

**Model 84**  
**I/A Series® Intelligent Vortex Flowmeters**  
**FM and CSA Certification Connection Diagrams**





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# 1. FM Approvals

## Intrinsically Safe

**⚠ WARNING**

1. To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.
2. Substitution of components may impair intrinsic safety.

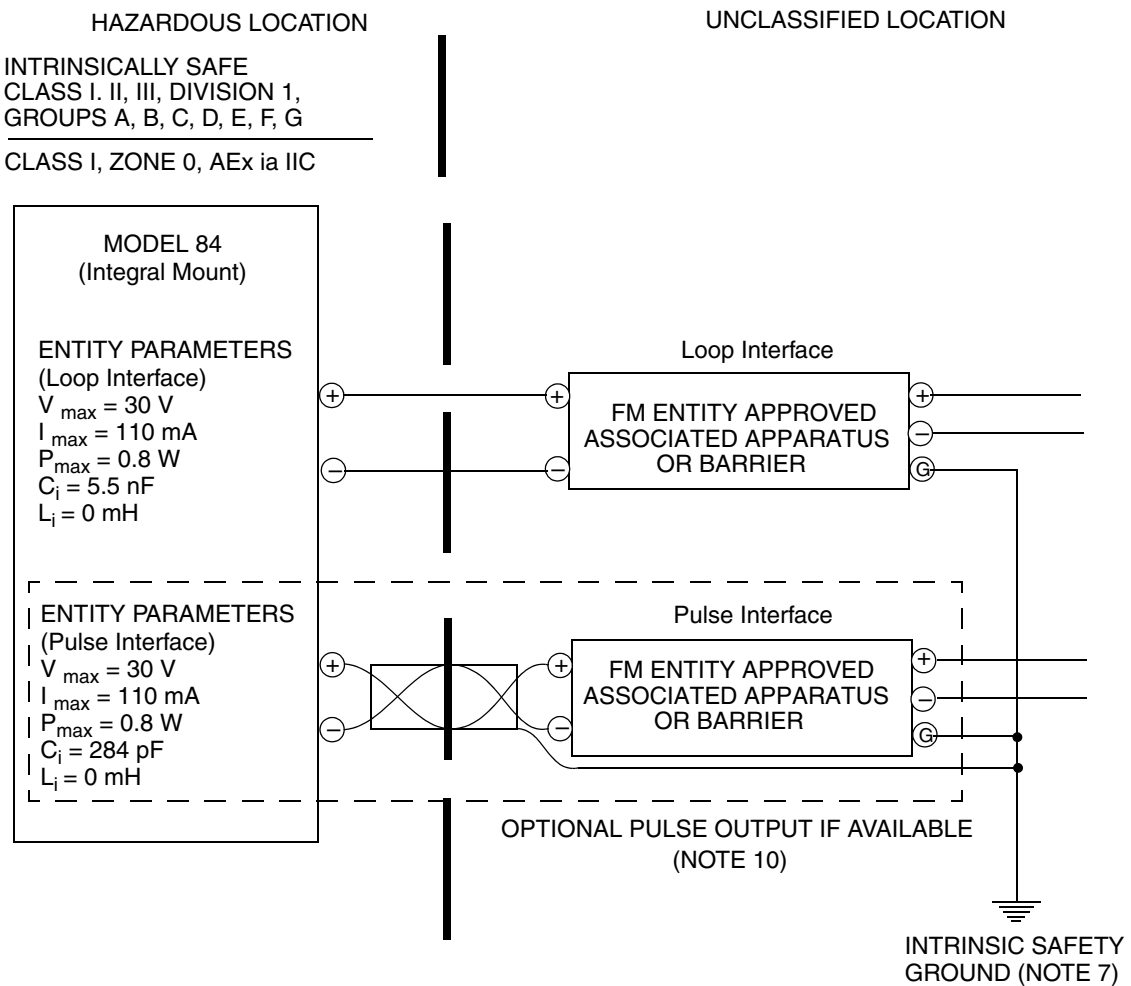


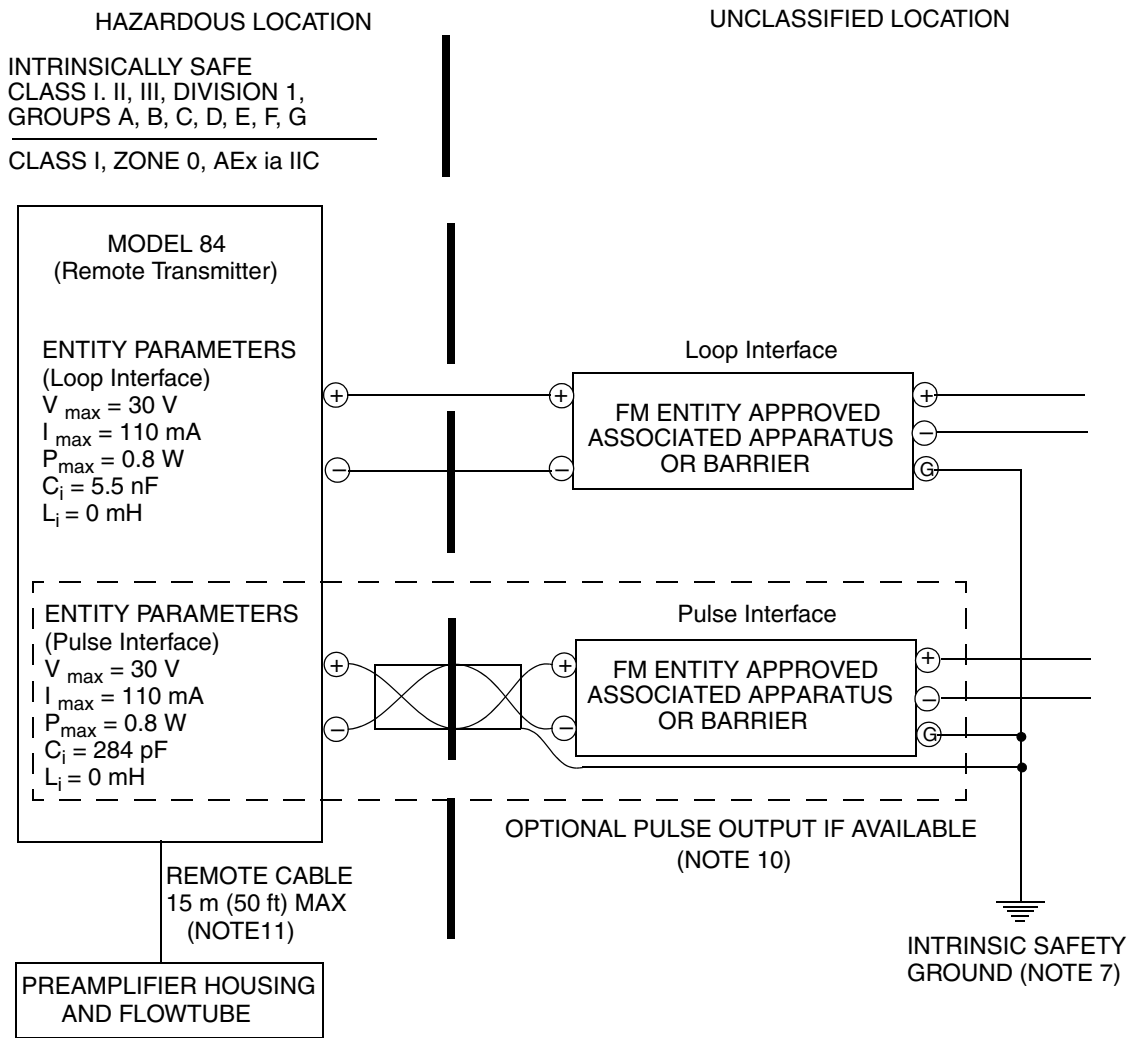
Figure 1. FM Intrinsically Safe Integral Mount Flowmeter - Electrical Certification F

