

# General Specifications

Model BA11  
Active Junction Box



## General

The BA11 Active Junction Box is designed for a wide range of industrial environments and is tested against the latest standards. The model BA11 Active Junction Box has the ability to connect multiple Yokogawa SA11 smart adapters, acting as slave devices, to a host system using one trunk connection, resulting in a cost-effective solution.

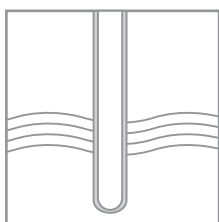
The BA11 Active Junction Box automatically senses a (dis) connected smart adapter, and as a result, switches the 120 Ω line termination for keeping the RS-485 communication balanced. This way, a plug and play solution is provided without the need for manually placed terminating resistors.



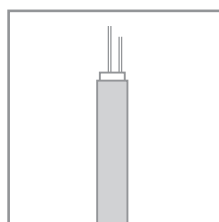
## Features

- Auto balancing of RS-485 digital bus
- Star topology for connecting multiple (maximum 4) Yokogawa smart adapters.
- Indoor- and outdoor application
- Application in industrial environments
- Wall- and pipe mounting options
- NEMA 4X protection (only in combination with option /UM)
- General purpose and Non-Incendive version

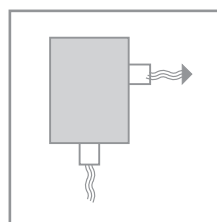
## System configuration



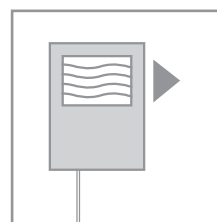
Sensors



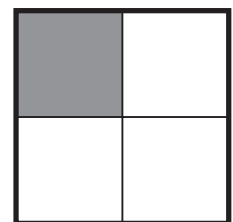
Cables



Fittings



Transmitters



Accessories

## General specifications

### 1. Basic

Architecture : An epoxy coated aluminium die cast housing provided with connection system for host system and Yokogawa smart adapters. Interconnection cables to be used are model WU11 connection/extension cable, which can be provided in different length up to maximum 100 meter (328ft). The housing can be mounted on a wall, pipe or at the backside of a FLXA402 analyzer using the optional universal mounting set (see section 8).

### 2. Electrical

#### Power supply

Operating\* : +2.7 VDC to +5.5 VDC / 30mW avg.  
Input/Output : Bi-directional digital communication (RS485) with auto balancing of bus termination (120Ω).

**Note:** Total power consumption depends on number of Field Devices and the amount of Modbus registers read from individual Field Device in time

### 3. Mechanical and others

#### Housing

Material : Aluminum die cast with epoxy coating  
Size (LxWxH) : 154 x 64 x 34 mm (5.9x2.5x1.3")  
Color : Grey (RAL 7001)  
IP classification : IP66 (acc. ANSI/IEC 60529:2004; C22.2 No. 60529:2016)  
NEMA classification : Type 4X (acc. NEMA 250:2014; ANSI/UL 50E:2015)  
Sealing : Neoprene  
Applicable torque : on cover screw (to meet IP66)  
Min. 1.1 Nm - Max. 2.5 Nm

**Connectors** : 5-pins male connector (BUS IN) for connection to host system and 5-pins female connectors (J1 ~ J4) for connection to smart adapters. The 5-pins female connector (BUS OUT) is for serial connection of BA11 devices.

Material : Nickel-plated brass  
Insulation : Polybutylene terephthalate (PBT)  
Contacts : Gold-plated  
Sealing : Male connector: EPDM; Female connector: NBR, EPDM  
Applicable torque : on BA11 connector screws and protection caps (to meet IP66) 0.25 Nm

For connection method and maximum allowed cable length in a Class I, DIV 2 location, then refer to the enclosed Control Drawing D&E 2019-012-A60.

