



## REMOTE NAVIGATIONAL FEATURES

1. WATER LEVEL HEAD
2. PITCH / GRADE
  - 2.1 - UNITS: % OF GRADE
  - 2.2 - ACCURACY +/- 0.05%
3. ROLL
  - 3.1 - UNITS: .01ft OF CIRCUMFRENTIAL ROLL
  - 3.2 - ACCURACY +/- .01ft
4. ILLUMINATED WATER LEVEL DISCHARGE STREAM
  - 4.1 - PROVIDES HORIZONTAL LINE REFERENCE FROM THE LEAD CASING JOINT
  - 4.2 - CAN BE USED IN CONJUNCTION WITH SURVEYNG EQUIPMENT TO DETERMINE EXACT RIGHT/LEFT LOCATION WITHOUT CONFINED SPACE ENTRY.



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| REV 2   |             |        |
| REV 3   |             |        |

SCALE

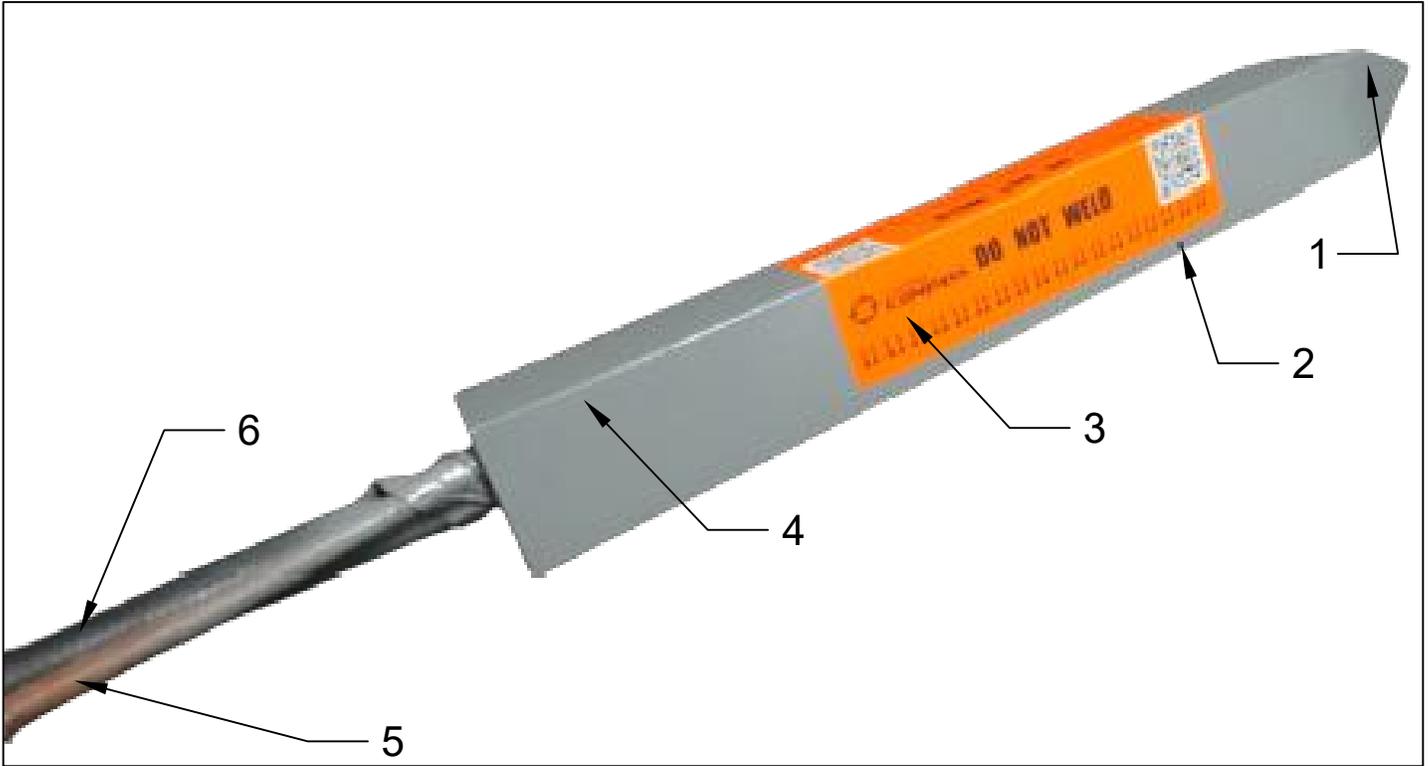
TITLE

DRAWING #

NTS

COVER

SHEET 1 OF 18



## COMPONENTS

1. NOSE CONE
2. WATER LEVEL DISCHARGE ALIGNMENT NOTCH (EA SIDE)
3. "NO WELD" AREA
4. STEEL BODY
5. POWER & COMMUNICATION CABLE
6. 3/8" WATER LEVEL INLET HOSE



