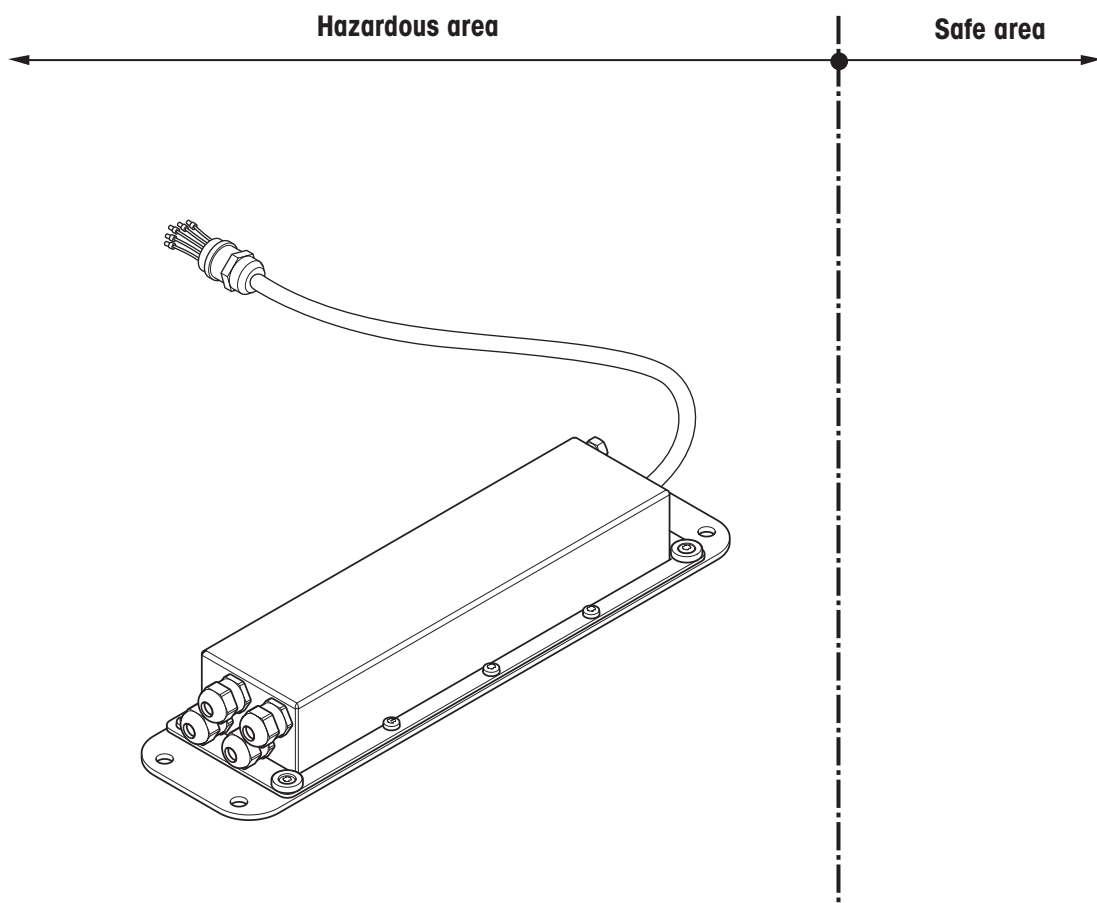


AJB579x-a / AJB579xx-a

Junction Box



METTLER TOLEDO

METTLER TOLEDO Service

Congratulations on choosing the quality and precision of METTLER TOLEDO. Proper use of your new equipment according to this Manual and regular calibration and maintenance by our factory-trained service team ensures dependable and accurate operation, protecting your investment. Contact us about a service agreement tailored to your needs and budget. Further information is available at www.mt.com/service.

There are several important ways to ensure you maximize the performance of your investment:

- 1 **Register your product:** We invite you to register your product at www.mt.com/productregistration so we can contact you about enhancements, updates and important notifications concerning your product.
- 2 **Contact METTLER TOLEDO for service:** The value of a measurement is proportional to its accuracy – an out of specification scale can diminish quality, reduce profits and increase liability. Timely service from METTLER TOLEDO will ensure accuracy and optimize uptime and equipment life.
 - ⇒ **Installation, Configuration, Integration and Training:** Our service representatives are factory-trained weighing equipment experts. We make certain that your weighing equipment is ready for production in a cost effective and timely fashion and that personnel are trained for success.
 - ⇒ **Initial Calibration Documentation:** The installation environment and application requirements are unique for every industrial scale so performance must be tested and certified. Our calibration services and certificates document accuracy to ensure production quality and provide a quality system record of performance.
 - ⇒ **Periodic Calibration Maintenance:** A Calibration Service Agreement provides on-going confidence in your weighing process and documentation of compliance with requirements. We offer a variety of service plans that are scheduled to meet your needs and designed to fit your budget.

