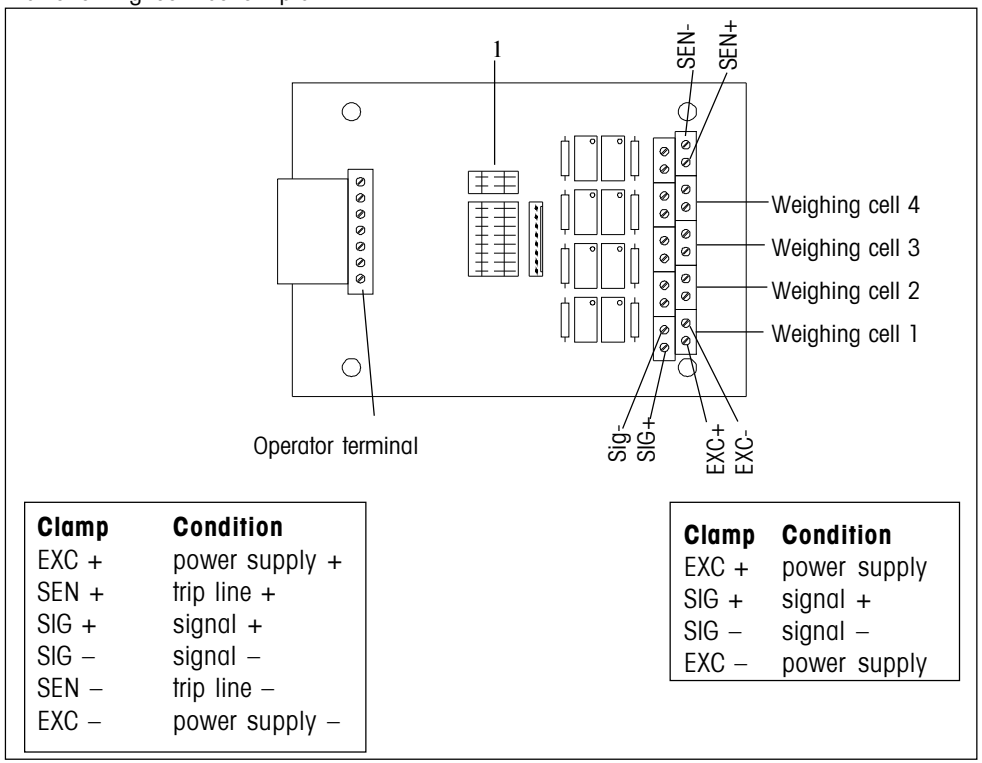
2.4 Attaching cable to the analog board

Connect the cable to the appropriate terminal strip of the Ex1 system solution in accordance with the following connection plan:



Clamp	Condition
EXC +	power supply +
SEN +	trip line +
SIG +	signal +
SIG –	signal –
SEN –	trip line –
EXC –	power supply –

Clamp	Condition
EXC +	power supply
SIG +	signal +
SIG –	signal –
EXC –	power supply

When connecting 6-wire loadcells, the loadcell SEN (+/-) wires must be connected to the terminals as shown in the diagram.

In addition, **both hook switches (1) must be off (open)**

2.5 Connecting equipotential bonding

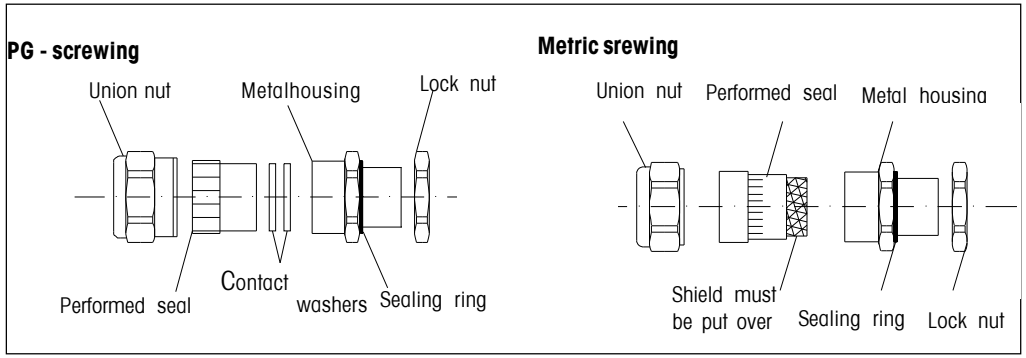
Caution

The equipotential bonding may be connected only by a qualified electrician of the end-user company. The METTLER TOLEDO service functions here only in a supervisory and advisory capacity.

