. Refer to Table 1 to identify which conductor carries the common VW- signal.

FIGURE 2: *Model 8032-27 Jumper Wire Assembly*

10-pin Bendix	Function	3 Gauge VW Load Cell Violet Cable	4 Gauge WV Load Cell Violet Cable	6 Gauge VW Load Cell Orange Cable
H	Common	White's Black*	Green	Blue

TABLE 11: *Common Conductor Chart*

Note: *White's black and Green wires are switched on GEOKON 3 gauge VW load cells prior to serial number 3313.

The following wiring charts detail the connections between the load cell and 8032-27 with the terminal board:

Model 4999-11-4S	
Terminal Board	**VW with Thermistor**
1H	VW Sensor #1
1L	8032-27
2H	Thermistor
2L	Thermistor
S	Shield Drain Wire
3H	VW Sensor #2
3L	8032-27
4H	-
4L	-
S	-
5H	VW Sensor #3
5L	8032-27
6H	-
6L	-
S	-
7H	VW Sensor #4
7L	8032-27
8H	-
8L	-
S	-

TABLE 12: *Load Cell and 8032-27 Jumper Wire Connection to the Model 4999-11-4S*

Model 4999-11-8S OR Model 4999-16VTS	
Terminal Board	**VW with Thermistor**
1H	VW Sensor #1
1L	8032-27
2H	Thermistor
2L	Thermistor
S	Shield Drain Wire
3H	VW Sensor #2
3L	8032-27
4H	-
4L	-
S	-
5H	VW Sensor #3
5L	8032-27
6H	-
6L	-
S	-
7H	VW Sensor #4
7L	8032-27
8H	-
8L	-
S	-
9H	VW Sensor #5
9L	8032-27
10H	-
10L	-
S	-
11H	VW Sensor #6
11L	8032-27
12H	-
12L	-
S	-

TABLE 13: *Load Cell and 8032-27 Jumper Wire Connection to the Model 4999-11-8S or Model 4999-16VTS*

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