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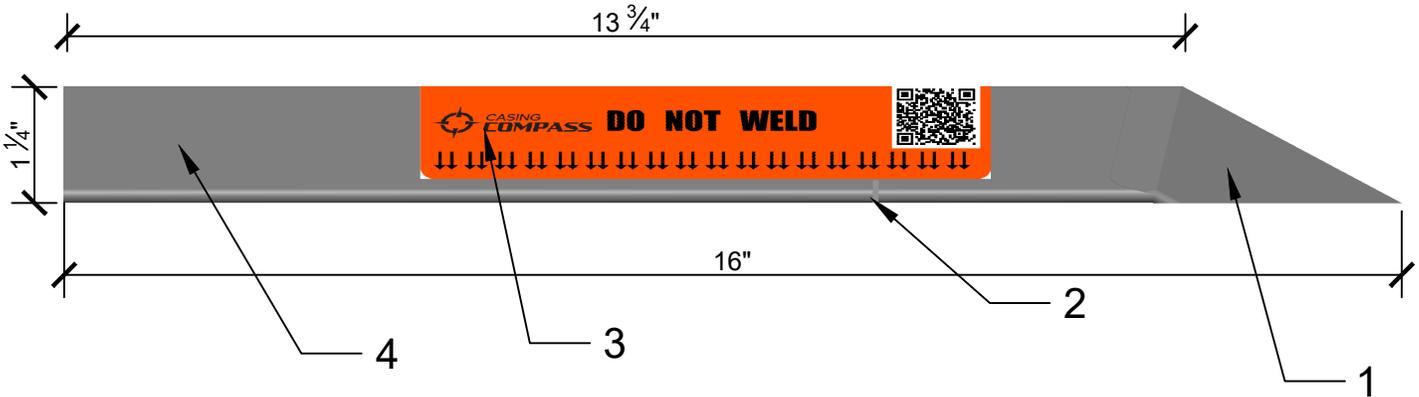
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NTS

COMPONENTS

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SHEET 2 OF 18



## COMPONENTS

1. NOSE CONE
2. WATER LEVEL DISCHARGE ALIGNMENT NOTCH (EA SIDE)
3. "NO WELD" AREA
4. STEEL BODY



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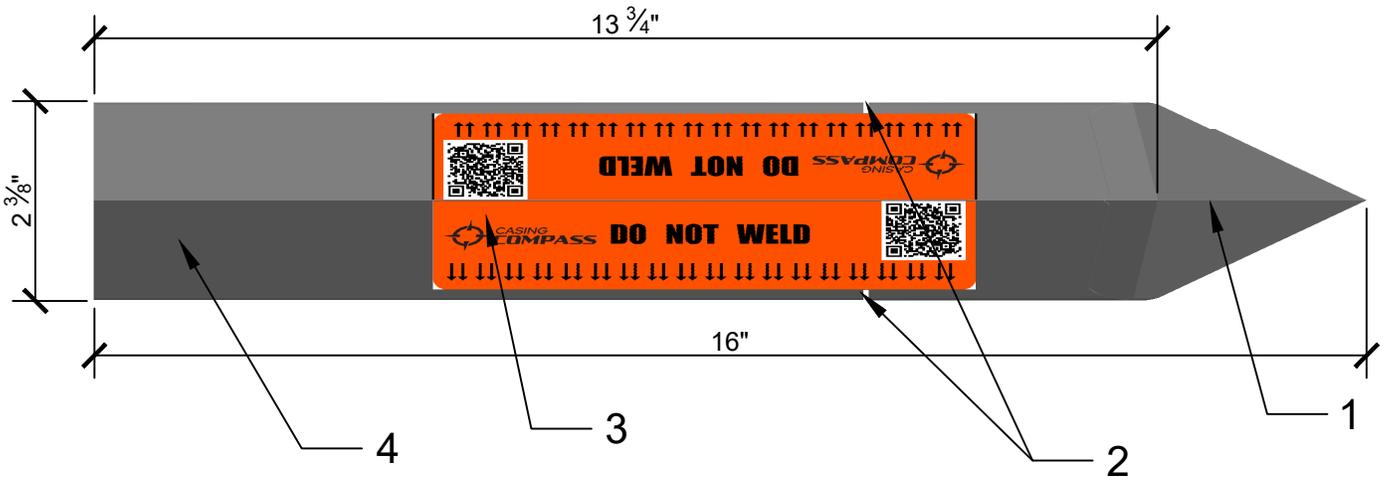
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SIDE VIEW

