

Intrinsic-Safety Explosion-proof Devices

Zener Barriers

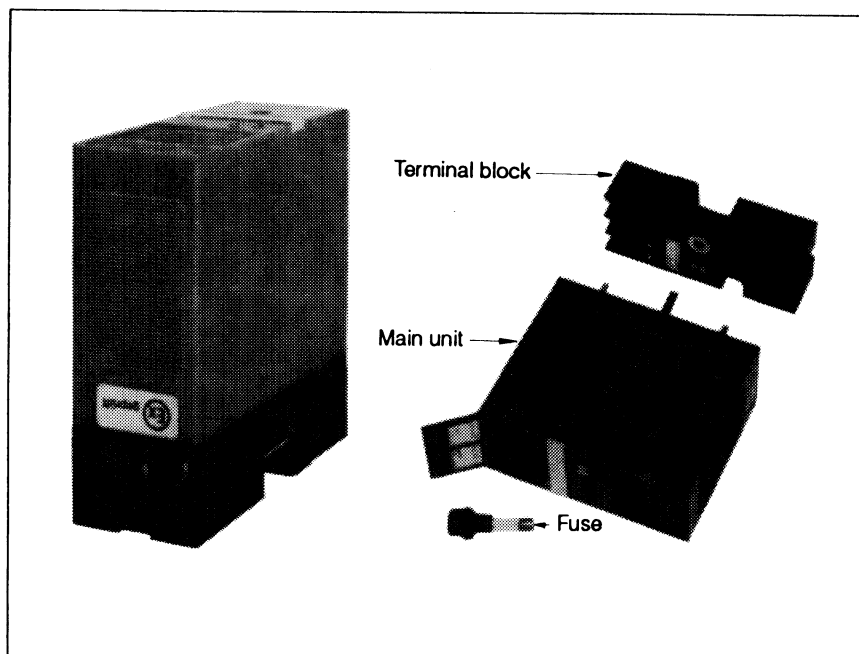
Model 8907

Introduction

Model 8907 Zener Barriers are intrinsic-safety explosion-proof devices designed by Yamatake in compliance with the Technical Recommendations issued by the Industrial Safety Technology Association. These Zener Barriers are model-approved as intrinsic-safety explosion-proof devices by the Industrial Safety Research Institute of the Ministry of Labor.

Features

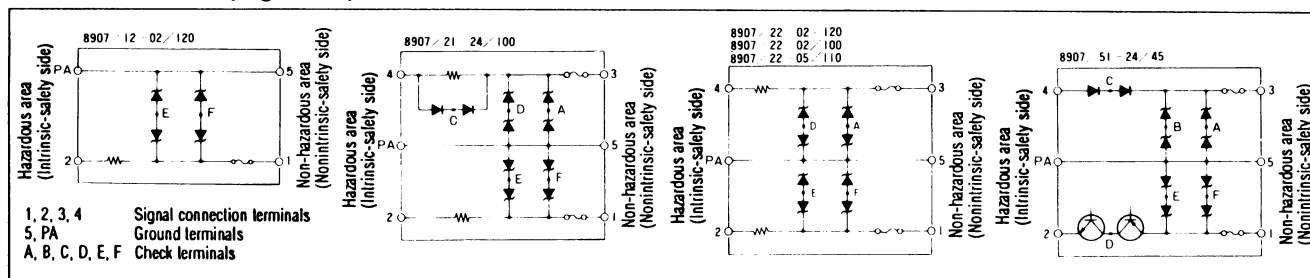
- Split-structure (main unit and terminal block) for easy maintenance
- Readily replaceable fuse
- High safety assurance ratings (500V AC, 35A)
- Check terminal provided (for convenient test of internal elements)
- Easy electrical connections (shielding wire connection terminals provided)



