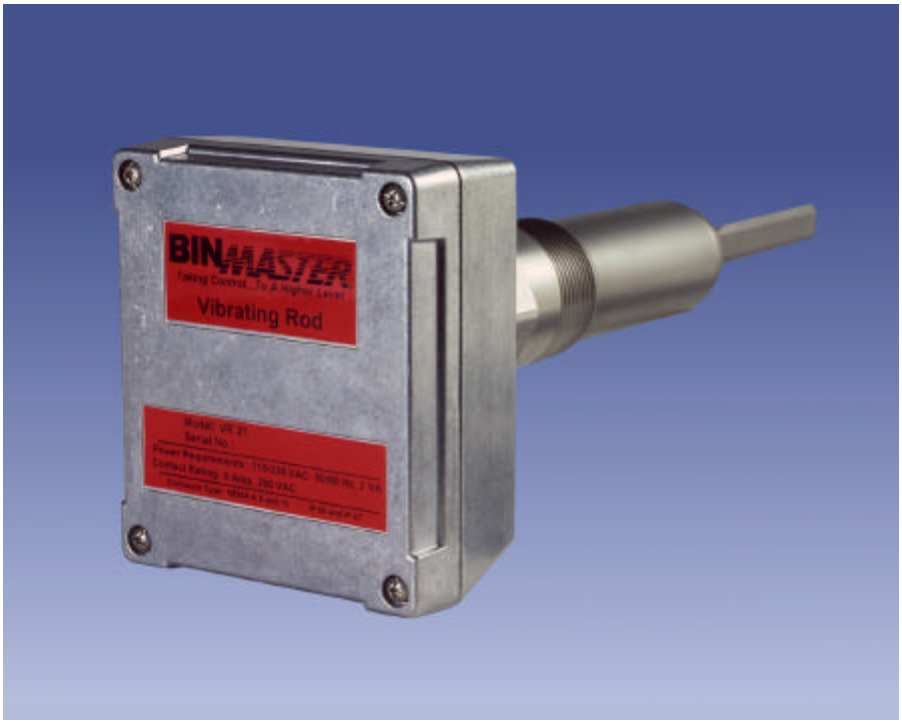
BINMASTER

Taking Control . . .To A Higher Level

BINMASTER Vibrating Rod
Level Control Instrument



VR21 / VR41 / VR51

Installation and Operation Instructions
Please Read Before Installing Equipment

BINMASTER

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1.0 APPLICATIONS

The BINMASTER VR is a vibration type point level control that detects the high and low material level in bins, silos and hoppers, filled with grained or powdered materials. The following list shows some of these materials:

powdered milk	peanuts
frozen potato chips	tobacco
beans	wood shavings
sugar	chalk
sweets	stearine chips
coffee beans	powdered cellulose
coffee ground	glass finely ground
coffee freeze-dried	granular plastics
tea (leaf)	gravel
salt	powdered clay
flour (in a flour mill)	polysterene powder
foundry sand	styrofoam
spices	soda
animal food	soot dry pellets

Important: The instrument can not be used for detecting sticky materials and materials which tend to hang up.

2.0 OPERATION

2.1 General

The signal from the electronic circuit of the BINMASTER VR excites the blade of the instrument to vibrate on its resonance frequency of 290 Hz. When material covers the blade of the probe, the vibration stops. This is sensed by the electronic circuitry which forces its relay to switch. When the blade gets uncovered, the vibration will restart and the relay will switch back. As only the end of the vibrating blade is sensitive and not the base, build-up on the container wall has no influence on the function of the instrument The shape of the blade and its vibration have a self-cleaning effect.

2.2 Sensitivity

There are 2 sensitivity settings which can be selected by the sensitivity switch on the circuit board, see Figure 7.2, page 14.

Position A: High Sensitivity: Standard setting

Position B: Low Sensitivity: For materials which may form a deposit on the vibrating blade (dense material)

As the sensitivity of the instrument is low at position B, extremly light material such as expanded styrofoam can not be detected at this setting.

2.3 Failsafe high (FSH) / Failsafe low (FSL)

The BINMASTER VR operates in either failsafe high (FSH) or failsafe low (FSL) mode. The failsafe mode is selected by switch on the PCB. The relay status is indicated by the red LED (D6) on the circuit board.

FSH: For High Level Alarm: The relay is de-energized (LED off), when the blade is covered by material or power has failed.

FSL: For Low Level Alarm: The relay is de-energized (LED off), when the blade is free or power has failed.

