

Emerson A0701PBU

Emerson™ 701P SmartPower™ Module - Blue



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Patents

The product(s) described in this manual are covered under existing and pending patents.

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1 Document scope

Notice

This guide provides basic guidelines for the Blue Power Module (A0701PBU). It does not provide instructions for detailed configuration, diagnostics, maintenance, service, troubleshooting, or installation of wireless devices. Refer to the wireless device's manuals and Quick Start Guides for more instruction.

The Blue Power Module (referred to in this document as Model A0701PBU; Part Number MHM-89004) is an extended life power module, with a broad field of applications. It can be used to provide long-lasting power to many of Emerson's wireless transmitters including models 3051S, 648, 702, 705, 2160, and 9420. Use this guide to install or replace the power module in any of these transmitters—they share the same enclosure, enclosure thread, and power module connection mechanism.

The power module is designed for use in explosive gas atmospheres according to the marking assigned.

Because Emerson's SmartPower power modules are self-contained, there is no need for cables, cable glands, etc. during the installation process. No specific training is required beyond what is outlined in this document. As always, personnel should take care to consider any applicable local, national or international regulations that may apply.

These instructions are intended for qualified personnel with the necessary level of tolerance. Installation should be carried out in accordance with national regulations of electrical installation in hazardous areas, including in accordance with the standards GOST 30852.16-2002 GOST 30852.13-99 GOST IEC 60079.14-2011.

⚠ WARNING

- Explosions could result in death or serious injury.
- Installation of this power module in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review Product Certifications for any restrictions associated with a safe installation.
- Before connecting a Field Communicator in an explosive atmosphere, ensure the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- Electrical shock can result in death or serious injury.
- Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock. The power module may be replaced in a hazardous area.
- The power module has surface resistivity greater than one gigaohm and must be properly installed in the wireless device enclosure. Care must be taken during transportation to and from the point of installation to prevent electrostatic charge build-up. Under certain extreme circumstances, it could be possible to build up an ignition-capable level of electrostatic charge in the enclosure. Therefore, the equipment should not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. This is particularly important if the equipment is installed in a Zone 0 location.

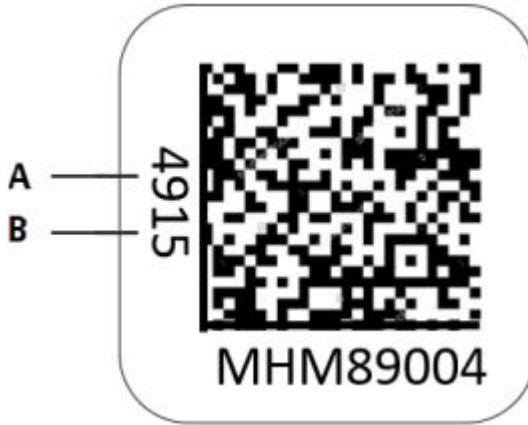
⚠ CAUTION

Each Blue Power Module (A0701PBU) contains two "D" size primary lithium batteries. Primary lithium batteries are regulated in transportation by the U.S. Department of Transportation, and are also covered by IATA (International Air Transport Association), ICAO (International Civil Aviation Organization), and ARD (European Ground Transportation of Dangerous Goods). It is the responsibility of the shipper to ensure compliance with these or any other local requirements. Please consult current regulations and requirements before shipping.

2 Label and date of manufacture

The date of manufacture of a power module is indicated on a white label as shown in [Figure 2-1](#). The example manufacturing date code 4915 represents the date of manufacture is the 49th week of 2015.

Figure 2-1: Blue Power Module (A0701PBU) label manufacturing date code for the 49th week of 2015.



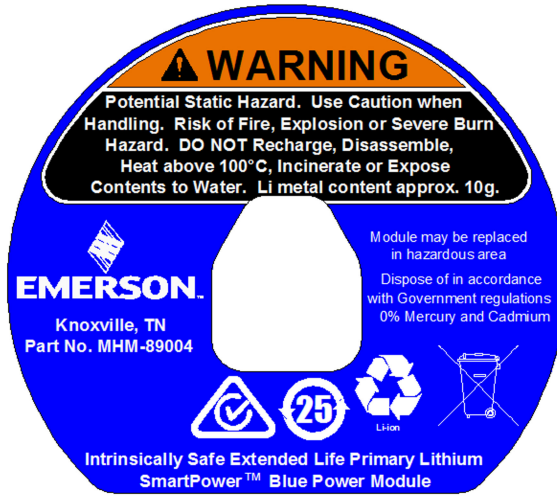
- A. Two digit production week
- B. Two digit production year

The power module has a stated shelf life of 10 years; It will, however, typically continue to function well beyond this date but may exhibit a proportionally reduced operating life. If the time elapse since the manufacture date exceeds the environmental life of the power module (i.e. 25 years), then refer to [Disposal or recycling of depleted power modules](#) for disposal or recycling of the depleted module.