Model Nos. and Specifications

Model No.	V _e [V]	I _L [μA]	R _L		V _{max} . [V]	I _{cc} [mA]	Ambient condition	Remarks
			[Ω]	Temp. coefficient [PPM/°C]				
8907/22-02/100	±2	2	79±4.85	250	7	100	Temperature: 0 – 50°C Humidity: 0 – 90%RH	V _e (rated voltage): Maximum allowable voltage (nominal) of nonintrinsic-safety circuit of zener barrier. I _L (leak current): Maximum current which leaks through zener diode (at V _e). R _L (total resistance): Resistance between terminals ① and ② or between terminals ③ and ④. V _{max} (open voltage): Maximum voltage of intrinsic-safety circuit of zener barrier, including that in case of failure. I _{cc} (short-circuit current): Maximum current of intrinsic-safety of zener barrier, including that in case of failure.
8907/12-02/120	±2	2	66±1.72	30	7	120		
8907/22-02/120	±2	2	66±1.72	30	7	120		
8907/22-05/110	±5	20	104±6.3	250	10	110		
8907/21-24/100	+24	16 (1mA at 27.5V)	①→② / ③→④ 394 ± 20.5	250	35	100		
			④→③ ≤ 1.7V at 20mA	—				
8907/51-24/45	+24	16 (1mA at 27.5V)	①-② 3.3V ④-③ 1.7V at 20mA	—	35	45		

Internal Circuits (Figure 1)



Intrinsic-Safety Systems List for Zener Barriers

Object devices		Specified, combined barrier type	Class	Approved number	System number	Connection dwg. no.	Remarks
Intrinsic-safety devices	Type						
Resistance thermobulb	Shown in this specification	8907/22-02/120 8907/12-02/120	3nG5	22210	YSS-22	①	
Thermocouple	Shown in this specification	8907/22-05/110	3nG5	22211	YSS-23	②	
Flow transmitter	NQI	8907/51-24/45	3nG5	22212	YSS-24	③	
Electric-pneumatic converter	VPI07, VPT07, NOX110	8907/51-24/45	3nG5	22213	YSS-25	③	
Control switch	See note.	8907/51-24/45	3nG5	23497	YSS-39	④	
Control switch	See note.	8907/21-24/100	2G4	23499	YSS-41	④	
Ammeter	TME 120, EPM	8907/51-24/45	3nG5	28496	YSS-57	③	Serial connection between TME and EPM available
Field type ammeter	NW35	8907/51-24/45	3nG5	29912	---	③	
Electric - pneumatic converter	NOX110	8907/51-24/45	2G2	30344	YSS-60	③	Allowable wiring capacitance: 0.076μF
Pneumatic - electric converter	NOX120	8907/51-24/45	2G2	30343	YSS-61	③	
Positioner	HEP	8907/51-24/45	3aG5	37859	---	③	Combination with NW35 available
Pressure transmitter	JTD, JTR, JTG JTF, JTV, JTA	8907/51-24/45	3aG5	45995	---	③	Combination with SFC 100/110/150 /300/310/320 and NW35 available
Field type I/P transducer	KUX113	8907/51-24/45	3aG4	41953	---	③	

