MACTek® *Corporation*

VIATOR ® *Bluetooth*® Interface for use with HART® Devices

Users' Manual

DM0100410UAE

LIMITED WARRANTY
VIATOR **Interface for HART**

MACTek *Corporation* warrants this interface and all its component against defects in materials or workmanship for a period of one year from the date of purchase. This warranty only extends to the original consumer of this product.

If the Interface or a component does not function because of defects in material or workmanship during the warranty period, **MACTek** will either repair the defective product or replace it with a new or remanufactured functionally equivalent product of equal value. The original consumer must send proof of purchase along with the defective product as provided below. To obtain service under this warranty, first call the **MACTek** Support Center to obtain a Return Merchandise Authorization (RMA) number from **MACTek**; then deliver the product, shipment pre-paid, to **MACTek** addressed as follows:

MACTek *Engineering Dept.*
Attn: RMA # _____
2112 Case Parkway South #1
Twinsburg, OH 44087
USA

Call the **MACTek** Support Center at (330) 487-5477 to obtain an RMA number, or for further product or service information under this warranty.

MACTek has no obligation to repair or replace any defective product that has been subject to misuse, neglect, accident, or abuse, or subject to alteration or repair by persons other than **MACTek** or its authorized repair agents. This warranty does not cover normal wear and tear.

REPAIR OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE SOLE AND EXCLUSIVE REMEDY OF THE CONSUMER. **MACTek** SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OR FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY ON THIS PRODUCT. EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, **MACTek** SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Some state or countries do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. In addition, some states or countries do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you.

This warranty gives you specific legal rights, you may also have other rights which vary from state to state and country to country.

No terms in any purchase order or other sales agreement shall alter or replace the terms contained in this Limited Warranty

Table of Contents

1 OVERVIEW

The VIATOR ***Bluetooth*** Interface is a point-to-point modem for temporary connection to HART-enabled field devices for use primarily as a configuration management tool. The VIATOR ***Bluetooth*** Interface is an intrinsically safe designed device for use in hazardous locations. The Interface can operate approximately 20 hours powered by three internal replaceable AAA alkaline battery cells. The PC host uses an internal ***Bluetooth*** interface or an external ***Bluetooth*** adapter to communicate with the ***Bluetooth*** modem. The modem physically attaches to the HART field device with 18 inch lead wires terminated in mini-grabbers clips.

Default operating mode is to establish a ***Bluetooth*** connection using the Windows ***Bluetooth*** Serial Port Profile (SPP) and connect your HART application software to the resulting virtual com port. The factory default ***Bluetooth*** passkey is set to "mactek".

The faceplate push button is used to turn the modem on and off and to check remaining battery level. The faceplate LED displays communication heartbeat, ***Bluetooth*** connection status, and battery charge remaining.

Optional ViatorCheck software provided by MACTek provides a PC based user interface to monitor and configure the operation of the VIATOR ***Bluetooth*** Interface.

The VIATOR ***Bluetooth*** Interface contains a Class 1 ***Bluetooth*** radio with a range of up to 100 meters when used with a Class 1 ***Bluetooth*** adapter on your computer. When using a Class 2 ***Bluetooth*** adapter, the range will be limited to 10 meters. The operating range can be reduced by interference from other nearby devices transmitting in the 2.4 GHz ISM band. These interference sources include some cordless telephones, wireless networking devices and even microwave ovens. Interference can prevent the establishment of a ***Bluetooth*** connection and may also cause HART network message retries.

The VIATOR ***Bluetooth*** Interface approvals, certifications, technical data sheet, CONTROL drawing, and this document is available on the MACTek Installation Compact Disk (SS 01031IM).

1.1 Getting Started

1.2 Hardware and Software Requirements

- VIATOR ***Bluetooth*** Interface Model 010041
- Computer with built in ***Bluetooth*** or ***Bluetooth*** USB adapter
- Windows Operating System
  Microsoft Windows XP SP2 or Microsoft Windows Vista
- HART application software for communication with HART instruments
  (HART communication software must be capable of recognizing virtual Com ports to work with the Interface.)