3 Warnings on product labels

The Emerson power modules have a warning printed on them.

The text of the warning is: “WARNING Potential Static Hazard, Use Caution when Handling. Risk of Fire, Explosion or Severe Burn Hazard. DO NOT Recharge, Disassemble, Heat above 100 °C, Incinerate or Expose Contents to Water. Li metal content approx 10g.”



4 Physical installation

The Blue Power Module (A0701PBU) has been designed with safety in mind. The connector is keyed so that it cannot be inserted incorrectly, and it uses a patented mechanism that enables it to be replaced while the transmitter is installed in a hazardous area. The installation procedure includes replacing the power module and extended battery cover.

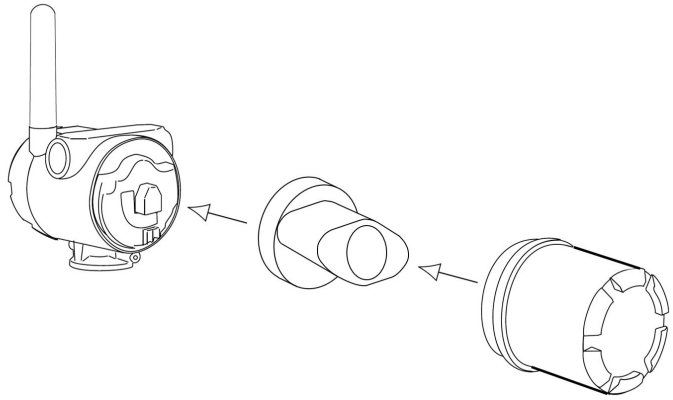
Prerequisites

When replacing a standard Black Power Module with the extended life Blue Power Module, you also need to replace the smaller end cap (2.5 in / 70 mm) with the extended end cap (4.5 in / 115 mm).

Procedure

1. Inspect the power module for any obvious signs of damage.
Emerson's SmartPower Power Modules are designed to be rugged. The product design has been tested in environmental conditions such as extreme temperature, pressure, vibration and shock. In testing, it also was dropped repeatedly from 3m height without leading to an unsafe operating condition.
If there are any obvious signs of damage, do not install the power module. Refer to [Disposal or recycling of depleted power modules](#) for disposal or recycling of the power module.
2. Install the HART™ wireless device according to standard installation practices and the manufacturer's instructions, being sure to use an approved thread sealant on all connections.
3. Unscrew the power module cover from the wireless device.
Normally, no tools are required; however, a strap wrench may be used to unscrew the cover.
4. Connect the power module to the wireless device. The power module has a keyed connection to prevent improper connection.

Figure 4-1: Blue Power Module (A0701PBU) connects using a keyed connection on the wireless device.



Note

Power up wireless devices in order of proximity from the Emerson Wireless Gateway, beginning with the closest. This will result in a simpler and faster network installation.

5. Close the extended end cap on the housing and tighten. Always ensure a proper seal by installing the electronics housing covers so that metal touches metal, but do not over tighten.

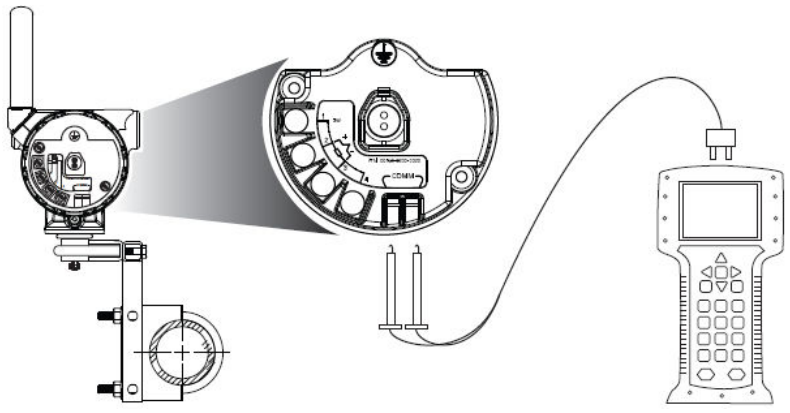
5 Verify Operation

Operation can be verified in four locations: by using the Field Communicator, at the Gateway via the Emerson Wireless Gateway's integrated web server, via AMS Wireless Configurator, or with the wireless device's LCD display.