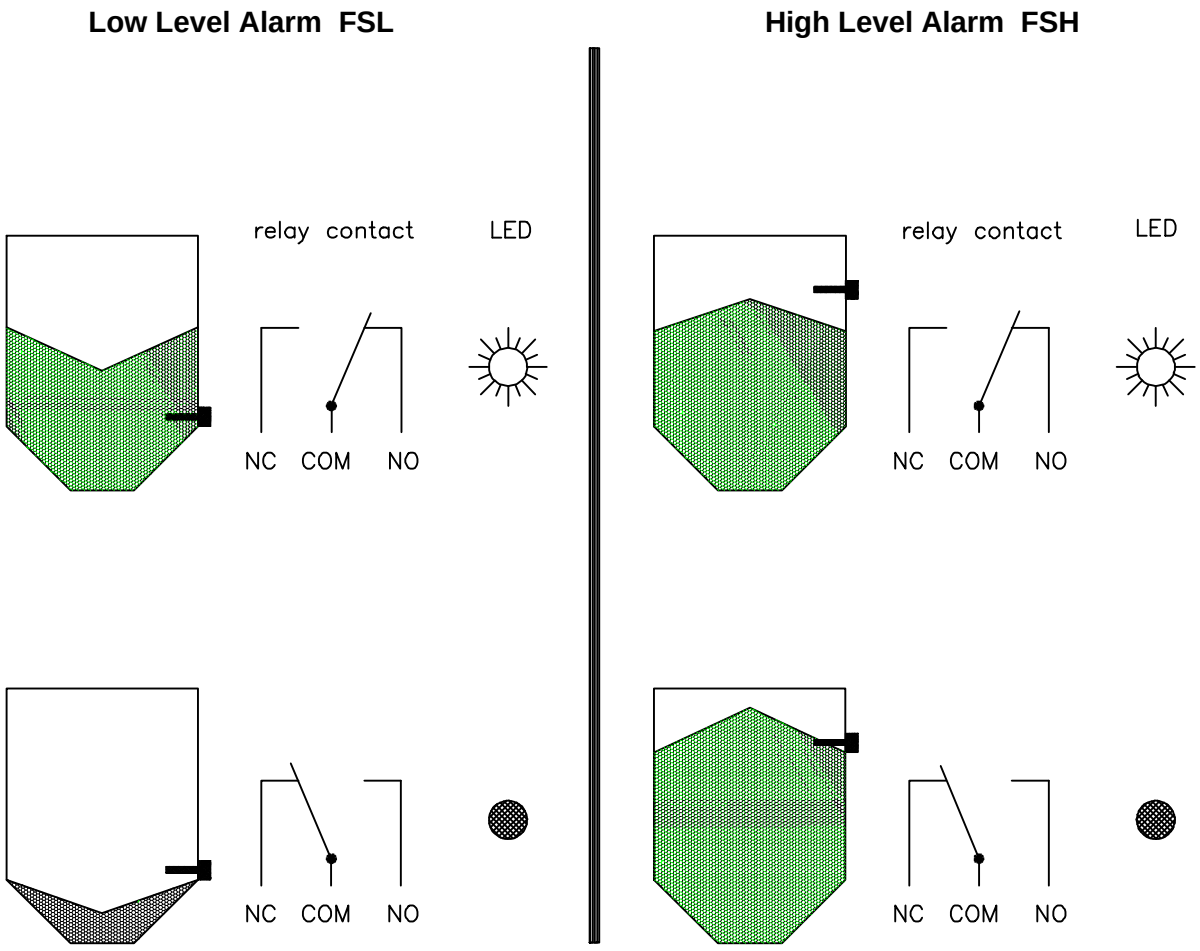


Figure 2.1: Failsafe Low / Failsafe High

3.0 SPECIFICATIONS

Enclosure:	Decast Aluminium. Type 4 1 conduit entry PG 13.5 or ½“ NPT
Power Supply:	115/230 V -15 / +10% 50/60Hz (Different power supplies available)
Power consumption:	2 VA
Relay:	1 potential-free change-over contact (SPDT) (2 contacts, DPDT, optional) Maximum switching voltage: 250V-AC Maximum switching current: 5A Maximum switching power: 1000 VA Cos φ = 1; 80 Watt for DC
Time Delay:	1 second from stop of vibration 2 to 5 seconds for start of vibration
Probe:	Stainless steel 1.4301 / AISI 304. Type 4 Thread 11/2“ conical DIN 2999 or 11/2“ NPT Resonance frequency 290 Hz Maximum vertical and horizontal load upon the end of the blade: 100N = 22.5 Lbs. Maximum tensile load of cable VR51: 440lbs (200kg)
Indication:	Relay: Red LED on PCB Power: Yellow LED on PCB