1.3 Hardware and Software Installation

The MACTek VIATOR ***Bluetooth*** Interface for HART Devices connects to your computer over the air using ***Bluetooth*** wireless technology. No additional MACTek hardware is required for the PC. There are no MACTek specific drivers or software required to use this product. All communications are handled through the ***Bluetooth*** Serial Port Profile. See the documentation supplied with your computer or ***Bluetooth*** adapter for installation instructions for those devices.

The VIATOR ***Bluetooth*** Interface is physically connected either across the HART compliant transmitter or the associated current loop terminating resistor. The VIATOR ***Bluetooth*** Interface HART connections are polarity independent. If the VIATOR ***Bluetooth*** Interface is to be installed in areas classified as a HAZARDOUS LOCATION refer to Section 4 INSTALLATION.

1.4 Power Push Button and LED Operation

The Power push button controls power to the VIATOR ***Bluetooth*** Interface and is also used to determine the battery status. The VIATOR is turned on by depressing the Power push button for a half second. The Status indicator will light for 1 second, go out for a half second, and then blink to indicate the amount of charge left in the batteries.

4 Blinks = 80%or more Battery power remaining
3 Blinks = 50% or more Battery power remaining
2 Blinks = 30% or more Battery power remaining
1 Blinks = 10% or more Battery power remaining
0 Blinks = less than 10% Battery power remaining - replace batteries immediately

Depressing the Power push button briefly while the unit is on will indicate the amount of charge left in the battery.

Turn the VIATOR ***Bluetooth*** Interface off by holding the Power push button down until the Status indicator goes out. This takes about 1 second.

During normal operation the Status Indicator will blink once per second. When a ***Bluetooth*** connection is established the blink rate will remain the same but the on-time will increase. With a ***Bluetooth*** connection established, the Status Indicator will blink twice to show loop activity when the VIATOR is connected to the HART loop.

1.5 Under Voltage Lockout

When the battery voltage drops below the hardware set Shutdown Voltage of 2.8V, the modem will immediately power itself off. The User must replace the batteries, which is described in section 1.8.

1.6 *Bluetooth* idle timeout

The VIATOR ***Bluetooth*** Interface can be configured to automatically drop the ***Bluetooth*** connection after a period of inactivity to conserve battery power. This feature is disabled by default and must be set by the VIATOR CheckBT application.

1.7 Inactivity power down

The VIATOR ***Bluetooth*** Interface will automatically power down to conserve battery life after 30 minutes with no ***Bluetooth*** connection. The Power push button must be pressed to power the VIATOR ***Bluetooth*** Interface up once the inactivity timeout has expired.

1.8 Battery Replacement

The VIATOR ***Bluetooth*** Interface requires three, 1.5VDC, AAA, alkaline batteries.
To replace the batteries refer to figure 1.1. Unscrew the captive screw that secures the battery door into the bottom housing. Fully remove the battery door with the retained captive screw, remove the used batteries and install new batteries. When installing the batteries refer to figure 1.2 and observe the battery polarity embossed in the bottom of the battery compartment for each of the three battery positions. To complete the battery installation, first verify the polarity of the installed batteries as compared to figure 1.2 then re-install the battery door into the bottom housing with the captive screw

