

GRINDING ADDITIVE FLOW TRANSMITTER





Grinding Additive Flow Transmitter is designed specifically to meet the increased requirements of Cement Industries for accurate CCR Controlled Mill TPH Linked Additive Dosing applications. The user friendly design concept offers flexibility, cost-saving operation and reliability while providing a long service life and exceptionally low maintenance.

The Plug and Play system have special grade of Sensor material for compatibility with all types of commercially available Cement Additives in the market .

With Local Flow Display and highly accurate flow transmission signal to CCR , flow meter is very useful to Production department, CCR , Instrumentation department and Quality department to ensure correct proportionate dosing .

Flow Transmitter also have in built on-site calibration facility for adapting to all ranges of types of commercially available Cement Additive in the market .

With Advanced Self fault monitoring and diagnostic functions , it is very user friendly and reduce down times. As a result, productivity is increased and down times are avoided. Self-cleaning, double-sealed polished measuring electrodes enhance the device's reliability and performance. With its advanced filtering methods, the device improves accuracy even under difficult conditions by separating the noise from the measuring signal.

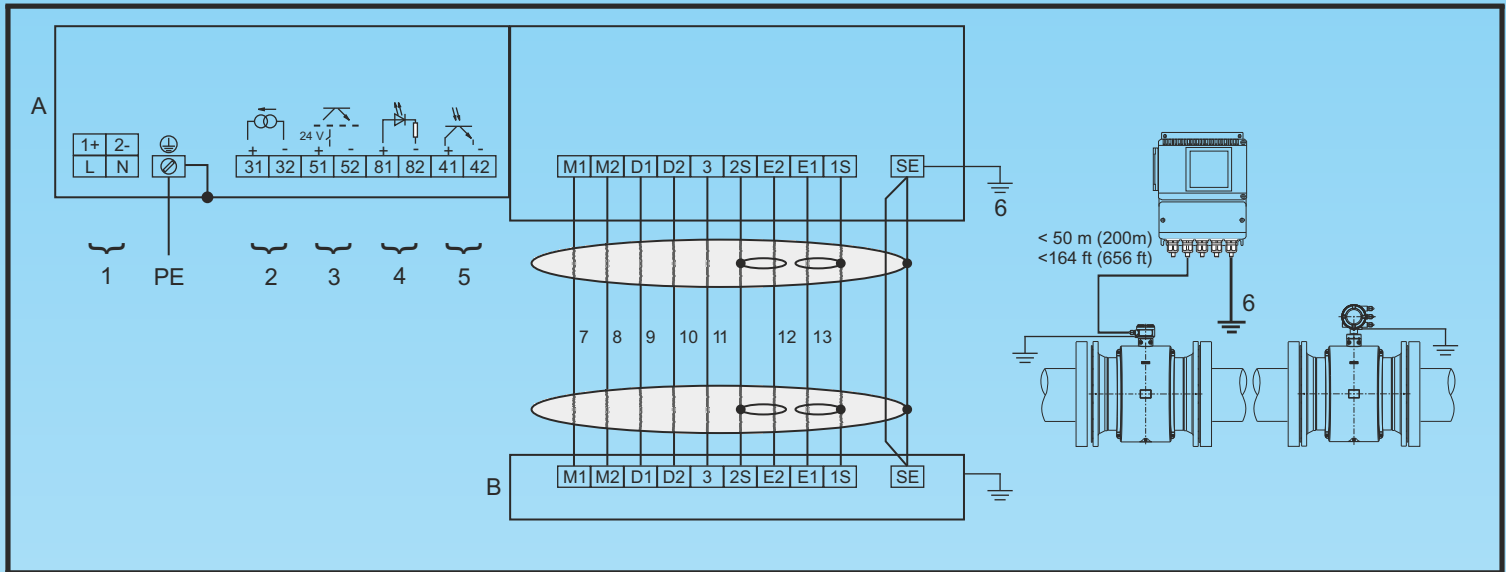


Easy and quick commissioning is the best feature of this Additive flow transmitter. Advanced data storage inside the sensor eliminates the need to match sensor and transmitter in the field. The on-board sensor memory automatically identifies the transmitter. On power-on, the transmitter self configuration function is run. and replicates all sensor data and parameters into the transmitter. This eliminates the opportunity for errors and leads to an increased start up speed and reliability. All parameters can be modified quickly and easily via the user-friendly display and the non-contact buttons, without opening the housing.