Minimum Density of Material to be Monitored: 30 g / liter

Maximum Pressure Inside Bin: 6 bar

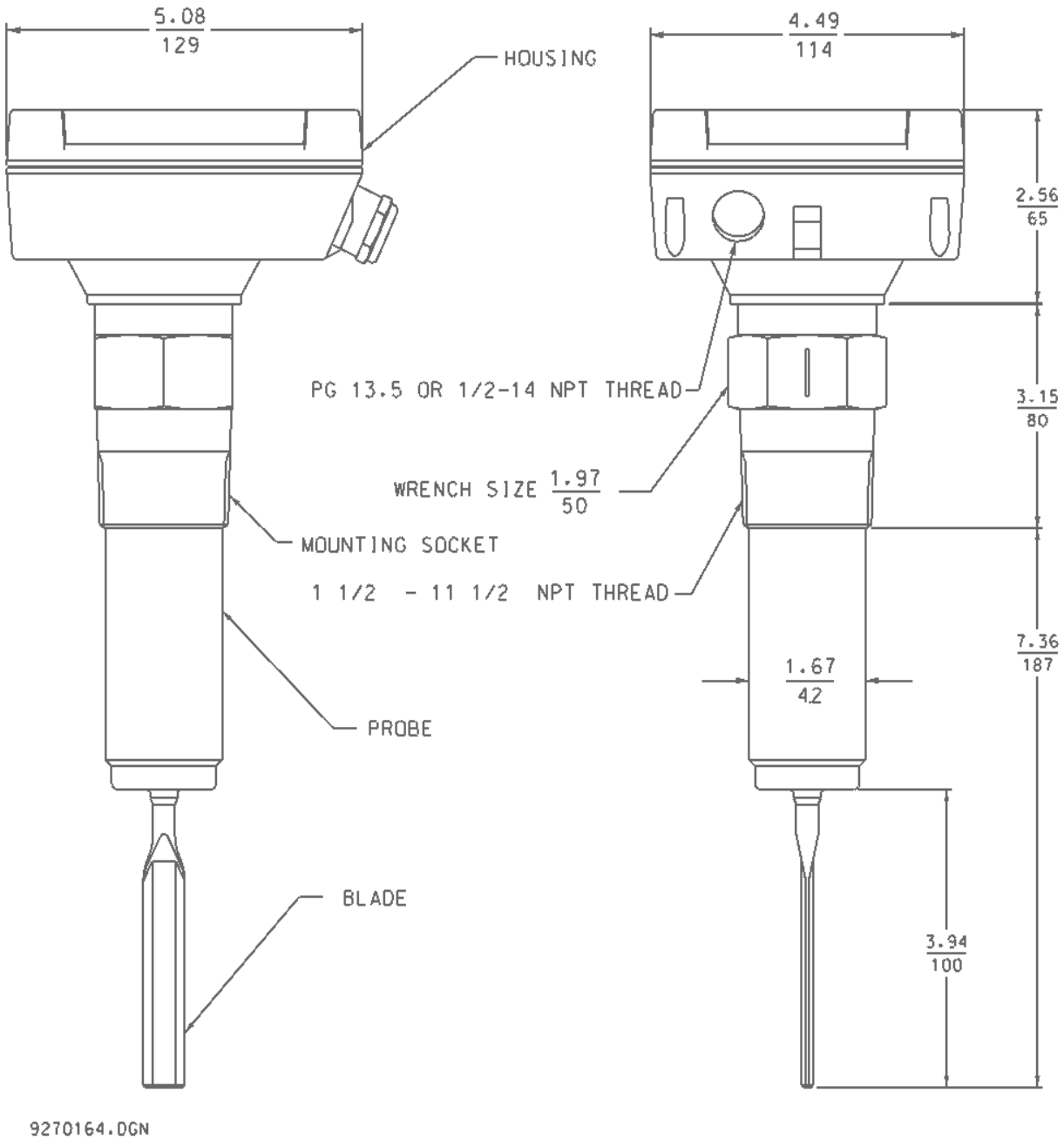
Ambient Temperature:
- Electronic: -4°F … +140°F (-20°C ... + 60°C)
- Probe: -4°F … +176°F (-20°C ... + 80°C)
- Probe HT: -4°F … +284°F (-20°C ... + 140°C)

4.0 VERSIONS

The BINMASTER VR is available in 3 different versions:

- VR21 Standard Insertion Length 7.36 in. (187 mm)
- VR41 Insertion Length extended from 14“up to 13 feet by a tube which is screwed between the vibrating probe and the mounting socket.
- VR51 Insertion Length extended from 18“ up to 19.5 feet by a cable extension.