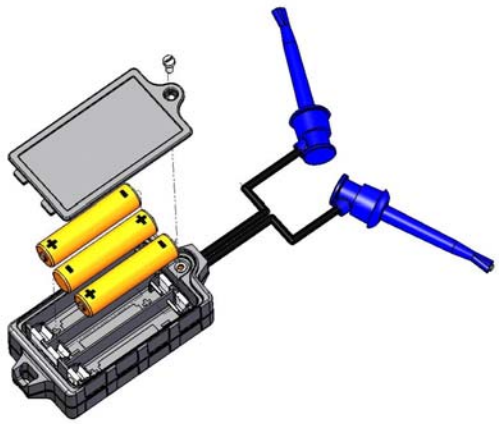

Figure 1: BATTERY COMPARTMENT ASSEMBLY

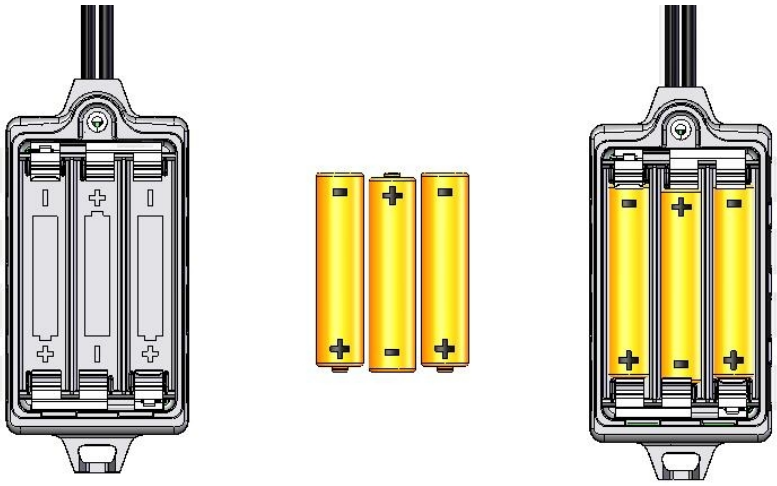

Figure 2: BATTERY COMPARMENT & BATTERY ORIENTATION

WARNING: ONLY APPROVED BATTERERIES MAY BE INSTALLED:
ENERGIZER, MODEL: EN92, AAA, 1.5VDC

WARNING: DO NOT MIX NEW AND OLD BATTERIES

WARNING: EXPLOSION HAZARD. DO NOT OPEN ENCLOSURE OR REPLACE BATTERY WHEN FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

1.9 Maintenance

The VIATOR ***Bluetooth*** Interface has a IP20 rated housing and may be cleaned by wiping the device down with a soft, lint free, damp cloth to remove dust and dirt. A mild non-abrasive soap/detergent may be used if required. Do not use any type abrasive cloth/pad to clean the device. Do not submerge in liquid when cleaning. Visually inspect the unit regularly and discontinue use if the case is cracked or damage or if there is damage to the to the cable insulation.

WARNING: DO NOT USE ANY TYPE OF ABRASHIVE OR SOLVENT BASED CLEANER OR SUBMERGE DEVICE IN LIQUID WHEN CLEANING.

1.10 Repair

The VIATOR ***Bluetooth*** Interface can only be repaired by authorized MACTek personal. To obtain repair services refer to the Limited Warranty provide in this manual.

WARNING: ONLY AUTHORIZED MACTek PERSONAL MAY REPAIR THIS DEVICE.

2 Establishing Communications

2.1 Initial Connection

The MACTek VIATOR ***Bluetooth*** interface uses the standard ***Bluetooth*** Serial Port Profile (SPP) which is supported by most ***Bluetooth*** hosts. Using SPP creates a virtual serial COM port which allows the interface to be used with HART applications in a manner similar to a traditional built in serial COM port.

The method to connect to ***Bluetooth*** devices varies, depending on the ***Bluetooth*** Host software that is being used. Please refer to the documentation for your Host PC or ***Bluetooth*** adapter for instructions on establishing a SPP connection.

It is highly recommend that the Microsoft ***Bluetooth*** Stack be used – this ***Bluetooth*** stack is directly supported by Windows XP SP2. Many ***Bluetooth*** adapters come with third party software to handle the ***Bluetooth*** communications, however not all are reliable. Some third party software stacks have issues with opening and closing COM ports and some HART applications do not work well with in these situations. Our testing has shown the Microsoft Stack is the best with regards to this.

All MACTek VIATOR ***Bluetooth*** Interfaces have a preset ***Bluetooth*** Device Name in the format of "MACTekVIATOR XXXX" where "XXXX" represents the last four hexadecimal digits of the ***Bluetooth*** MAC address for the device. The ***Bluetooth*** MAC address is printed above the serial number near the bottom of the front label. You can use this name to help choose the correct device in a busy ***Bluetooth*** environment.