5.1 Field Communicator

If you are able to communicate to the wireless device via a Field Communicator, the power module is powering the device and working correctly. [Figure 5-1](#) shows how to connect a Field Communicator to a wireless device.

Figure 5-1: Field Communicator Connections



5.2 Emerson Wireless Gateway

If the wireless device was configured with the Network ID and Join Key and sufficient time has passed for network polling, the transmitter will be connected to the network. To verify device operation and connection to the network with the Smart Wireless Gateway's integrated web server, open the Smart Wireless Gateway's integral web interface, and navigate to the Explorer page. If the wireless device has joined the network, the Power Module is functioning properly.

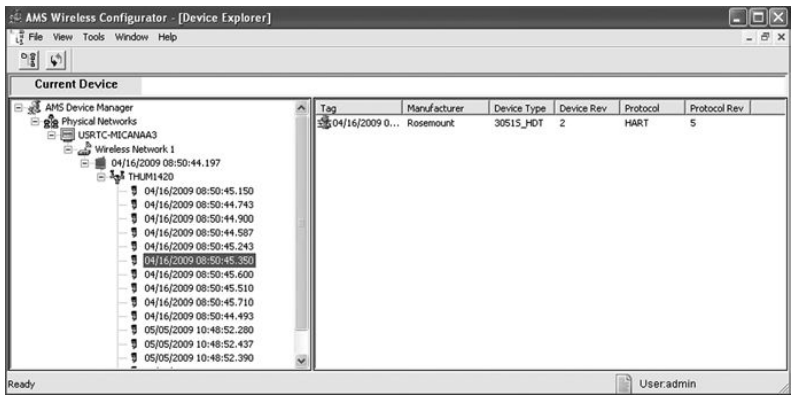
Notice

It may take several minutes for the device to join the network.

5.3 AMS Wireless Configurator

When the device has joined the network, it will appear in the Wireless Configurator as illustrated below in [Figure 5-2](#).

Figure 5-2: AMS Wireless Configurator



5.4 Wireless Device LCD Display

If the wireless device has an LCD display, it can be used to verify operation. When the power module is first connected to the wireless device, the LCD display will turn on for approximately 40 seconds. If the LCD display turns on after the power module is installed, the power module is functioning properly.

5.5 Troubleshooting

If the wireless device does not turn on after the power module is installed, the power module might be depleted. Replace the power module, then see if the wireless device turns on. If not, contact Product Support.

Note

Contact Product Support regarding any issues or concerns with the power module. POWER MODULES SHOULD NOT BE RETURNED TO EMERSON (unless dictated by local laws).

The nominal voltage for a new Blue Power Module (A0701PBU) is 7.2V. The supply voltage as reported by the transmitter should normally read above 7.0V at room temperature upon initial installation. It may, however, report lower values when installed in hotter or colder environments.

Each Emerson transmitter has a unique minimum supply voltage requirement for sustained operation. If the supply voltage drops below its minimum supply voltage, the device will report the operational error by generating the alert message: "CRITICAL_POWER_FAILURE". When this occurs, the power module should be replaced as soon as possible. Refer to [Disposal or recycling of depleted power modules](#) for disposal or recycling of the depleted module.

6 Disposal or recycling of depleted power modules

1. Dispose in accordance with applicable laws and regulations in your country and state.
2. Disposal should only be performed by authorized professionals in accordance with applicable requirements for hazardous waste transportation and disposal.
3. Incineration should only be performed by trained professionals in authorized facilities.

6.1 Shipping regulations

Primary lithium batteries are regulated in transportation by the U.S. Department of Transportation and are also covered by IATA (International Air Transport Association), ICAO (International Civil Aviation Organization), and ARD (European Ground Transportation of Dangerous Goods). It is the responsibility of the shipper to ensure compliance with these or any other local requirements. Please consult current regulations and requirements before shipping.

6.2 Handling considerations

Each blue power module (A0701PBU) contains two “D” size primary lithium batteries. Under normal conditions, the battery materials are self-contained and are not reactive as long as the batteries and the battery pack integrity are maintained. Care should be taken to prevent thermal, electrical, or mechanical damage. Contacts should be protected to prevent premature discharge. Use caution when handling the power module. It may be damaged if dropped onto a hard surface. Battery hazards remain when cells are discharged.

6.3 Environmental considerations

As with any battery, local environmental rules and regulations should be consulted for proper management of spent batteries. If no specific requirements exist, recycling through a qualified recycler is encouraged. Consult the materials safety data sheet for battery specific information.

7 Product certifications

7.1 European directive information

The most recent revision of the EC Declaration of Conformity can be found at www.emerson.com.