4.1 Binmaster VR21

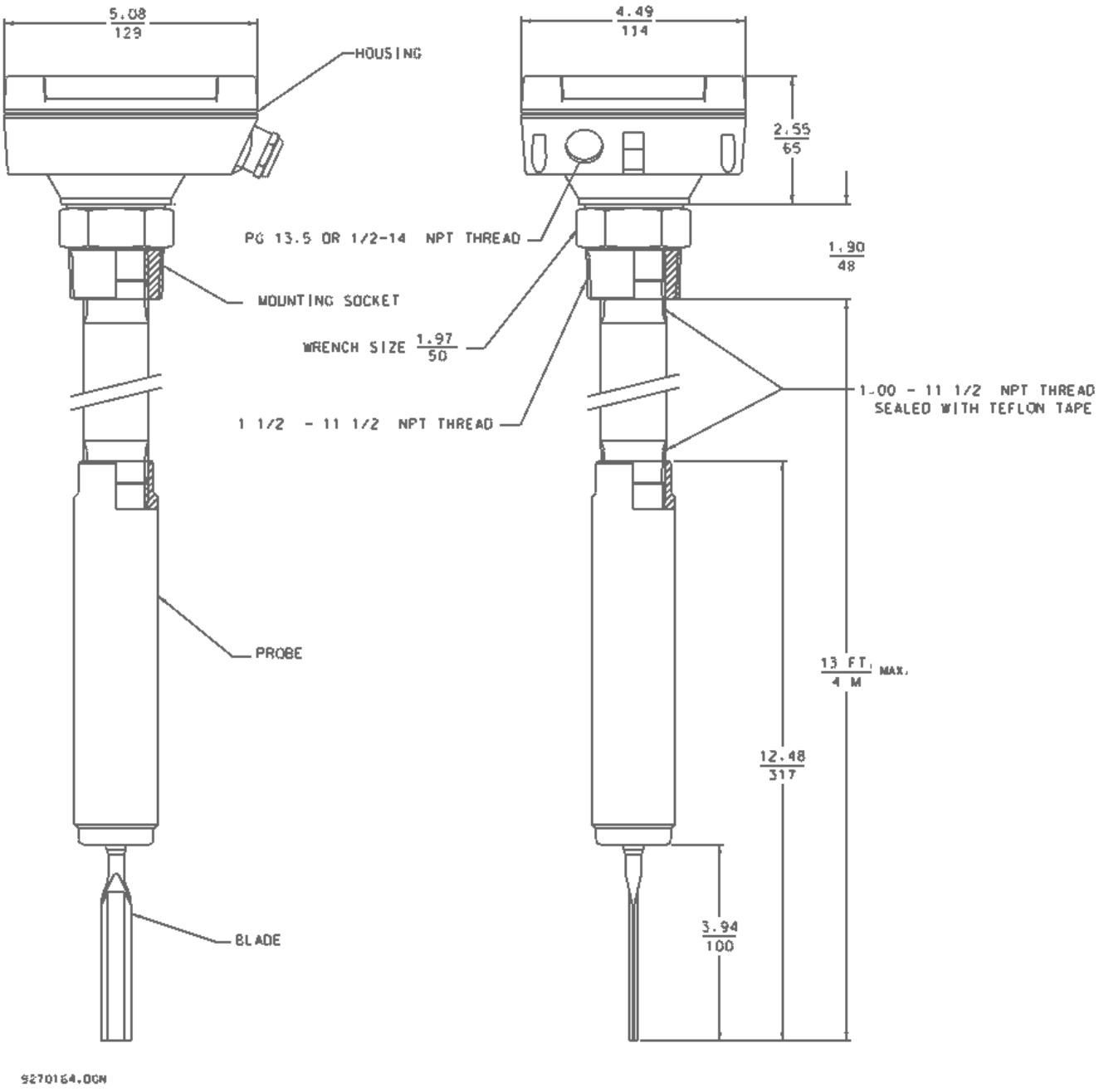


Insertion Length: 187 mm = 7.36“

Installation: Top and Side Mounting

Weight: 2.3 kg = 5.07 Lbs.