SHEET 3 OF 18



## COMPONENTS

1. NOSE CONE
2. WATER LEVEL DISCHARGE ALIGNMENT NOTCH (EA SIDE)
3. "NO WELD" AREA
4. STEEL BODY



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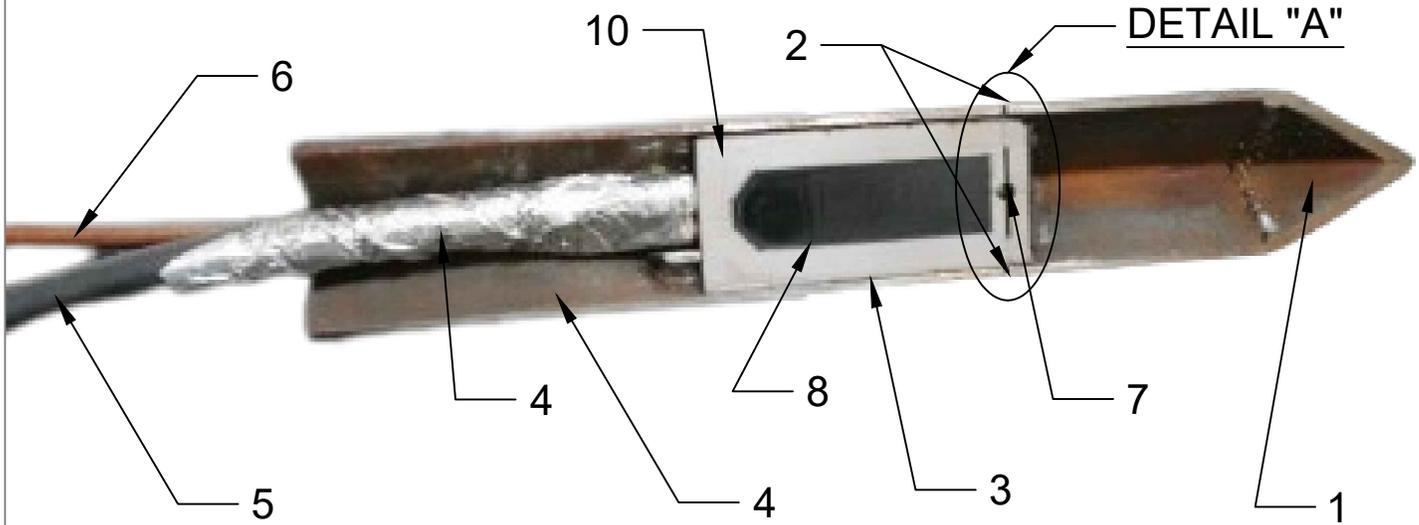
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TOP VIEW

SHEET 4 OF 18



## COMPONENTS

1. NOSE CONE
2. WATER LEVEL DISCHARGE ALIGNMENT NOTCH (EA SIDE)
3. "NO WELD" AREA
4. STEEL BODY
5. WATER LEVEL INLET -  $\frac{3}{8}$ " HOSE
6. POWER AND COMMUNICATION CABLE
7. WATER LEVEL DISCHARGE
8. SENSORS AND ELECTRONICS ENCASED IN WATERPROOF EPOXY
9. PROTECTIVE HEAT WRAP
10. WATER LEVEL & SENSOR INSERT



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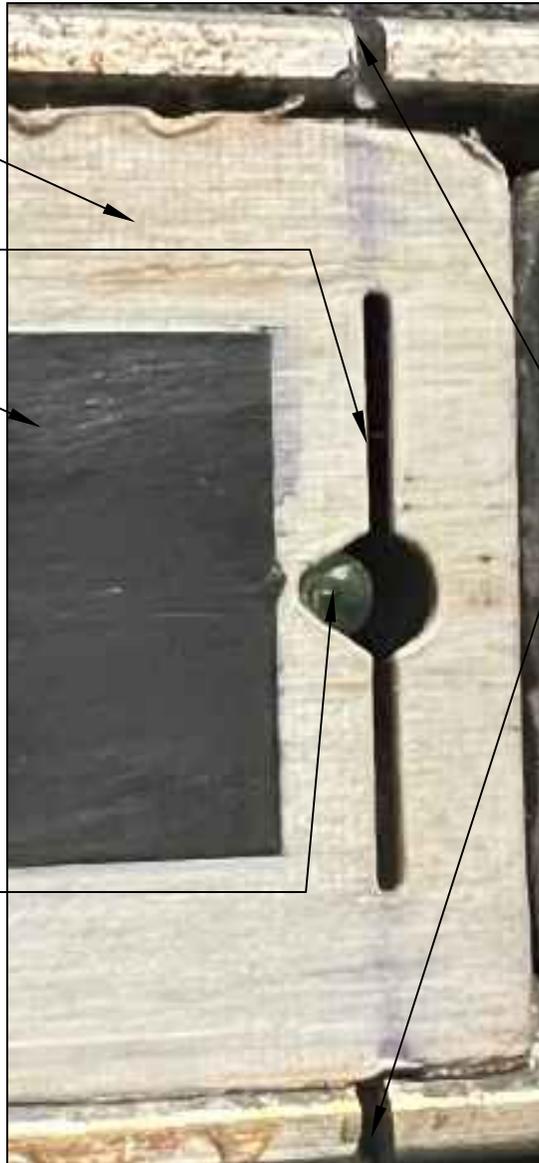
TITLE

DRAWING #

NTS

BOTTOM VIEW

SHEET 5 OF 18



## COMPONENTS

1. WATER LEVEL ALIGNMENT NOTCHES
2. WATER LEVEL & SENSOR INSERT
3. WATER LEVEL DISCHARGE SLOT
4. SENSORS AND ELECTRONICS ENCASED IN WATERPROOF EPOXY
5. WATER LEVEL DISCHARGE ILLUMINATION LED LIGHT