When you connect to the ***Bluetooth*** modem the first time, you will need to use a PIN code or passkey to establish a connection.

Pin Code: mactek (all lowercase)

Many ***Bluetooth*** stacks will create two COM ports when initially establishing an SPP connection to the VIATOR ***Bluetooth*** Interface. One port is labeled "incoming" and is used if the modem attempts to establish the ***Bluetooth*** connection. The second port is labeled "outgoing" and is used when the computer establishes the ***Bluetooth*** connection. The Outgoing COM port number is what will be used by your HART application.

If using the Microsoft ***Bluetooth*** stack, after this initial connection is complete, opening and closing the outgoing COM port is all that is needed to start a connection to the VIATOR Interface. This connection setup only has to be performed the first time a VIATOR Interface is used. The operating system will store the PIN code and the COM port number even through reboots.

2.2 Connections from HART® Applications

To use the MACTek VIATOR ***Bluetooth*** Interface, first power on the device and then start up the HART application. From within the HART application, select the COM port for the HART interface and select the COM port number associated with the outgoing COM port for the VIATOR ***Bluetooth*** Interface. You should now be able to use the interface for HART communications.

2.3 Connection Problems

If there are connection problems, try the following procedure.
Exit all HART applications
Power off the MACTek ® VIATOR ***Bluetooth*** Interface
Wait 10 seconds
Power on the MACTek VIATOR ***Bluetooth*** Interface
Wait 10 second
Start up the HART application and try to open the COM port

3 Bluetooth Radio

This product contains a contains a Class 1 ***Bluetooth*** radio module operating in the 2.4 GHz (ISM) band utilizing a frequency hopping spread spectrum (FHSS) scheme. The radio module has a range of up to 100 meters when used with a Class 1 ***Bluetooth*** adapter and 10 meters range with a Class 2 ***Bluetooth*** adapter.

The operating range can be reduced by interference from other nearby devices transmitting in the 2.4 GHz ISM band. These interference sources include some cordless telephones, wireless networking devices and even microwave ovens. Interference can prevent the establishment of a ***Bluetooth*** connection and may also cause HART network message retries.

The device complies with FCC 47 CFR, Part 15 rules. Operation is subject to the two following conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesirable operation.

4 Technical Specification

Host System	
Platform	Any PC, PDA, Laptop or other computer with ***Bluetooth*** support
Operating System	Windows, Windows Mobile, or any OS that supports ***Bluetooth*** COM port
Application	Any HART compatible Communication Application
RF	
Bluetooth	Version 2.0 EDR (***Bluetooth*** 2.0 Class 1)
Range	100 meters (open air)
Operating Frequency	2.4GHz (2402 – 2480 MHz), 79 channels
RF Output Power	18dBm (***Bluetooth*** 2.0 Class 1)
Antenna	Integrated Omni-Directional
Electrical	
Batteries	Accepts 3 – AAA alkaline cells, type IEC-LR03
Battery Life (per charge)	Approximately 20 hours maximum continuous usage.
Approved Battery Vendor (Note 1)	ENERGIZER Model EN92
Output Level	Fully HART compliant trapezoidal wave @ 1200/2200 Hz
Environmental	
Operating	-20°C to 50°C (-4°F to 122°F), 0% to 95% relative humidity non-condensing
Storage	-20°C to 35°C (-4°F to 95°F), 0% to 95% relative humidity non-condensing
Enclosure	
Dimension, Material, Enclosure Rating	88mm x 42mm x 19mm, Conductive Polycarbonate, IP20
Electrical Connections	
HART I/O Interface Cable	.5m length, 20AWG stranded, termination BLUE mini-grabbers