Note) Applicable switches

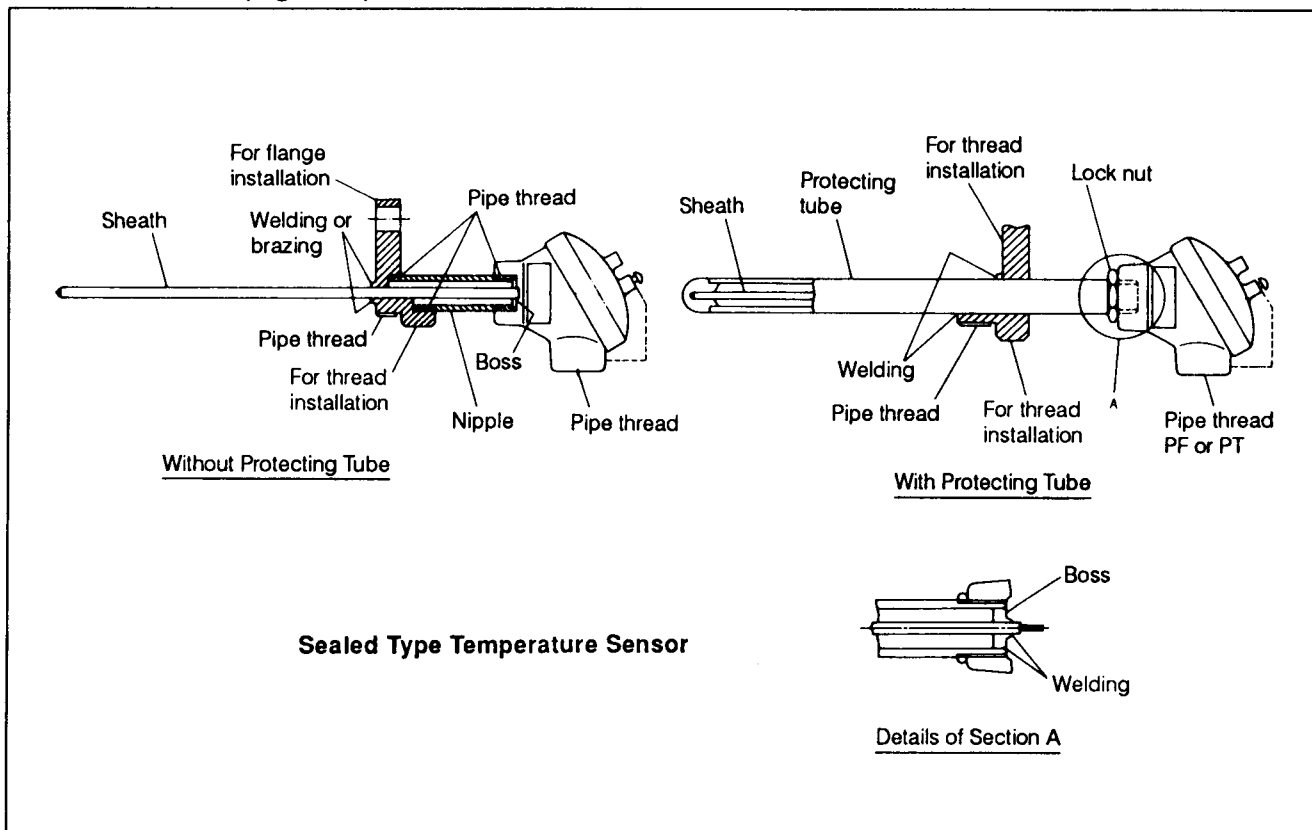
Flow switch: FS5-J, FS7-4WJ, FS7-SWJ

Limit switch: General use LS, Compact SL1

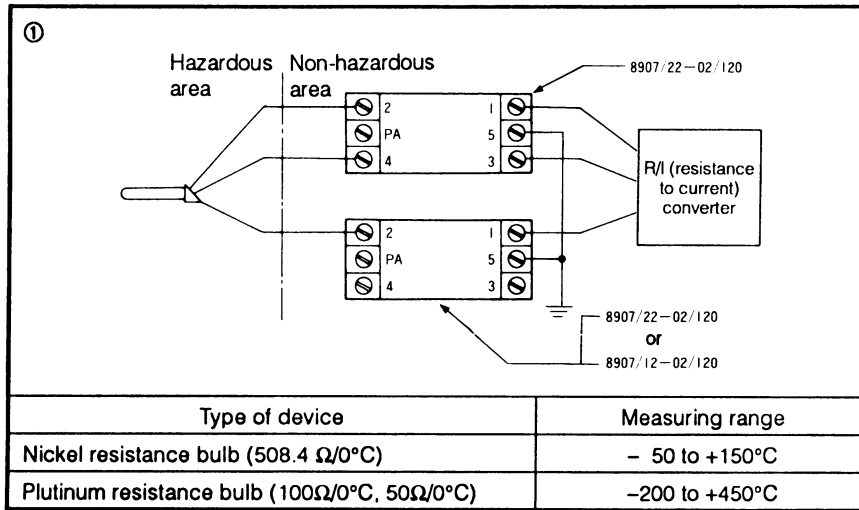
Liquid level switch: MC61-J, MC150-JY (float type)