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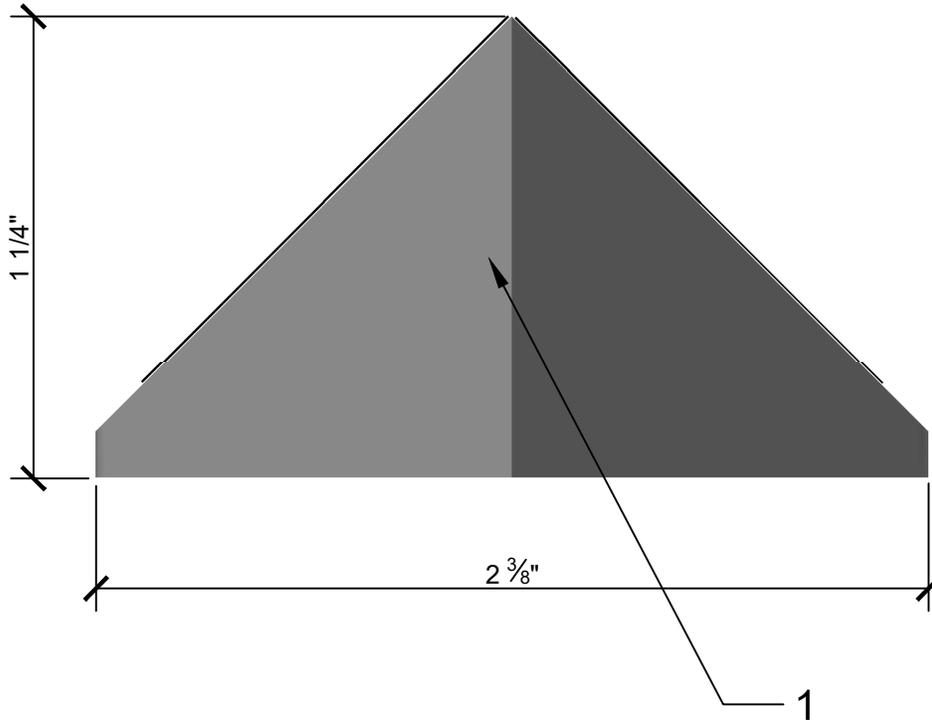
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DETAIL "A"

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**COMPONENTS**

1. NOSE CONE



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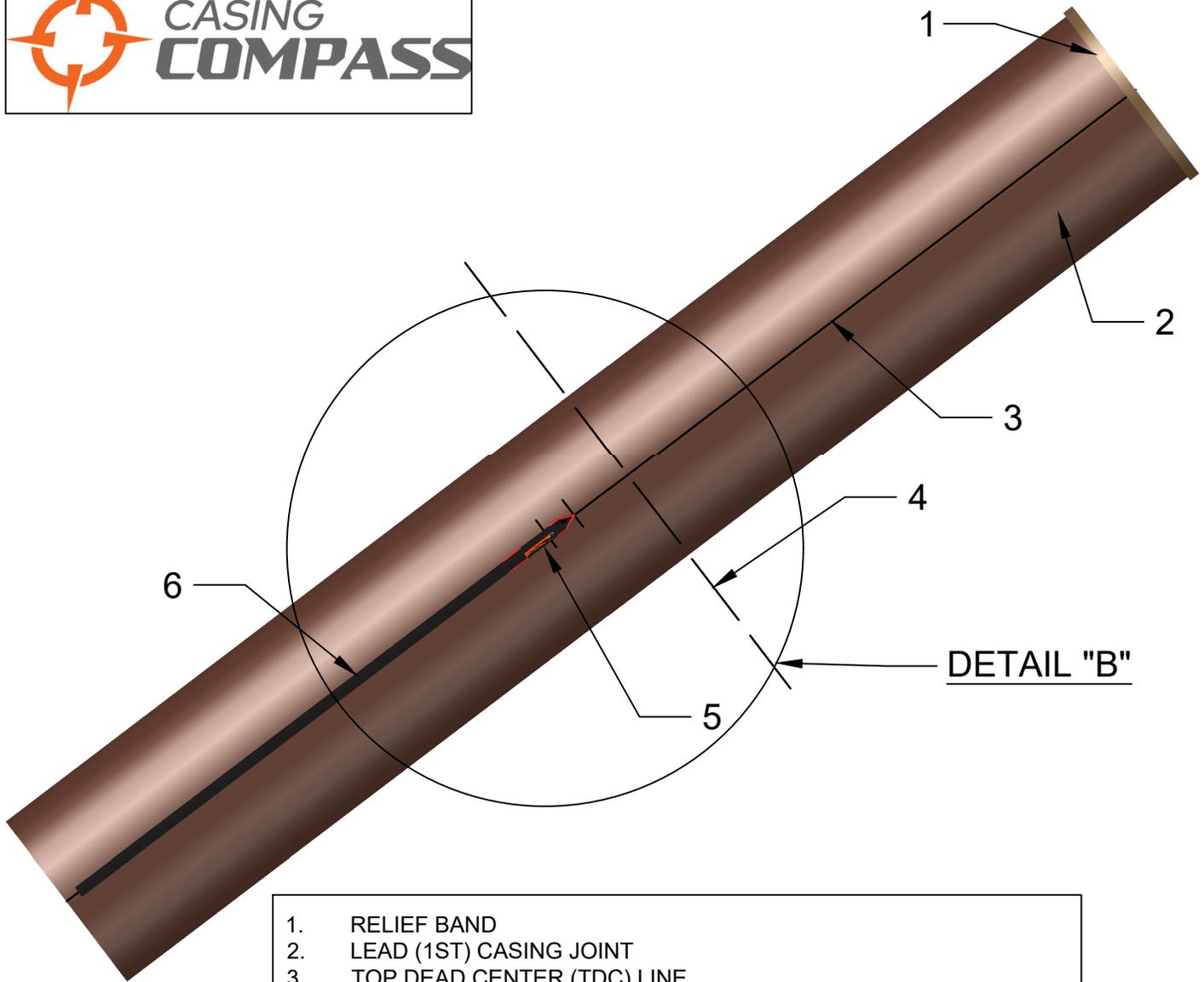
TITLE