5 Certifications and Approvals

Certifications	Approvals for use in hazardous areas (Note 1)
EUROPE	ATEX
Intrinsic Safety	II 1G Ex ia IIC T4 -20°C < ta ≤ +50°
USA & CANADA	FM Approval
Intrinsic Safety (Division)	Class I, Division 1, Group A,B,C,D (Gas), T4 -20°C < ta ≤ +50°C
Intrinsic Safety (Zone)	Class1 Zone 0, AEx ia IIC T4 -20°C < ta ≤ +50°C
Non-Incendive	Class I, Division 2, T4 -20°C < ta ≤ +50°C
EMC	
EUROPE: Directive 2004/108/EC	CE approved for emissions and immunity, EN 61326-1
UNITED STATES	FCC Part 15B, Contains FCC ID: T9J-RN41-1
CANADA	IECS-003, Contains IC ID: 6514A-RN411
Directive (RoHS) 2002/95/EC	Restricted materials not used

Note 1: Approved for use in areas classified as HAZARDOUS LOCATION with only ENERGIZER EN92 AAA. 1.5VDC, batteries.

6 Product Labels

6.1 Serial Number Label

The VIATOR ***Bluetooth*** Interface serial number label is located on the front device and consists of two lines of text. Line 1(top) contains the last six characters of the MAC address of the ***Bluetooth*** radio followed by the month and year of construction. Line 2 (bottom) contains the eight digit MACTek serial number of this device.