Table of Contents

1	Safety precautions	3
2	System overview	5
2.1	Using the Junction Box.....	5
2.2	Typical configuration.....	5
2.2.1	AJB579x-a Junction Box in Category 2.....	5
2.2.2	AJB579xx-a Junction Box in Category 3.....	6
3	Installation	7
3.1	Checking entity parameters for ib (AJB579x-a) and ic (AJB579xx-a).....	7
3.2	Setting up the Junction Box.....	7
3.2.1	Preparing the Junction Box.....	7
3.2.2	Connecting strain gauge weighing cells.....	7
3.2.3	Closing the housing of the Junction Box.....	9
3.2.4	Connecting the Junction Box to the weighing terminal.....	9
3.3	Equipotential bonding.....	10
4	Configuration and adjustment	11
4.1	Configuration of the weighing system.....	11
4.2	Corner adjustment.....	11
5	Cleaning	13
6	Technical data and accessories	14
6.1	General technical data.....	14
6.2	Dimensional drawing.....	14
6.3	AJB579x-a: Accessories.....	15
7	Disposal	16
8	Servicing	17
8.1	Spare parts.....	17
8.2	Maintenance.....	18
8.3	Replacing the Junction PCB.....	18
8.4	Replacing the connection cable to the weighing terminal.....	19
8.4.1	AJB579x-a: Making a new connection cable.....	19
8.4.2	Installing a new connection cable.....	20

1 Safety precautions

General

The **AJB579x-a** Junction Box is suitable for use in **Zone 1 and Zone 21** hazardous areas.

The **AJB579xx-a** Junction Box is suitable for use in **Zone 2 and Zone 22** hazardous areas.

Particular care is required when using weighing systems with the Junction Box in hazardous areas. The code of practice is oriented to the "Safe Distribution" concept drawn up by METTLER TOLEDO.

Competence

- The Junction Box may only be installed, maintained and repaired by authorized METTLER TOLEDO service personnel.

Ex approval

- No modifications may be made to the Junction Box and no repair work may be performed on the modules. Any weighing cells or system modules that are used must comply with the specifications contained in this manual. Non-compliant equipment jeopardizes the safety of the system, cancels the "Ex" approval and renders any warranty or product liability claims null and void.
- The safety of the weighing system is only guaranteed when the weighing system is operated, installed and maintained in accordance with the respective instructions.
- Also comply with the following:
 - the instructions for the system modules and weighing cells,
 - the regulations and standards in the respective country,
 - the statutory requirement for electrical equipment installed in hazardous areas in the respective country,
 - all instructions related to safety issued by the owner.
- The explosion-protected weighing system must be checked to ensure compliance with the requirements for safety before being put into service for the first time, following any service work and every 3 years, at least.

Operation

- Prevent the build-up of static electricity.
- Only use the Junction Box when electrostatic processes leading to propagating brush discharges are impossible.
- Always wear suitable working clothes when operating or performing service work in a hazardous area.
- Do not use protective coverings for the devices.
- Avoid damage to the system components.
- If danger occurs, immediately put the system out of operation.
- Immediately replace damaged system components.

Installation / maintenance

- Only install or perform maintenance work on the weighing system in the hazardous areas if the following conditions are fulfilled:
 - The intrinsically safe characteristic values and zone approval of the individual components are in accord with one another.
 - The type of protection and the temperature range of the Junction Box and the specifications of the weighing terminal and weighing cells connected must correspond.
 - The owner has issued a permit ("Spark permit" or "Fire permit").
 - The area has been rendered safe and the owner's safety co-ordinator has confirmed that there is no danger.
 - The necessary tools and any required protective clothing are provided (danger of the build-up of static electricity).
- The certification papers (certificates, manufacturer's declarations) must be present.
- Do not separate when energized.
- Lay cabling securely so that it does not move and effectively protect it against damage.
Bending radius > 5 x cable diameter.
- Only route cables into the housing of the system modules via the suitable cable gland and ensure proper seating of the seals. Always consider the recommended tightening torque for cable glands.
- Connection cables and cable glands must be protected in a manner to avoid electrostatic charging processes in category 2D resp. 3D atmospheres.
- Protect the cable glands of the connection cable against the impact of dropping goods.
- Ensure that the compression cup nut is fixed properly. Do not exceed the maximum torque values for the compression cup nut and the lock nut specified by METTLER TOLEDO or by the manufacturer of the cable gland.
- Provide an appropriate strain-relief.
- Do not cut through cables.
- Perform installation and maintenance at ambient temperature.