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NTS

FRONT VIEW

SHEET 7 OF 18



1. RELIEF BAND
2. LEAD (1ST) CASING JOINT
3. TOP DEAD CENTER (TDC) LINE
4. REARWARD LOCATION OF LARGEST DIAMETER LEAD AUGER
5. CASING COMPASS
6. MINIMUM 1 1/2" x 1 1/2" x .125" WALL ANGLE IRON



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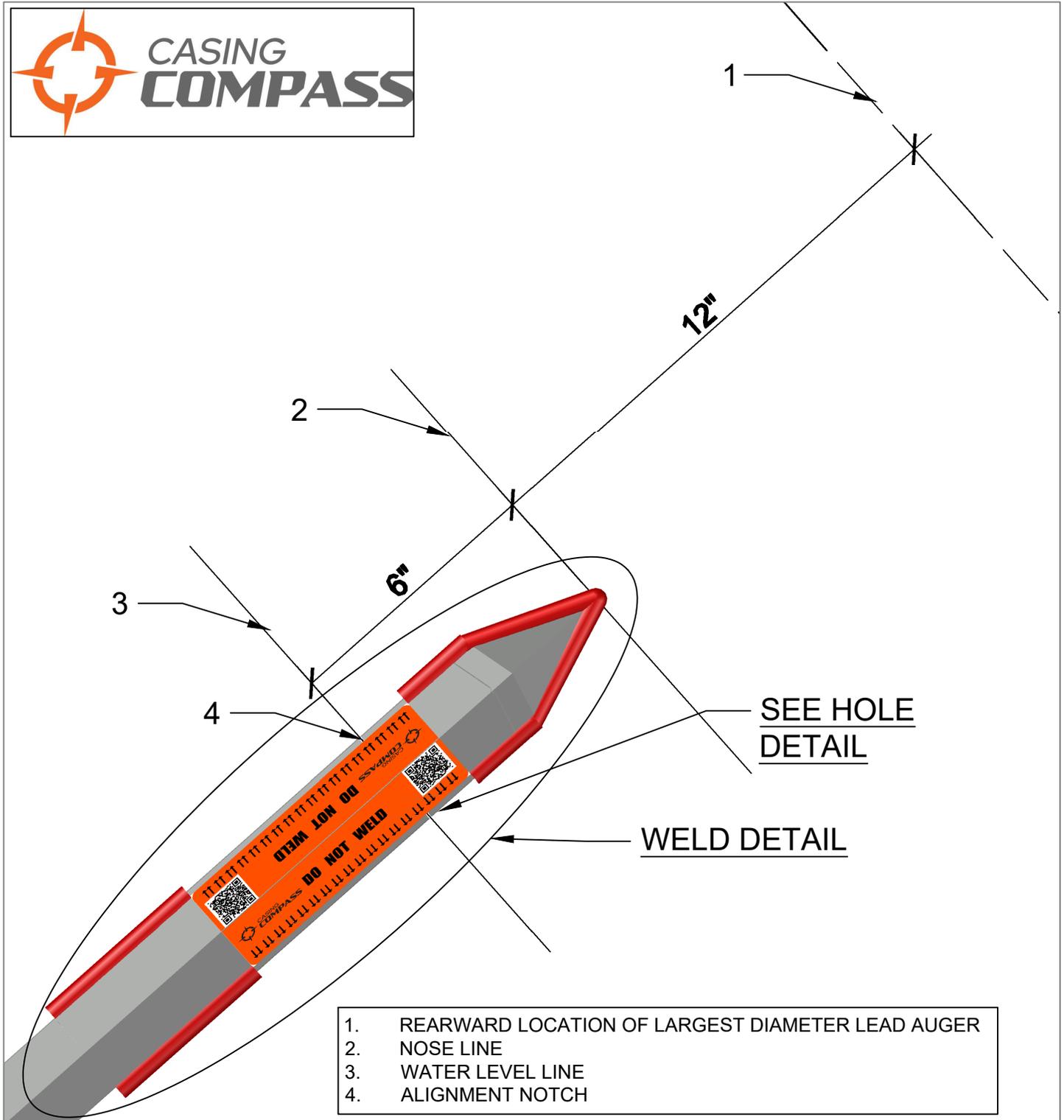
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COMPASS PLACEMENT