4.2 Binmaster VR41

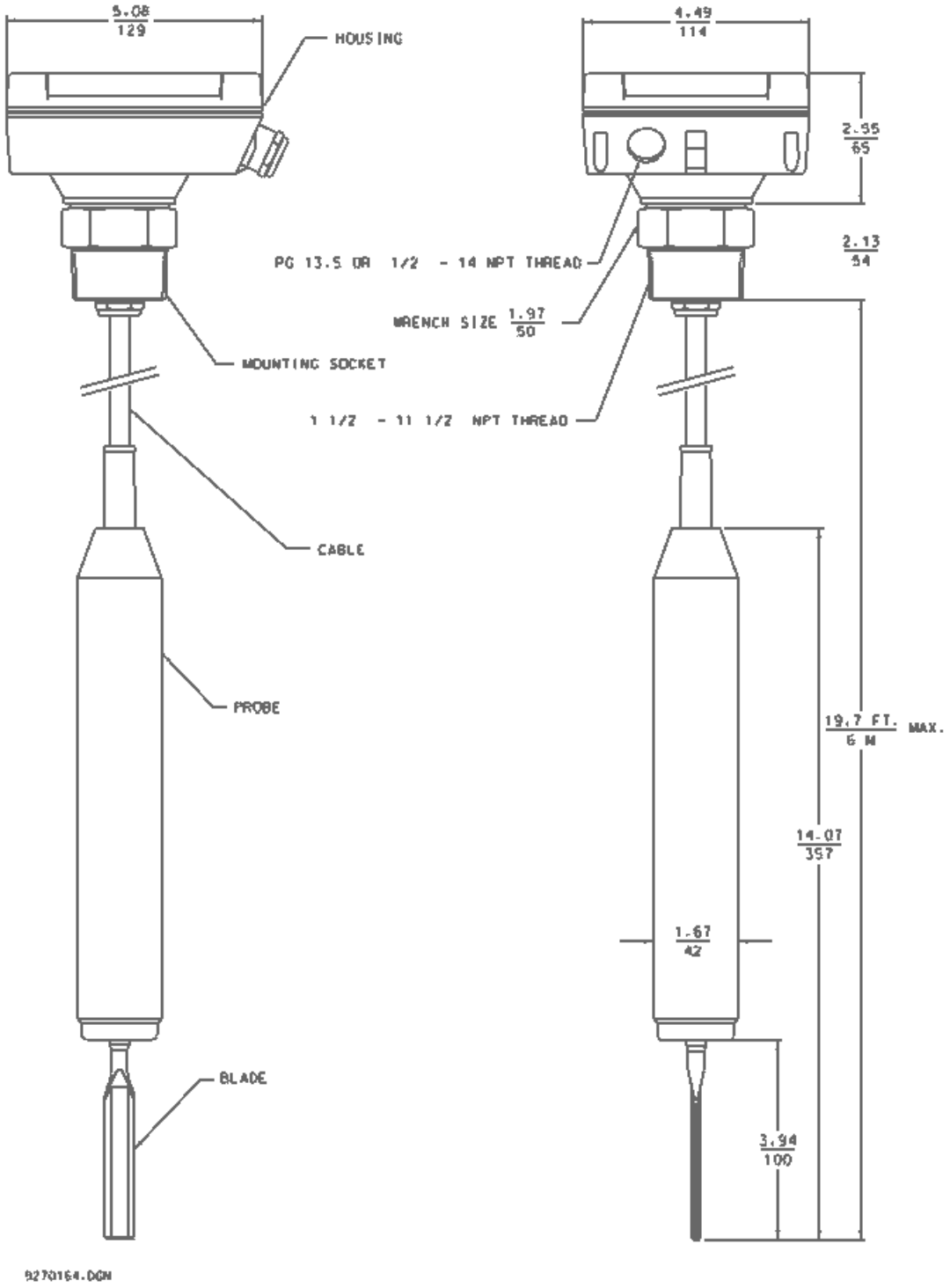


Insertion Length: Minimum 14 in., Maximum 13 ft.

Installation: Top mounting
(Side mounting for short extensions possible)

Weight: Maximum 28.7 lb with maximum insertion length of 13 ft.

4.3 Binmaster VR51



Insertion Length: Maximum 19.5 ft

Installation: Top mounting

Weight: Maximum 7.7 lb with max. insertion length of 19.5 ft

5.0 OPTIONS

Besides the above standard versions the following options are available:

- HT-version for high temperatures in the bin up to 285°F (not for VR51)
- Separate housing installation for PCB which is necessary for HT-version and in case of heavy, continuous vibration of the bin, see Section 9.1
- Different supply voltage: 48 V-AC; 24 V-AC; 24 V-DC; 20...55V-DC
- Housing powder coated
- Second conduit entery
- Relay with two potential-free change over contacts (DPDT)

6.0 INSTALLATON

6.1 General

Figure 6.1 shows typical installation possibilities of the BINMASTER VR.

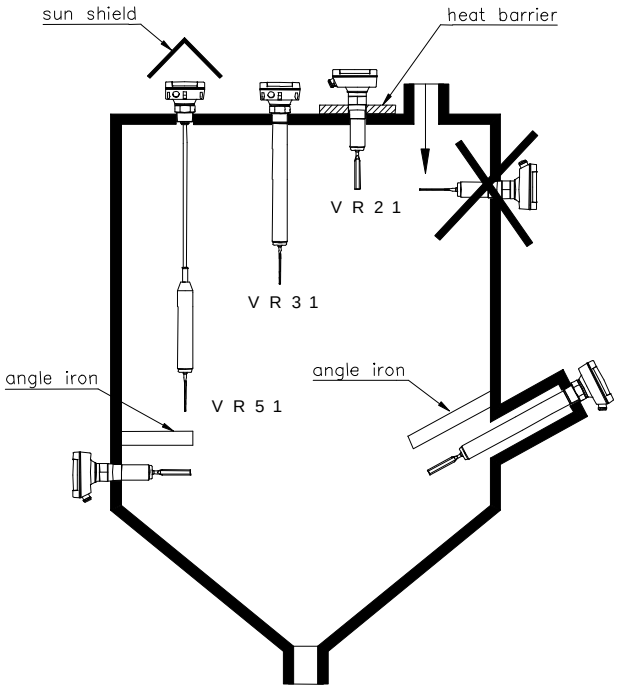


Figure 6.1

The BINMASTER VR gets installed by screwing the mounting socket of the instrument into the bin wall by means of a 50mm open-end wrench.

WARNING: Do not screw by turning the housing.

The conduit entery must always point downwards to prevent moisture seeping inside the housing. If the housing is not in the correct position after the probe has been firmly screwed into the bin wall, proceed as follows:

- Remove the cover of the housing
- Loosen the screw in the center of the PCB
- Turn the housing into the correct position (cable ducts pointing downwards)
- Tighten the screw in the center of the PCB
- Replace the cover of the housing.

In order to keep the ambient temperature of the PCB within the allowed range of -4 to +140°F the housing should be protected from direct sunlight by installing a sun shield.