2 System overview

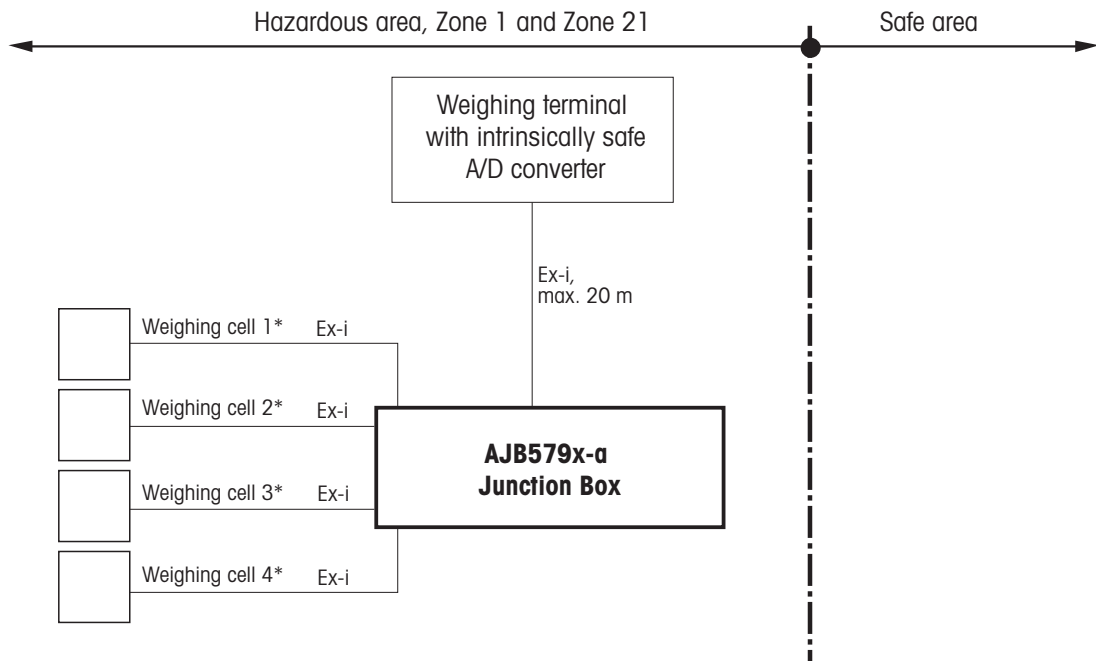
2.1 Using the Junction Box

The Junction Box adds up the analog voltage signals of the individual weighing cells.

With the Junction Box it is possible to construct special scales, e.g. container scales consisting of several strain gauge weighing cells with a container placed on top.

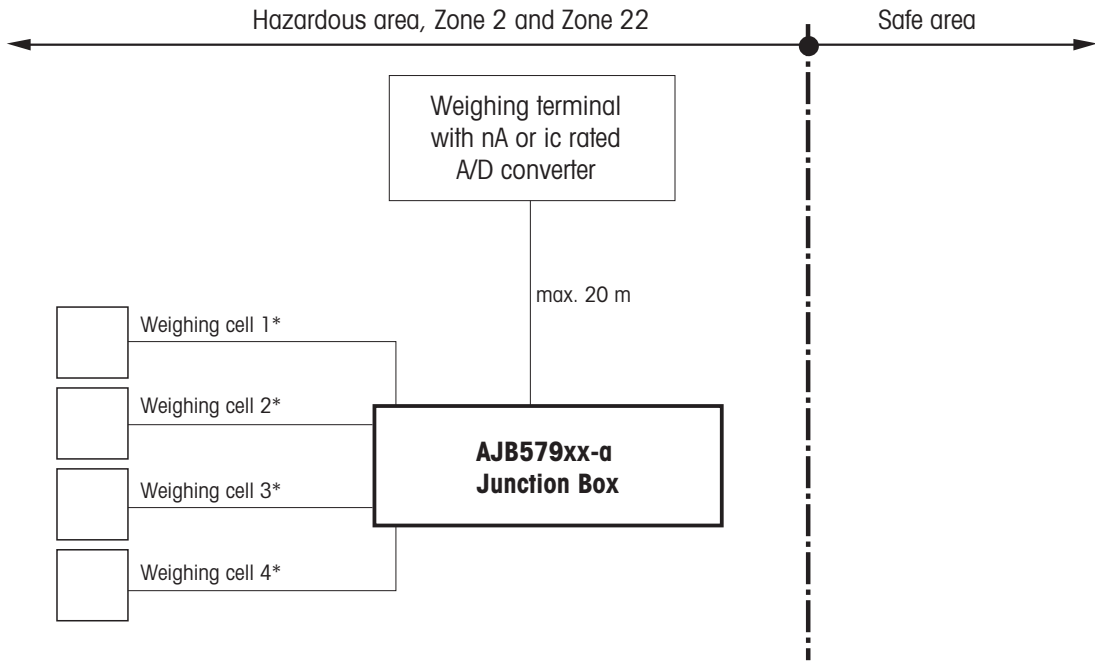
2.2 Typical configuration

2.2.1 AJB579x-a Junction Box in Category 2



- * Weighing cells must be approved for the hazardous area.
The intrinsically safe characteristic values must be in accord with those of the A/D converter of the weighing terminal.