SHEET 8 OF 18





1. REARWARD LOCATION OF LARGEST DIAMETER LEAD AUGER
2. NOSE LINE
3. WATER LEVEL LINE
4. ALIGNMENT NOTCH



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DETAIL "B"

SHEET 9 OF 18



TOP DEAD CENTER (TDC) LINE

FRONT OF CASING



WATER LEVEL LINE



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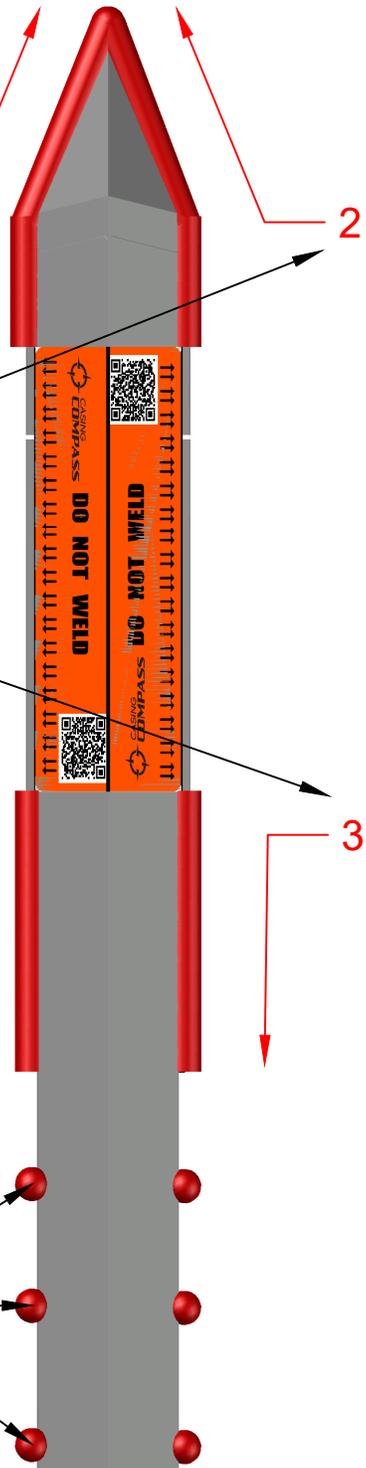
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NTS

HOLE DETAIL

SHEET 10 OF 18



**WELD ORDER AND DIRECTION**

1. PLACE TACK WELDS PRIOR TO FILLET WELDS
2. KEEP "DO NOT WELD" AREA COVERED W/ WET TOWEL DURING WELD PROCESS
3. ALLOW WELDS TO COOL
4. START WELDS AT THE "NO WELD" BORDER AND CARRY HEAT OUTWARD TO THE ENDS OF THE CASING COMPASS

**TACK WELDS (TYP)**



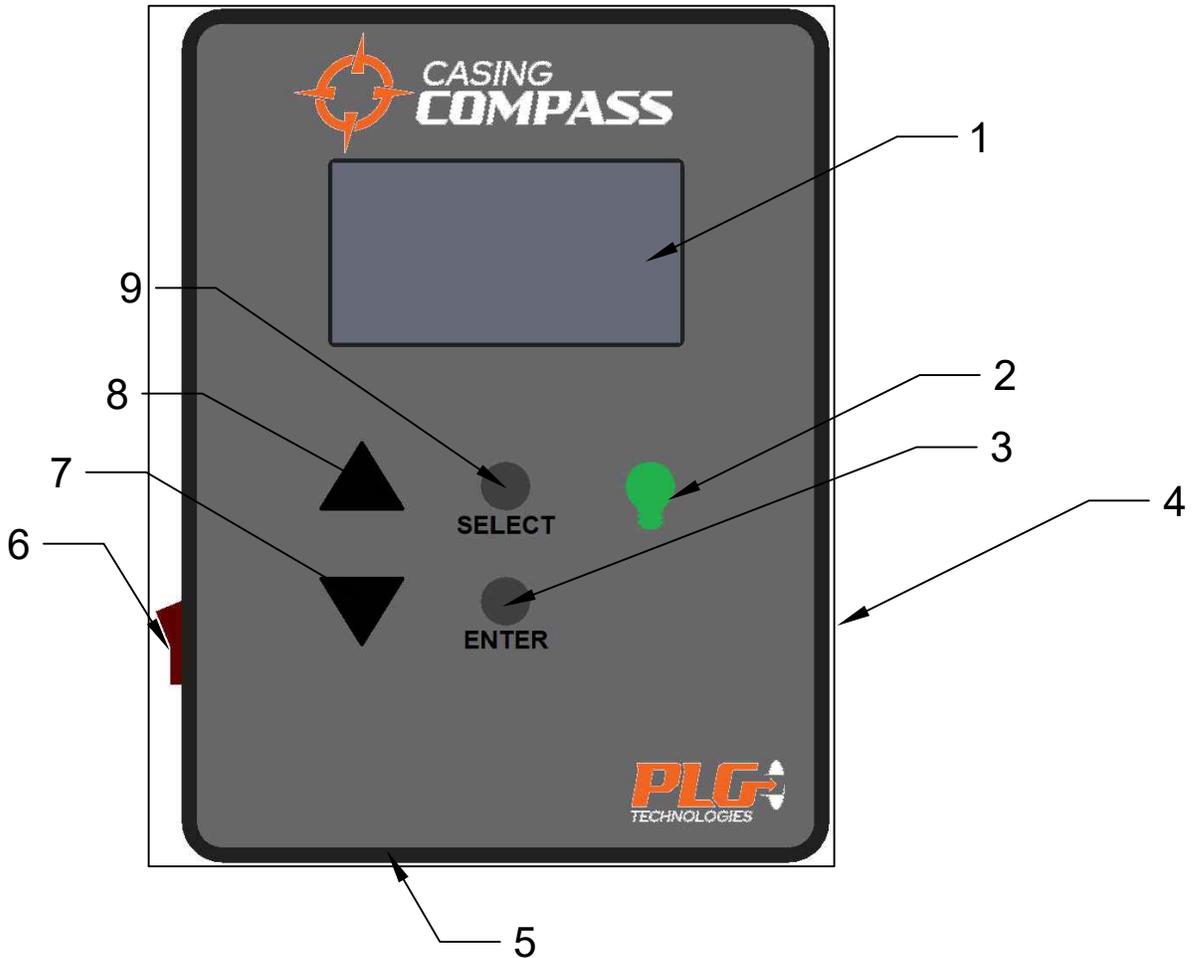
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| REV 3   |             |        |