Connect equipotential bonding (PA) of all devices (weighing platform, analog Ex1 system solution, operator terminal) in accordance with the national regulations and standards. Ensure that

– all device housings are the same potential by means of PA terminals,
– no compensating current flows via the shielding of the intrinsically safe cables.

Attaching cable of the weighing cell to the system solution



Note

Shielding measures against interference irradiation and radiation are particularly important for longer connection cables. The maximum interference immunity classes are achieved only with careful and correct installation and wiring of all attached peripherals and scale platforms.

Cable screwing

- Cut new cable according to length of old cable
- Attach screw fitting to cable.

  PG - screwing

  Shield must be properly inserted between the two contact washers.

  Metric srewing

  Shield must be put over the bonding.
- Route cable through the hole in the housing. Screw nut onto thread of the cable srewing.
- Connection of the wires.
- Screw cover onto the junction box, make scale ready for operation.

Note

After changing a strain gauge weighing cell, the following checks must be performed:

- Check corner load and adjust if necessary.
- Calibrate at full load.

2.3 Attaching terminal

The system solution is shipped with a pre-mounted and prepared cable for connection to METTLER TOLEDO operator terminals. If the system solution is to be connected to a different operator terminal, the standard cable may need to be prepared again.
If the standard cable is too short, a longer cable can be connected. Use **only intrinsically** safe cables for this purpose!

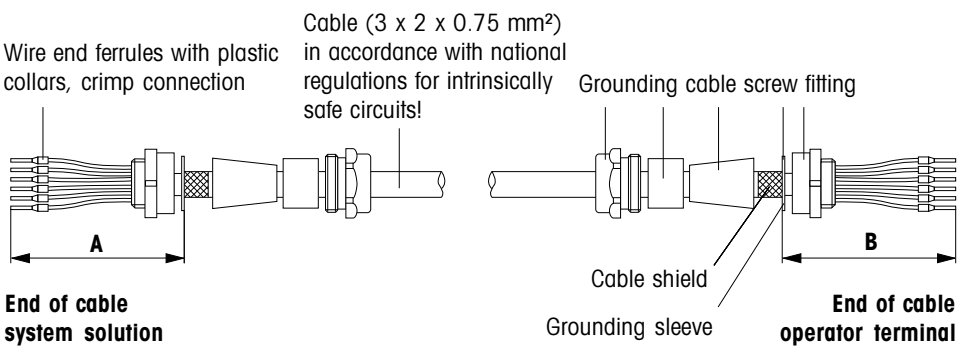
Attaching standard cable

1. Route cable to the operator terminal and pull into the operator terminal.
2. Secure grounding cable screw fitting on the operator terminal housing with the lock nut.
3. Connect cable, see installation instructions for operator terminal (e. g. ID3sTx).

Preparing standard cable again

1. Remove grounding cable screw fitting.
2. Strip appropriate length of the insulation from cable end and shorten shield to 7 mm.
3. Strip insulation from litz wire ends and press wire end ferrules with crimping tool to litz wire ends.
4. Mount the 3 rear parts of the grounding cable screw fitting on the cable.
5. Push grounding sleeve between cores and shield.

   Caution
   Do not damage insulation of the cores!
6. Mount front part of grounding cable screw fitting and screw to the rear part.
7. Connect cable, see above.



Cable	max. length	Distance A	Distance B*
System solution – Operator terminal	100 m	65 + 5 mm	210 + 10 mm

* only for METTLER TOLEDO operator terminals

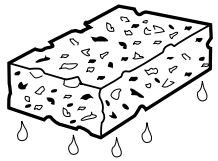
Attaching new cable

1. Remove pre-mounted standard cable:
   – Open system solution and disconnect standard cable.
   – Disconnect grounding cable screw fitting and pull out cable.
2. Shorten new cable. Observe the permissible cable length when doing so, see table above.
3. Strip cable ends as per dimension A and B, see table above.
4. Shorten shield to 7 mm.
5. Strip insulation from litz wire ends and press wire end ferrules with crimping tool to litz wire ends.
6. Mount grounding cable screw fittings:
   – Mount the 3 rear parts of the grounding cable screw fitting on the cable.
   – Push grounding sleeve between cores and shield.

     Caution
     Do not damage insulation of the cores!