The easy programming functions reliably guides unpracticed users through the menu step by step. The soft key-based functionality makes handling a breeze - it's just like using a smart phone. During the configuration, the permissible range of each parameter is indicated on the display and invalid entries are rejected.

The backlit display can be easily rotated without the need for any special tools. The contrast is adjustable and the display fully configurable. The character size, number of lines and display resolution (number of decimals) can be set as required. The smart design of the transmitter unit allows for easy disassembly without the need to unscrew cables or unplug connectors. Whether count pulses, 20 mA signals or the status output are active or passive, the Grinding Additive transmitter always delivers the correct signal. HART is used as the standard protocol.

Electrical connection



A Transmitter

B Flowmeter sensor

1 Power supply

See name plate

2 Current output (terminals 31 / 32)

The current output can be operated in "active" or "passive" mode.

- Active: 4 ... 20 mA, HART protocol (standard), load: $250\ \Omega \leq R \leq 650\ \Omega$
 - Passive: 4 ... 20 mA, HART protocol (standard), load: $250\ \Omega \leq R \leq 650\ \Omega$
- Supply voltage for the current output: minimum 11 V, maximum 30 V at terminals 31 / 32.

3 Digital output DO1 (terminals 51 / 52) (pulse output or digital output)

Function can be configured locally as "Pulse Output" or "Digital Output" using software. Factory setting is "Pulse Output".

The output can be configured as an "active" or "passive" output (in the case of the transmitter with the dual-compartment housing, the output is configured using the software; in the case of the transmitter with the single-compartment housing, it is configured by means of jumpers on the transmitter backplane).

Configuration using software.

- Configuration as pulse output.
Max. pulse frequency: 5250 Hz.
Pulse width: 0.1 ... 2000 ms.
The pulse factor and pulse width are interdependent and are calculated dynamically.
- Configuration as contact output
Function: System alarm, empty pipe alarm, max. / min. alarm, flow direction signaling, other
- Configuration as "active" output
 $U = 19 \dots 21\text{ V}$, $I_{\text{max}} = 220\text{ mA}$, $f_{\text{max}} \leq 5250\text{ Hz}$
- Configuration as "passive" output
 $U_{\text{max}} = 30\text{ V}$, $I_{\text{max}} = 220\text{ mA}$, $f_{\text{max}} \leq 5250\text{ Hz}$

4 Digital input (terminals 81 / 82) (contact input)

Function can be configured locally using software:

External output switch-off, external totalizer reset, external totalizer stop, other

Data for the optocoupler: $16\text{ V} \leq U \leq 30\text{ V}$, $R_i = 2\text{ k}\Omega$

5 Digital output DO2 (terminals 41 / 42) (pulse output or digital output)

Function can be configured locally as "Pulse Output" or "Digital Output" using software.

Factory setting is "Digital Output", flow direction signaling.

The output is always a "passive" output.

6 Functional ground

7 Yellow

8 Brown

9 Green

10 Red

11 Blue

12 Orange

13 Violet

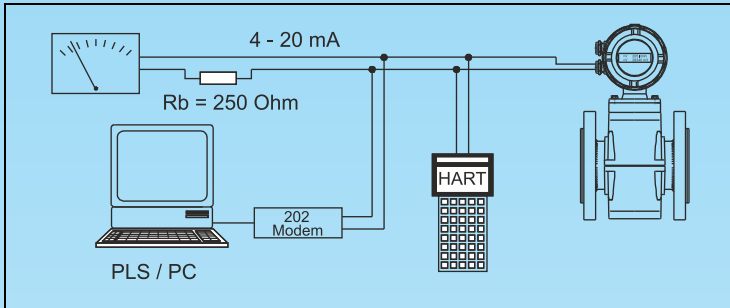


Digital communication

The transmitter has the following options for digital communication:

HART protocol

The unit is registered with the HART Communication Foundation.



HART protocol	
Configuration	Directly on the device
Transmission	FSK modulation on current output 4 ... 20 mA acc. to Bell 202 standard
Max. signal amplitude	1.2 mA _{SS}
Current output load	Min. 250 Ω, max. = 560 Ω
Cable	AWG 24 twisted
Max. cable length	1500 m
Baud rate	1,200 baud
Display	Log. 1: 1,200 Hz Log. 0: 2200 Hz

For additional information, see the separate interface description.