SCALE  
**NTS**

TITLE  
**WELD DETAIL**

DRAWING #  
 SHEET 11 OF 18



- 1. LCD DISPLAY SCREEN
- 2. LED / ILLUMINATED WATER DISCHARGE TOGGLE BUTTON
- 3. ENTER BUTTON
- 4. RJ45 568b CONNECTOR
- 4.1. SUPPLIES 5VDC POWER AND RECEIVES SIGNAL FROM CASING COMPASS
- 5. 12VDC POWER SUPPLY JACK
- 6. POWER ROCKER SWITCH
- 7. ARROW DOWN BUTTON
- 8. ARROW UP BUTTON
- 9. SELECT BUTTON



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SCALE  
**NTS**

TITLE  
**CONTROLLER**

DRAWING #  
 SHEET 12 OF 18

1. **<CONTINUE>**  
**<NEW BORE>**

NEW BORE →  
← NO

2. **ARE YOU SURE?**  
**<YES> <NO>**

↓ YES

4. **CURRENT %: +aa.aa**  
**START %: +xx.xx**  
**ROLL: R zz.zzft**  
**TEMP DIFF: +bb Deg** **1**

← SET

3. **START %: <+xx.xx>**  
**CASING DIA.: <yyin>**  
**<CLEAR> <SET>**

↓ SELECT ↑

5. **CURR. TEMP: ss Deg**  
**TARE TEMP: rr Deg**  
**CASING DIA.: <yyin>** **2**

6. **NO COMS**

7. **LED**



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SCALE

TITLE

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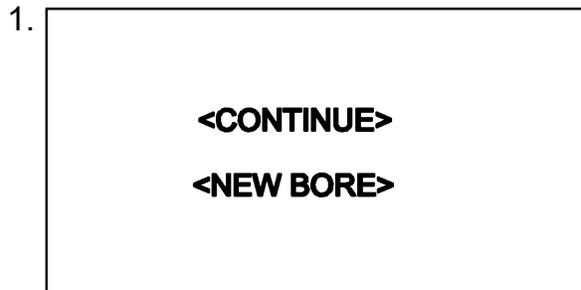
NTS

SCREEN FLOWCHART

SHEET 13 OF 18

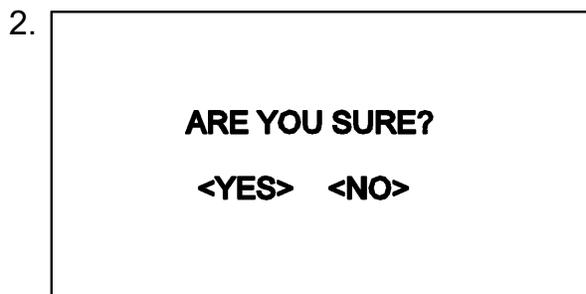


## POWER UP SCREEN



- 1.1 1ST VISIBLE SCREEN UPON POWER UP
- 1.2 SELECT "CONTINUE" RETAINS ALL STORED VARIABLES
- 1.3 SELECT "NEW BORE" TO SEND USER TO SCREEN #2
- 1.4 USE "SELECT" BUTTON (9) TO TOGGLE SELECTIONS
- 1.5 USE "ENTER" BUTTON (3) TO CONFIRM SELECTION

## "NEW BORE" SCREEN



- 2.1 VERIFICATION SCREEN TO ERASE STORED VARIABLES
- 2.2 SELECT "YES" SETS STORED VARIABLES TO DEFAULT VALUES.
- 2.3 SELECT "NO" TAKES USER TO SCREEN #1
- 2.4 USE "SELECT" BUTTON (9) TO TOGGLE SELECTIONS
- 2.5 USE "ENTER" BUTTON (3) TO CONFIRM SELECTION



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| REV 2   |             |        |
| REV 3   |             |        |

|       |               |                |
|-------|---------------|----------------|
| SCALE | TITLE         | DRAWING #      |
| NTS   | SCREENS 1 & 2 | SHEET 14 OF 18 |



## CALIBRATION SCREEN

3.