**Labeling** : Ink printing combined with adhesive metallized stickers.

**Weight** : Approximately: 350 gr.

#### Ambient operating conditions

Temperature : -20°C to +55°C (-5°F to +130°F)  
Humidity : 93% at +40°C (+100°F), non-condensing

#### Storage conditions

Temperature : -30°C to +70°C (-20°F to +160°F)

## 4. Regulatory standards

### Non-Incendive

#### FM-United States

Non-Incendive for Class I, Division 2, Groups A, B, C & D Hazardous (Classified) Location, Indoors/Outdoors with a Temperature code T6/T5/T4 for  $-20^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$  when connected in accordance with Control Drawing D&E 2019-012-A60.  
By applying:  
: FM3600: 2018 Electrical Equipment for Use in Hazardous (Classified) Locations, General Requirements  
: FM3611: 2018 Non-Incendive Electrical Equipment for Use in Class I and II, Division 2, and Class III, Divisions 1 and 2, Hazardous (Classified) Locations  
: FM3810: 2018 Electrical and Electronic Test, Measuring and Process Control Equipment  
: UL 121201: 2017 Non-Incendive Electrical Equipment for Use in Class I and II, Division 2, and Class III, Divisions 1 and 2, Hazardous (Classified) Locations  
: ANSI/ISA 61010.1: 2012 Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements  
Certificate no.: FM19US0166X. For Specific conditions of Use refer to section 5.

#### FM-Canada

Non-Incendive for Class I, Division 2, Groups A, B, C & D Hazardous (Classified) Location, Indoors/Outdoors with a Temperature code T6/T5/T4 for  $-20^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$  when connected in accordance with Control Drawing D&E 2019-012-A60.  
By applying:  
: CSA-C22.2 No. 0.4: R2013 Bonding of Electrical Equipment  
: CSA-C22.2 No. 213: 2017 Non-Incendive Electrical Equipment for Use in Class I, Division 2, Hazardous Locations  
: C 22.2 No. 61010.1: 2012 Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements  
: C22.2 No. 94.2: 2015 Enclosures for Electrical Equipment, Environmental Considerations  
Certificate no.: FM19CA0089X. For Specific conditions of Use refer to section 5

<b>CE</b> (768/2008/EC)	By applying: - EN-ISO 9001: 2008.
<b>• EMC Directive</b> (2014/30/EU)	By applying: - IEC 61326-1:2012 Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements. Emission: Class B, control and laboratory use. Immunity: For use in industrial locations. - EN 61326-1:2013 Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements. Emission: Class B, control and laboratory use. Immunity: For use in industrial locations. - CISPR 11:2015 Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics Limits and methods of measurement. Emission: Radiated emission up to 1 GHz (SAC). - EN 55011:2016 + A1:2017 Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics Limits and methods of measurement. Emission: Radiated emission up to 1 GHz (SAC).
<b>• LVD Directive</b> (2014/35/EU)	By applying: - IEC/EN 61010-1:2010 Safety requirements for electrical equipment for measurement, control and laboratory use. - IEC 61010-2-030:2017 Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-030: Particular requirements for testing and measuring circuits. - EN 61010-2-030:2010 Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-030: Particular requirements for testing and measuring circuits. - IEC 60529:1989 + A1:1999 + A2:2013 Degrees of protection provided by enclosures (IP Code). - EN 60529:1991 + A1:2000 + A2:2013 Degrees of protection provided by enclosures (IP Code).
<b>• RoHS 2 Directive</b> (2011/65/EU)	By applying: -EN 50581:2012 and IEC 50581:2012 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
<b>Compliance</b>	- AS/NZS CISPR 11 - KC Registration of broadcasting and communication equipment KCC-R-R-YPA-BA11

## Recommendations and guidelines

<b>NAMUR</b>	Precompliance checked by applying: - NAMUR NE21: 2017 Electromagnetic compatibility (EMC) of industrial process and laboratory.
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## 5. Specific Conditions of Use

