

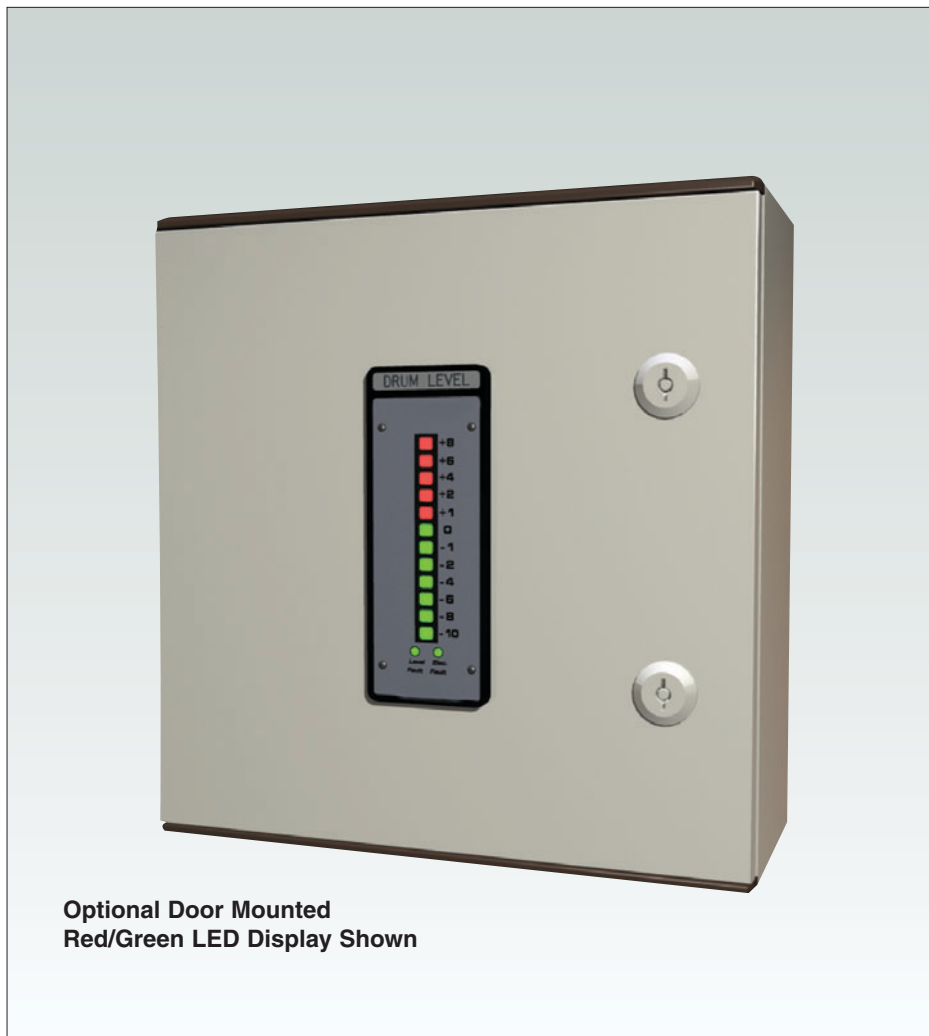
# PENBERTHY

## Features

The Penberthy Series 12B five probe and above alarm system represents the latest advancement in electronic level indication. The Series 12B has upgraded internal diagnostics for monitor clock faults, power supply faults and level fault. Based on the conductivity probe technology now widely accepted in the industry, it was specially designed to meet increasing demand for a reliable, cost effective means of sensing water in various applications. The probes can be mounted directly to the pressure vessel or column. The probes are welded stainless steel HP and IP electrode with zirconia insulator (3000 psig saturation, up to 1200°F [207 barg @ saturation, up to 649°C]) or threaded stainless steel LP electrode with Teflon® insulator (850 psig @ 525°F [58 barg @ 274°C]). The Series 12B consists of three major components: the column with probes, the detection and verification unit and the remote display. The number of probes can be selected and spaced to indicate liquid level through a desired range. The column is custom manufactured to provide the most accurate indication for any application. Independent detection circuitry for each probe allows selecting relay output for alarms or trips. Local indication is standard within the Type 4X/IP65 D & V enclosure. Bright red and green indicator for the control room is standard.

### Note

Teflon® is a registered trademark of E.I. du Pont de Nemours & Company.



Optional Door Mounted  
Red/Green LED Display Shown

## Typical applications

- Boiler Drum Level
- Equipment Drains (Desuperheaters, Control Valves, Sootblower Systems)
- Receiver Tanks (Condenser, Water Tank, Deaerator)
- Flash Tanks, Feedwater Heaters



Total Flow Control Solutions

# Penberthy Series 12B

## Electronic Level Indication

### Specifications

- Up to twelve level switch/indication applications per pcb, cascable to accept unlimited add-on probes.
- Independent detection circuit for each probe.
- Failure of any channel or probe does not disable system.
- Standard Green LED internal D&V display, yellow LED for faults.
- Every level has a relay output for alarms and trips with remote Red/Green LED indication (flash programmable).
- Low voltage mixed dual frequency sine wave used for water detection (<12 Vac RMS nominal).
- Net integral zero current waveform. No DC = no possibility of electrolysis of water or plating.
- D&V accepts up to three additional Red/Green LED remote displays.
- Redundant internal power supply.
- Relay outputs for level and electronic faults.
- Internal diagnostics for monitor clock faults, power supply faults and level fault.
- Patent Pending.
- Enclosure: Type 4X/IP65
- Maximum sensitivity:  $1\mu\text{S}/1\text{M}\Omega$  - cm water
- Input Power: 120Vac/240 Vac nominal, 50-60 Hz 45 VA nominal Unit incorporates MOV protection
- Relay contacts: Form C, SPDT 10A @ 120 Vac 5A @ 240 Vac 8A @ 28 VDC
- Operating Temperature: 0 - 160°F [-17°C/+71°C]