**— NOTE —**

- 
1. No revision to drawing without prior FM approval.
  2. The associated apparatus must be FM approved.
  3. The FM Approved Associated Apparatus must be a linear output device.
  4. Control equipment connected to the associated apparatus must not use or generate more than 250 V rms or V dc.
  5. Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
  6. The Entity Concept allows interconnection of intrinsically safe apparatus with associated apparatus when the following is true:
    - $V_{\max}$  or  $U_i \geq V_{oc}, V_T$  or  $U_o$
    - $I_{\max}$  or  $I_i \geq I_{sc}, I_T$  or  $I_o$
    - $P_{\max}$  or  $P_i \geq P_o$
    - $C_a \geq C_i + C_{cable}$
    - $L_a \geq L_i + L_{cable}$
  7. Resistance between intrinsically safe ground and earth ground must be less than 1 ohm.
  8. Dusttight conduit seal must be used when installed in Class II and Class III environments.
  9. Installation should be in accordance with ANSI/ISA RP12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code (ANSI/NFPA 70).
  10. Pulse Output must use shielded twisted pair cable.
-

**⚠ WARNING**

1. To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.
2. Substitution of components may impair intrinsic safety.



*Figure 2. FM Intrinsic Safe Remote Mount Flowmeter with Intrinsic Safe Connections - Electrical Certification F*

**— NOTE**

- 
1. No revision to drawing without prior FM approval.
  2. The associated apparatus must be FM approved.
  3. The FM Approved Associated Apparatus must be a linear output device.
  4. Control equipment connected to the associated apparatus must not use or generate more than 250 V rms or V dc.
  5. Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
  6. The Entity Concept allows interconnection of intrinsically safe apparatus with associated apparatus when the following is true:
    - $V_{\max}$  or  $U_i \geq V_{oc}, V_T$  or  $U_o$
    - $I_{\max}$  or  $I_i \geq I_{sc}, I_T$  or  $I_o$
    - $P_{\max}$  or  $P_i \geq P_o$
    - $C_a \geq C_i + C_{cable}$
    - $L_a \geq L_i + L_{cable}$
  7. Resistance between intrinsically safe ground and earth ground must be less than 1 ohm
  8. Dusttight conduit seal must be used when installed in Class II and Class III environments.
  9. Installation should be in accordance with ANSI/ISA RP12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code (ANSI/NFPA 70).
  10. Pulse Output must use shielded twisted pair cable.
  11. Intrinsically safe transmitter/flowtube connection. Consult certificate.
-



— **NOTE** —

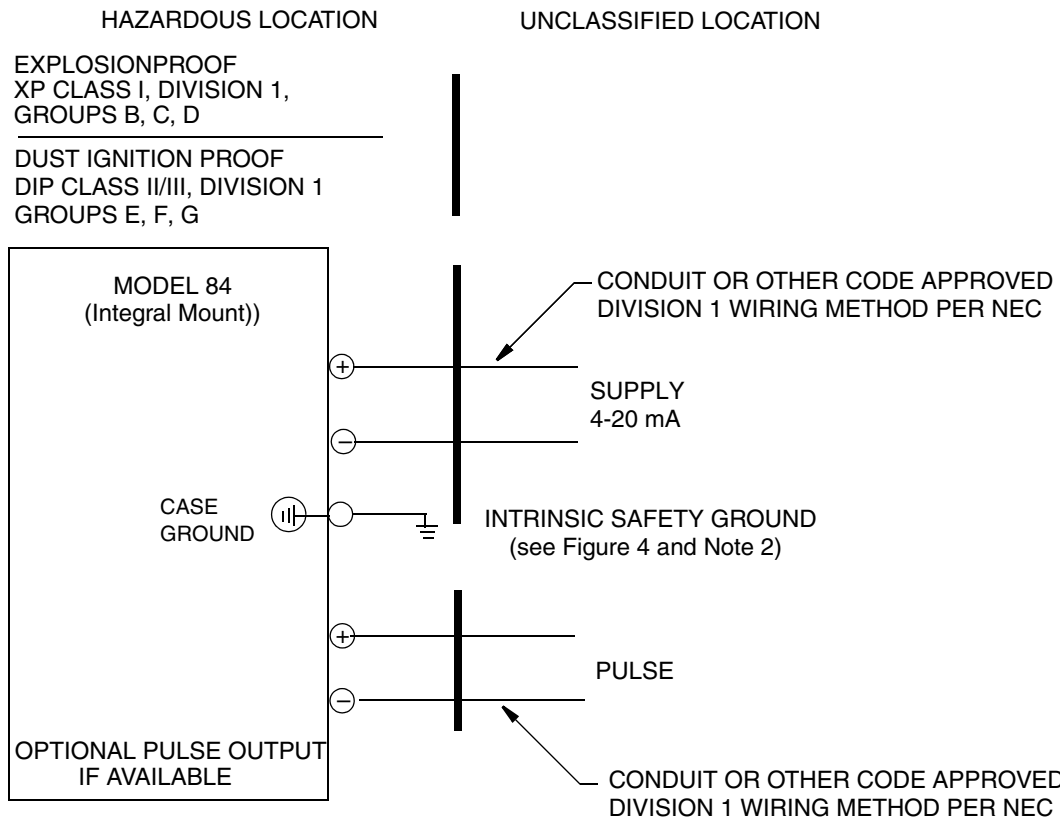
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1. No revision to drawing without prior FM approval.
  2. Resistance between intrinsically safe ground and earth ground must be less than 1 ohm.
  3. Dusttight conduit seal must be used when installed in Class II and Class III environments.
-