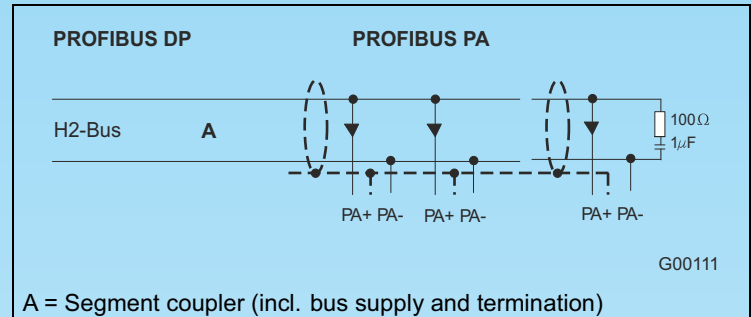
System integration

In conjunction with the DTM (Device Type Manager) available for the device, communication (configuration, parameterization) can occur with the corresponding framework applications.

PROFIBUS PA protocol

The interface conforms to follows.:

PROFIBUS PA ID no.:	0x3430
Alternative standard ID no.:	0x9700 or 0x9740
Configuration	Directly on the device Software DAT200 Asset Vision Basic (+ PROFIBUS PA-DTM)
Transmission signal	Acc. to IEC 61158-2
Cable	Shielded, twisted cable (acc. to IEC 61158-2, types A or B are preferred)



A = Segment coupler (incl. bus supply and termination)

Example for PROFIBUS PA interface connection

Bus topology

- Tree and/or line structure
- Bus termination: passive at both ends of the main bus line (RC element $R = 100 \Omega$, $C = 1 \mu F$)

Voltage / current consumption

- Average current consumption: 10 mA
- In the event of an error, the integrated FDE function (=Fault Disconnection Electronic) integrated in the device is ensures that the current consumption can rise to a maximum of 13 mA.
- The upper current limit is restricted electronically.
- The voltage on the bus line must lie in the range of 9 ... 32 V DC.

For additional information, see the separate interface description.

System integration

ABB provides three different GSD files (equipment master data) which can be integrated in the system.

Users decide at system integration whether to install the full range of functions or only part.

Installation requirements

Grounding

The flowmeter sensor must be connected to ground potential. For technical reasons, this potential should be identical to the potential of the metering fluid.

For plastic or insulated lined pipelines, the fluid is grounded by installing ground plates. When there are stray potentials present in the pipeline, a ground plate is recommended on both ends of the meter sensor.

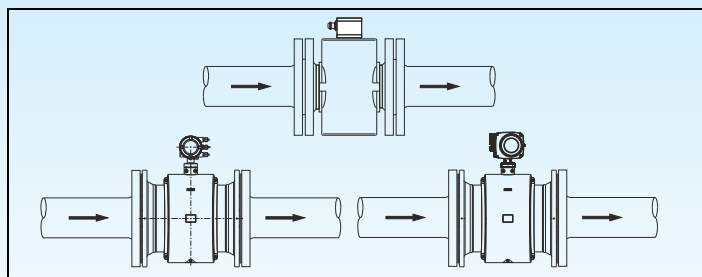
Mounting

The following points must be observed for the installation:

- The meter tube must always be completely full.
- The flow direction must correspond to the identification if present.
- The maximum torque for all flange connections must be complied with. The max torque depends on the temperature, pressure, material of the flange bolts and gaskets and has to be chosen accordingly.
- The devices must be installed without mechanical tension (torsion, bending).
- Flowmeters with coplanar counter flanges may only be installed with suitable seals.
- Use flange seals made from a compatible material for the fluid and fluid temperatures.
- Seals must not extend into the flow area since possible turbulence could influence the device accuracy.
- The pipeline may not exert any unallowable forces and torques on the device.
- Do not remove the plugs in the cable connectors until you are ready to install the electrical cable.
- Install the separate converter at a largely vibration-free location.
- Do not expose the converter to direct sunlight or provide for appropriate sun protection where necessary.

