Series 7270

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LIQUID LEVEL TECHNOLOGY

Product Manual

CONTINUOUS LEVEL CONTROLS

7270 Series
HR Digital Stik

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7270 Series Manual

Overview

This document explains the basic hardware interface requirements, operating characteristics and describes the software protocols for the 7270 series HR Digital Stik. In addition, the dimension and installation drawings, part number sequence and agency approvals have been included in the back of this document. It is important to note that the standard product is intrinsically safe and any device, controller, or radio connected to this product must have a barrier designed to meet the entity parameters and special requirements indicated in the installation drawing E0241200 (page 7).

Electrical Interface

Signal Descriptions
The 7270 requires only three wires for its power and interface connections, Power, Data, and Ground. On the stainless steel housing models, the cable shield or “Shield” pin in the 4 pin connector, is connected to the steel housing and must be connected to earth ground.

Power Supply
The supply voltage to the probe “Power” is typically +5Vdc but can range from 3.7Vdc to 7.93Vdc (limited by the entity parameter for hazardous locations). There is not a main switching power supply in the 7270, so running it at a higher voltage does not reduce the input current draw.

Data Signal
The “Data” signal is an “open-drain” type signal and is used for the bidirectional half duplex asynchronous serial communications. Any device connected to the probe must be of an “open-drain” type signal and must not be driven to a high logic level. Because this data signal may be driven by either the master or any slave device, a single pull up resistor of typically 1kΩ should be the only element that establishes the high logic level voltage. Also, because of this scheme, there could be multiple master or slave devices connected together.

The logic level voltage thresholds are similar to TTL levels and a pull-up resistor must be included in the user’s interface circuitry. This signal is clamped internally by the 7270 with a +5V TVS device. The inactive or “idle” state is at a “high” logic level.

Ground
The “Ground” connection is the common return path for both “power” and “data”.

Intrinsically Safe Connections
The 7270 is an intrinsically safe device and therefore, when used in an intrinsically safe installation or application, must be connected to an apparatus that limits the power, voltage, and current to the 7270 in accordance to the entity parameters specified. Reference the installation drawing E0241200 (page 7) for more details.

Operation

The 7270 runs continuously once power is applied to it. When connected to a battery powered device (i.e. a wireless radio), power is typically supplied for a short duration of time, long enough to collect the required amount of data, then power is switched off to the probe in an effort to reduce the power draw and conserve battery life. If power is applied to the 7270 on a continuous basis, it will continue to take level and temperature readings and communicate the data through the asynchronous serial communications signal.

Power Consumption

The 7270 typically draws between 10mA and 12mA of current, depending on the number of temperature sensors.

Software Protocol

There are several different product numbers available for the 727x Series of probes. The ‘x’ in the 727x part number represents the data protocol. The mechanical properties and the electrical interface remains the same, regardless of the software protocol specified by the model number.

The significant difference between the available protocols is the amount of product level measurements transmitted within the data string. For example, there is one protocol that provides 25 product level readings and another one that provides 10 product level readings. There is also a unique start character used at the beginning of each data string to identify its ‘protocol’.

NOTE: Contact the factory for protocol details and additional documentation.

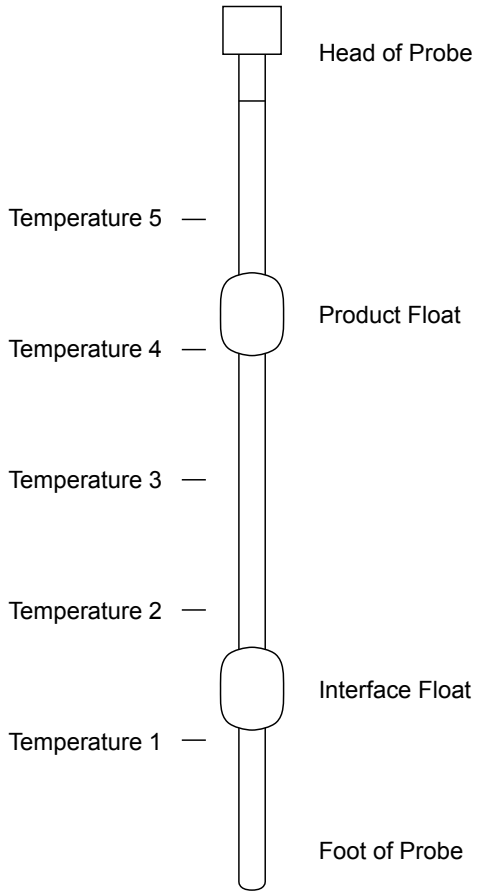


Fig. 1 Temperature Sensor Locations for the 7270X Series.