### Standard Assembly

- Type 4X/IP65 Enclosure
- One Remote Red/Green LED Display with programmable flash.
- Water Column with Probes

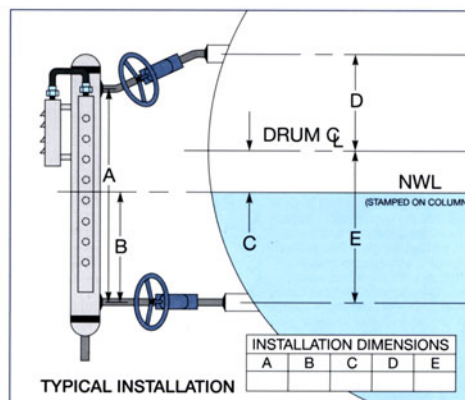
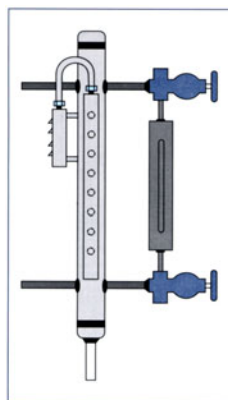
### Optional

- 4-20mA loop output
- Dual primary level power supplies.
- Type 4X/IP65 enclosure for remote displays.
- Door mounted Red/Green LED display for local viewing.
- Trip By-pass Key switch.
- Continuity check for short/open probe/wire detection. Short based on less than 1/10 nominal water conductivity.

Meets requirements of ANSI/ISA S84-01-96 "Safety Instrumented Systems" with optional dual primary level power supplies and short/open detection specified.

Facility Phone: 815-537-2311  
Ask for Boiler Trim

### Water Columns



### Ratings

3000 psig [207 barg] @ saturation

1800 psig [124 barg] @ saturation

850 psig [58 barg] @ saturation

### Materials of Construction

Seamless Pipe and 1 1/2" NPS [40 mm] vessel stub fittings (8" length) and 3/4" NPS [20 mm] stub drain connections. Standard water column is 3" NPS [75 mm], 36" [758 mm] length. Pipe schedules: [3000 psig] XXS, [1800 psig] Sch 160 and [850 psig] Sch 160. Probe covers are stainless steel IP32. Each standard 36" [758 mm] comes with 36" HT probe wires extending from the conduit connection.

- Optional:
- Remote junction box (Type 4X/IP67).
  - Prewired column mounted junction box (Type 3R/IP22).
  - Extended length column over 36" [758 mm].
  - 2" NPS [50 mm] and 3" NPS [75 mm] vessel fittings.
  - Redundant probe level indication. (Requires 4" [100 mm] diameter column)
  - Isolation and Drain Valves.
  - 3/4" NPS [20 mm] vent connection.
  - Flanged or Female socket weld connections.
  - Insulation heat jacket.
  - Weldolet/Bossets on connections.
  - Welded support brackets.

### Manufacturer's Standard Materials

SA 106 gr B UNS K03006 to  $T_{\text{max}} = 1000^\circ\text{F}$  [538°C] EN 10210-1, S275J0H

Optional:

SA 335 gr P22 UNS K21590 to  $T_{\text{max}} = 1200^\circ\text{F}$  [649°C] EN 10210-1, S275J0H

SA 312 TP316 UNS S31600 to  $T_{\text{max}} = 1500^\circ\text{F}$  [816°C] DIN 17175 X5CrNiMo17-12-2/1.4401

### Extended delivery time optional materials

SA 335 gr P11 UNS K11597 to  $T_{\text{max}} = 1200^\circ\text{F}$  [649°C] DIN 17175 13CrMo 4 4 (1.7335)

SA 335 gr P91 UNS K90901 to  $T_{\text{max}} = 1200^\circ\text{F}$  [649°C] DIN 17175 X20CrMoV 12 1 (1.4922)

SA 312 TP304 UNS S30400 to  $T_{\text{max}} = 1500^\circ\text{F}$  [816°C] DIN 17175 X5CrNi 18-10/1.4301

$T_{\text{max}}$  established by ASME B&PV Code Sect IID

EN/DIN material = closest equivalent

### Density error correction options

1. Steam heating tube for overall span density error correction.
2. Probe placement offset for single user specified operating point error correction.

### Electrodes

1. Welded Stainless steel HP and IP electrode with zirconia insulator – 3000 psig @ saturation, up to 1200°F [207 barg @ 649°C].
2. Threaded stainless steel LP electrode with Teflon® insulator – 850 psig @ 525°F [58 barg @ 274°C]

### Hazardous Area Usage

Diode barrier sets for intrinsically safe protection are available for electrode/sense wire energy limiting if water column is used in a class