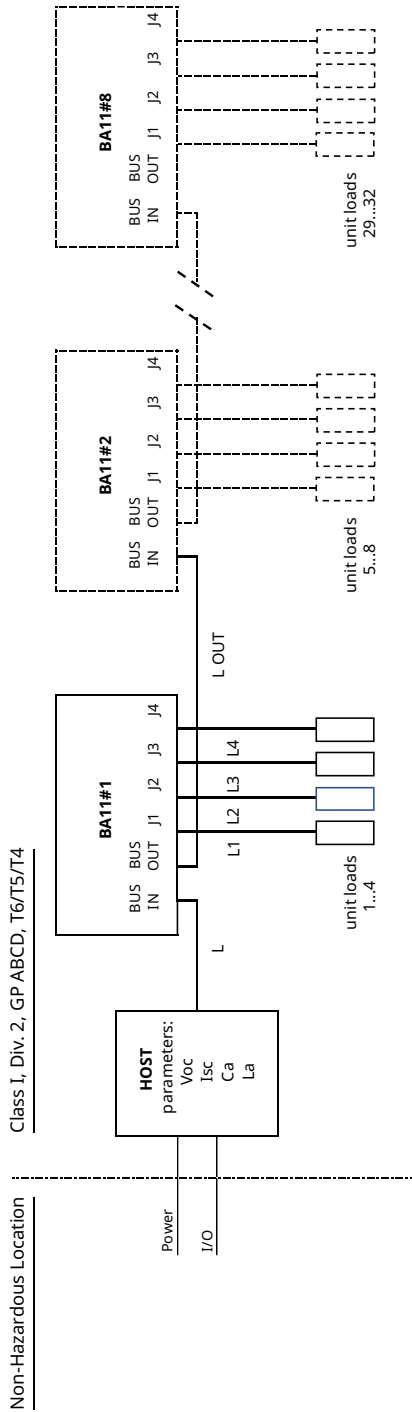
If the BA11 product is not installed using Non-Incendive Field Wiring, then the BA11 product shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application, including a tool removable cover. To maintain the IP66 rating, the BA11 product shall be installed using the WU11 cables or the original connector caps supplied with the BA11 product.

To maintain the Type 4X rating, the BA11 product shall be installed using the WU11 cables or the original connector caps supplied with the BA11 product, and the BA11 product shall be installed using the tool secured, NEMA 4X identified mounting bracket which is part of option UM.

## 6. Model & Suffix Codes

Model Code	Suffix Code	Option Code	Description
BA11			Active Junction Box
Material	-C		Aluminium alloy, epoxy coating
Type	-AA -DD		General purpose NI (Non-Incendive) for FM-United States/FM-Canada
Conn. type	-M9		M9 male/female connectors, 5p
Options		/UM	Universal mounting set

7. Control Drawing D&E 2019-012-A60



NFW Parameters BA11	
Vmax	5.5 V
I <sub>max</sub>	517 mA
Ci	1.42µF
Li	0 mH

Specified Voc of the HOST shall not exceed the Vmax of the BA11 or the Vmax of any of the unit loads  
 Specified Isc of the HOST shall not exceed the I<sub>max</sub> of the BA11 or the I<sub>max</sub> of any of the unit loads  
 Sum of Ci values for all BA11s and all unit loads connected, plus the sum of all associated cable capacitance shall not exceed the specified Ca value of the HOST  
 Sum of Li values for all BA11s and all unit loads connected, plus the sum of all associated cable inductance shall not exceed the specified La value of the HOST

Sum of L IN, L OUT, L1, L2, L3, L4 ≤ 250 mtr. All cables must be type WU11 (Cable = 0.2 nF/mtr., Lcable = 0.1 µH/mtr.)