**START %: <+xx.xx>**

**CASING DIA.: <yyin>**

**<CLEAR>**
**<SET>**

- 3.1 START %: INC/DEC +/- 0.05% WITH ARROW KEYS. THIS IS THE STARTING GRADE OF THE LEAD CASING SECTION
  - 3.1a: MAX/MIN +/- 30.00%
  - 3.1b: DEFAULT VALUE 00.00%
- 3.2 CASING DIA: INC/DEC BY +/- 1" WITH ARROW KEYS (7) & (8)
  - 3.2a: MAX 96"
  - 3.2b: DEFAULT VALUE 6"
- 3.3 CLEAR: SETS GRADE AND DIAMETER VALUES TO DEFAULT VALUES
- 3.4 SET: LOCKS DESIGN GRADE, CASING DIAMETER
  - 3.4a: SAVES (3) VALUES: CURRENT GRADE, CURRENT ROLL, CURRENT TEMPERATURE
- 3.5 "SELECT" BUTTON (3) TOGGLES BETWEEN "START %," "CASING DIA," "CLEAR," AND "SET" TO ALLOW USER TO DEFINE VARIABLES
- 3.6 USE "UP" (8) AND "DOWN" (7) ARROW KEYS TO INCREASE / DECREASE VALUES
- 3.7 USE "ENTER" BUTTON (3) WHILE "SET" IS HIGHLIGHTED TO SAVE VARIABLES
- 3.8 SAVING VARIABLES CALIBRATES CASING COMPASS TO "START %" VALUE THAT WAS DEFINED HERE



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|-------|----------|----------------|
| SCALE | TITLE    | DRAWING #      |
| NTS   | SCREEN 3 | SHEET 15 OF 18 |



# DISPLAY SCREEN 1

4.

|                           |          |
|---------------------------|----------|
| <b>CURRENT %: +aa.aa</b>  |          |
| <b>START %: +xx.xx</b>    |          |
| <b>ROLL: R zz.zzft</b>    |          |
| <b>TEMP DIFF: +bb Deg</b> | <b>1</b> |

- 4.1 CURRENT %: PRESENT GRADE OF THE CASING COMPASS
  - 4.1a: CASING COMPASS GRADE ACCURACY IS +/- 0.05%
- 4.2 START %: GRADE OF THE CASING COMPASS WHEN CALIBRATED
  - 4.2a: THIS VALUE WAS USER DEFINED ON SET UP SCREEN
- 4.3 ROLL: THE AMOUNT OF ROLL THE CASING COMPASS IS CURRENTLY EXPERIENCING
  - 4.3a: "R" INDICATES A ROLL TO THE RIGHT / CLOCKWISE ROLL WHEN VIEWED FROM THE BORE PIT
  - 4.3b: "L" INDICATES A ROLL TO THE LEFT / COUNTERCLOCKWISE ROLL WHEN VIEWED FROM THE BORE PIT
  - 4.3c: ROLL IS BASED ON USER-DEFINED CASING DIAMETER IN SETUP
  - 4.3d: UNITS: .01ft (HUNDREDTHS OF FOOT) OF CIRCUMFRENTIAL ROLL
- 4.4 TEMP DIFF: CURRENT CASING COMPASS TEMPERATURE MINUS INITIAL CASING COMPASS TEMPERATURE AT CALIBRATION TIME.
  - 4.4a: TEMPERATURES OF INTERNAL CASING COMPASS CIRCUIT BOARD AND CHIPS, NOT THE SURFACE OF THE ANGLE IRON HOUSING
  - 4.4b: FOR BEST ACCURACY, KEEP "TEMP DIFF" TO +/- 30deg F.
  - 4.4c: FOR VALUES >30deg F, RUN WATER THROUGH THE WATER LEVEL UNTIL VALUE IS <30deg F BEFORE RECORDING GRADE AND ROLL MEASUREMENTS
- 4.5 USE "ENTER" BUTTON (3) TO TOGGLE BETWEEN DISPLAY SCREENS 1 AND 2



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| SCALE | TITLE    |
| NTS   | SCREEN 4 |

|                |
|----------------|
| DRAWING #      |
| SHEET 16 OF 18 |





# INSTALLATION INSTRUCTIONAL VIDEOS



**SCAN ME**

# PLG TECHNOLOGIES HOMEPAGE



**SCAN ME**



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SCALE

TITLE

NTS

REFERENCE

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SHEET 18 OF 18