   – Mount front part of screw fitting and screw to the rear part.
7. Pull cable into the connection box of the system solution and secure the grounding cable screw fitting on the housing. Make sure the connections are leak-tight.
8. Attach cable to the analog board in the system solution as described in the connection plan, see section 2.4.
9. Route cable to the operator terminal and pull into the operator terminal.
10. Secure the grounding cable screw fitting to the operator terminal housing with the lock nut.
11. Connect cable, see installation instructions of operator terminal (e. g. ID3sTx).

3 Cleaning



With explosion-proof housings, particularly ensure that the cleaning agents and cleaning methods used have no adverse effect whatsoever on the explosion protection of the operating terminal and the measuring cell.
Use only commercially available dishwashing liquid and glass cleaners for cleaning!
When cleaning with a steam jet **never** direct steam jet **directly** against measuring cell.

4 Technical data

Housing material	Chrom nickel steel
Type of protection	IP68
Connecting cable for operator terminal	Ex-i, length 5 m
Temperature range	–10 °C to +40 °C
Number of weighing cells	1 to 4 (only one cell per clamp)
Admissible bridge resistance	> 75 Ohm
Data weighing cell	Resistance of weighing cell > 300 Ohm
Supply and testing current circuit (KI5, KI6, KI7)	only for connection to a certified intrinsically safe circuit with the maximum values: U_i = 20 V $C_i \approx 0$ I_i = 350 mA $L_i \approx 0$ P_i = 2 W The intrinsically safe characteristic value of the supply and measuring current circuit (U_i, I_i, P_i) must be **smaller** than the intrinsically safe characteristic values of the weighing cell. During calculation, watch the inductivity and capacitance of the weighing cell cables!

- Install the weighing system in hazardous areas only if
  - the end user has issued a permit ("spark certificate" or "fire certificate"),
  - the area has been made safe before the installation,
  - you may perform the necessary installation work,
  - appropriate tools and, if need be, protective clothing are available.
- No modifications whatsoever may be made to the analog Ex1 system solution. Service work and repairs may be performed only by personnel authorized by METTLER TOLEDO.
- Before performing service and repair work, an electrician authorized by the end-user company must separate the entire weighing system from the mains supply and reconnect it after work is completed.
- Before putting into operation for the first time and at least every 3 years, the weighing system must be checked to ensure it is in perfect condition with regard to safety.
- Route the cables to ensure they are protected against possible damage.
- When installing the explosion-proof weighing system, use only cables for intrinsically safe electric circuits in compliance with the national regulations and standards in force.
- Insert cables in the housings of the system modules only via the grounding cable gland and ensure tight seals.
- The approval documentation (certificates of conformity, manufacturers declarations) must be available.

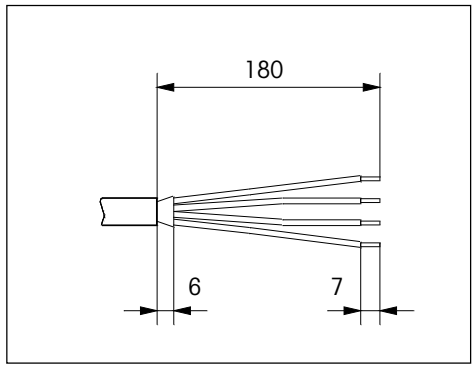
2 Installation

2.1 Important notes

The CE-conformity of the whole system rests in the responsibility of the person who takes it into operation.
The highest noise immunity class is achieved only with careful and correct installation and wiring of all attached peripherals and weighing platforms.

2.2 Attaching weighing cells

The weighing cells are shipped with a pre-mounted cable which must be attached to the system solution.



Preparing cable of the weighing cell

Do not shorten weighing cell cable!

