

CLAIMS

We claim:

1. A fluid flow system (300), comprising:
 - a pipeline (302) with a flowing fluid;
 - 5 a first vibrating meter (5) including a first sensor assembly (10) located within the pipeline (302) and configured to determine one or more flow characteristics, including a first flow rate;
 - a second vibrating meter (5') including a second sensor assembly (10') located within the pipeline (302) and in fluid communication with the first sensor assembly (10) and configured to determine one or more flow characteristics, including a second flow rate;
 - 10 a system controller (310) in electrical communication with the first and second vibrating meters (5, 5') and configured to:
 - receive the first and second flow rates;
 - 15 determine a differential flow rate based on the first and second flow rates;
 - compare the differential flow rate to a threshold value or band; and
 - correct one or more flow characteristics if the differential flow rate is less than a threshold value or band.
- 20 2. The fluid flow system (300) of claim 1, wherein the correction comprises setting the differential flow rate to zero.
3. The fluid flow system (300) of claim 1, wherein one of the first or second flow rates is determined using a differential zero offset.
- 25 4. The fluid flow system (300) of claim 3, wherein the system controller (310) is further configured to determine a new differential zero offset if the differential flow rate is less than the threshold value.
- 30 5. The fluid flow system (300) of claim 3, wherein the system controller (310) is further configured to determine a new differential zero offset if the differential flow rate is less than the threshold value for a predetermined amount of time.

6. The fluid flow system (300) of claim 1, wherein the system controller (310) is further configured to apply a group delay to one of the first or second flow rates such that the first and second flow rates are representative of flow rates occurring at substantially the same time.
7. A meter electronics (20') for a first sensor assembly (10') located within a pipeline (302) and in fluid communication with a second sensor assembly (10) of a vibrating meter (5) in electrical communication with the meter electronics (20'), configured to:
- receive sensor signals from the first sensor assembly (10') and determine one or more flow characteristics, including a first fluid flow rate;
 - receive a second fluid flow rate from the second vibrating meter (5);
 - determine a differential flow rate based on the first and second fluid flow rates;
 - compare the differential flow rate to a threshold value or band; and
 - correct one or more flow characteristics if the differential flow rate is less than the threshold value or band.
8. The meter electronics (20') of claim 7, wherein the correction comprises setting the differential flow rate to zero.
9. The meter electronics (20') of claim 7, further configured to determine the first fluid flow rate using a differential zero offset.
10. The meter electronics (20') of claim 9, further configured to determine a new differential zero offset if the differential flow rate is less than the threshold value or band.
11. The meter electronics (20') of claim 9, further configured to determine a new differential zero offset if the differential flow rate is less than the threshold value or band for a predetermined amount of time.

12. The meter electronics (20') of claim 7, further configured to determine the differential flow rate using a group delay applied to the first flow rate such that the first and second flow rates are representative of flow rates occurring at substantially the same time.

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13. A method of operating a fluid flow system including a first vibrating meter and a second vibrating meter in fluid communication with the first vibrating meter, comprising steps of:

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receiving first sensor signals from the first vibrating meter and receiving second sensor signals from the second vibrating meter;

determining one or more flow characteristics, including first and second flow rates based on the first and second sensor signals;

determining a differential flow rate based on the first and second flow rates;

comparing the differential flow rate to a threshold value or band; and

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correcting the one or more flow characteristics if the differential flow rate is less than the threshold value or band.

14. The method of claim 13, wherein the correction comprises setting the differential flow rate to zero.

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15. The method of claim 13, wherein one of the first or second flow rates is determined using a differential zero offset.

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16. The method of claim 15, further comprising a step of determining a new differential zero offset if the differential flow rate is less than the threshold value or band.

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17. The method of claim 15, further comprising a step of determining a new differential zero offset if the differential flow rate is less than the threshold value or band for a predetermined amount of time.