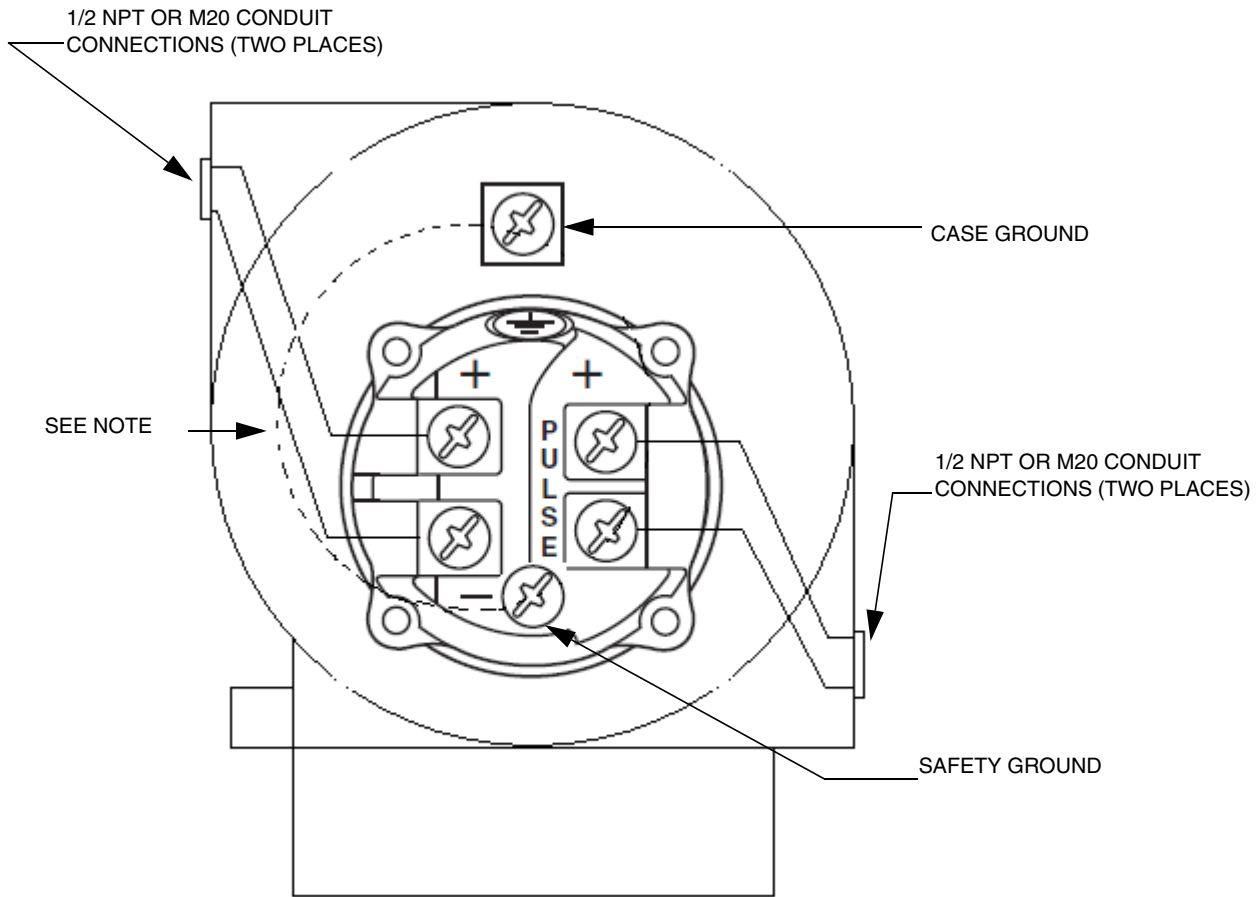
# Explosionproof

**⚠ WARNING**

1. To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.
2. Substitution of components may impair intrinsic safety.



*Figure 3. FM Explosionproof Integral Mount Flowmeter - Electrical Certification G*

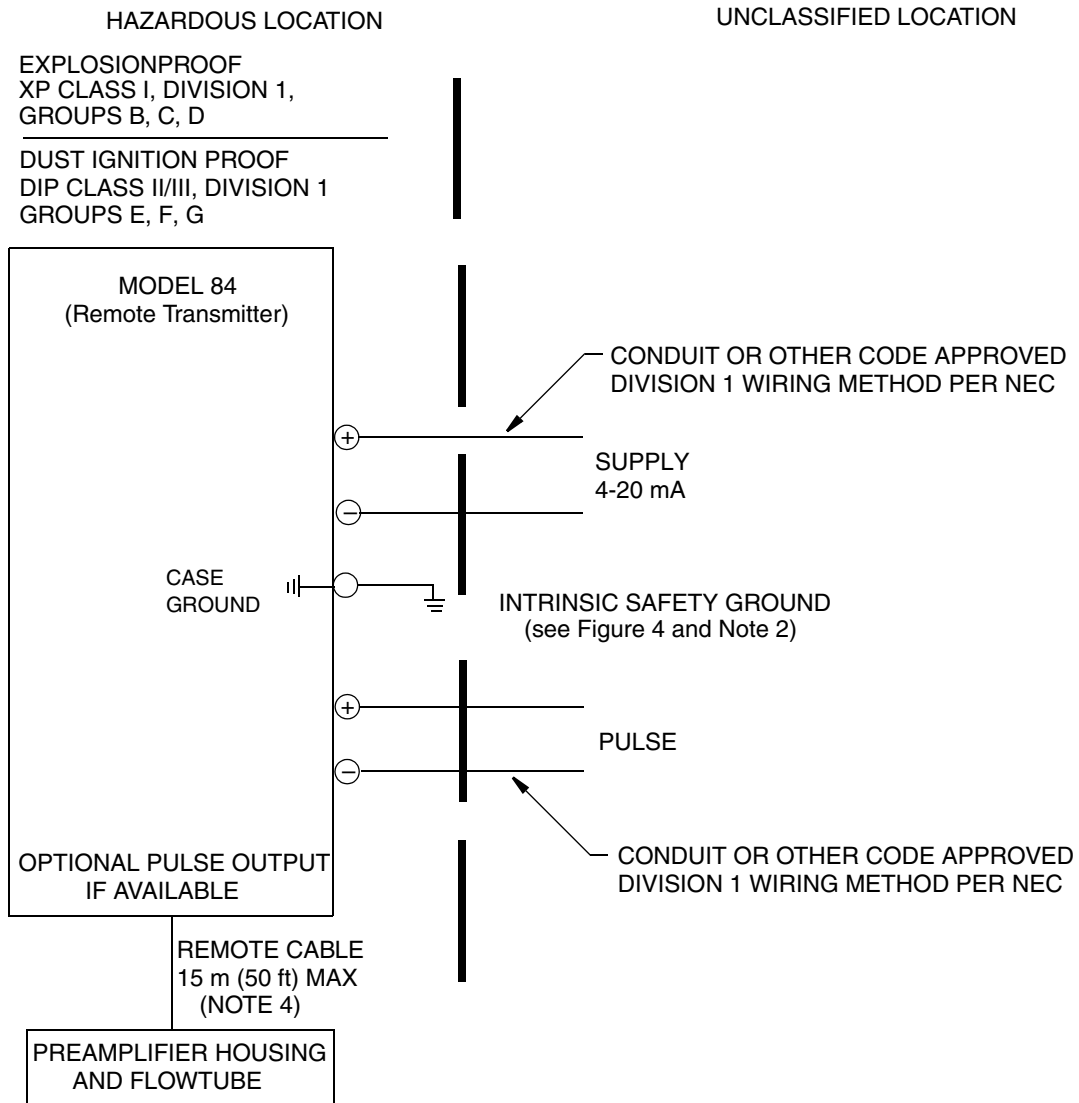


NOTE: IT IS PERMISSIBLE TO CONNECT CASE GROUND TO SAFETY GROUND USING A REMOVABLE JUMPER WIRE.