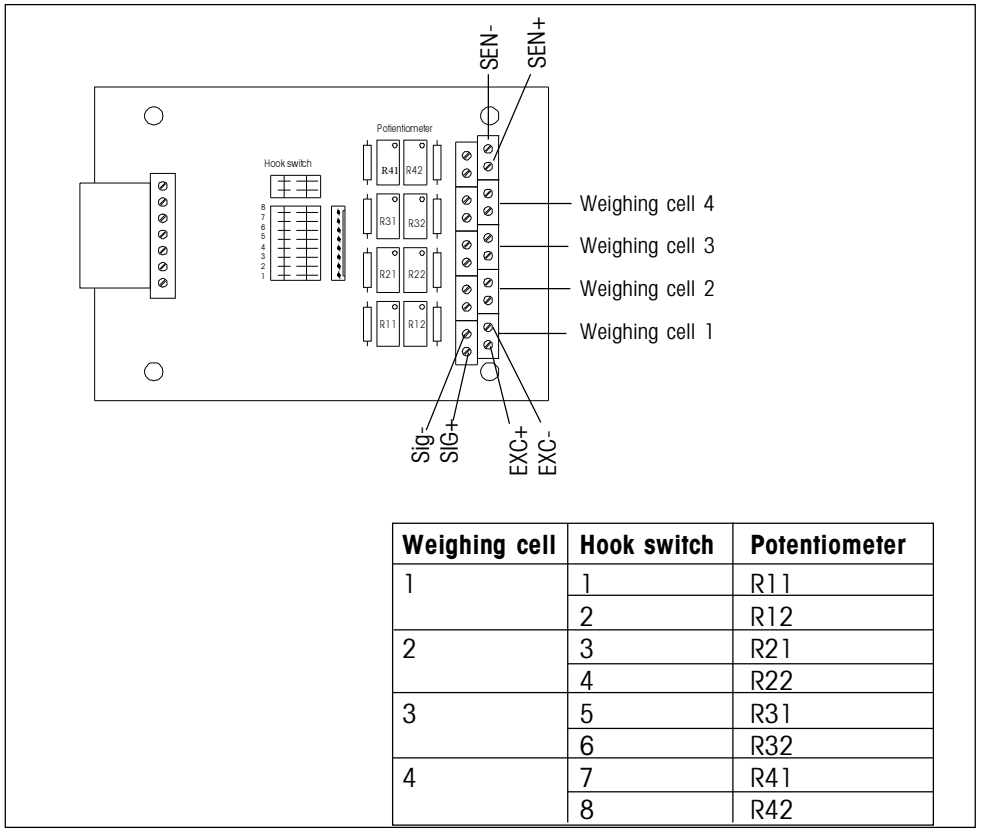
1. Strip approx. 180 mm insulation from end of cable.
2. Shorten cable shield to approx. 6 mm.
3. Strip approx. 7 mm insulation from conductor cores and twist together.
4. Mount wire end ferrules and press fit using crimping tool. In doing so, make sure that cable ends do not project beyond wire end ferrules.

2.6 Performing corner adjustment

For corner adjustment adjust the connected weighing cells to the analog board of the analog Ex1 system solution.

Adjusting weighing cell

1. Open both hook switches of the respective weighing cell on the analog board, see table.
2. Turn both potentiometers assigned to the hook switch consecutively all the way to the right or left (audible clicking).
3. Set both potentiometers to the middle position with 5 rotations in the opposite direction.
4. Adjust the weighing cells on the potentiometers. When doing so, turn both potentiometers the same number of turns.
   - **Positive** deviation, i.e. the weight value is above the tolerance limits: turn potentiometer to the **right**.
   - **Negative** deviation, i.e. the weight value is below the tolerance limits: turn potentiometer to the **left**.



Weighing cell	Hook switch	Potentiometer
1	1	R11
	2	R12
2	3	R21
	4	R22
3	5	R31
	6	R32
4	7	R41
	8	R42

5 Spare parts and optional equipment

Spare parts	Minimum order quantity	Order Number
Analog board	1	00205 924
Analog Ex1 connection cable; 5 m	1	00504 673
Dummy stopper	4	00205 035
Heavy gauge nut 7	4	00203 932
Heavy gauge screw fitting 7	4	00201 887
Heavy gauge seal 11	4	00203 950
Heavy gauge nut 11	4	00200 308
Reduct. for heavy gauge screw fitting 11-7	4	00204 456
Bag of desiccant	1	00209 382
Upper part of the housing	1	00204729
Lower part of the housing	1	00204730
Seal (housing)	1	00204731
Seal (test opening)	1	00204975
Set of screws	1	00506488
Dummy stopper (M12)	4	22006701
Lock nut M12	4	22005666
Reduction M20 / PG11	4	22006428
Cable screw connection M12	4	22006567

Optional equipment	Order Number
Cable for intrinsically safe power circuits Ex-i, 3 x 2 x 0.75 mm^2 ; 100 m	00504 638
Wire end ferrules; bag with 100 pieces	00504 639

Contents

1 General information 2
1.1 Purpose 2
1.2 Cautionary notes 2

2 Installation 4
2.1 Important notes 4
2.2 Attaching weighing cells 4
2.3 Attaching terminal 6
2.4 Attaching cable to the analog board 8
2.5 Connecting equipotential bonding 8
2.6 Performing corner adjustment 9

3 Cleaning 10

4 Technical data 10

5 Spare parts and optional equipment 12

1 General information

1.1 Purpose

The analog Ex1 system solution can be used in the hazardous areas of Zones 1, 2 and 22. The analog Ex1 system solution is used to connect analog weighing cells to intrinsically safe operator terminals. The operator terminal converts the analog measuring signal of the weighing cells into a digital signal and saves all weighing and country-specific data.

