DCI Two-Phase Acoustic Separator

Features:

- Accurate measurement of two fluid phases at pressure and temperature
- Analog output signal proportional to meniscus level for data acquisition or to allow level control
- Allows real time calculation of sample saturations
- Compatible with CFAS™ Technology

DCI
TEST SYSTEMS

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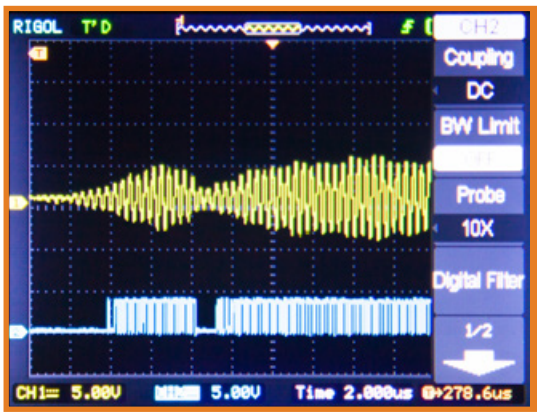
Acoustic Separator Configuration

The two phase separator consists of two precision bore tubes mounted vertically in a base connection block. One tube acts as a separation tube, where two immiscible fluids of different density separate due to gravitational forces. The second tube is the sensing tube where a meniscus between the two fluids is undisturbed by any flow in the separation tube. The higher density fluid communicates between the two tubes in the base connection block. The lower density fluid communicates through a similar connection block mounted to the top of the two tubes. An acoustic transducer is mounted in the base of the sensing tube. It uses the travel time of acoustic waves reflected from the meniscus between the two fluids to measure the volume of the higher density fluid in the separator.

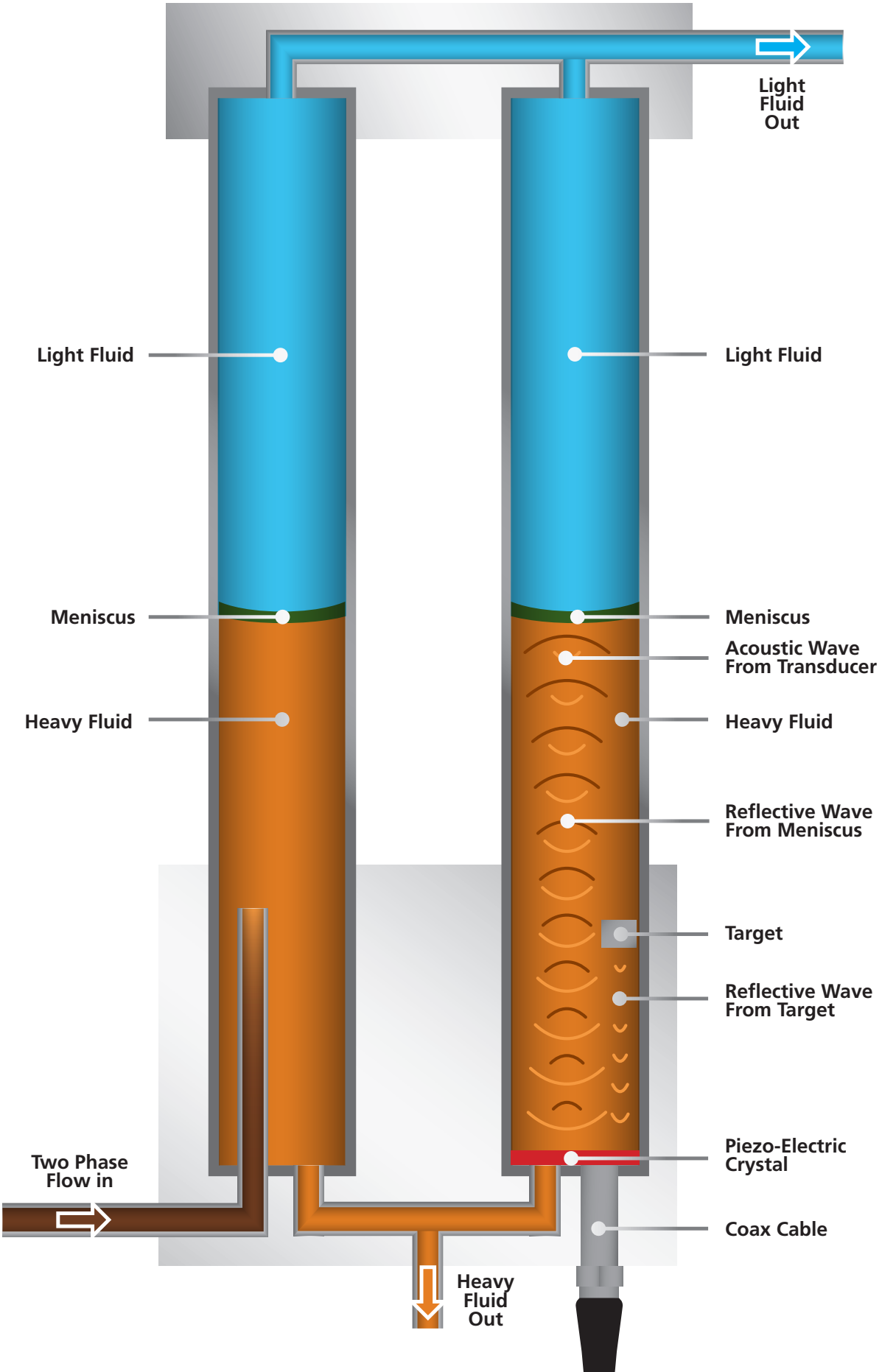
More Accurate Separation Process

The process in the sensing tube is shown schematically in the diagram at the right. A meniscus forms between two immiscible fluids in the tube. A target is located in the higher density fluid at a fixed, known distance above the transducer. The transducer is excited, generating an acoustic wave. This wave is reflected first off the target, and then off the meniscus separating the two fluids. The transducer detects the two reflections and the time of flight for both is measured with extremely high accuracy. The time of flight of the first allows the acoustic velocity in the fluid to be determined precisely. This then allows the time of flight of the wave reflected from the meniscus to be converted to an accurate distance.

The reflected wave from both the target and the meniscus can be captured and displayed on an oscilloscope. Although not necessary for system operation, this is sometimes useful for understanding the separator operation.



Separator operation can be understood by the reflected wave from both the meniscus and target on a oscilloscope.


Light Fluid Out
Light Fluid
Light Fluid
Meniscus
Meniscus
Acoustic Wave From Transducer
Heavy Fluid
Heavy Fluid
Reflective Wave From Meniscus
Target
Reflective Wave From Target
Piezo-Electric Crystal
Two Phase Flow in
Coax Cable
Heavy Fluid Out

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Two-Phase Acoustic Separator

Specifications:

Separator Volume:	150 ml
Measurement Volume:	100 ml
Measurement Accuracy:	0.1 ml
Measurement Resolution:	0.01 ml
Maximum Pore Pressure:	10,000 psi
Maximum Operating Temperature:	150 °C
Wetted Materials:	Titanium
Inlet and Outlet Connections:	W125 (1/8" SpeedBite)
Physical Size (With Stand):	8" Wide x 8.5" Deep x 32" High
Analog output range:	3.3 V DC
D/A resolution:	16 bit

DCI TEST SYSTEMS

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Based on Proven Technology

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