NOTE: To determine the actual location of a temperature sensor, refer to the Thermometer Spacing tables on Drawing D0246600, sheet 2 of 2, included on page 6 of this manual.

Specific Conditions of Use:

The equipment contains non-metallic enclosure parts, to prevent the risk of electrostatic sparking the non-metallic surface should only be cleaned with a damp cloth.

Installation
IMPORTANT
Be sure to read & understand all of the Instructions before beginning.

Unpacking
Carefully remove the contents of the shipping carton and check each item against the packing list before destroying any packing materials.

Storage
Level gauge probes should be stored in their original shipping containers until ready for installation. Damage that occurs in storage is not covered under manufacturer warranty.

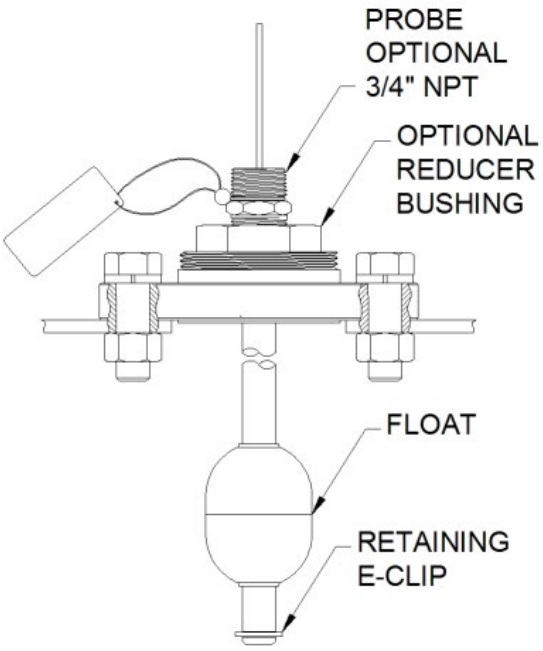
Mounting Conditions
CAUTION

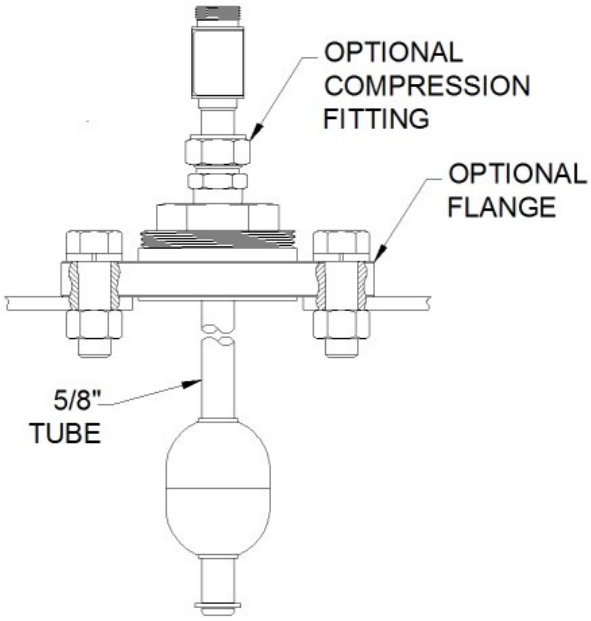
- **When installing probes, do not bend rigid probes, permanent damage may result.**
- **Longer rigid probes need to be supported at both ends while handling.**
- **Probes are sealed at the factory and contain no user serviceable components.**
- **Do not attempt to open probe or weld the tube.**

- Level gauge probes are designed for industrial applications, but should be mounted in a location as free as possible from vibration, corrosive atmospheres, or any possibility of mechanical damage.
- Place the level gauge in a reasonably accessible location, ambient temperature should be between -40°F and 158°F (-40°C to 70°C).
- Mount the Level gauge probe perpendicular with gravity.
- Float should have free movement along probe.
- Float retention clip should be in place at base of probe.