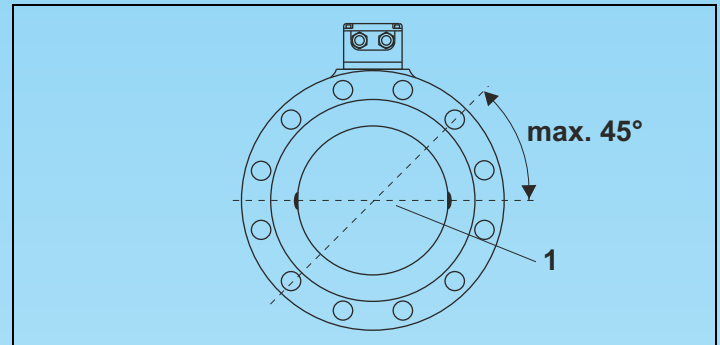
Flow direction

The device measures the flowrate in both directions. Forward flow is the factory setting.



Electrode axis

Electrode axis (1) should be horizontal if at all possible or no more than 45° from horizontal.



In- and outlet pipe sections

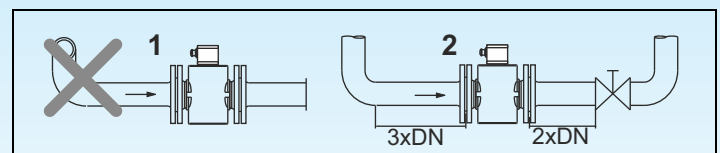
The metering principle is independent of the flow profile as long as standing eddies do not extend into the metering section, such as may occur after double elbows (1), in the event of tangential inflow, or where half-open gate valves are located upstream of the flowmeter sensor.

In such cases, measures must be put in place to normalize the flow profile.

- Do not install fittings, manifolds, valves, etc., directly in front of the flowmeter sensor (1).
- Butterfly valves must be installed so that the valve plate does not extend into the flowmeter sensor.
- Valves or other turn-off components should be installed in the outlet pipe section (2).

Experience has shown that, in most installations, straight inlet sections 3 x DN long and straight outlet sections 2 x DN long are sufficient (DN = nominal diameter of the sensor).

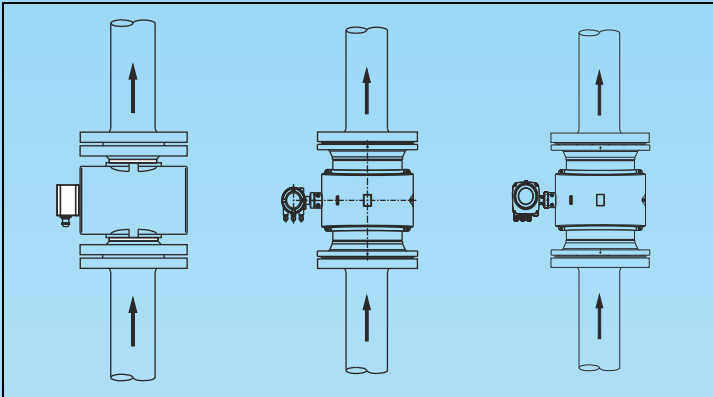
For test stands, the reference conditions of 10 x DN straight inlet and 5 x DN straight outlet must be provided.





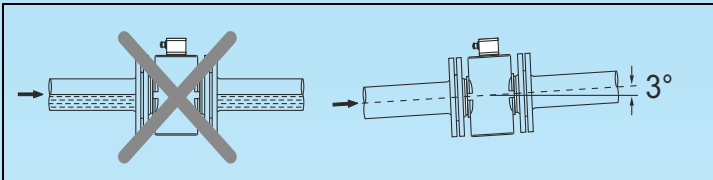
Vertical connections

- Vertical installation for measuring abrasive fluids, preferably with flow in upward direction.



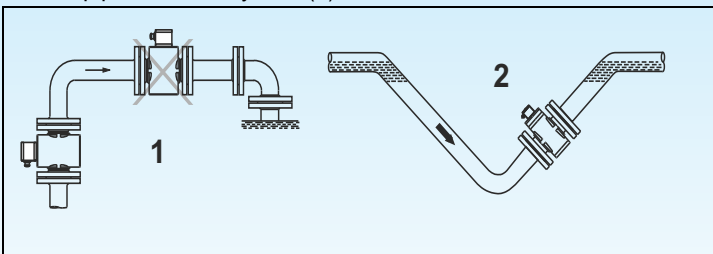
Horizontal connections

- Meter tube must always be completely full.
- Provide for a slight incline of the connection for degassing.