Label Format Line 1: MAC:xxxxxx MM/YY
Line 2: SN:41zzzzzz

6.2 Rear Label

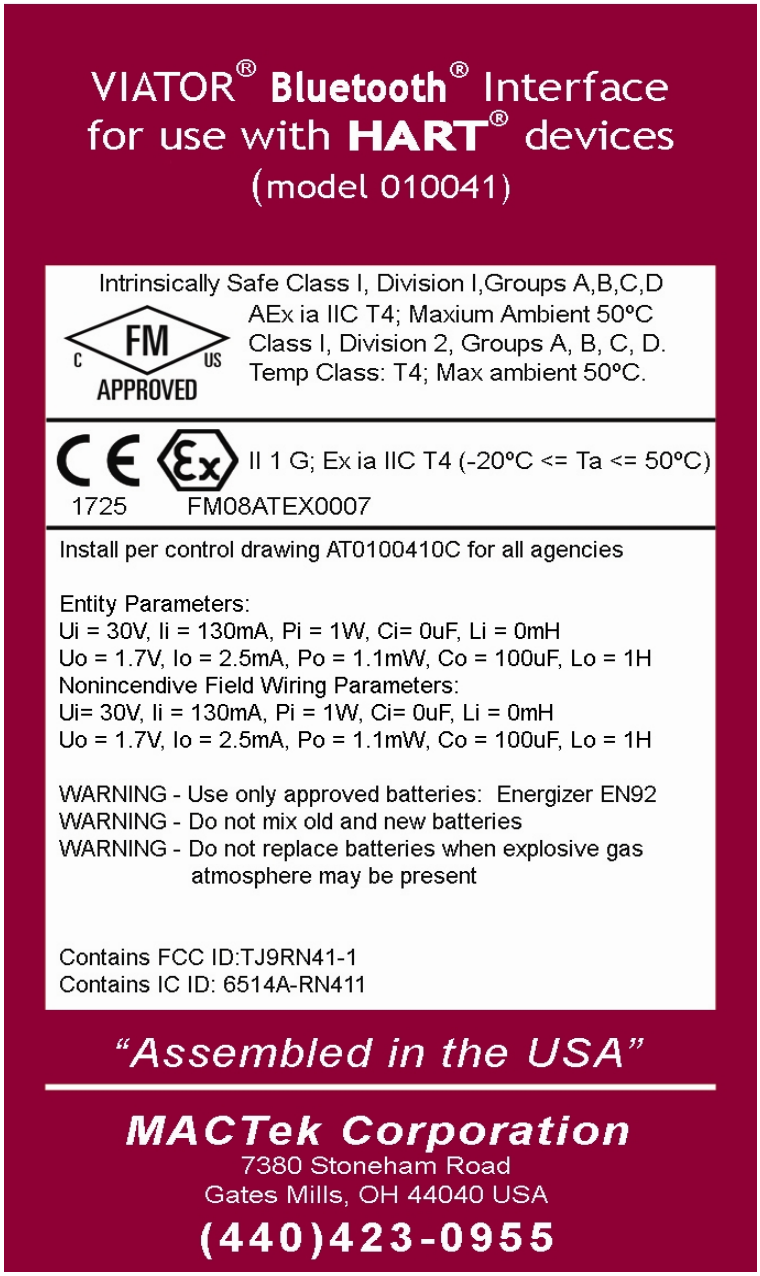

Figure 3: CERTIFICATION AND APPROVAL LABEL

7 INSTALLATION

7.1 Non-Classified Area Installation

The VIATOR ***Bluetooth*** Interface two clip leads are directly connected across either the HART compliant transmitter or the associated 4-20mA current loop terminating resistor. The VIATOR ***Bluetooth*** Interface HART connections are polarity independent.

7.2 Classified Area Installation

ONLY QUALIFIED PERSONAL TRAINED FOR INSTALLATION AND USE OF EQUIPMENT IN AREAS CLASSIFIED AS HAZARDOUS LOCATIONS PER LOCAL, REGIONAL OR NATIONAL CODES AND OR STANDARDS SHOULD INSTALL AND USE THIS APPARATUS.

For installation in areas classified as HAZARDOUS LOCATION refer to CONTROL drawing AT0100410C. The following twelve (12) items are taken from the NOTES of CONTROL Drawing AT1000410C. A PDF copy of the CONTROL DRAWING AT0100410C is located on the provided MACTek Installation and Documentation Compact Disk provide in the shipping box. The latest revisions are located on the MACTek web site.

7.2.1 Control Drawing Notes

1) No revision to drawing without fm approval

2) For installations in the United States, the associated apparatus and HART transmitter must be FM Approvals (FM) approved.

3) For installations in Canada, the associated apparatus and HART transmitter must be Canadian approved.

4) For installations in Europe, the associated apparatus and HART transmitter must be ATEX approved.

5) Associated apparatus and HART transmitter manufacturer's installation drawing must be followed when installing this equipment.

6) Installations in the United States should be in accordance with ANSI/ISA rp12.06.01 installation of intrinsically safe systems for hazardous (classified) locations and the latest edition of the national electrical code (ANSI/NFPA 70).

7) Installation in Canada should be in accordance with the latest edition of the C22.1 Canadian electrical code, part I.

8) Installations in Europe shall be in accordance with latest editions of the wiring practices for the country of origin.

9) For installation in the United States and Canada, control equipment connected to associated apparatus must not use or generate more than 250 VRMS or VDC.

10) For installations in Europe, control room equipment connected to intrinsically safe associated apparatus shall not use or generate more than the marked Um of the associated apparatus.

11) The entity concept allows interconnection of intrinsically safe apparatus with associated apparatus when the following is true:
Ca or Co >= Ci + Ccable;
La or Lo => Li + Lcable.
Vmax OR Ui => Voc, Vt OR Uo;
Imax OR Ii => Isc, It OR Io;
Pmax OR Pi => Po;

12) Resistance between intrinsically safe ground and earth ground must be less than 1.0 ohm.

7.2.2 Control Drawing Entity Parameters

The following INTRINSIC SAFETY and NONINCENDIVE entity parameters are reproduced from the CONTROL Drawing AT1000410C.

INTRINSIC SAFETY
Vmax or Ui = 30V, Imax or Ii = 130mA, Pi = 1W, Ci = 0uF, Li = 0mH
Voc or Uo = 1.7V, Isc or Io = 2.5mA, Po = 1.2mW, Ca or Co = 100uF, La or Lo =1H

NONINCENDIVE FIELD WIRING PARAMETERS
Vmax or Ui = 30V, Imax or Ii = 130mA, Pi = 1W, Ci = 0uF, Li = 0mH
Voc or Uo = 1.7V, Isc or Io = 2.5mA, Po = 1.2mW, Ca or Co = 100uF, La or Lo =1H

7.2.3 Control Drawing

The following page contains the CONTROL DRAWING AT0100410C required for the proper installation of the VIATOR ***Bluetooth*** Interface in areas classified as HAZARDOUS LOCATIONS. A PDF copy of the CONTROL DRAWING AT0100410C is located on the provided MACTek Installation Compact Disk (SS010041IM).