*Figure 4. Safety Ground*

**! WARNING**

1. To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.
2. Substitution of components may impair intrinsic safety.



*Figure 5. FM Explosionproof Remote Mount Flowmeter with Intrinsically Safe Connections - Electrical Certification G*

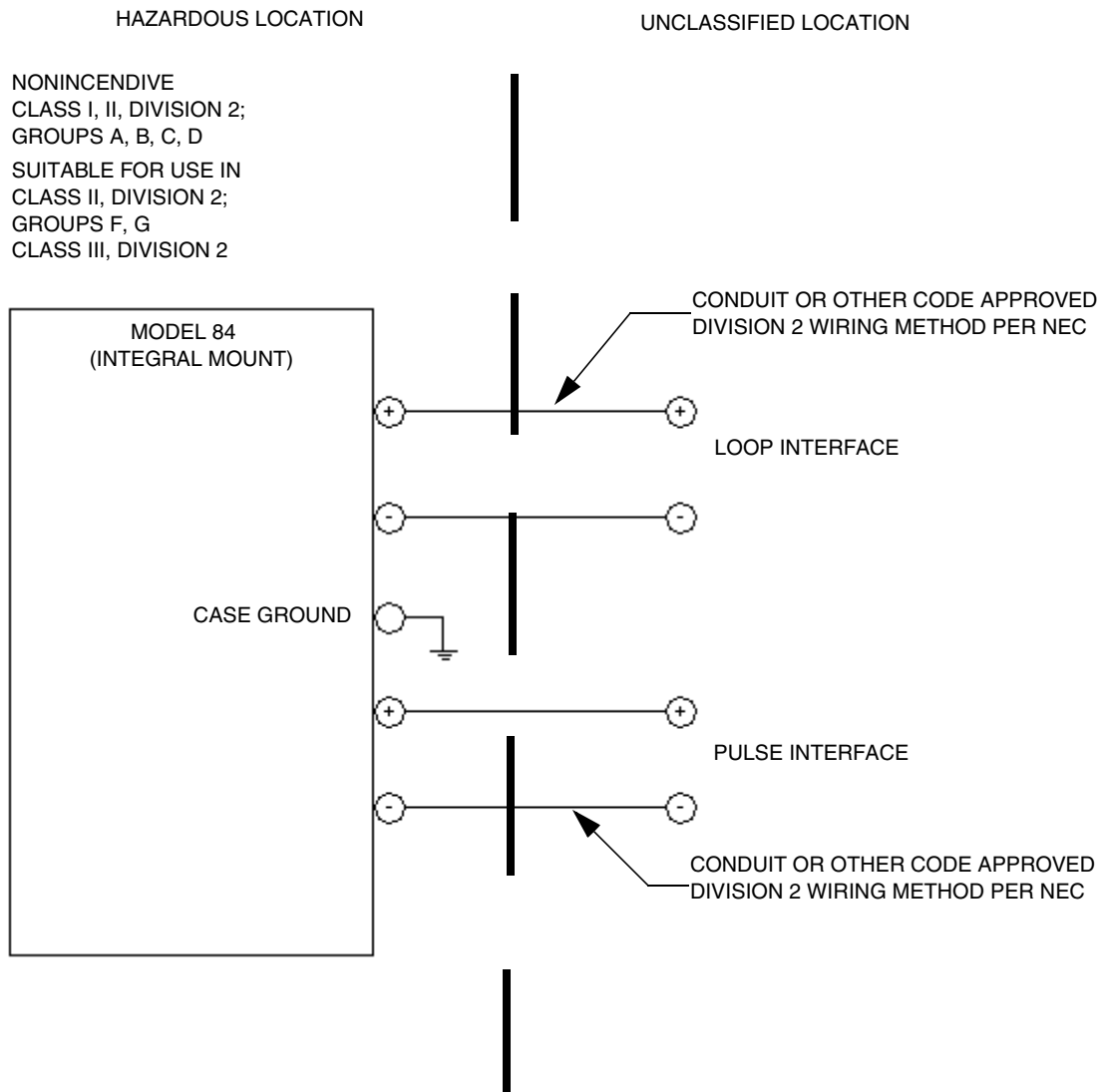
— **NOTE** —

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1. No revision to drawing without prior FM approval.
  2. Resistance between the safety ground and earth ground must be less than 1 ohm
  3. Dusttight conduit seal must be used when installed in Class II and Class III environments.
  4. Intrinsically safe transmitter/flowtube connection. Consult certificate.
-

# Nonincendive

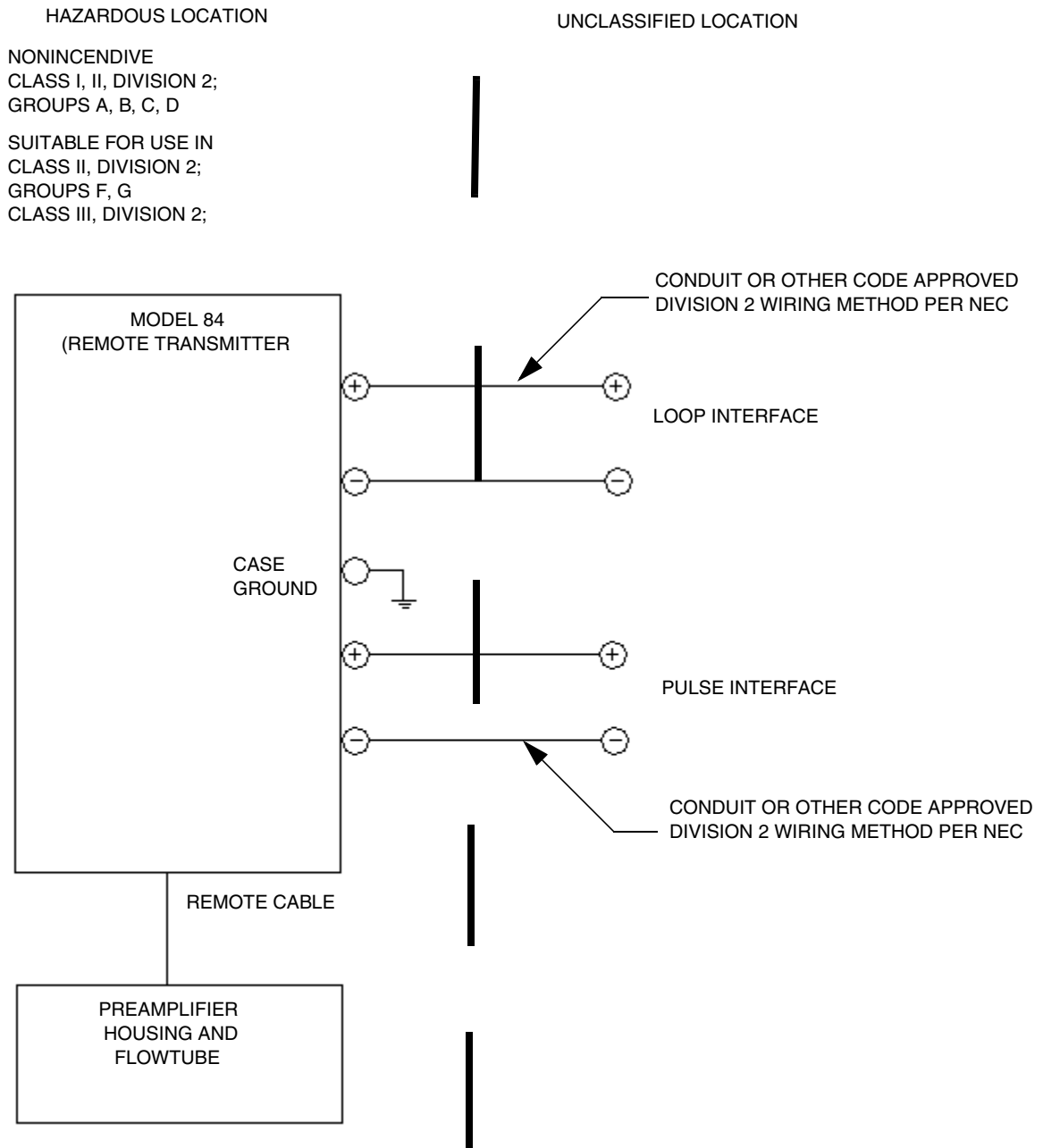
- 
- ! WARNING**
1. To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.
  2. Substitution of components may impair intrinsic safety.
- 



