

# SmartPower™ Solutions



WirelessHART® CE

- Intrinsically Safe design enables ability to perform routine maintenance in hazardous areas
- Predictable life specified under installed conditions
- Robust design for use in harsh environments
- Low Level alerts for easy maintenance
- Keyed connection for easy and fail-safe replacement

# IEC 62591 (WirelessHART™)... the Industry Standard

## Self-organizing, adaptive mesh routing

- No wireless expertise required, devices automatically find the best communication paths
- Network continuously monitors paths for degradation and repairs itself
- Adaptive behavior provides reliable, hands-off operation and simplifies network deployments, expansion, and reconfiguration
- Supports both star and mesh topologies

## Industry standard radio with channel hopping

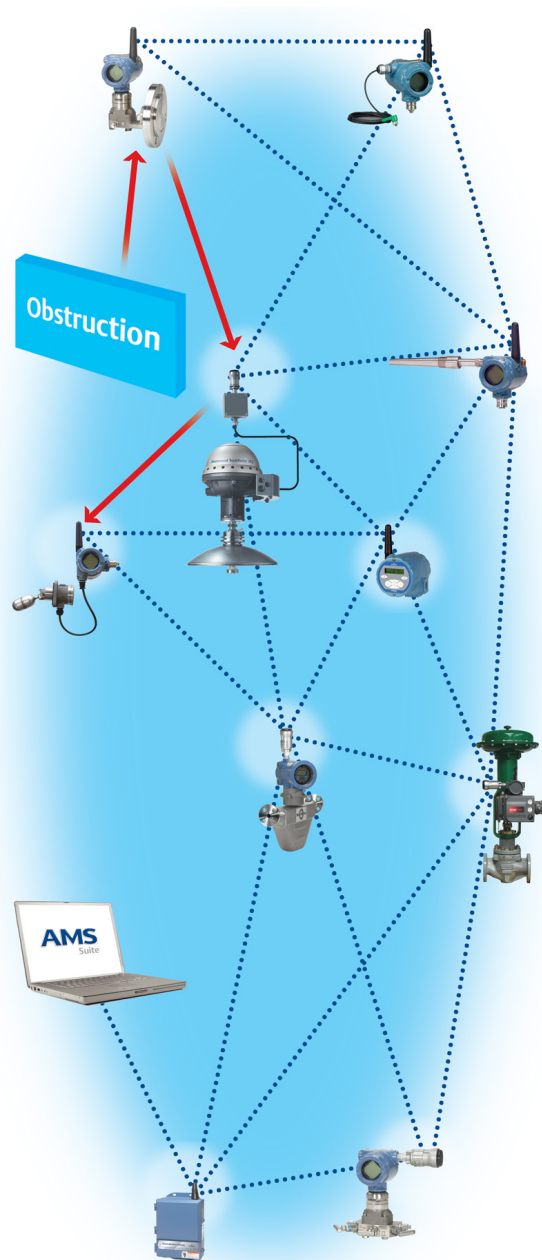
- Standard IEEE 802.15.4 radios
- 2.4 GHz ISM band sliced into 16 radio-channels
- Continually “hop” across channels to avoid interference and increase reliability
- Direct Sequence Spread Spectrum (DSSS) technology delivers high reliability in challenging radio environment

## Self-healing network

- The self-organizing, self-healing network manages multiple communication paths for any given device. If an obstruction is introduced into the network, data will continue to flow because the device already has other established paths. The network will then lay in more communication paths as needed for that device.