Application example

Special scales, e.g. hopper scales comprising 3 strain gauge weighing cells and mounted hopper.

1.2 Cautionary notes

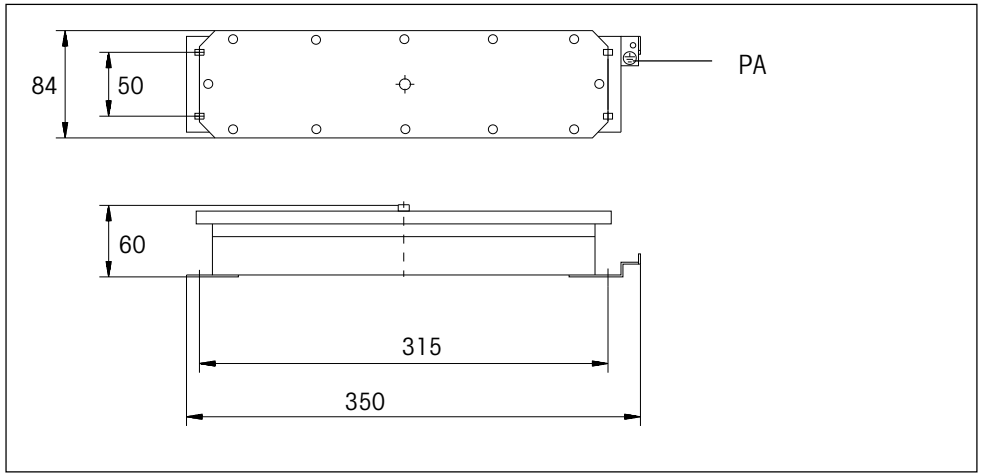
The analog Ex1 system solution ranks among products associated with an increased liability risk owing to their use in hazardous areas.

Special care must be exercised during operations in such areas. The code of conduct is determined by the "Intrinsically safe distribution" plan laid down by METTLER TOLEDO.

Strict adherence to the following basic rules is essential when installing an explosion-proof weighing system:

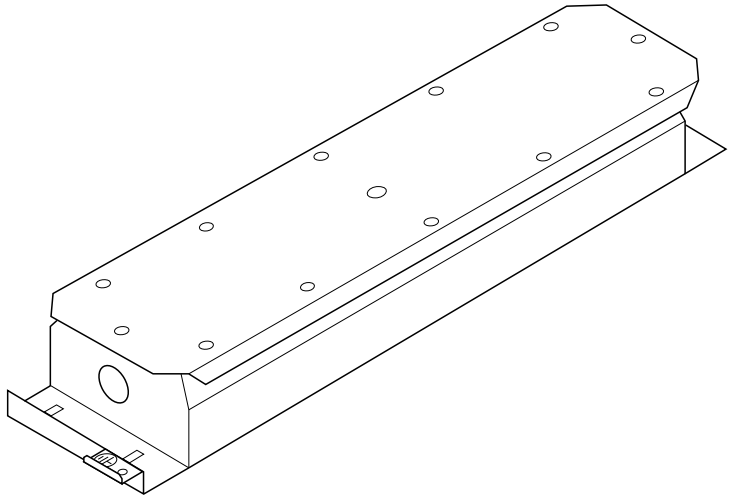
- The installation of the weighing system may be performed only by **METTLER TOLEDO authorized service**!
- Comply with the following during installation:
  - the applicable national regulations and standards
  - the national regulations governing electrical systems in hazardous areas
  - the instructions for the system modules, particularly the operating instructions
  - all "safety instructions" of the end-user company.
- Making and isolating the connection to the power supply must be effected solely by an **electrician authorized by the end user**! Ensure compliance with the data on the model plates of the system modules.
- The equipment with the poorest characteristic values for the hazardous area, temperature class and explosion group determines the application area of the entire weighing system.
- Fulfil requirements regarding splash- and dust-proofness.

Dimensions



Installations instructions

METTLER TOLEDO MultiRange Analog Ex1 system solution



00505891

Mettler-Toledo (Albstadt) GmbH
D-72458 Albstadt
Tel. ++49-7431-14 0, Fax ++49-7431-14 232
Internet: http://www.mt.com