A heat barrier has to be installed between the housing and the bin wall in cases the temperature of the material inside the bin exceeds 140°F. Instead it also is possible to install the PCB in a separate housing up to 6.5 feet away from the bin, see Section 9.1

In cases where continuous vibrations of the bin are present, the PCB must be installed in a separate housing apart from the vibrations, see Section 9.1

6.2 Side Mounting

VR21

The VR21 is normally screwed into the bin wall at the level to be monitored in horizontal direction or with the blade pointing slightly downwards.

The probe must be kept out of the path of falling material to avoide damage. If this is not possible a shield, for example an angle iron, must be installed over the blade as shown in Figure 6.1 Such a shield should always be installed when the instrument is used for low level indication.

When the probe is inserted horizontally into the bin, it must be turned until the blade is vertically oriented, so that material can flow freely over the blade and does not rest on it causing false alarm. Alignment of the blade is verified by the two slots in the mounting socket. These will be facing up and down when the orientation of the blade is correct, see Figure 6.2

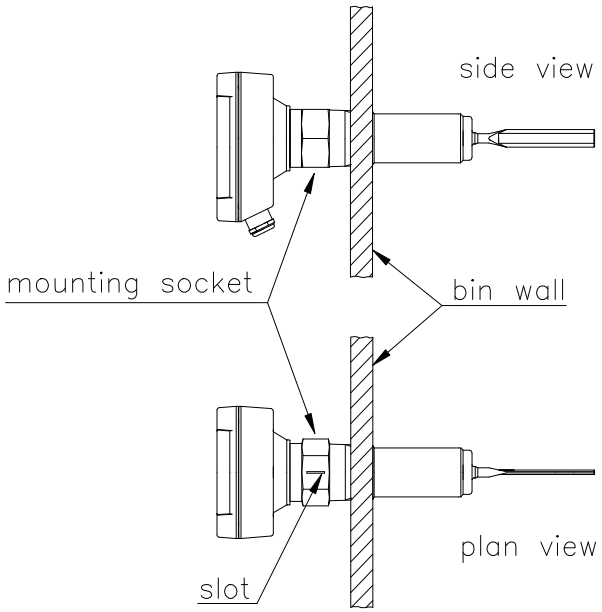


Figure 6.2 Orientation of the blade at horizontal installation

VR41

The rigid extended versions are designed for top mounting. Side mounting of this version is possible for short extensions if the probe as well as the protection shield over the blade are supported adequately.

6.3 Top Mounting

Top mounting is possible for all versions of the BINMASTER VR. The VR51 is designed for top mounting **only** and should never be installed within the path of falling material which might damage the cable.

7.0 CONNECTION

Figure 7.1 shows how the probe, housing and PCB are assembled.

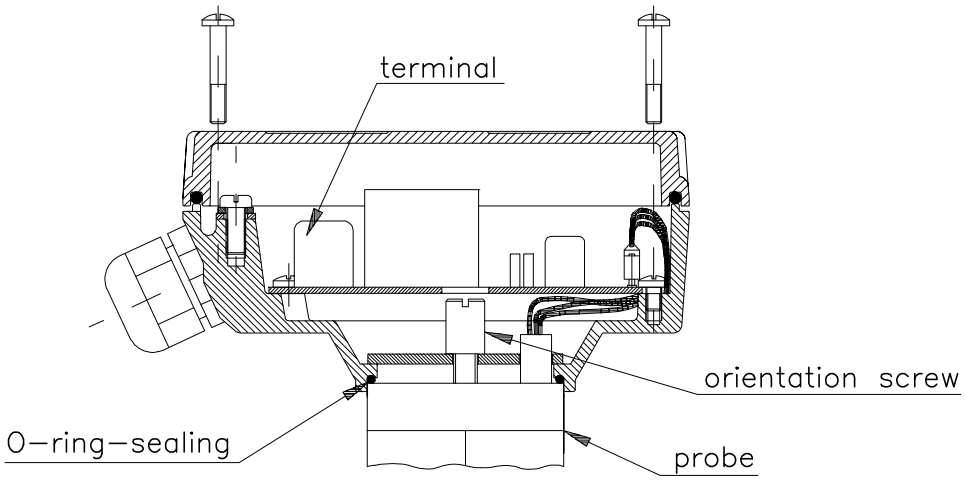


Figure 7.1 Assembly of probe, housing and PCB

The orientation screw must be tightened firmly.

The standard PCB is suitable to all versions of the BINMASTER VR probes, but the PCB-HT (for high temperature probe) must be used for HT - probes only and vice versa.