## Seamless integration to existing hosts

- Transparent and seamless integration
- Same control system applications
- Gateways connect using industry protocols



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# SmartPower Solutions



## Black power module

- Hazardous Area Certifications: FM, CSA, ATEX, IECEx
- Designed for use with:
  - Rosemount 702 Wireless Discrete Transmitter
  - Rosemount 3051S Wireless Pressure Transmitter
  - Rosemount 648 Wireless Temperature Transmitter
  - Rosemount 848T Wireless Temperature Transmitter
  - Rosemount 248 Wireless Temperature Transmitter
  - CSI 9420 Wireless Vibration Transmitter
  - Rosemount Analytical 6081 Wireless Transmitter for pH and Conductivity
  - Rosemount 2160 Wireless Vibrating Fork Liquid Level Switch
  - Rosemount 3308 Wireless Guided Wave Radar Level and Interface Transmitter



## Green power module

- Hazardous Area Certifications: FM, CSA, ATEX, IECEx
- Designed for use with:
  - Rosemount 708 Wireless Acoustic Transmitter
  - Rosemount 3051 Wireless Pressure Transmitter
  - Rosemount 2051 Wireless Pressure Transmitter

### Intrinsically safe power solution

- SmartPower Modules can be changed in hazardous areas
- No need to remove transmitter from process to change power module

### Predictable life

- Life expectancies specified under installed conditions
- Up to 10 year life depending on update rate

### Easy maintenance

- Low level alerts for easy planning of replacements
- Keyed connections for easy replacement and fail-safe connection

### Safe robust design

- Short circuit protection
- No special training required
- Designed for harsh environments

## Ordering Information

Specification and selection of product materials, options, or components must be made by the purchaser of the equipment. See [page 5](#) for more information on material selection.

**Table 1. SmartPower Solutions Ordering Information**

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.

The Expanded offering is subject to additional delivery lead time.

| Model                                 | Product description                         |   |
|---------------------------------------|---|---|
| 701P                                  | SmartPower Options                          |   |
| <b>SmartPower type</b>                |   |   |
| BK                                    | Black Power Module                          | ★ |
| GN                                    | Green Power Module                          | ★ |
| <b>Certification</b>                  |   |   |
| KF                                    | FM, CSA, ATEX, and IECEx Intrinsically Safe | ★ |
| <b>Typical model number: 701PBKKF</b> |   |   |

# Specifications

## Functional specifications

### Life expectancy

Up to 10-year life at 1 minute update rate. See Table on page 5 for more information.

### Humidity limits

0–100% relative humidity

## Physical specifications

### Material selection

Emerson provides a variety of Rosemount product with various product options and configurations including materials of construction that can be expected to perform well in a wide range of applications. The Rosemount product information presented is intended as a guide for the purchaser to make an appropriate selection for the application. It is the purchaser’s sole responsibility to make a careful analysis of all process parameters (such as all chemical components, temperature, pressure, flow rate, abrasives, contaminants, etc.), when specifying product, materials, options and components for the particular application. Emerson Process Management is not in a position to evaluate or guarantee the compatibility of the process fluid or other process parameters with the product, options, configuration or materials of construction selected.

### Electrical connections

Emerson SmartPower solutions were designed for use with various Smart Wireless devices. The black power module is used with the 3051S, 648, 848, 702, 2160, 9420, and 6081. The green power module is used with the 708, 3051C, and 2051.

### Rated voltage

Black Power Module: 7.2 V  
Green Power Module: 3.6 V

### Materials of construction

Lithium-thionyl chloride with a polybutylene terephthalate (PBT) enclosure.

### Weight

Black Power Module -0.50 lb. (230 g)  
Green Power Module - 0.34 lb. (155 g)

## Performance specifications

### Electromagnetic compatibility (EMC)

All Models:  
Meets all relevant requirements of EN 61326-1; 2006; EN 61326-2-3; 2006.

### Vibration effect

No effect when tested per the requirements of IEC60770-1: High Vibration Level - field or pipeline (10-60 Hz 0.21 mm displacement peak amplitude / 60-2000 Hz 3g).

## Temperature limits

| Operating limit | Storage limit |
|-----------------|---------------|
| -40 to 185 °F   | -40 to 185 °F |
| -40 to 85 °C    | -40 to 85 °C  |

## Power module life

Power module life in a given wireless transmitter is mainly a function of the wireless update rate. Faster wireless updates lead to lower power module life. Power module life is also impacted by extreme temperature service and wireless network conditions.