*Figure 6. FM Nonincendive Integral Mount Flowmeter - Electrical Certification K*

- 
- NOTE**
- No revision to drawing without prior FM approval.
-

- ! WARNING —**
1. To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.
  2. Substitution of components may impair intrinsic safety.



*Figure 7. FM Nonincendive Remote Mount Flowmeter - Electrical Certification K*

- NOTE —**
- No revision to drawing without prior FM approval.





# 2. CSA Approvals

## Intrinsically Safe/Securite Intrinseque (Ex ia)

- ! WARNING**
1. Explosionproof Hazard. Keep cover tight while circuits are alive unless the area is known to be nonhazardous.
  2. Substitution of components may impair intrinsic safety or suitability for Division 2.
- AVERTISSEMENT**
1. Risque d'explosion ouvrir le circuit ou s'assurer que l'emplacement est designe non-dangereux.
  2. La substitution de composants peut compromettre la securite intrinseque ou rendre ce materiel inacceptable pour Division 2.

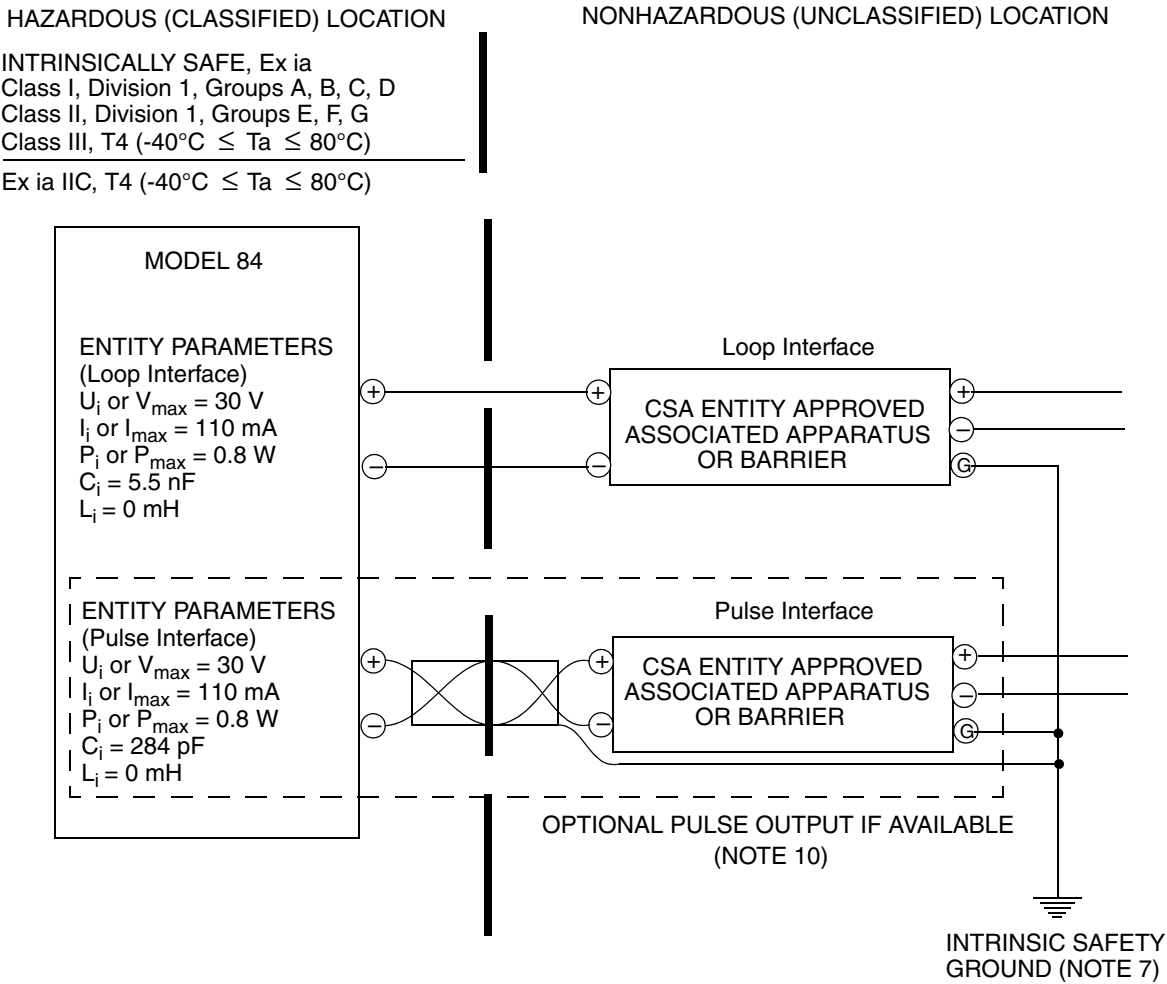


Figure 8. IS Entity Parmeters for Integral Mount Flowmeter - Electrical Certification C

**— NOTE —**

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1. No revision to drawing without prior CSA approval.
  2. The associated apparatus must be CSA approved.
  3. The CSA Approved Associated Apparatus must be a linear output device.
  4. Control equipment connected to the associated apparatus must not use or generate more than 250 V rms or V dc.
  5. Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
  6. The Entity Concept allows interconnection of intrinsically safe apparatus with associated apparatus when the following is true:
    - $V_{\max}$  or  $U_i \geq V_{oc}$  or  $U_o$
    - $I_{\max}$  or  $I_i \geq I_{sc}$  or  $I_o$
    - $P_{\max}$  or  $P_i \geq P_o$
    - $C_a \geq C_i + C_{cable}$
    - $L_a \geq L_i + L_{cable}$
  7. Resistance between intrinsically safe ground and earth ground must be less than 1 ohm.
  8. Dusttight conduit seal must be used when installed in Class II and Class III environments.
  9. Installation must be in accordance with the Canadian Electrical Code, Part 1.
  10. Pulse Output must use shielded twisted pair cable. Shield must be grounded as shown.
-

**! WARNING**

1. Explosionproof Hazard. Keep cover tight while circuits are alive unless the area is known to be nonhazardous.
2. Substitution of components may impair intrinsic safety or suitability for Division 2.