Pressure switch: L404A, L404B, L404F

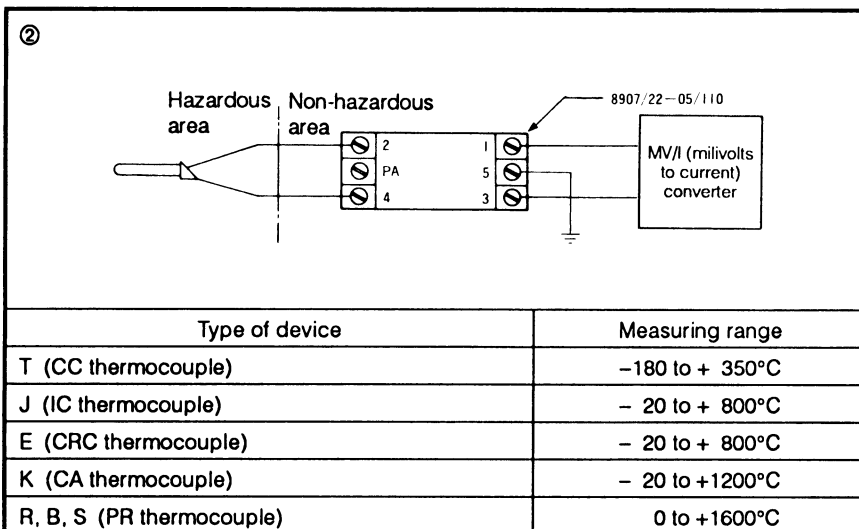
Sensor Structure (Figure 2)



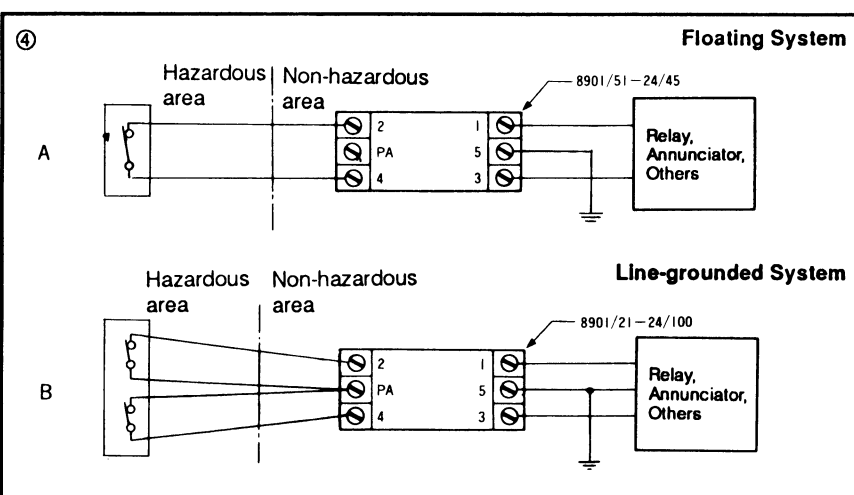
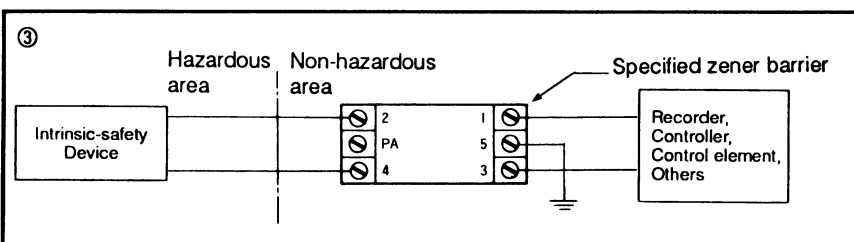
Wiring connection diagrams (Figure 3)



- Notes: 1) This system is applicable also to copper resistance bulb.
- 2) The intrinsic-safety temperature sensor must meet the electrical requirements of the intrinsic-safety explosion-proof feature and at the same time it must be mechanically sealed to guard against ingress of flammable atmospheric gas into the temperature sensor (high temperature section).



- Notes: 1) Tip grounded type can be used.
- 2) Double element can be used.
- 3) Same structure as the resistance bulb type.



- Notes: 1) Wiring connection A must be used by complete floating system.
- 2) Wiring connection B can be used either by Line-grounded system or floating system.