Non-standard PCBs are marked with a label: **Special Model HT**

The probe is connected to the PCB by the 3 leads as shown in Figure 7.2

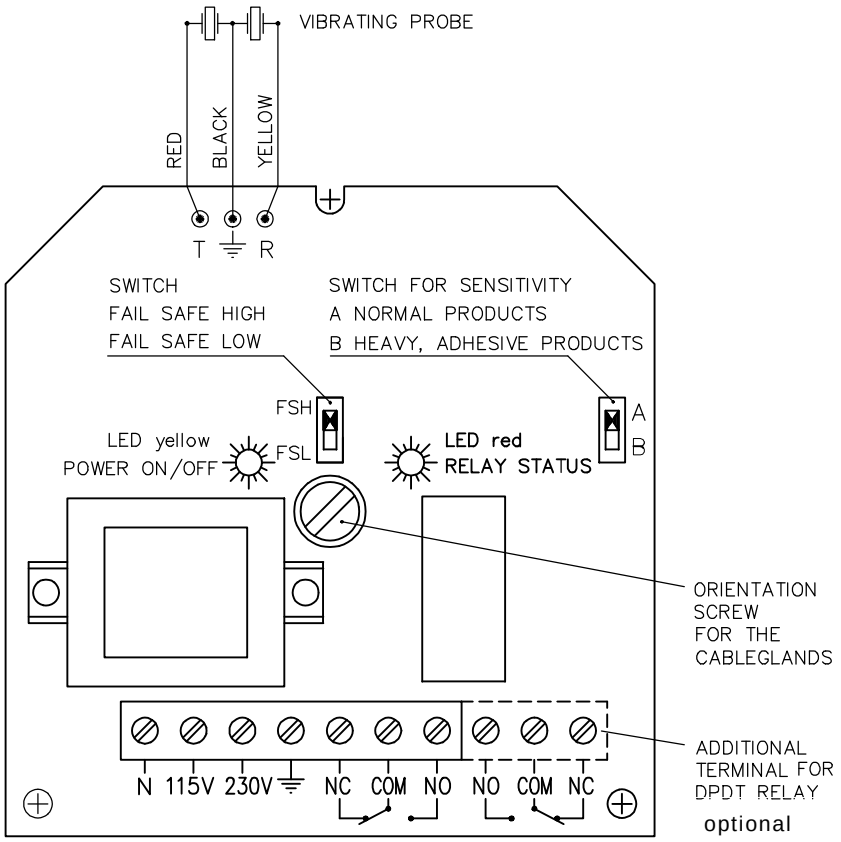
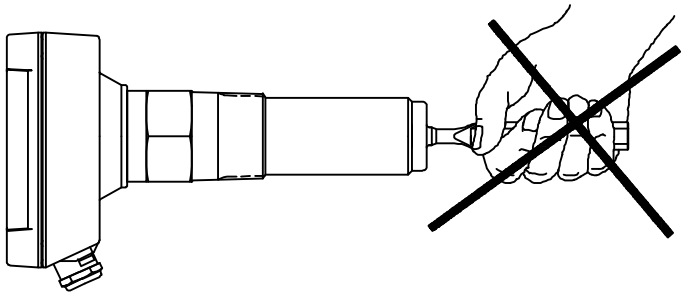


Figure 7.2 Standard PCB

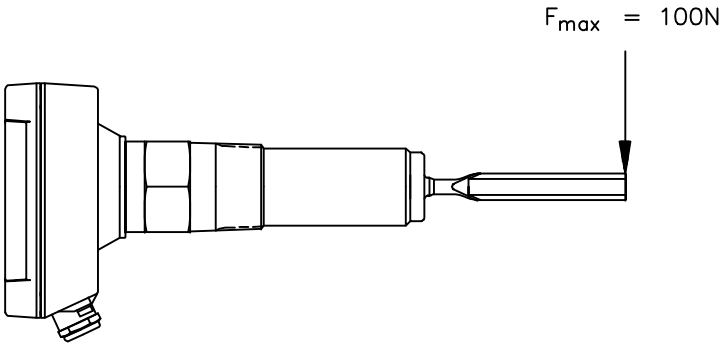
The terminal on the PCB for power supply and control circuit allows a maximum conductor size of 14 AWG.

8.0 HANDLING / CAUTION

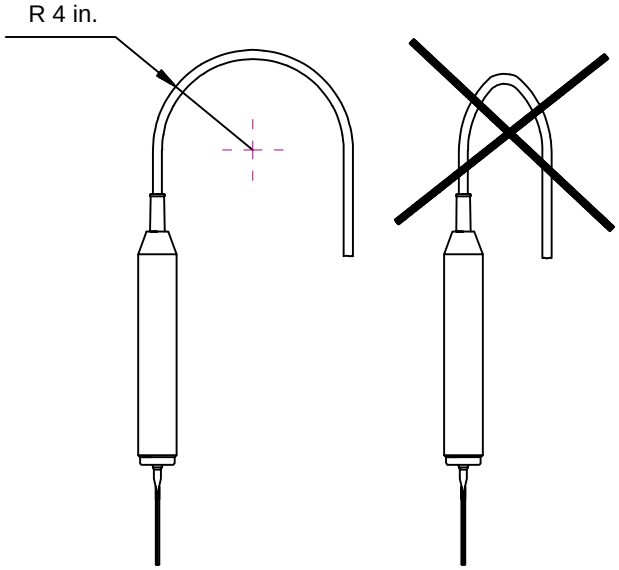
- The BINMASTER VR must never be handled by the blade