2.2.2 AJB579xx-a Junction Box in Category 3



* Weighing cells must be approved for the hazardous area. Before installation verify that the type of protection matches the one of the AJB579xx-a Junction Box.

3 Installation

3.1 Checking entity parameters for ib (AJB579x-a) and ic (AJB579xx-a)



CAUTION

Explosion hazard

- Before connecting the Junction Box to the A/D converter of the weighing terminal:
 - ⇒ Make sure to fulfill the conditions below.
 - ⇒ When calculating the inductivities and capacitances, make sure to take into account the weighing cell cable and connection cable of the Junction Box.

- Check the conditions below based on the certification papers of the following components:
 - ⇒ AJB579x-a resp. AJB579xx-a Junction Box
 - ⇒ Weighing cells
 - ⇒ A/D converter of the weighing terminal

$$U_{i, \text{cell}} > U_{o, \text{A/D converter}}$$

$$I_{i, \text{cell}} > I_{o, \text{A/D converter}}$$

$$P_{i, \text{cell}} > P_{o, \text{A/D converter}}$$

$$n \times C_{i, \text{cell}} + C_{\text{cable}} < C_{o, \text{A/D converter}}$$

(n = number of connected cells)

$$L_{i, \text{cell}} + L_{\text{cable}} < L_{o, \text{A/D converter}}$$

$$U_{i \text{ max, AJB579x-a}} > U_{o, \text{A/D converter}}$$

$$I_{i \text{ max, AJB579x-a}} > I_{o, \text{A/D converter}}$$

$$P_{i \text{ max, AJB579x-a}} > P_{o, \text{A/D converter}}$$

3.2 Setting up the Junction Box

3.2.1 Preparing the Junction Box

- 1 Open the cover of the Junction Box by loosening the 10 screws.
- 2 Remove blind plugs for connection of the weighing cell cables.

3.2.2 Connecting strain gauge weighing cells



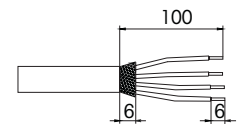
CAUTION

Explosion hazard

- Weighing cell cables may not be shortened!

Preparing weighing cell cable

- 1 Strip cable end approx. 100 mm.
- 2 Shorten cable shielding to 6 mm.
- 3 Strip the wire ends approx. 6 mm and twist them.
- 4 Push on the wire end ferrules and press them on firmly with a pair of crimping pliers.



Attaching the M12 cable gland to the weighing cell cable

Measures for shielding against incoming and outgoing interference are especially important with longer cell cables. The maximum interference immunity classes will only be achieved with careful and proper installation and wiring of all connected peripherals and weighing platforms.

For this purpose, it is extremely important to connect the shielding on both sides in a professional manner.

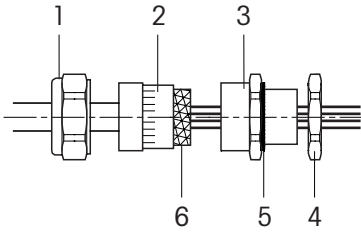
The CE conformity of the entire system is the responsibility of the person commissioning the device.



CAUTION

Explosion hazard

- 1 Only use cable glands that are suitable and approved for hazardous areas to introduce the load cell cable!
- 2 The technical specifications of the cable gland must address the outer cable diameter of the weighing cell connected.

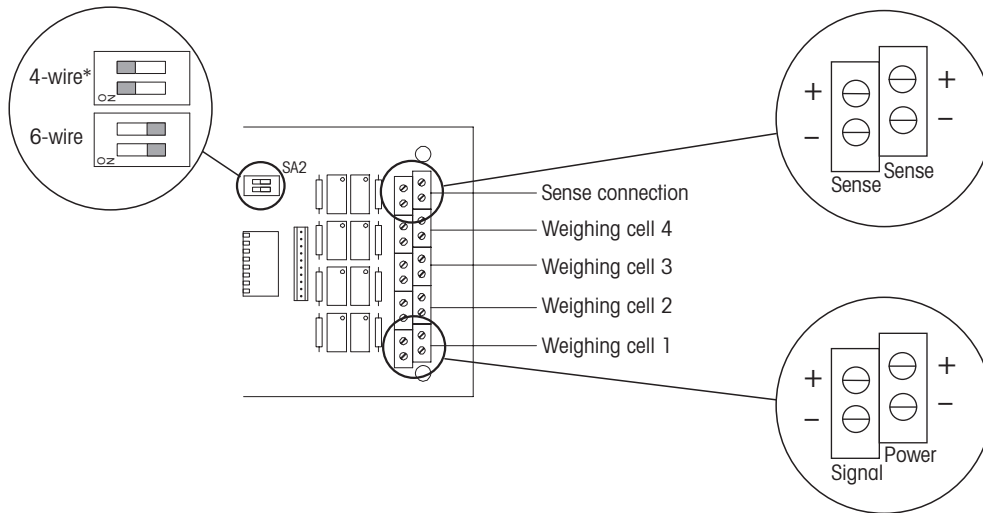


- | | | | |
|---|---------------------|---|-------------|
| 1 | Compression cup nut | 2 | Molded seal |
| 3 | Metal housing | 4 | Lock nut |
| 5 | Seal | 6 | Shield |