Mounting Considerations
Mounting considerations may vary (Flanges, Compression Fitting, etc.) depending on the application. For underground tanks, the probe is generally mounted in the riser, resting on the bottom of the tank. Spacers are used to hold the sensor in the center of the riser. While most underground tanks are horizontal and fairly standard in design, above ground tanks vary considerably. The requirements for mounting these probes are fairly simple. Since the probe requires a float to provide level position, there is a minimum size required for insertion of the float into the tank.

It is recommended that a minimum of a 2” NPT pipe opening be used.





7270 Series Specifications

Specifications			
316 Stainless Steel	**(Lengths Consult Factory)**	**Logic Levels**	
Resolution[1]	0.0001”	V_{OH}	2.7v (Leakage current is less than 1µA)
Repeatability	Equal to Resolution	V_{OL}	0.4v (5mA load)
Linearity	+/- 0.01%[2]	V_{IH}	2.1v
Hysteresis	+/- 0.002%[3]	V_{IL}	0.9v
Indicated Temperature		**Cable**	**Pin Out**
Resolution	0.1º C[1]	The cable will be a shielded 3 conductor 22AWG with a PVC jacket (Belden 6501FE or equivalent)	1 - BLACK - Common 2 - WHITE - Data Signal 3 - RED - Power 4 - DRAIN - Cable shield, chassis ground on S.S. housing probes
Accuracy			
0°C to +100°C	+/- 0.75º C		
-40°C to -1°C	+/- 1.0º C		
+101C to +125º C	+/- 1.0º C		
Power Supply		**Data Update Time[1]**	
Voltage	+5 VDC, +/- 10% typical (+3.7 VDC Minimum)	Position Data	0.100 seconds/per reading[1]
		Temperature data	0.800 seconds/per[1]
Current (@+5VDC)	10mA max. (8mA typical) plus 1.5mA max. (1mA typical) per temperature sensor (i.e. 8 - 13mA typical)		
Pressure Rating	1000 psi max. Float Dependent (Consult Factory)	**Intrinsically Safe Entity Parameters**	V_{max} 7.93 V I_{max} 280 mA P_i 1.0 W C_i 30.1 uF L_i 0 µH
Enclosure Material	316 Stainless Steel	**Null Zone** **Dead Band**	R Style: 9” M Style: 8” M & R Style: 2”
Rating	IP68		

[1] protocol dependent
[2] or +/- 0.015”, whichever is greater
[3] or +/- 0.005”, whichever is greater

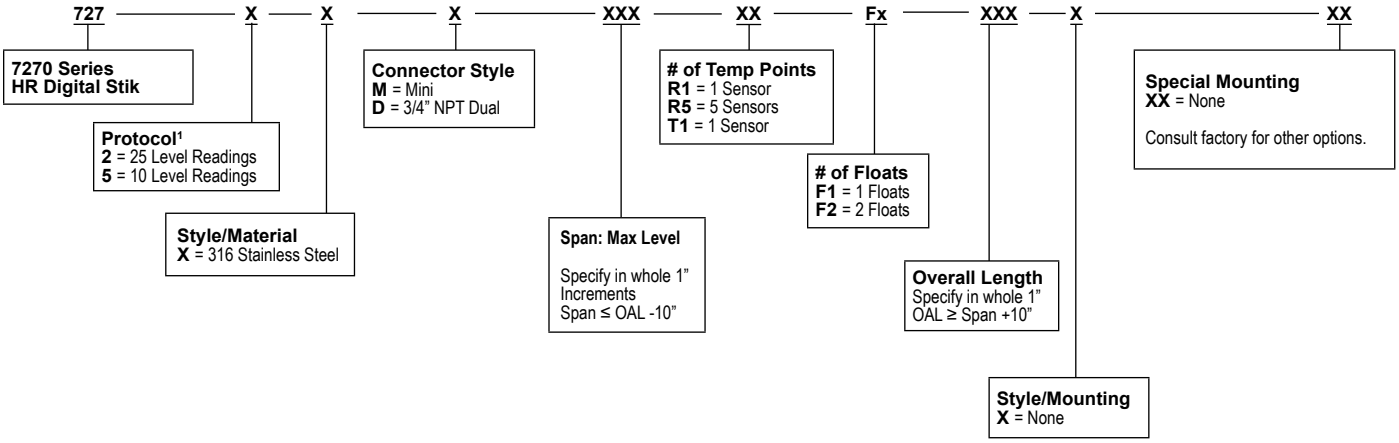
Operating Temperature: -40ºC to 70ºC (Consult Factory for Higher Temperatures)

Specifications are subject to change without notice. Patented.