- The blade must not be bent and its dimensions must not be altered.
- The maximum vertical and horizontal load upon the end of the blade must not exceed 100N (10kp)

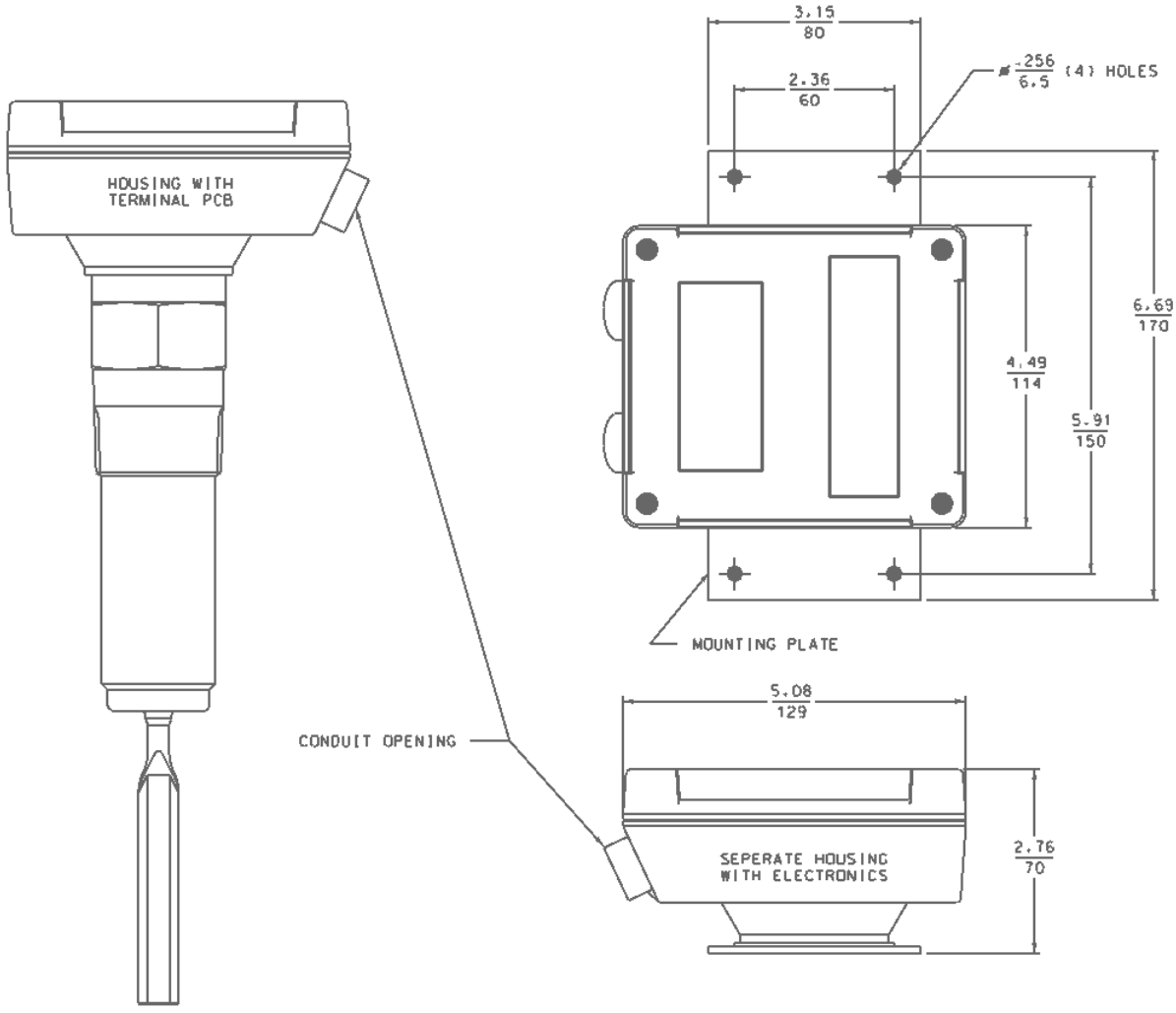


- The cable of the VR51 must not be bent with a bending radius smaller than 4 inches.



9.0 APPENDIX

9.1 Separate Housing Installation



The drawing shows a separate housing installation of the VR21. Separate housing installation is also possible for VR41 and VR51.

If the temperature outside the bin near the bin wall exceeds the maximum ambient temperature of the PCB, (140°F), it is necessary to install the PCB in a separate housing apart from the bin where the temperature is in the allowed range. Separate housing installation is also necessary in case of heavy vibrations of the bin. In this case the separate housing has to be installed at a place apart from the vibrations.

PCB and probe get connected by a shielded cable via the terminal PCB which is located inside the housing on top of the mounting socket of the probe. A metal hose which is screwed between the separate housing and the housing that contains the terminal PCB is protecting the cable. The separate housing can be installed by means of the mounting plate.