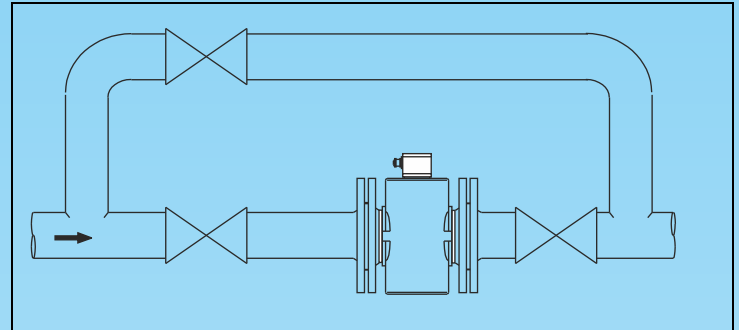
Free inlet or outlet

- Do not install the flowmeter at the highest point or in the draining-off side of the pipeline, flowmeter runs empty, air bubbles can form (1).
- Provide for a siphon fluid intake for free inlets or outlets so that the pipeline is always full (2).



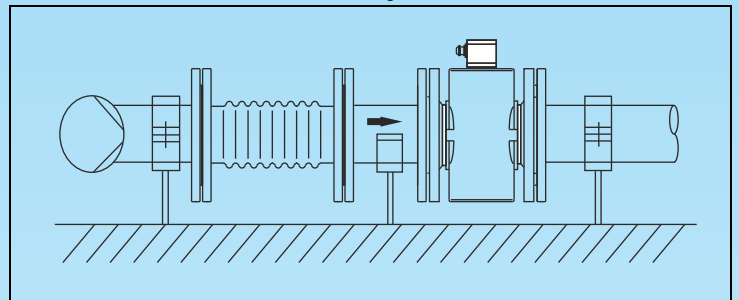
Strongly contaminated fluids

- For strongly contaminated fluids, a bypass connection according to the figure is recommended so that operation of the system can continue to run without interruption during the mechanical cleaning.



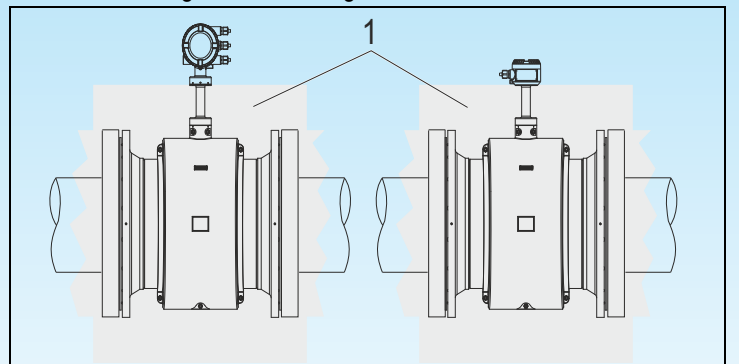
Installation in the vicinity of pumps

- For flowmeter primaries which are to be installed in the vicinity of pumps or other vibration generating equipment, the utilization of mechanical snubbers is advantageous.