Hazardous Areas Approvals	
FM -40° ≦ Tamb ≦ 70° C Class I, II, III, Div. 1 Groups C, D, E, F, G, T4 Class I, Div. 2 Groups A, B, C, D, T4 Class I, Zone 0, AEx/Ex ia IIB T4 Ga	ATEX Ex ia IIB T4 Ga FM13ATEX0102X IECEx FMG 12.0008X Issued Date: 06/29/12 EN IEC 60079-0:2018 IEC 60079-11:2011 INMETRO DNV 14.0106X (See PVDF installation note) CE 2460 Ex II 1G

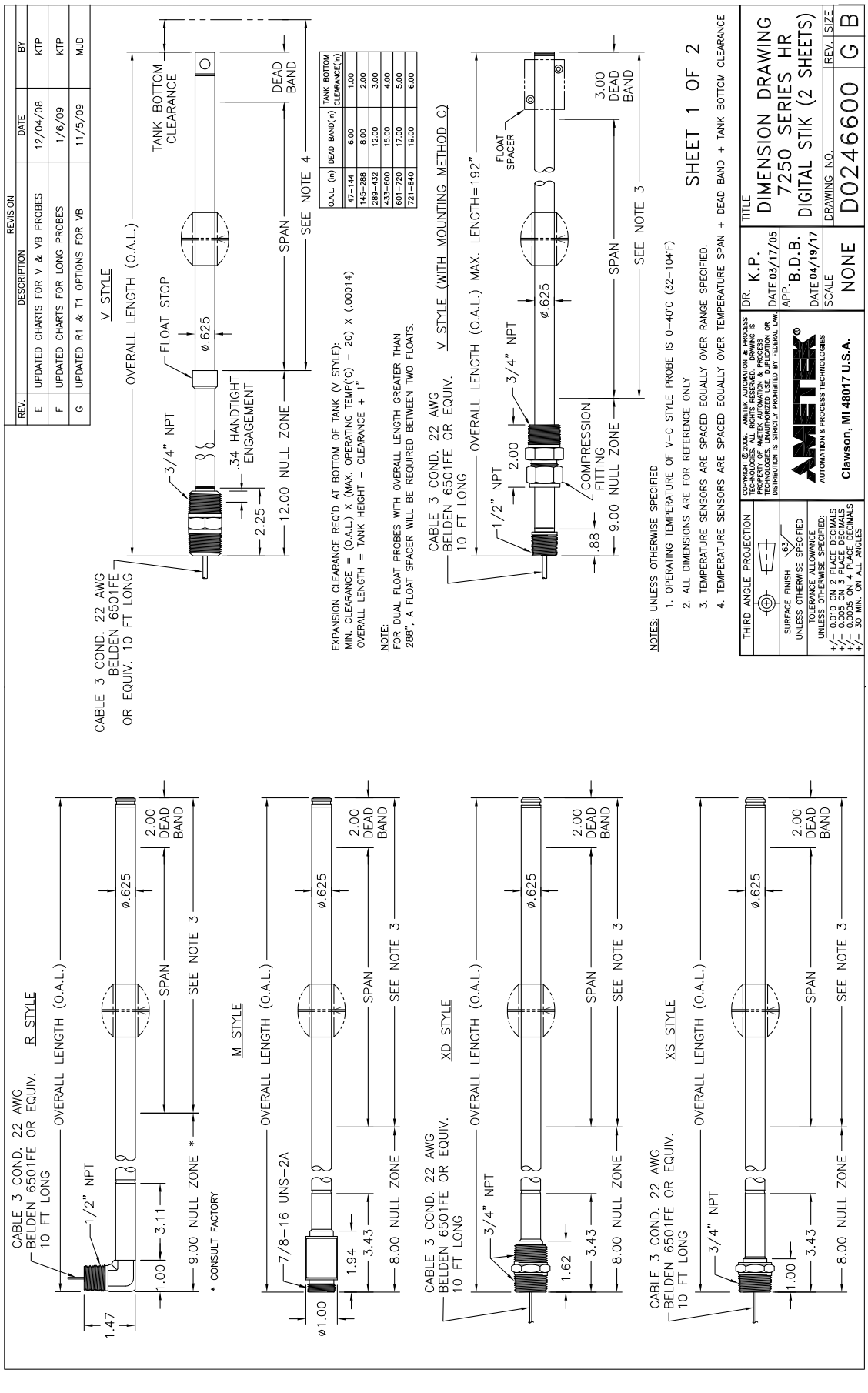
7270 Series Part Numbering Sequence

727X Series Part Numbering

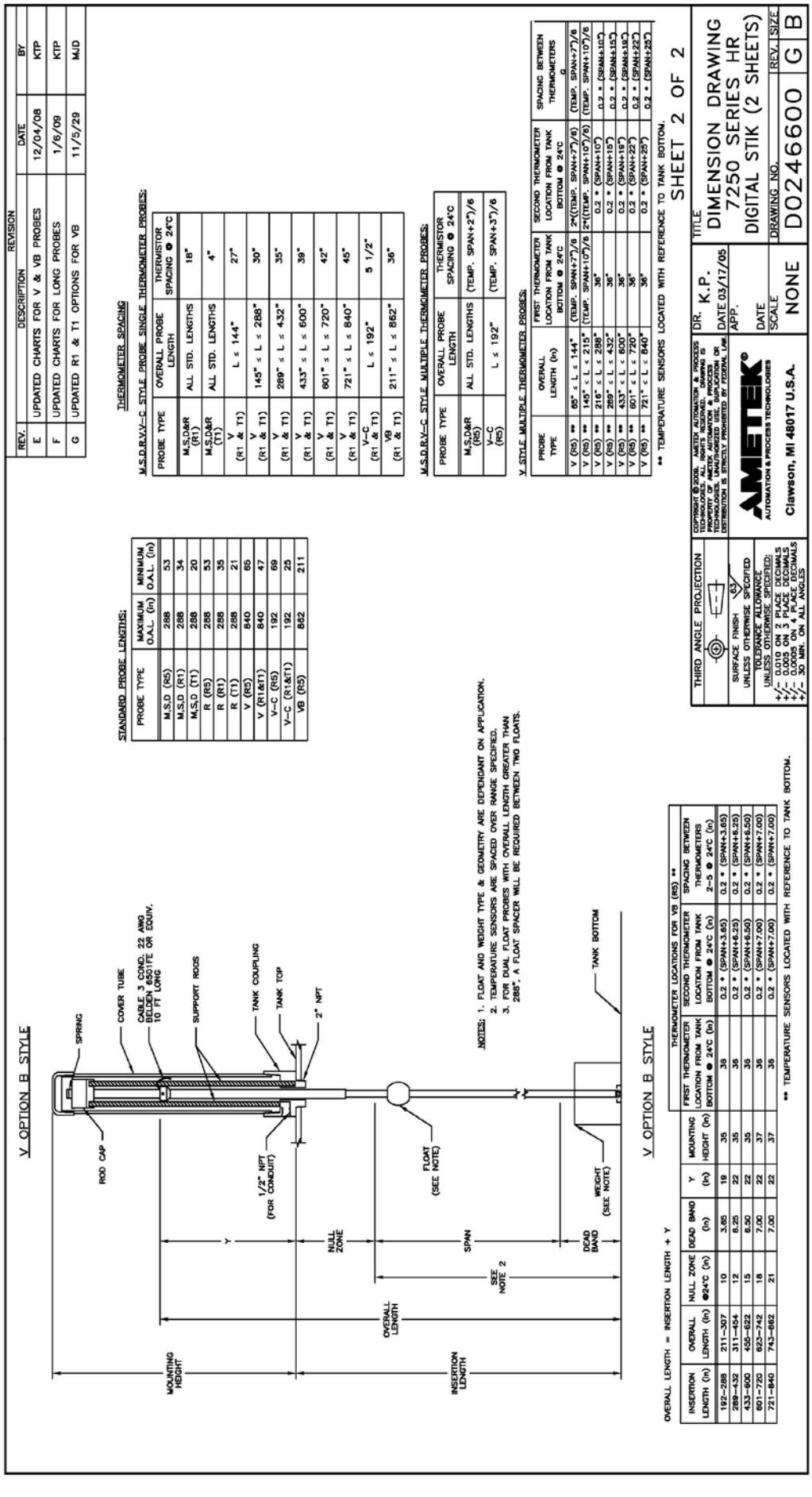


[1] Consult Factory for additional information.