- 1 Slide the compression cup nut (1) and molded seal (2) over the prepared cable.
- 2 Place the cable shielding (6) over the contact.
- 3 Screw in the metal housing (3) with the compression cup nut (1).
- 4 Use a torque wrench to secure the compression cup nut with a tightening torque of 2.0 Nm. Please observe as well the recommendations of the cable gland manufacturer, if a 3rd party cable resp. cable gland is used.

Connecting weighing cell cables to the Junction Box

- 1 Insert the prepared cable in the housing of the Junction Box.
- 2 Screw the cable to the housing of the Junction Box. When doing so, ensure proper seating of the seal.
- 3 Use a torque wrench to secure the counter nut with a tightening torque of 2.0 Nm. Please observe as well the recommendations of the cable gland manufacturer, if a 3rd party cable resp. cable gland is used.
- 4 Identify the weighing cells (1 to 4).
- 5 Connect the weighing cell cables to the Junction Box as shown below.
For 6-wire weighing cells with a Sense connection, lead the Sense connections from each of two weighing cells to one terminal.
- 6 Make sure that the two dip switches SA2 are set correctly (4-wire or 6-wire weighing cells).



* factory setting: 4-wire
 ON = closed
 OFF = open

3.2.3 Closing the housing of the Junction Box



NOTICE

Tightening torque of the 10 housing screws: 2.7 Nm.

- 1 Close the cover of the Junction Box. When doing so, ensure the correct position of the cover seal.
- 2 Tighten the 10 screws crosswise.
- 3 Start with a low torque of 30 % of the maximum torque, i.e. 0.8 Nm for all 10 screws.
- 4 Increase torque to 60 % of the maximum torque, i.e. 1.6 Nm for all 10 screws.
- 5 Finally tighten all 10 screws with 2.7 Nm.

3.2.4 Connecting the Junction Box to the weighing terminal

- 1 Lay the connection cable to the weighing terminal and pull it into the housing.
- 2 Screw the cable to the housing. When doing so, ensure proper seating of the seal.
- 3 Connect wires, see terminal diagram of the weighing terminal.

Color (AJB579x-a connection cable)	Color (AJB579xx-a connection cable)	Signal
grey	grey	EXC+
yellow	yellow	SEN+
white	white	SIG+
brown	brown	SIG-
green	green	SEN-
pink	blue	EXC-

Default settings

3.3 Equipotential bonding



NOTICE

- Equipotential bonding must be installed by an electrician authorized by the owner. The METTLER TOLEDO Service only has a monitoring and consulting function here.

- Connect the equipotential bonding (EB) of all devices (power supply unit, weighing terminal and Junction Box in accordance with the terminal diagram and the country-specific regulations and standards. In the process, the following must be ensured:
 - All device housings are connected starlike to the same potential via the EB terminals.
 - No circulating current flows via the cable shielding for intrinsically safe circuits.
 - Min. cross section: 4 mm².

4 Configuration and adjustment

4.1 Configuration of the weighing system

The configuration of the weighing system occurs via the service mode / ASM of the connected weighing terminal.

- For configuring, see the service manual of the connected weighing terminal.

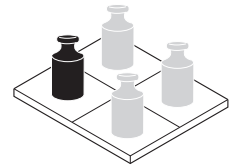
4.2 Corner adjustment

Corner adjustment must be performed after configuration and calibration of the weighing system.

Checking cornerload

In the following, checking of a multi-sensor weighing platform with four weighing cells is described.

- 1 Place the test weight (1/3 of the maximum load) in the centre of the load plate and tare.
 - 2 Load the test weight in succession in the middle of each of the four quadrants and note the absolute value with sign.
- ⇒ Adjustment is required for deviations greater than the permissible verification error limit.