**Notes:**

- 1) No revision to this drawing without prior approval of FM.
- 2) Installation must be in accordance with the National Electrical Code (ANSI/NFPA 70; CSA C22.1) and relevant local codes.
- 3) WARNING - EXPLOSION HAZARD. DO NOT OPEN WHILE THE EQUIPMENT IS ENERGIZED OR WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT.  
 AVERTISSEMENT - RISQUE D'EXPLOSION. NE PAS OUVRIR LORSQUE L'EQUIPEMENT EST SOUS TENSION OU EN PRESENCE D'UNE ATMOSPHERE EXPLOSIVE
- 4) WARNING - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR DIVISION 2.  
 AVERTISSEMENT - LA SUBSTITUTION DE COMPOSANTS PEUT NUIRE A L'APTITUDE A LA DIVISION 2.
- 5) Cable connectors must be fully engaged using the positioning notch and mechanical retension.
- 6) The BA11 connectors and protection caps must be secured with a torque of 0.25 Nm. The lid screws must be secured with a torque of 1.1 Nm.
- 7) Some equipment identifies interconnection parameters using terminology associated with the Zone classification scheme. In such case, note that the following terms are equivalent:

HOST parameters	
Terminology	Zone scheme:
Voc	Uo
Isc	Io
Ca	Co
La	Lo

BA11 / unit load parameters	
Terminology	Zone scheme:
Vmax	Ui
I <sub>max</sub>	Ii
Ci	Ci
Li	Li

### 8. Dimensions and Mounting

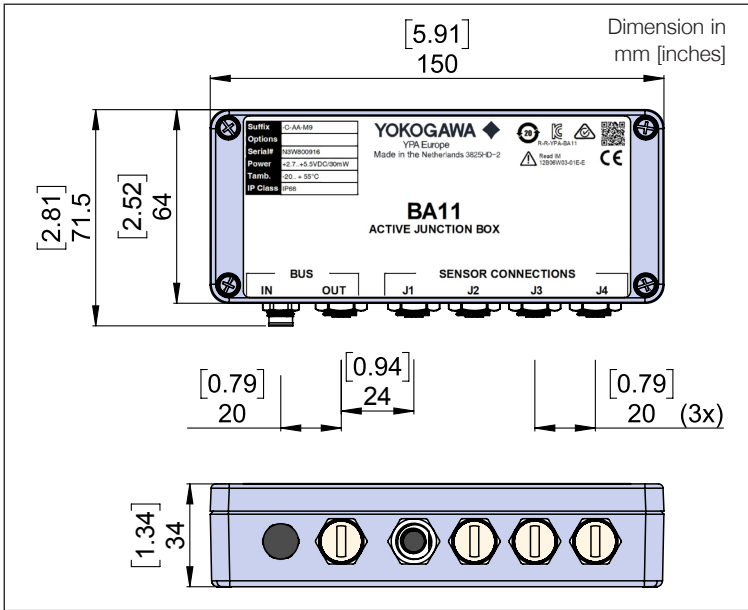


Figure 1. Dimensions BA11 Active Junction Box

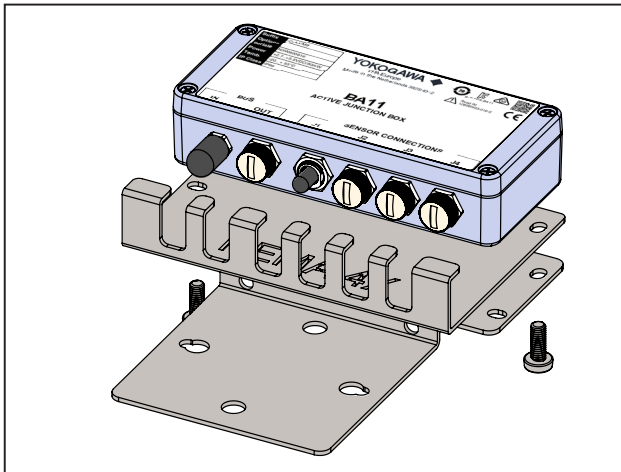


Figure 2. BA11 with /UM (NEMA 4X bracket included)