**Table 2. Power Module Life Estimates**

| Power module life estimates in years |       |        |        |         |        |        |        |
|--------------------------------------|-------|--------|--------|---------|--------|--------|--------|
| Update                               | 4 sec | 16 sec | 60 sec | 300 sec | 20 min | 40 min | 60 min |
| 3051S                                | 2.2   | 5.8    | 10.0   | 10.0    | 10.0   | 10.0   | 10.0   |
| 3051                                 | 2.2   | 5.8    | 10.0   | 10.0    | 10.0   | 10.0   | 10.0   |
| 2051                                 | 2.2   | 5.8    | 10.0   | 10.0    | 10.0   | 10.0   | 10.0   |
| 648                                  | 2.8   | 6.9    | 10.0   | 10.0    | 10.0   | 10.0   | 10.0   |
| 848                                  | 0.7   | 2.4    | 6.3    | 10.0    | 10.0   | 10.0   | 10.0   |
| 248                                  | 2.8   | 6.9    | 10.0   | 10.0    | 10.0   | 10.0   | 10.0   |
| 702                                  | 4.1   | 8.8    | 10.0   | 10.0    | 10.0   | 10.0   | 10.0   |
| 2160                                 | 2.0   | 6.0    | 10.0   | 10.0    | 10.0   | 10.0   | 10.0   |
| 708                                  | 3.8   | 8.4    | 10.0   | 10.0    | 10.0   | 10.0   | 10.0   |
| 3308                                 | 1.5   | 4.7    | 10.0   | 10.0    | 10.0   | 10.0   | 10.0   |
| 6081 pH                              | 2.1   | 2.8    | 3.2    | 10.0    | 10.0   | 10.0   | 10.0   |
| 6081 C                               | 2.4   | 5.5    | 8.7    | 10.0    | 10.0   | 10.0   | 10.0   |
| 4310/20 Std                          | 4.0   | 7.2    | 9.0    | 10.0    | 10.0   | 10.0   | 10.0   |
| 4310/20 Ext                          | 8.4   | 10.0   | 10.0   | 10.0    | 10.0   | 10.0   | 10.0   |
| 9420 <sup>(1)</sup>                  | NR    | NR     | NR     | NR      | 1.5    | 2.4    | 3.0    |

### Assumptions

- 3 Network Descendants
- 70 °F Ambient Temperature
- 10 years is shelf life of lithium cell
- +/- 10% capacity for temperature and network variation

### Note

NR: this update rate not recommended for this product

(1) Applies to Rev. 5.02 or higher. Results may be substantially lower with older product revisions

To better estimate power module life for a wireless transmitter in your network, visit <http://www2.emersonprocess.com/en-US/brands/rosemount/Wireless/SmartPower-Solutions/Pages/index.aspx> for an on-line power module life estimator.

# Product Certifications – 701P SmartPower Solutions

## European Directive Information

A copy of the EC Declaration of Conformity can be found at the end of the Quick Start Guide. The most recent revision of the EC Declaration of Conformity can be found at [www.rosemount.com](http://www.rosemount.com).

## Ordinary Location Certification for FM Approvals

As standard, the transmitter has been examined and tested to determine that the design meets the basic electrical, mechanical, and fire protection requirements by FM Approvals, a nationally recognized test laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA).

## Installing in North America

The US National Electrical Code (NEC) and the Canadian Electrical Code (CEC) permit the use of Division marked equipment in Zones and Zone marked equipment in Divisions. The markings must be suitable for the area classification, gas, and temperature class. This information is clearly defined in the respective codes.