18. The method of claim 13, wherein the step of determining the differential flow rate comprises applying a group delay to one of the first or second flow rates such that the first and second flow rates are representative of flow rates occurring at substantially the same time.

CLAIMS

We claim:

1. A fluid flow system (300), comprising:
 - a pipeline (302) with a flowing fluid;
 - 5 a first vibrating meter (5) including a first sensor assembly (10) located within the pipeline (302) and configured to determine one or more flow characteristics, including a first flow rate;
 - a second vibrating meter (5') including a second sensor assembly (10') located within the pipeline (302) and in fluid communication with the first sensor assembly (10) and configured to determine one or more flow characteristics, including a second flow rate;
 - 10 a system controller (310) in electrical communication with the first and second vibrating meters (5, 5') and configured to:
 - receive the first and second flow rates;
 - 15 determine a differential flow rate based on the first and second flow rates;
 - compare the differential flow rate to a threshold value or band;
 - correct one or more flow characteristics if the differential flow rate is less than a threshold value or band; and
 - 20 apply a group delay to one of the first or second flow rates such that the first and second flow rates are representative of flow rates occurring at substantially the same time.
2. The fluid flow system (300) of claim 1, wherein the correction comprises setting the differential flow rate to zero.
- 25 3. The fluid flow system (300) of claim 1, wherein one of the first or second flow rates is determined using a differential zero offset.
4. The fluid flow system (300) of claim 3, wherein the system controller (310) is further configured to determine a new differential zero offset if the differential flow rate is less than the threshold value.
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5. The fluid flow system (300) of claim 3, wherein the system controller (310) is further configured to determine a new differential zero offset if the differential flow rate is less than the threshold value for a predetermined amount of time.

6. A meter electronics (20') for a first sensor assembly (10') located within a pipeline (302) and in fluid communication with a second sensor assembly (10) of a vibrating meter (5) in electrical communication with the meter electronics (20'), configured to:

receive sensor signals from the first sensor assembly (10') and determine one or

more flow characteristics, including a first fluid flow rate;

receive a second fluid flow rate from the second vibrating meter (5);

determine a differential flow rate based on the first and second fluid flow rates;

compare the differential flow rate to a threshold value or band;

correct one or more flow characteristics if the differential flow rate is less than

the threshold value or band; and

determine the differential flow rate using a group delay applied to the first flow rate such that the first and second flow rates are representative of flow rates occurring at substantially the same time.

7. The meter electronics (20') of claim 6, wherein the correction comprises setting the differential flow rate to zero.

8. The meter electronics (20') of claim 6, further configured to determine the first fluid flow rate using a differential zero offset.

9. The meter electronics (20') of claim 8, further configured to determine a new differential zero offset if the differential flow rate is less than the threshold value or band.

10. The meter electronics (20') of claim 8, further configured to determine a new differential zero offset if the differential flow rate is less than the threshold value or band for a predetermined amount of time.

11. A method of operating a fluid flow system including a first vibrating meter and a second vibrating meter in fluid communication with the first vibrating meter, comprising steps of:

5 receiving first sensor signals from the first vibrating meter and receiving second sensor signals from the second vibrating meter;
determining one or more flow characteristics, including first and second flow rates based on the first and second sensor signals;
determining a differential flow rate based on the first and second flow rates by
10 applying a group delay to one of the first or second flow rates such that the first and second flow rates are representative of flow rates occurring at substantially the same time;
comparing the differential flow rate to a threshold value or band; and
correcting the one or more flow characteristics if the differential flow rate is less
15 than the threshold value or band.

12. The method of claim 11, wherein the correction comprises setting the differential flow rate to zero.

20 13. The method of claim 11, wherein one of the first or second flow rates is determined using a differential zero offset.

14. The method of claim 13, further comprising a step of determining a new differential zero offset if the differential flow rate is less than the threshold value or
25 band.

15. The method of claim 13, further comprising a step of determining a new differential zero offset if the differential flow rate is less than the threshold value or band for a predetermined amount of time.