**AVERTISSEMENT**

1. Risque d'explosion ouvrir le circuit ou s'assurer que l'emplacement est designe non-dangereux.
2. La substitution de composants peut compromettre la securite intrinseque ou rendre ce materiel inacceptable pour Division 2.

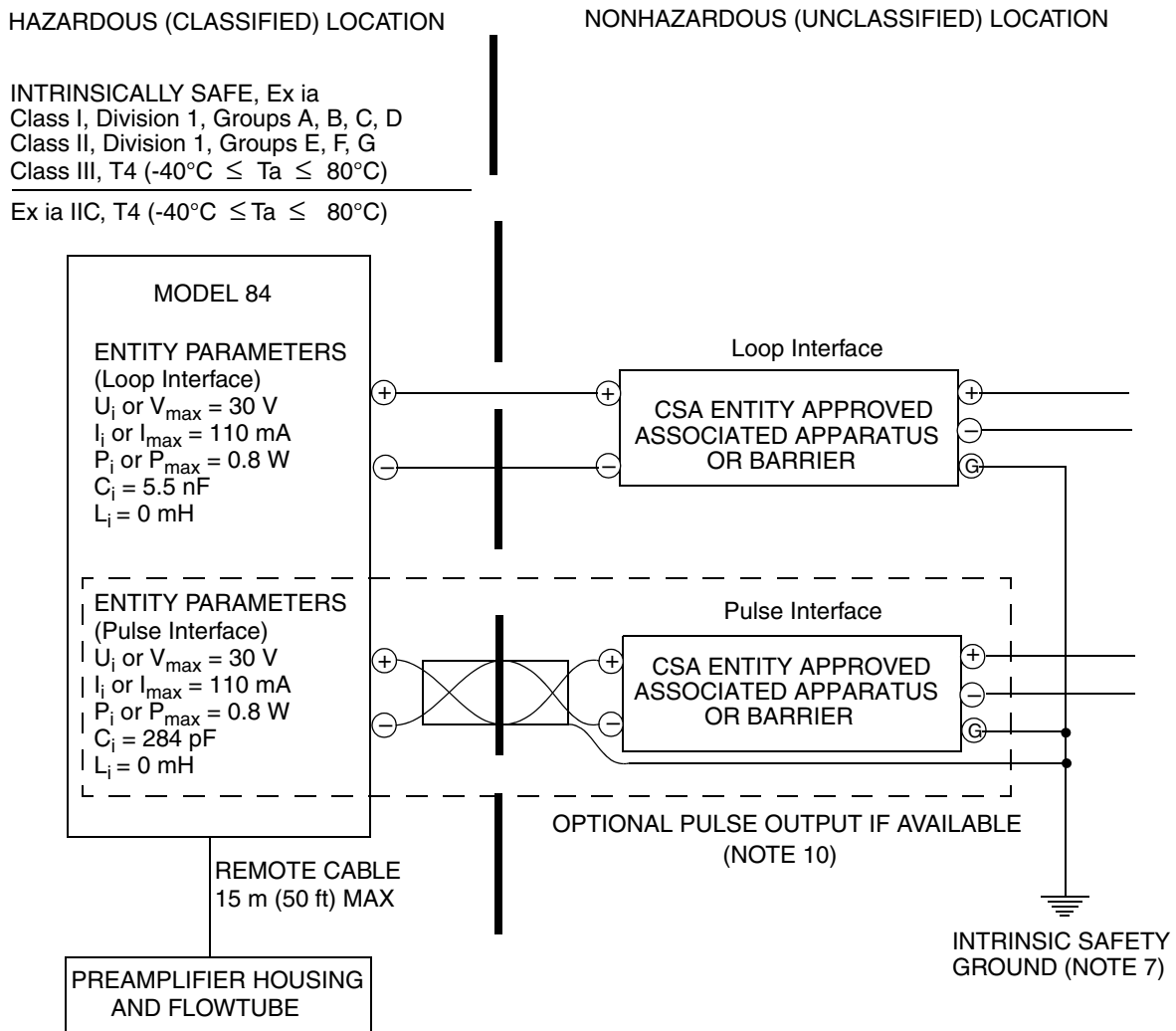


Figure 9. IS Entity Parameters for Remote Mount Flowmeter - Electrical Certification C

**— NOTE**

- 
1. No revision to drawing without prior CSA approval.
  2. The associated apparatus must be CSA approved.
  3. The CSA Approved Associated Apparatus must be a linear output device.
  4. Control equipment connected to the associated apparatus must not use or generate more than 250 V rms or V dc.
  5. Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
  6. The Entity Concept allows interconnection of intrinsically safe apparatus with associated apparatus when the following is true:
    - $V_{\max}$  or  $U_i \geq V_{oc}$  or  $U_o$
    - $I_{\max}$  or  $I_i \geq I_{sc}$  or  $I_o$
    - $P_{\max}$  or  $P_i \geq P_o$
    - $C_a \geq C_i + C_{cable}$
    - $L_a \geq L_i + L_{cable}$
  7. Resistance between intrinsically safe ground and earth ground must be less than 1 ohm
  8. Dusttight conduit seal must be used when installed in Class II and Class III environments.
  9. Installation must be in accordance with the Canadian Electrical Code, Part 1.
  10. Pulse Output must use shielded twisted pair cable. Shield must be grounded as shown.
-

# Explosionproof

**! WARNING**

1. Explosionproof Hazard. Keep cover tight while circuits are alive unless the area is known to be nonhazardous.
2. Substitution of components may impair intrinsic safety or suitability for Division 2.

**AVERTISSEMENT**

1. Risque d'explosion ouvrir le circuit ou s'assurer que l'emplacement est designe non-dangereux.
2. La substitution de composants peut compromettre la securite intrinseque ou rendre ce materiel inacceptable pour Division 2.