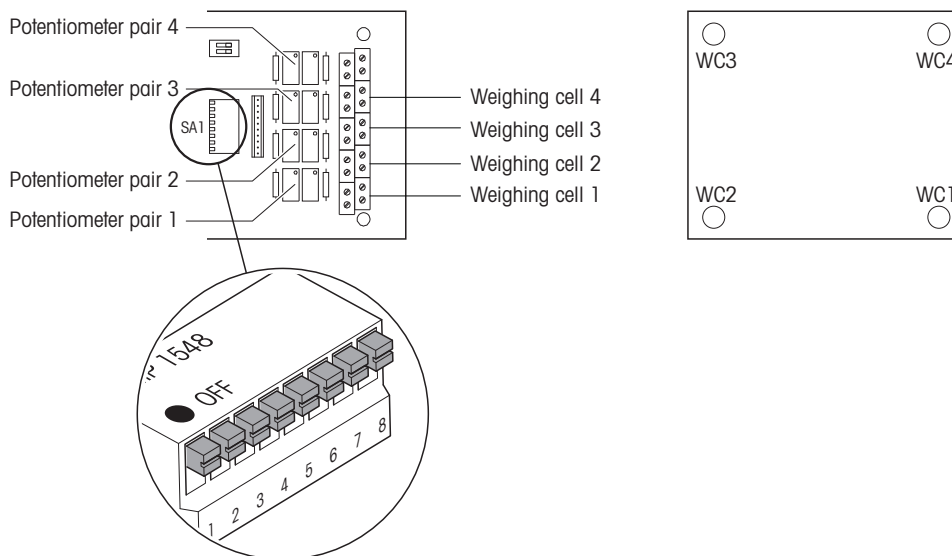


Adjusting corners

Note

Recommended Service Tool: 00 507 660 Service Adjustment Box. The corresponding Adjustment Software is available on DSM.

The adjustment of weighing cell 1 occurs at the potentiometer pair 1, weighing cell 2 at potentiometer pair 2 etc.



- 1 In the service mode / ASM of the connected weighing terminal set the highest readability for test purposes for improved checking of changes resulting during adjustment.
- 2 Create access to the Junction Box, see [Preparing the Junction Box ▶ Page 7].
- 3 Set all dip switches SA1 to OFF.
- 4 Move all the potentiometers to the middle position.
To this purpose turn the potentiometer to the left-hand stop until it clicks audibly and turn it subsequently 10 rotations to the right.
- 5 Place the test weight on each corner and note the measured values.
- 6 If at least one corner is out of the limit, continue with step 7, otherwise jump to step 9.

- 7 Place the weight on the position with the biggest negative deviation and turn both potentiometers until the deviation is zero.
 - ⇒ With a **positive** deviation: Turn both potentiometers the same number of rotations to the **right**.
 - ⇒ With a **negative** deviation: Turn both potentiometers the same number of rotations to the **left**.
- 8 Repeat steps 5 to 7.
 - ⇒ Several iterations might be necessary until all corners are within the acceptable limits.
- 9 Close the Junction Box, see [Closing the housing of the Junction Box ▶ Page 9].

5 Cleaning

Maintenance of the Junction Box is limited to regular cleaning.



NOTICE

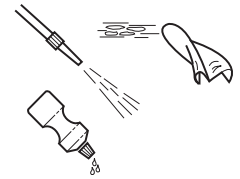
Damage to the Junction Box

- 1 Use only such cleaning agents that do not act on the plastics used in the Junction Box.
- 2 Only use disinfectants and cleaning agents in accordance with the manufacturer's instructions.
- 3 Do not use highly acidic, highly alkaline or highly chlorinated cleaning agents. Avoid substances with a high or low pH value since increased danger of corrosion otherwise exists.
- 4 Do not use high-pressure cleaners.

- Remove dirt and deposits at regular intervals from the outside of the Junction Box. The procedure depends on the environmental conditions prevailing at the installation location.

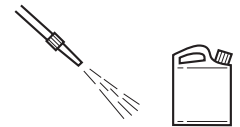
Stainless steel

- Wipe with a damp cloth.
- Use a medium-power water jet: < 2 bar, 5 l/min, up to 60 °C.
- Use household cleaning agents.



Corrosive environment

- Use a medium-power waterjet: < 2 bar, 5 l/min, up to 60 °C.
- Remove corrosive substances at regular intervals.
- Only use disinfectants and cleaning agents in accordance with the manufacturer's specifications and instructions.



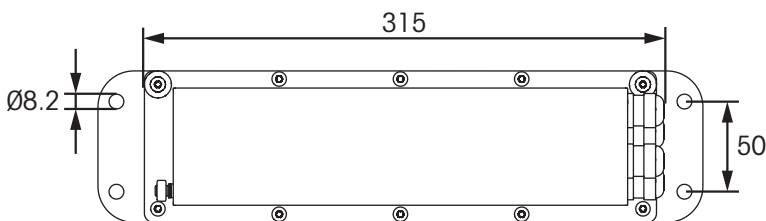
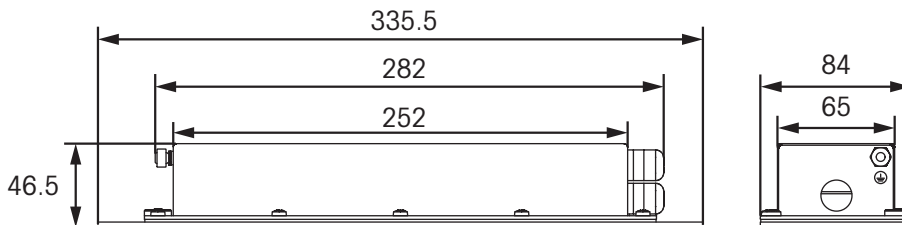
6 Technical data and accessories