Allowable Cable Distances (between field device or instrument and zener barrier)

For the intrinsic-safety system with the 8907 zener barrier, use cables which meet the requirement shown in the table at right. [The values (L, C) shown in the table are those certified by the model-approval test.]

Examples of allowable inductances and capacitances of cables, and allowable cable lengths.

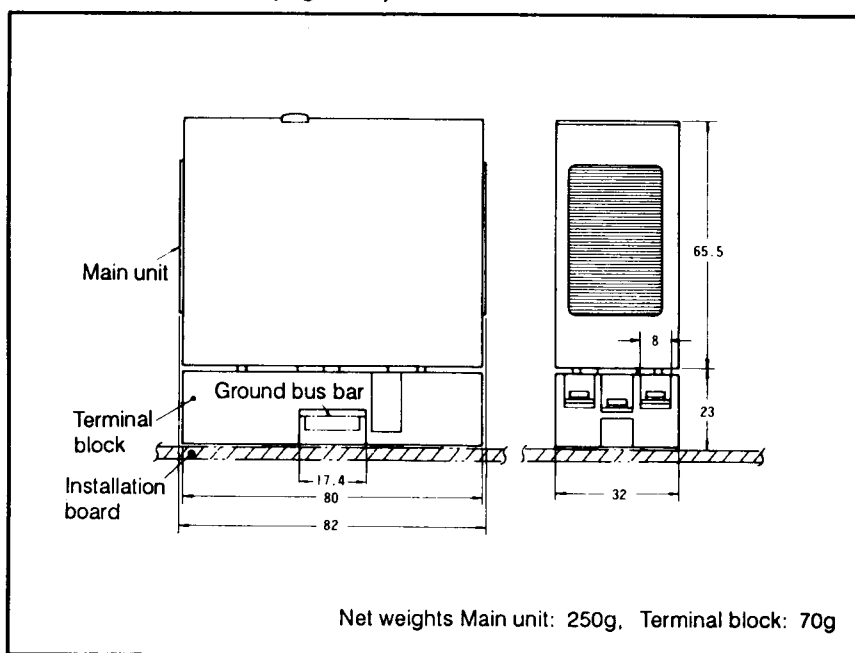
Intrinsic-safety system No.	Allowable inductance L(mH)	Allowable capacitance C(μF)	Specifications of cable	Allowable cable length
YSS-22 (For resistance bulb)	2	0.72	CEE, 1.25 mm ²	Approx. 2.5 km
YSS-23 (For thermocouple)	2.5	0.1	T/C wires manufactured by Yamatake. (element wires 7/0.65, P=30 or less)	Approx. 1 km
YSS-24 (NDI/NKI/NOI/NOX)	1	0.024	CEE, 1.25 mm ²	Approx. 500 m
(KDI)	4	0.024	CEE, 1.25 mm ²	Approx. 500 m
(KKI)	4	0.024	CEE, 1.25 mm ²	Approx. 500 m
(NW35)	4	0.024	CEE, 1.25 mm ²	Approx. 500 m
YSS-25 (For I/P transducer)	8.4	0.028	CEE, 1.25 mm ²	Approx. 500 m
YSS-39 (For contact)	2	0.015	CEE, 1.25 mm ² (P = 30 or less)	Approx. 300 m
YSS-41 (For contact)	2.1	0.225	CEE, 1.25 mm ² (P = 30 or less)	Approx. 1.4 km

External Dimensions

Notes:

- 1) The ground bus bar and installation board should be prepared by the customer.
- 2) For the copper bus bar, one conforming with that specified by JIS 3361 (16mm wide, 4mm thick) or equivalent should be used. Its surfaces are recommended to be processed for rust-proof (nickel plated, for example).
- 3) The copper bus bar must be grounded in JIS Class 1 Grounding Work (grounding resistance 10 ohms or less).
- 4) Never use any fuse other than the dedicated fuse (Model M0.1) supplied by Yamatake.
- 5) When other contacts than those manufactured by Yamatake are supplied for this intrinsic-safety explosion-proof system, model-approval certificates for such contacts will accompany the zener barriers upon request by the customer.

External Dimensions (Figure 4)



Specifications are subject to change without notice.

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