HAZARDOUS (CLASSIFIED) LOCATION

NONHAZARDOUS (UNCLASSIFIED) LOCATION

**EXPLOSIONPROOF**

Class I, Division 1, Groups B, C, D; [Ex ia]  
 T5, (-40°C ≤ Ta ≤ +60°C)  
 Ex d [ia] IIC T4 (-40°C ≤ Ta ≤ +80°C)

**DUST IGNITION PROOF**

Class II, Division 1, Groups E, F, G  
 Class III

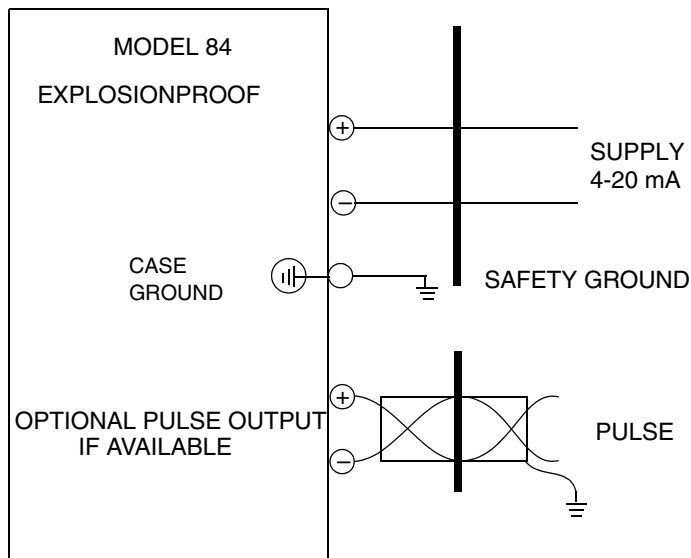


Figure 10. Integral Mount Flowmeter - Electrical Certification D

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**— NOTE**

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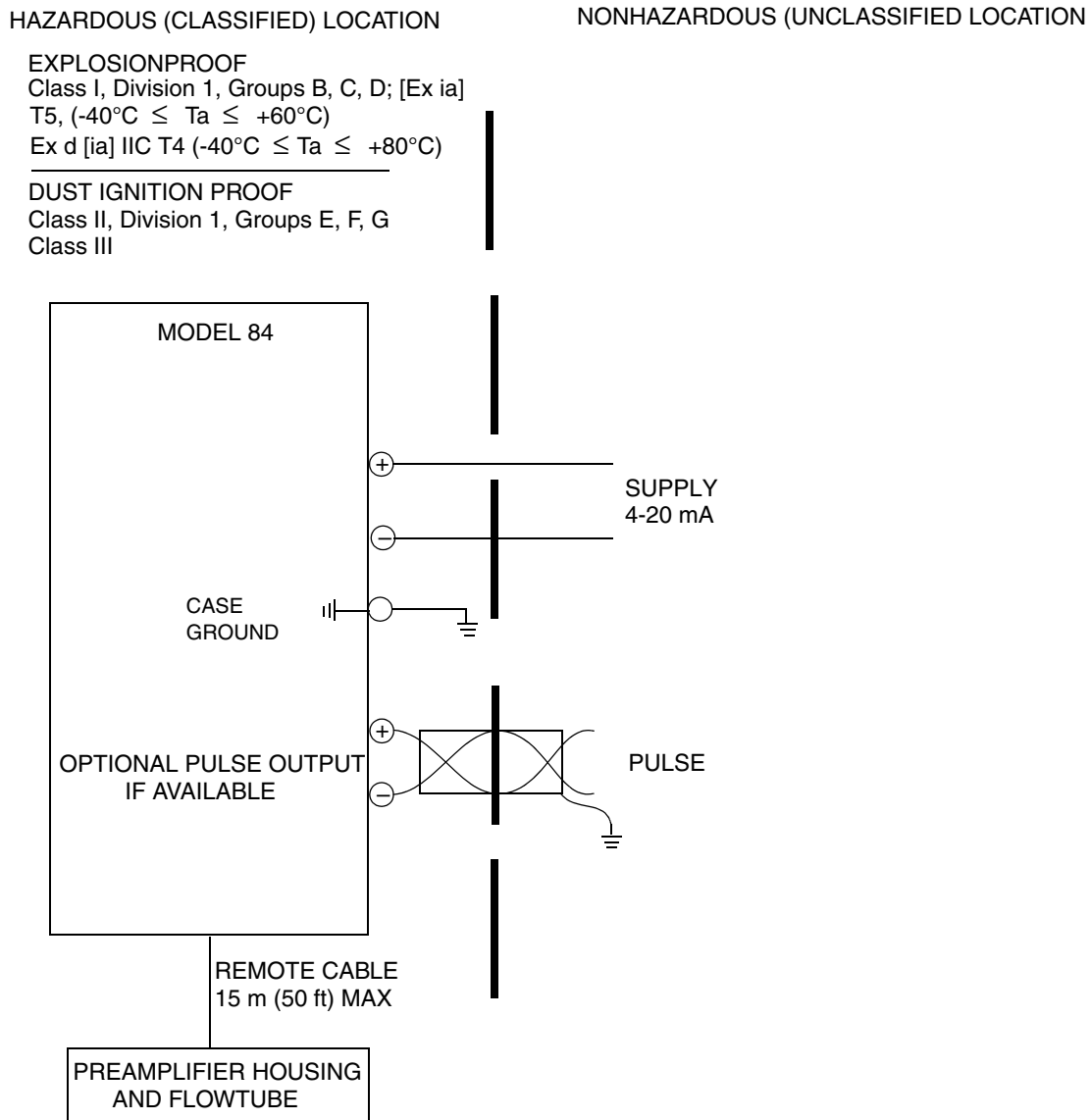
1. No revision to drawing without prior CSA approval.
  2. The associated apparatus must be CSA approved.
  3. The CSA Approved Associated Apparatus must be a linear output device.
  4. Control equipment connected to the associated apparatus must not use or generate more than 250 V rms or V dc.
  5. Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
  6. Dusttight conduit seal must be used when installed in Class II and Class III environments.
  7. Installation must be in accordance with the Canadian Electrical Code, Part 1.
-

**! WARNING**

1. Explosionproof Hazard. Keep cover tight while circuits are alive unless the area is known to be nonhazardous.
2. Substitution of components may impair intrinsic safety or suitability for Division 2.

**AVERTISSEMENT**

1. Risque d'explosion ouvrir le circuit ou s'assurer que l'emplacement est designe non-dangereux.
2. La substitution de composants peut compromettre la securite intrinseque ou rendre ce materiel inacceptable pour Division 2.



*Figure 11. Remote Mount Flowmeter - Electrical Certification D*

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**— NOTE**

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1. No revision to drawing without prior CSA approval.
  2. The associated apparatus must be CSA approved.
  3. The CSA Approved Associated Apparatus must be a linear output device.
  4. Control equipment connected to the associated apparatus must not use or generate more than 250 V rms or V dc.
  5. Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
  6. Dusttight conduit seal must be used when installed in Class II and Class III environments.
  7. Installation must be in accordance with the Canadian Electrical Code, Part 1.
-



# Nonincendive

## ⚠ WARNING

1. Explosionproof Hazard. Keep cover tight while circuits are alive unless the area is known to be nonhazardous.
2. Substitution of components may impair intrinsic safety or suitability for Division 2.

## AVERTISSEMENT

1. Risque d'explosion ouvrir le circuit ou s'assurer que l'emplacement est designe non-dangereux.
2. La substitution de composants peut compromettre la securite intrinseque ou rendre ce materiel inacceptable pour Division 2.