6.1 General technical data

Explosion protection		AJB579x-a	AJB579xx-a
Ignition protection type	ATEX	II 2G Ex ib IIC T4 Gb II 2D Ex ib IIIC T65°C Db $T_o = -10\text{ °C to }+50\text{ °C}$ BVS 18 ATEX E007	II 3G Ex ic IIC T4 Gc II 3G Ex nA IIC T4 Gc II 3D Ex tc IIIC T55°C Dc $T_o = -10\text{ °C to }+50\text{ °C}$ BVS 18 ATEX E008
	IECEX	Ex ib IIC T4 Gb Ex ib IIIC T65°C Db $T_o = -10\text{ °C to }+50\text{ °C}$ IECEX BVS 18.0008	Ex ic IIC T4 Gc Ex nA IIC T4 Gc Ex tc IIIC T55°C Dc $T_o = -10\text{ °C to }+50\text{ °C}$ IECEX BVS 18.0008
Preinstalled cable	5 m		
Number of weighing cells	max. 4 (To ensure intrinsically safety, connect only one weighing cell per connection terminal!)		
Permissible resistance of load cell or weighing platform configuration	$\geq 87.5\text{ Ohms}$		

Housing	
Housing protection type	IP66 / IP68
Housing type	Chrome-nickel-steel (1.4301)

6.2 Dimensional drawing



Dimensions in mm

6.3 AJB579x-a: Accessories

Designation	Order No.
Cable for intrinsically safe circuits Ex-i 3 x 2 x 0.75 mm ² , shielded, 100 m	00 504 638
Wire end ferrules H 0.75 / 13, with plastic collar, 100 pcs.	00 504 639
Cable gland M16 x 1.5 Ex e II, 6 pcs.	22 006 708

7 Disposal

In accordance with the requirements of European Directive 2002/96 EC on Waste Electrical and Electronic Equipment (WEEE), this device may not be disposed of with domestic refuse. This also applies for countries outside the EU in accordance with their respective national regulations.

- Please dispose of this product in accordance with local regulations for the separate collection of waste electrical and electronic equipment.



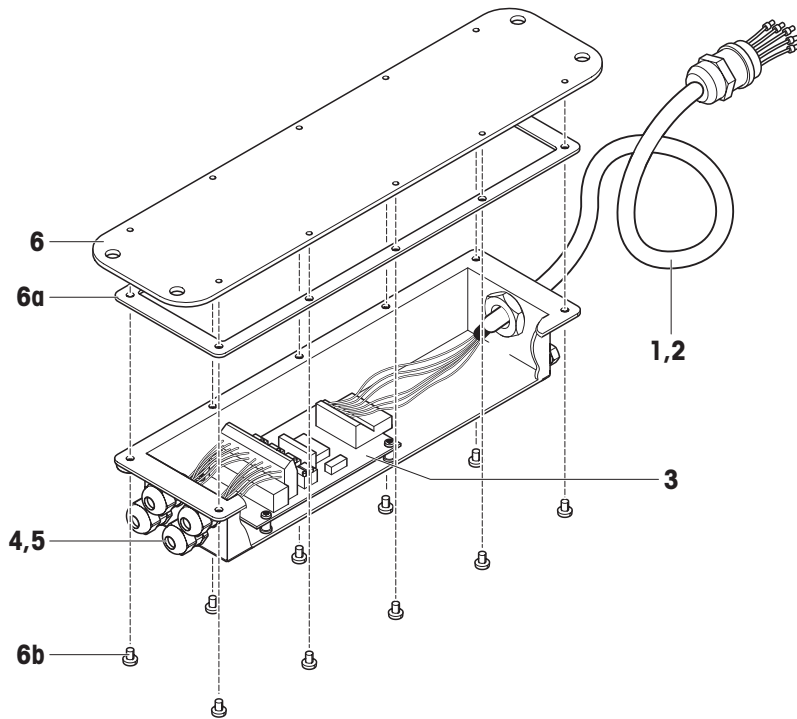
Should you have any questions, please contact the corresponding authorities or the dealer from whom this device was purchased.

If this device is passed on (for example for further private or commercial/industrial use), this regulation is also to be passed on.

Many thanks for your contribution to the protection of the environment.