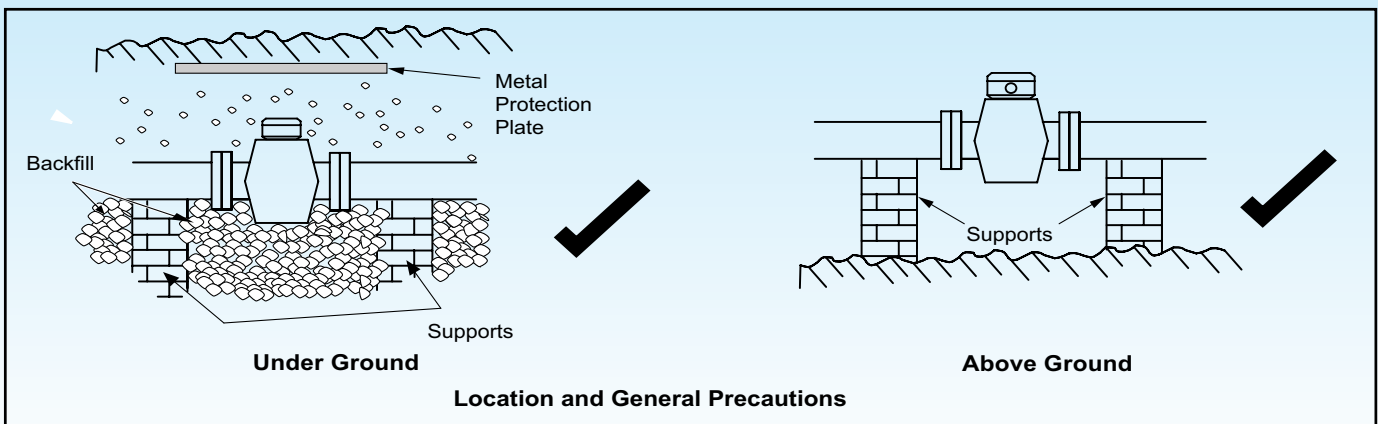
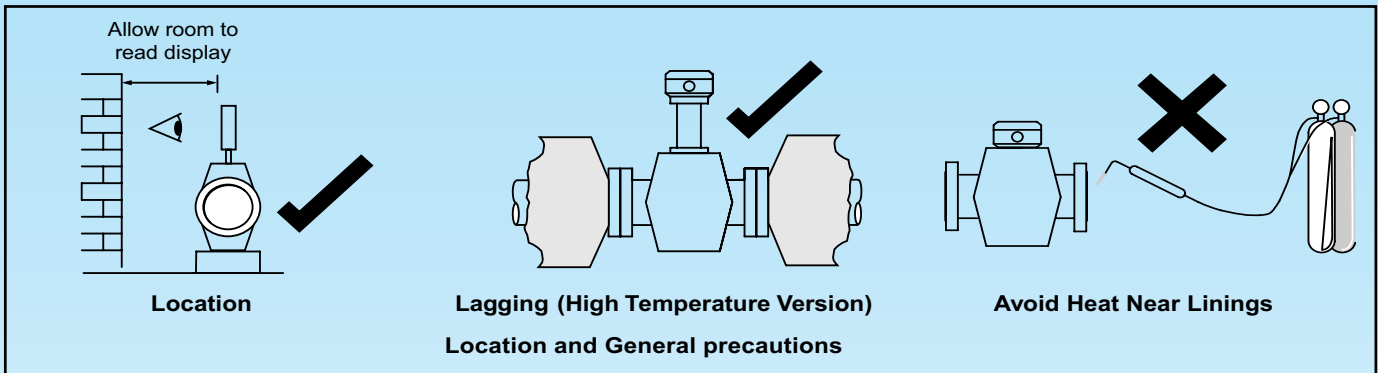
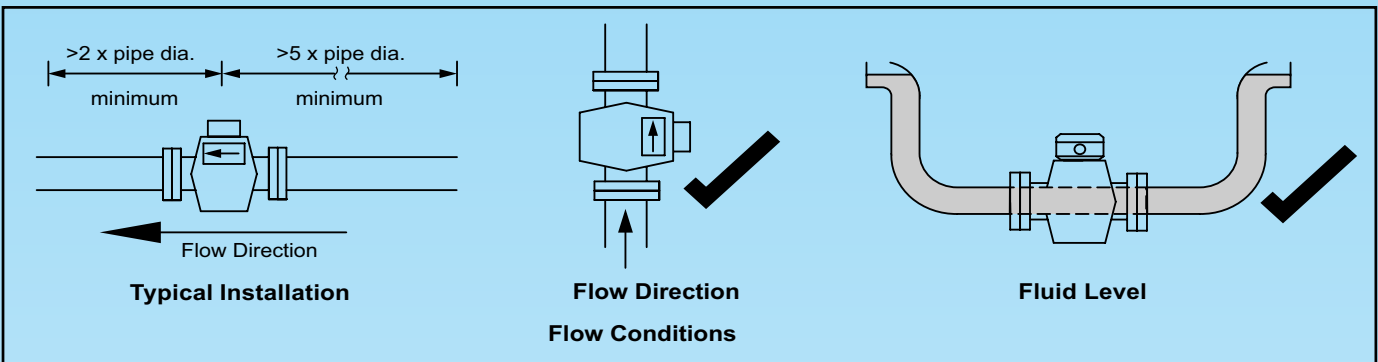
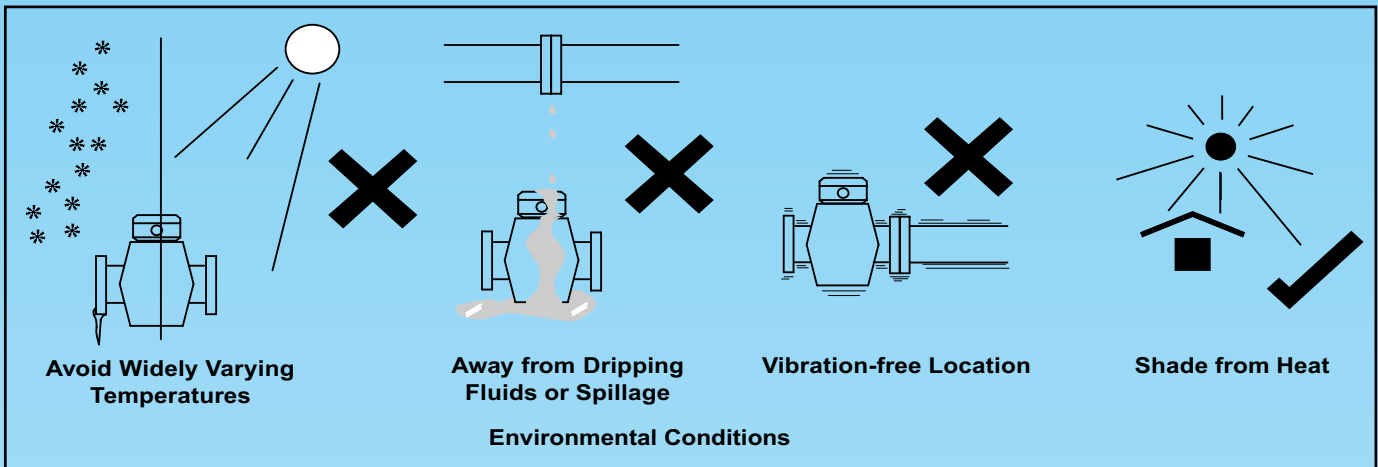
Installing the high temperature design