### USA

**KF** FM Intrinsic Safety (IS)  
Certificate: 3042016  
Standards: FM Class 3600 – 1998, FM Class 3610 – 2010, FM Class 3810 – 2005  
Markings: IIS CL I, DIV 1, GP 1, B, C, D; CL II, DIV 1, GP E, F, G; Class III; Class 1, Zone 0 AEx ia IIC T4; NI CL I, DIV 2, GP A, B, C, D T4;  
( $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ )  
(See [Table 3](#) or [Table 4](#) for parameters)

#### **Special Condition for Safe Use (X):**

1. Replacement of power module, see instructions for final product.

### Canada



**KF** CSA Intrinsically Safe  
Certificate: 2430393  
Standards: CAN/CSA C22.2 No. 0-M91, CSA Std C22.2 No. 157-92  
Markings: Intrinsically Safe Class I, Division 1, Groups A, B, C, and D T3C ( $T_a \leq +70^{\circ}\text{C}$ ) Warning – refer to | QSG 825-0100-4701 for Safe I.S. Use  
(See [Table 3](#) or [Table 4](#) for parameters)

#### **Specific Condition for Safe Use (X):**

1. The power modules are certified as components for use in intrinsically safe products where the suitability/combination of use in the final assembly shall be subjected to CSA acceptance. The final assembly must incorporate all protection features necessary for batteries in accordance

with applicable standards of the final intrinsically safe application.

### Europe

**KF** ATEX Intrinsic Safety  
Certificate: Baseefa11ATEX0042X  
Standards: EN 60079-0: 2012, EN 60079-11: 2012  
Markings:  II 1G Ex ia IIC T4 Ga, T4( $-60^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ )  
 II 1G Ex ia IIC T5 Ga, T5( $-55^{\circ}\text{C} \leq T_a \leq +40^{\circ}\text{C}$ )  
(See [Table 3](#) or [Table 4](#) for parameters)

#### **Special Condition for Safe Use (X):**

1. The plastic enclosure of the Model 701P SmartPower Power Modules may constitute a potential electrostatic ignition risk and caution should be used when being handled.

#### **Note**

This condition of use does not apply after a Power Module is installed within a wireless transmitter enclosure.

### International

**KF** IECEx Intrinsic Safety  
Certificate: IECEx BAS 11.0026X  
Standards: IEC 60079-0: 2011, IEC 60079-11: 2011  
Markings: Ex ia IIC T4/T5 Ga T4( $-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ ),  
T5( $-40^{\circ}\text{C} \leq T_a \leq +40^{\circ}\text{C}$ )

#### **Special Condition for Safe Use (X):**

1. The plastic enclosure of the Model 701P SmartPower Power Modules may constitute a potential electrostatic ignition risk and caution should be used when being handled.

#### **Note**

This condition of use does not apply after a Power Module is installed within a wireless transmitter enclosure.

### Safety parameters

**Table 3. 701PBKKF**

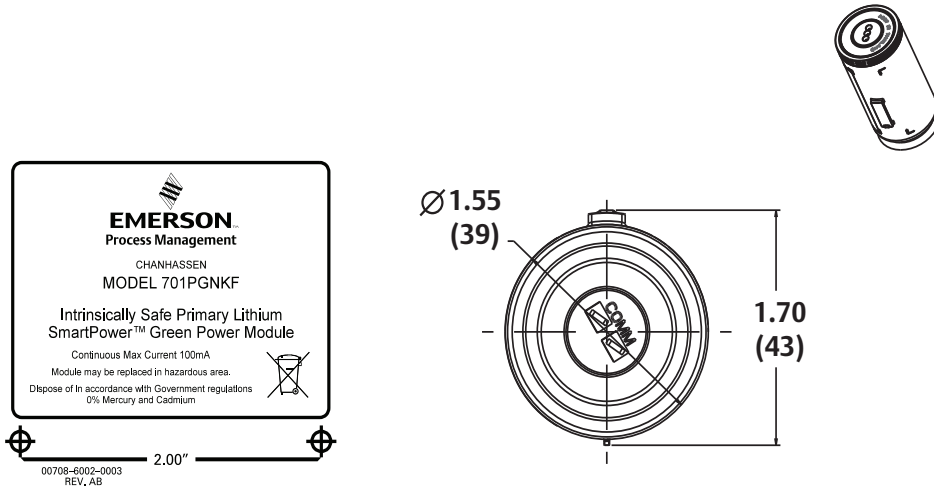
|       |             |
|-------|-------------|
| $U_o$ | 7.8V        |
| $I_o$ | 2.16A       |
| $P_o$ | 0.83W       |
| $C_o$ | 3.0 $\mu$ F |
| $L_o$ | 7.6 $\mu$ H |