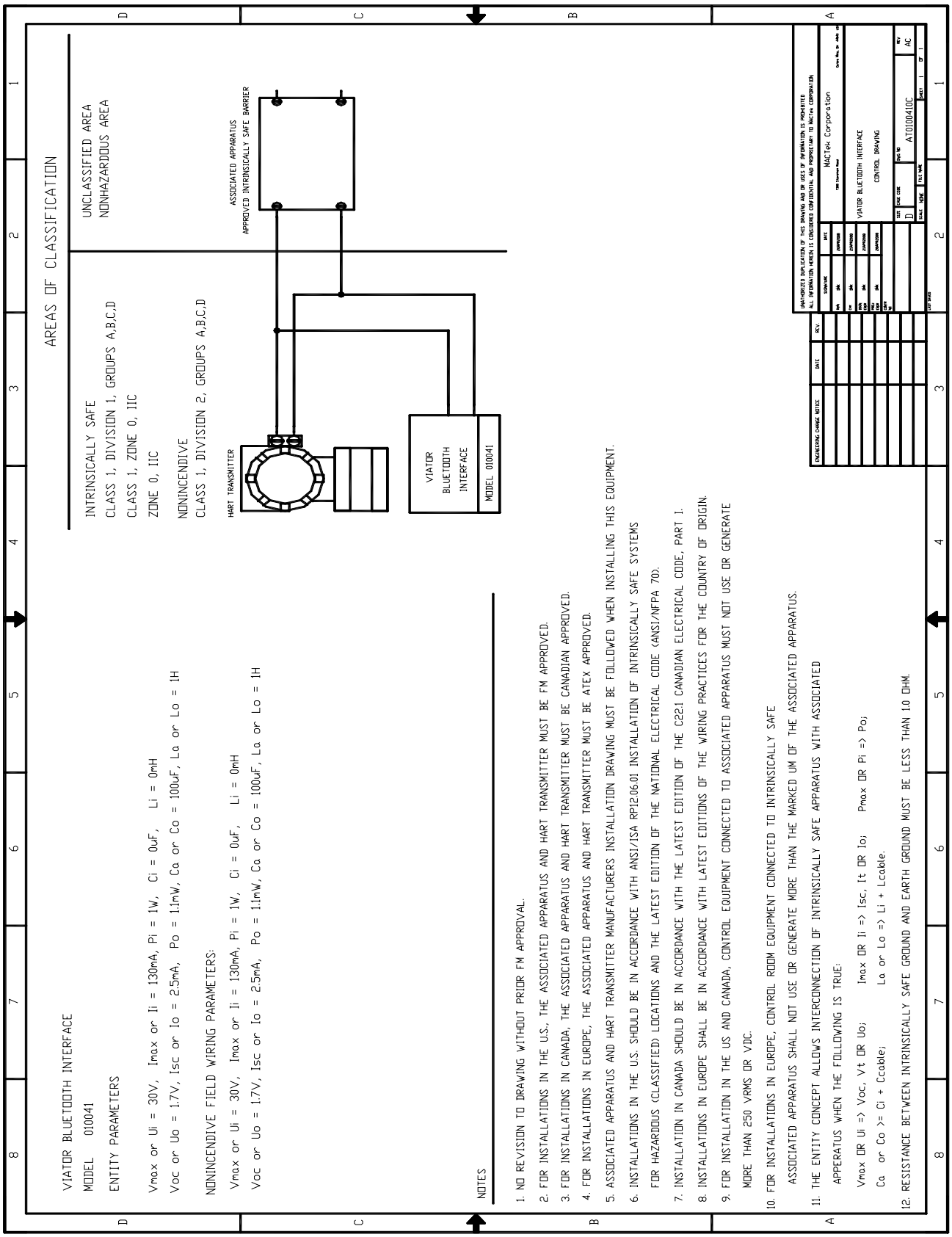

Figure 4 CONTROL DRAWING AT010410C