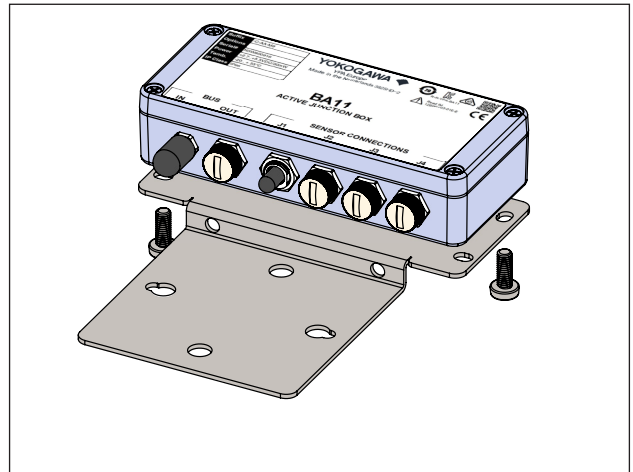


Figure 3. BA11 with /UM (NEMA 4X bracket excluded)

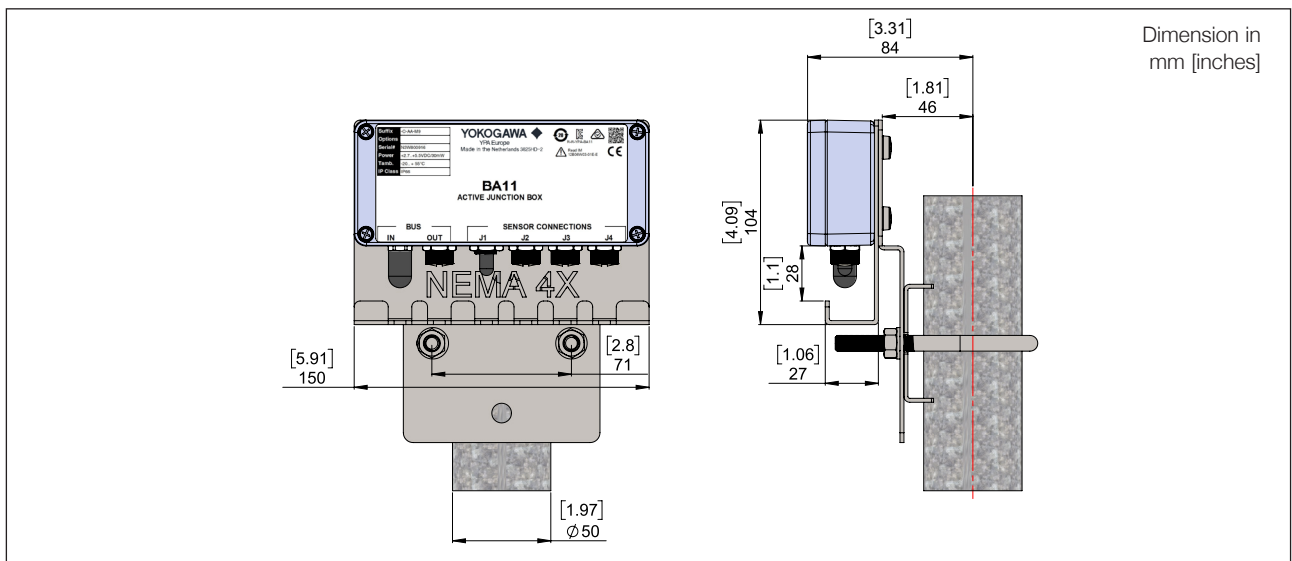


Figure 4. Pipe mounting

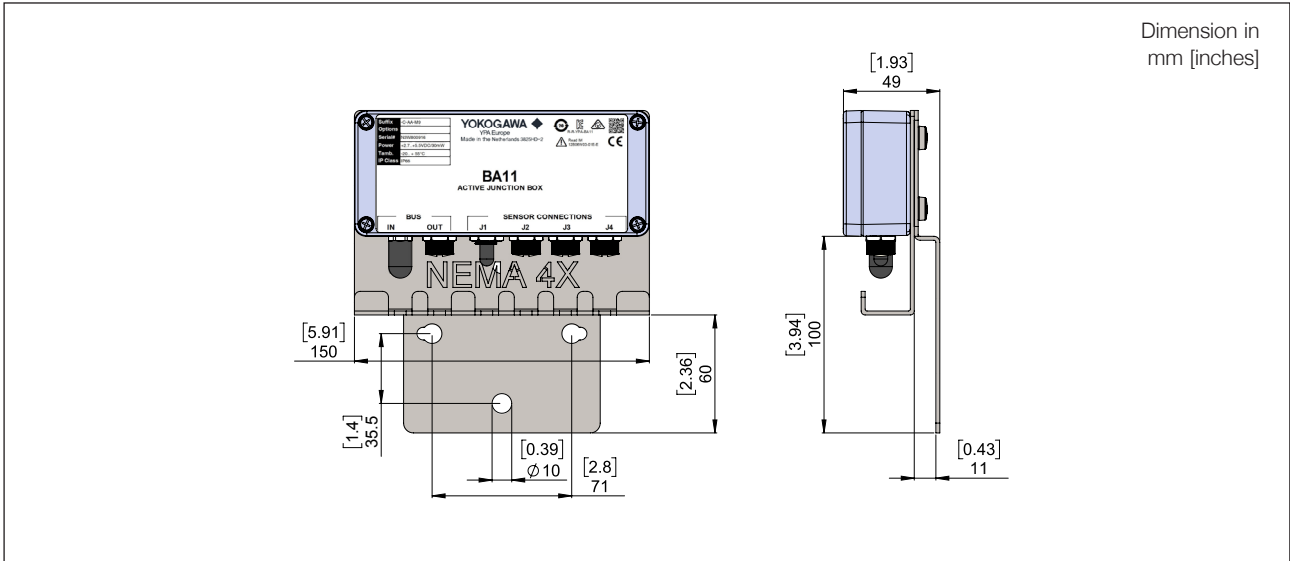