**Table 4. 701PGNKF**

|       |             |
|-------|-------------|
| $U_o$ | 3.9 V       |
| $I_o$ | 2.78 A      |
| $P_o$ | 2.71 W      |
| $C_o$ | 100 $\mu$ F |
| $L_o$ | 4.6 $\mu$ H |

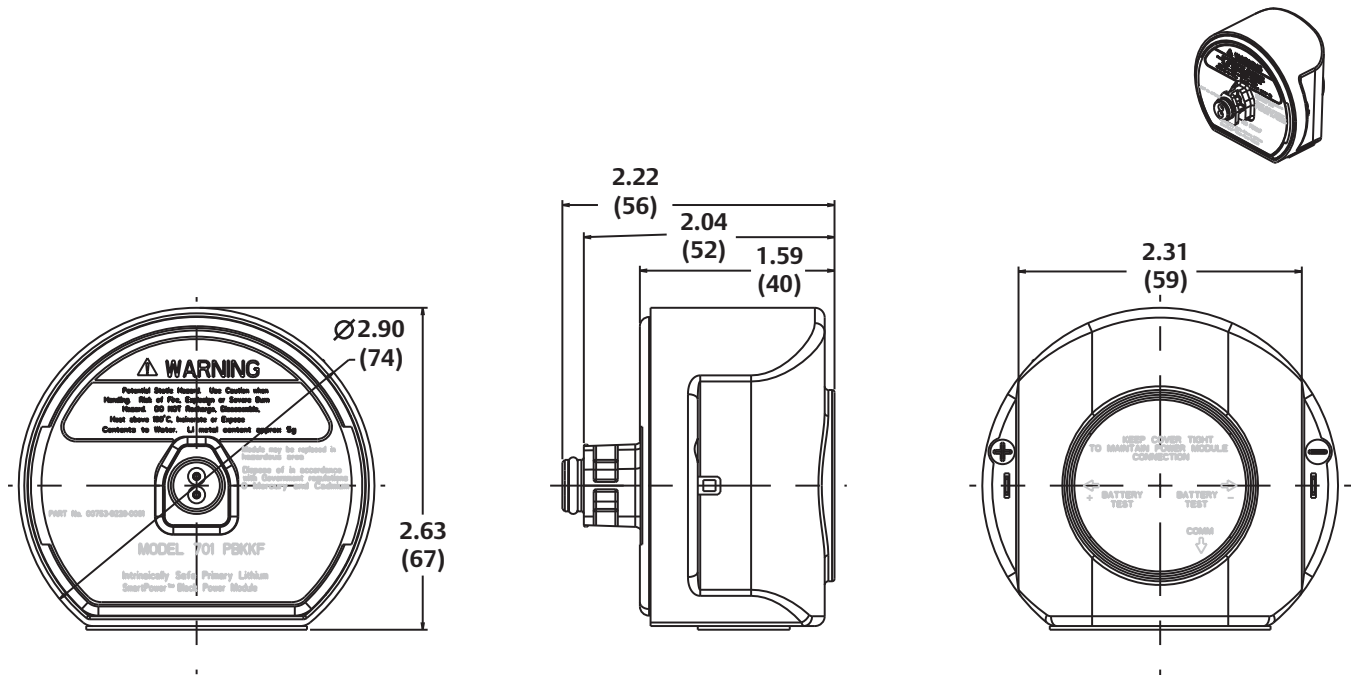
# Dimensional Drawings

Figure 1. 701PGN Green Power Module



Dimensions are in inches (millimeters).

Figure 2. 701PBK Black Power Module



Dimensions are in inches (millimeters).

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