7.1.1 ATEX directive (2014/34/EU)

Emerson Process Management complies with the ATEX Directive.

7.1.2 Electro Magnetic Compatibility (EMC) (2014/30/EU)




Emerson Process Management complies with the EMC Directive.

7.2 Ordinary location certification

The transmitter has been examined and tested to determine that the design meets the basic electrical, mechanical, and fire protection requirements.

7.3 Hazardous locations certifications

Table 7-1: Hazardous locations certifications

USA/Canada 	Certificate 70051230
	Marking: AEx/Ex ia IIC T4 Ga, Cl I, Div 1, Cl I, Zone 0 Gr. A,B,C,D
	Ta = -55°C to +85°C
Europe 	Certificate Sira 15ATEX2332X
	Marking: II 1G, Ex ia IIC T4 Ga
	Ta = -55°C to +85°C
International 	Certificate IECEx CSA 15.0045X
	Marking: Ex ia IIC T4 Ga
	Ta = -55°C to +85°C

7.4 Entity Parameters

Table 7-2: Entity Parameters

U _o	7.8 V
I _o	2.16 A
P _o	0.83 W
C _o	3.0 μF

Table 7-2: Entity Parameters (continued)

L_o	9.4 μ H
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Special Condition for Safe Use (X)

The plastic enclosure may constitute a potential electrostatic ignition risk and caution should be used when being handled.

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

Compatibility

The Blue Power Module (A0701PBU) is compatible with most other Emerson wireless transmitters that use a power module. It has been certified intrinsically safe as indicated here; however, always refer to the individual certification requirements for each product to determine whether it is suitable for installation and in which environments.

List of critical failures

Not specified

Special conditions for safe use

Do not operate the unit if there is any damage to housing, cover, or rubber seals.

Special procedure in case of an incident, critical failure or accident

Remove power module from unit, if safe to do so. Report incident to management. Responsible engineer must identify if any further action is required, including contacting the manufacturer.

Special training requirements for personnel

Review operating instructions, certification documentation. Device should be verified as appropriate for installation in the intended environment by the safety officer responsible for the end use location.

Shelf Life

10 years

Note

Shelf life can be maximized by storing the power module in a dry location with an ambient temperature between 60 and 80°F (16 to 26°C).

Storage Temperature

-40 to +185°F (-40 to +85°C)

Service Life

Power module life is mainly a function of the wireless update rate. Faster wireless update rates, as well as acquisition of specialized data such as vibration spectra and waveforms, will decrease power module life. Power module life is further affected by extreme temperature service and wireless network conditions.

8 Declaration of Conformity

EU Declaration of Conformity

In accordance with IEC 17050-1

We:

Manufacturer's Name: Emerson
Manufacturer's Address: 835 Innovation Drive
Knoxville, TN 37932
USA

declare under sole responsibility that the product:

Product Name: Blue Power Module
Model: A0701PBU
Part Number: MHM-89004
Revision Level: 0 and up

to which this declaration relates, is in conformity with the provisions of the European Community Directives, including the latest amendments, as shown in the attached schedule.

Assumption of conformity is based on the application of the harmonized standards and, when applicable or required, a European Community notified body certification, as shown in the attached schedule.



A handwritten signature in black ink, appearing to read 'Joshua Taylor', is written over a horizontal line.

Joshua Taylor
Quality Manager
Knoxville, Tennessee U.S.A.
on 1 November 2019

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EU Declaration of Conformity

In accordance with IEC 17050-1

EMC Directive 2014/30/EU

All Versions

Applicable Standards: IEC 61326-1:2012 (2012 Edition)
EN 61326-1: 2013 (2013 Edition)

Low Voltage Directive 2014/35/EU

All Versions

Applicable Standards: IEC 61010-1:2010 + A1: 2016 (3rd Edition)
EN 61010-1:2010 (2010 Edition)

ATEX Directive 2014/34/EU

Type Examination Certificate Number: Sira 15ATEX2332X & IECEx CSA 15.0045X
Applicable Standards: EN 60079-0:2012/A11:2013
EN 60079-11:2012

Marking appears as follows:

CE 2813  II 1 G

Ex ia IIC T4 Ga -55°C to +85°C

Ex ia IIC T4 Ga -55°C ≤ Ta ≤ +85°C

Output Parameters:

U_o = 7.8V

P_o = 0.83W

I_o = 2.16A

Co = 3.0μF

Lo = 9.4μH

Special Condition for Safe Use

Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore, the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces, this is particularly important if the equipment is installed in a zone 0 location. Use caution when replacing the battery pack.

ATEX Notified Body for EC Type Examination Certificate

Number Sira 15ATEX2332X
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Notified Body for Quality System

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