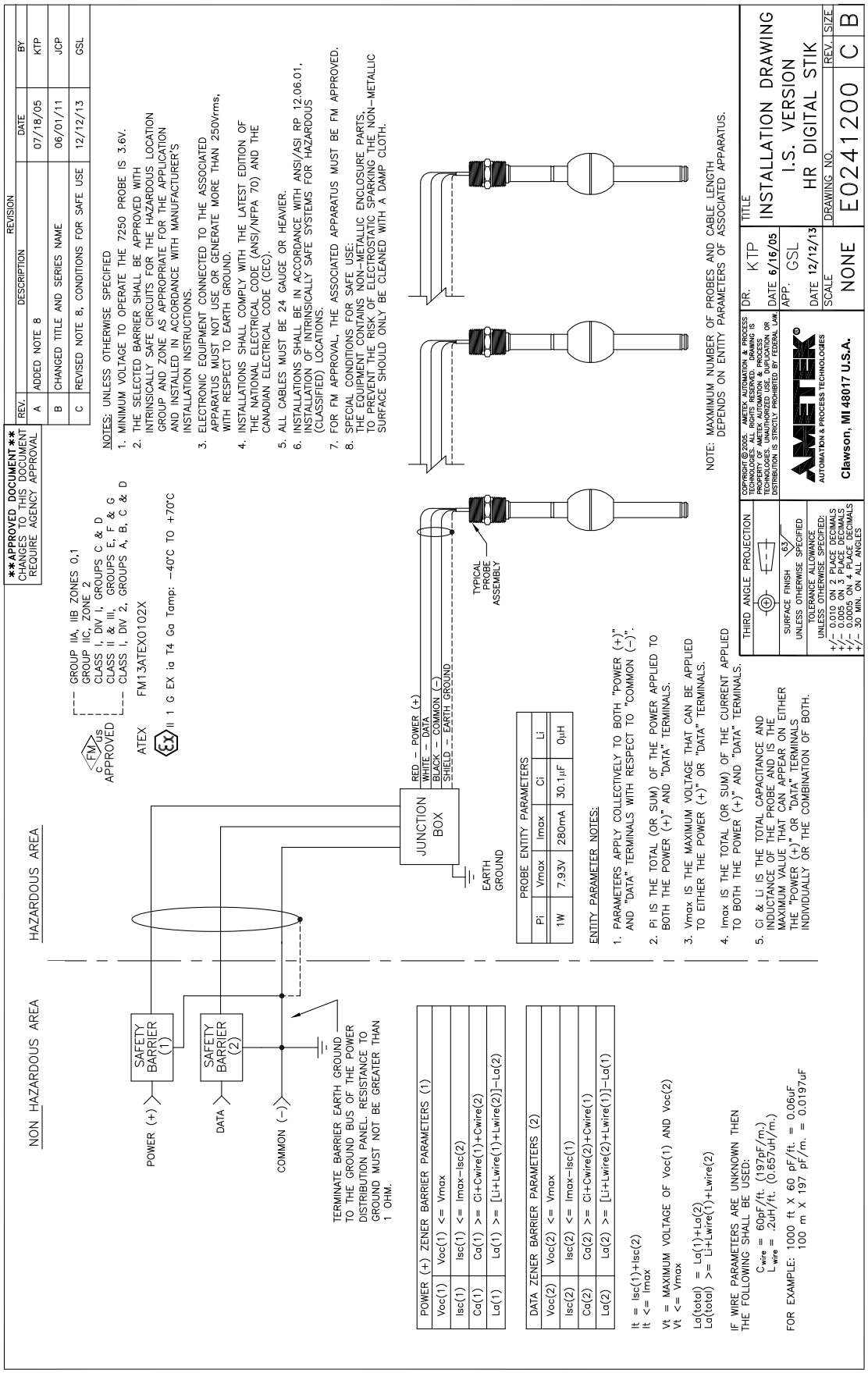
7270 Dimension Drawing



7270 Installation Drawing



7270 Dimension Drawing



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