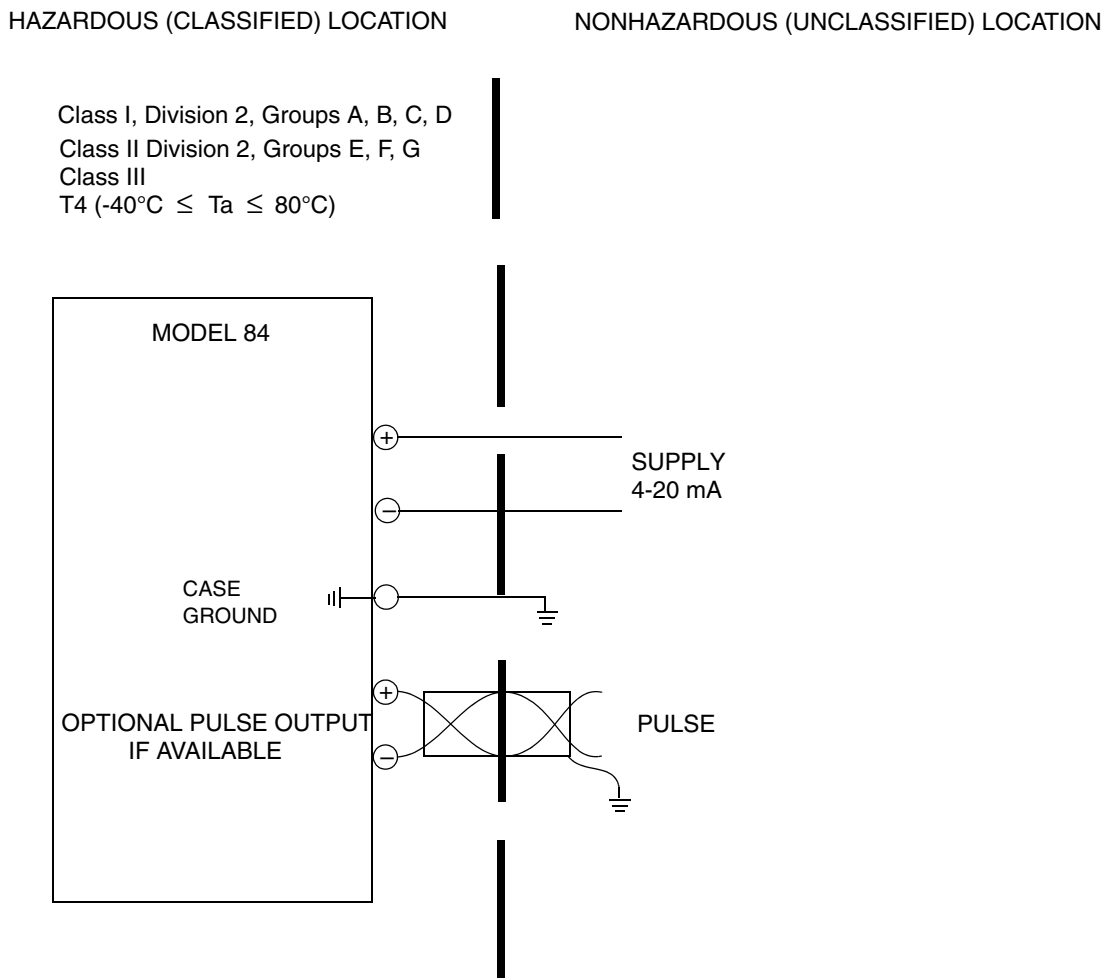


Figure 12. Division 2 Integral Mount Flowmeter - Electrical Certification M

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**— NOTE**

1. No revision to drawing without prior CSA approval.
  2. The associated apparatus must be CSA approved.
  3. The CSA Approved Associated Apparatus must be a linear output device.
  4. Control equipment connected to the associated apparatus must not use or generate more than 250 V rms or V dc.
  5. Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
  6. Dusttight conduit seal must be used when installed in Class II and Class III environments.
  7. Installation must be in accordance with the Canadian Electrical Code, Part 1.
-

**! WARNING**

1. Explosionproof Hazard. Keep cover tight while circuits are alive unless the area is known to be nonhazardous.
2. Substitution of components may impair intrinsic safety or suitability for Division 2.

**AVERTISSEMENT**

1. Risque d'explosion ouvrir le circuit ou s'assurer que l'emplacement est designe non-dangereux.
2. La substitution de composants peut compromettre la securite intrinseque ou rendre ce materiel inacceptable pour Division 2.

HAZARDOUS (CLASSIFIED) LOCATION

NONHAZARDOUS (UNCLASSIFIED) LOCATION

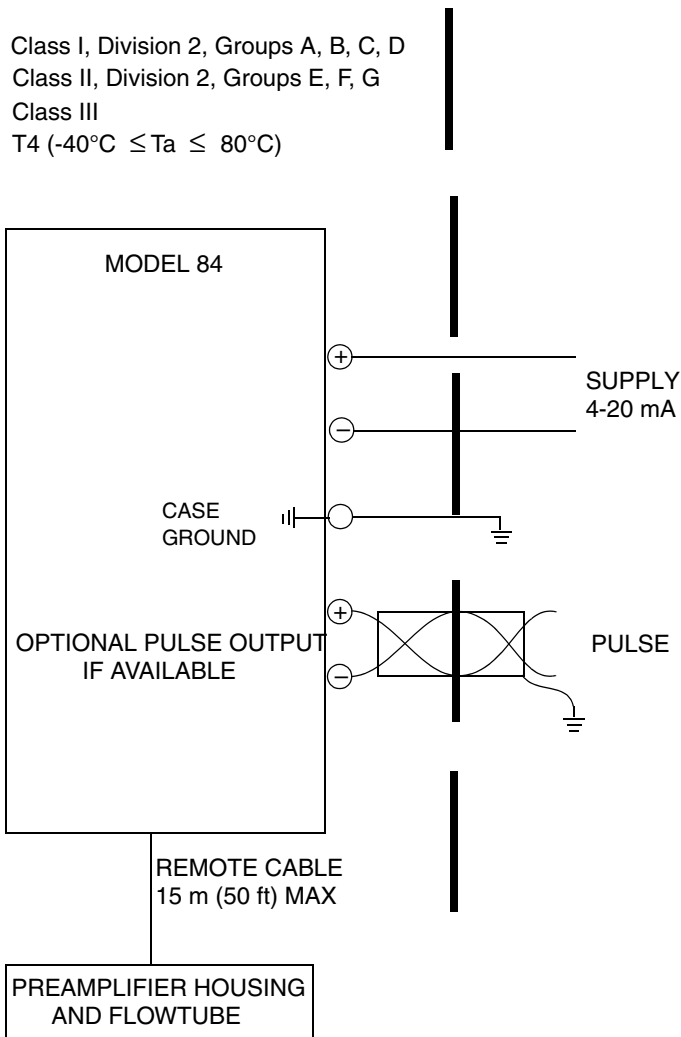


Figure 13. Division 2 Remote Mount Flowmeter - Electrical Certification M

**— NOTE**

1. No revision to drawing without prior CSA approval.
2. The associated apparatus must be CSA approved.
3. The CSA Approved Associated Apparatus must be a linear output device.
4. Control equipment connected to the associated apparatus must not use or generate more than 250 V rms or V dc.
5. Associated apparatus manufacturer’s installation drawing must be followed when installing this equipment.
6. Dusttight conduit seal must be used when installed in Class II and Class III environments.
7. Installation must be in accordance with the Canadian Electrical Code, Part 1.

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