8 Servicing

8.1 Spare parts



Item	Designation		AJB579x-a	AJB579xx-a
1	Connection cable Category 2	5 m	30 528 790	–
		10 m	30 528 791	–
		20 m	30 528 792	–
2	Connection cable Category 3	5 m	–	30 528 594
		10 m	–	30 528 595
		20 m	–	30 528 596
3	Junction PCB		00 205 924	00 205 924
4	Cable gland, M12x1.5, set of 4		22 006 567	22 006 567
5	Counter nut M12x1.5, set of 4		22 006 566	22 006 566
6	Cover plate incl. sealing (6a) and screw set M4x6 (6b)		30 415 223	30 415 223

8.2 Maintenance

The following maintenance work has to be performed on a regular basis depending on the environmental conditions.

Item	Maintenance work	Remark
Cover sealing	<ul style="list-style-type: none">– Check the cover sealing for damages.– If damaged, exchange the cover sealing.	–
Housing screws	<ul style="list-style-type: none">– Tighten with a tightening torque of 2.7 Nm.	<ul style="list-style-type: none">• Perform check at ambient temperature.• Tightening procedure see [Closing the housing of the Junction Box ▶ Page 9].
Cable glands	<ul style="list-style-type: none">– Check the cable glands for damage.– Tighten the cable glands thoroughly.– If damaged, exchange the cable glands.	–

8.3 Replacing the Junction PCB

- 1 Switch off the weighing terminal.
- 2 Open the Junction Box by loosening the 10 screws.
- 3 Note the cable connections on the Junction PCB and detach all cables.
- 4 Loosen all screws fixing the Junction PCB and remove it.
- 5 Mount the new Junction PCB in the housing and fix the screws.
- 6 Reattach all cables as noted in step 3.
- 7 Ensure that the gasket is in a good condition and position it properly.
- 8 Close the Junction Box as described in [Closing the housing of the Junction Box ▶ Page 9].

8.4 Replacing the connection cable to the weighing terminal

8.4.1 AJB579x-a: Making a new connection cable



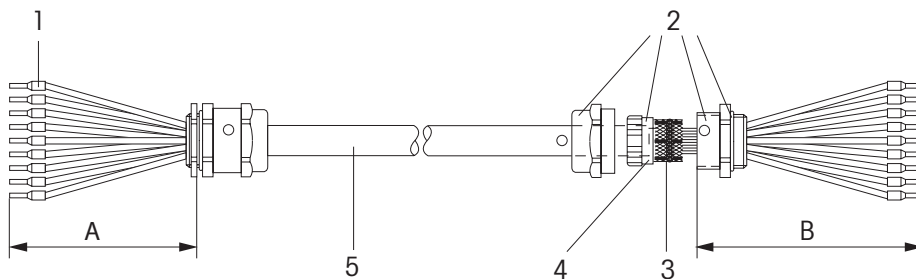
WARNING

Explosion hazard

- 1 Take the parameters of the cable used into consideration when checking the intrinsically safe parameters.
- 2 Use only cables approved for use in the hazardous area.

Customer specific connection cables for intrinsically safe circuits must be fabricated as follows.

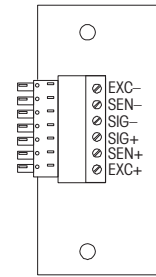
Cable	Dimension A (AJB579x-a)	Dimension B (weighing terminal)	Max. length
3 x 2 x 0.75 mm ²	150 mm	215 mm	20 m



- 1 Wire end ferrules with plastic collar, crimp connection
 - 2 Earthing cable gland
 - 3 Cable shielding
 - 4 Sleeve to be pushed over wires and shielding
 - 5 As per country-specific regulations for intrinsically safe circuits
- 1 Cut cable to length and strip cable ends according to dimensions A and B.
 - 2 Shorten shielding on both sides to 10 mm.
 - 3 Strip wire ends.
 - 4 Crimp wire end ferrules onto the wire ends with a crimping tool.
 - 5 Push the second rear section of the earthing cable gland onto the cable. Ensure not to damage the insulation of the wires here.
 - 6 Push the sleeve over the wires and the shield. Fold over the cable shielding.
 - 7 Push on the front section of the cable gland and screw it onto the rear section.
 - 8 Secure the compression cup nut with a maximum torque of 6 Nm.

8.4.2 Installing a new connection cable

- 1 Open the Junction Box and detach the preinstalled connection cable from the junction PCB.
- 2 Disconnect the earthing cable gland and pull out the cable.
- 3 Pull the newly made connection cable into the Junction Box and secure it with the earthing cable gland.
When doing so, ensure the correct position of the seal.
- 4 Ensure that the lock nut of the cable gland is fixed with an appropriate tool and a tightening torque of 2.0 Nm.
- 5 Attach the wires according to the terminal inscription.
- 6 Ensure that the gasket is in a good condition and position it properly.
- 7 Close the housing cover of the Junction Box, see [Closing the housing of the Junction Box ▶ Page 9].
- 8 Lay the connection cable securely to the weighing terminal and connect it according to the installation manual of the weighing terminal.



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For more information

Mettler-Toledo GmbH

Im Langacher 44
8606 Greifensee, Switzerland
www.mt.com/contact

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