Figure 5. Wall mounting

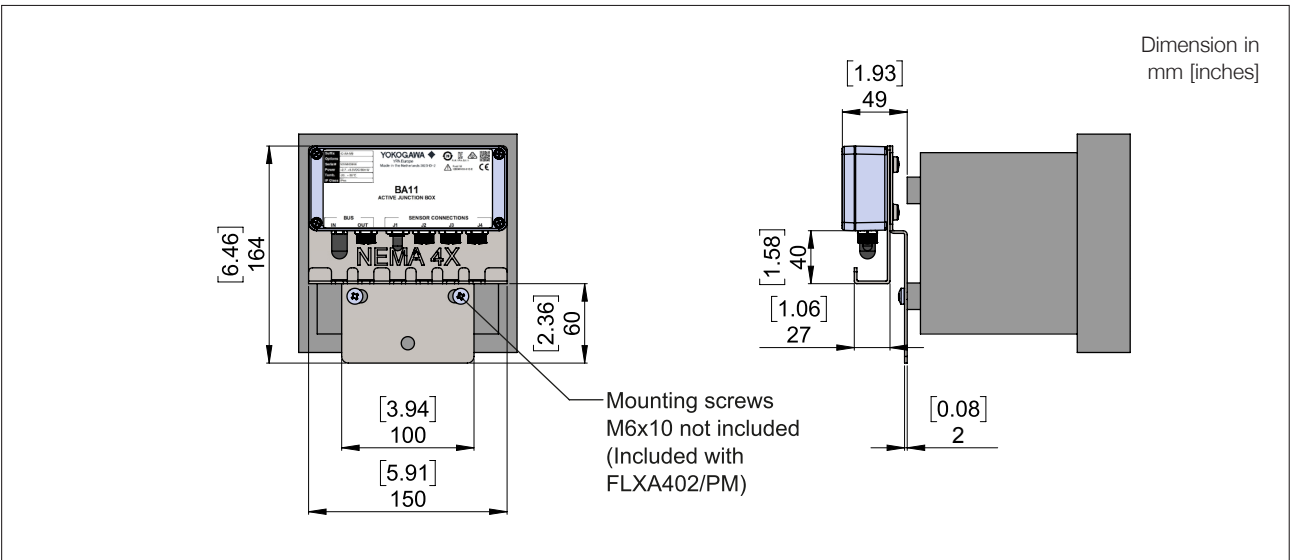



Figure 6. Mounting at backside of FLXA402 analyzer

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