The high temperature design allows for complete thermal insulation of the sensor. The pipeline and sensor must be insulated after installing the unit according to the following illustration.



1 Insulation

INSTALLATION CONDITIONS



Model number	ATFM11GA48FS10SS316
Process connection	Flange End. ASME B16.5 / 150 #
Nominal pressure	PN 10
Lining	Additive Compatible special grade
Conductivity	> 5 μ S/cm
Electrodes	Additive Compatible special grade
Process connection material	Stainless Steel Grade SS316
Degree of protection	IP 65, IP 67
Medium temperature	-25 ... 80 °C
Power supply	AC 100 ... 230 V
Current output	4 ... 20 mA, active or passive
Pulse output	Can be configured locally as active or passive
Switch output	Optocoupler, programmable function
Contact input	Optocoupler, programmable function
Display	Graphical display, configurable
Housing	Integral mount design
Communication	HART protocol (standard)
Local Field Mounted Display	Flow rate , Flow Totaliser value , 4-20 Output
On Site Calibration Facility	Available

Grinding Additive Flow meters are regularly supplied and installed by us across all major cement industries since 2010 along with the starting of usage of Additives in Cement Industry. These Flow Transmitters are used either as stand alone capacity or as a part of CCR controlled Mill TPH linked Fully Automatic Additive Dosing System. This has lead to :

- (1) Cost saving due to better production capacity and improved strength parameter due to accurate and automatic control of proportionate Additive dosing based on mill feed rate, % GA addition and GA flow
- (2) Cost saving in grinding process in mills due to better comminution and reduction in specific energy consumption per ton of cement due to better control in TPH linked dosing
- (3) Cost saving in respect of reduction in consumption of costly Additives / Grinding Aid chemicals due to accurate dosing thus avoiding Over dosing or under dosing of additives.
- (4) Complete process control thru CCR / Instrument Control Room with negligible on site manpower / manhour involvement due to all feedbacks in CCR .



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