ANNEXE 11

Spécifications techniques du débitmètre

SOUTHAVEN POWER PROJECT AND CALEDOINA GENERATING PROJECT

SOUTHAVEN POWER, LLC CALEDONIA POWER, LLC

SOUTHAVEN & CALEDONIA, MS.

NEPCO

National Energy Production Corporation

PADDLEWHEEL FLOW METER

NO	BY	DATE	REVISION
A	RAB	4/12/2002	FOR CONSTRUCTION

SHEET 1 OF 1	
SPEC. NO. I1160-0-036	REV. A
CONTRACT 0516	DATE 4/12/02
So Haven PO	
Caledonia PO	N/A
BY RAB / CHK'D	APPR.

GENERAL	Tag Number	**10FE1442**			
	Service	DW			
	Description	DEMIN SYSTEM OUTLET FLOW			
	P&ID No.	0516 P1028-4			
	Location / Line No. / Equip No.	DW2018-FS-3-H			
	Line Size / Sched. / Material	3"	10S	304 SS	
	Fluid	DEMIN WATER			
	Oper. Specific Gravity	1.00			
	Ambient Temp	0 to 110 Deg F			
	Oper. Temp: Min. Norm. Max.		60 Deg F	90 Deg F	
	Oper Press: Min. Norm. Max.		20 psig	30 psig	
	Area Classification	UNCLASSIFIED			
PROCESS CONDIT'NS	Design Flow: Min. Norm. Max.		125 GPM	280 GPM	
	Oper. Viscosity				
	Coef. Of Expansion				
	Percent Solids & Type	NIL			
ELEMENT	Manufacturer	**DATA INDUSTRIAL**			
	Model No.	**226SS0000-1211**			
	Type	INSERTION FLOW SENSOR			
	Connection Size	2" NPT			
	End Connections	N/A			
	Face to Face Dimensions	N/A			
	Rating: Temp / Pressure	221 Deg F	400 psig		
	Flow Rate Range	0-280 GPM			
	Accuracy	0.5% o.F.S.			
	Enclosure Class				
	Supply Power				
	Materials: Body	316 SS			
	Sensor Holder	316 SS			
	Paddlewheel	GLASS REINFORCED NYLON			
	Axis & bearing	TUNGSTEN CARBIDE/PENNLON			
	O-rings	ETHYLENE PROPYLENE			
	Blades	GLASS REINFORCED NYLON			
	Pickoff Type	HALL EFFECT			
	Weight				
	Interconnecting Cable	20' LENGTH / BELDEN TYPE 9320			
	Isolation Valve	2" NPT BALL VALVE			
TRANSMITTER	Manufacturer	**DATA INDUSTRIAL**			
	Model No.	**500-10**			
		10FT1442			
	Type	NEMA 4 ENCLOSURE			
	Function	ANALOG TRANSMITTER			
	Calibrated Range	0-280 GPM (See Note 2)			
	Preamplifier	NONE			
	Mounting	CONDUIT MOUNTED			
	Supply Power	LOOP POWERED			
	Scale Range	N/A			
	Display	N/A			
	Totalized Units	N/A			
	Output Signals	4 to 20 mA			
	Weight				

Notes: 1. VENDOR SHALL PROVIDE PERMANENTLY ATTACHED SS TAG WITH STAMPED TAG NO.
2. INSTRUMENT TO BE FACTORY CALIBRATED 0-280 GPM=4-20 mADC

ORIGINAL

\\THEENGINEERS\SHARED\PROJECTS\0516\DATASHEETS\INSTR\[I1160_0_036.XLS]Positive Displacement Meter

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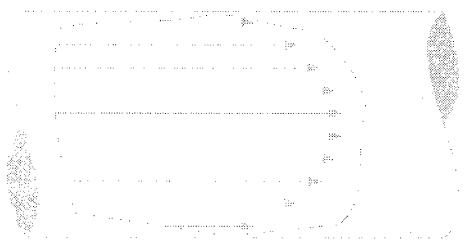
Specifications
Model: 226

Data Industrial®

September 1998

FLOW SENSOR

The flow sensor shall be an insertion type with a non-magnetic, spinning impeller (paddle wheel) as the only moving part. The sensor sleeve will be brass (or 316 stainless steel) with the sensor housing being glass-filled PPS. The impeller shall be glass-filled nylon or Tefzel® with a UHMWPE or Tefzel® sleeve bearing. The shaft material shall be tungsten carbide. The flow sensor shall be supplied with a 2" full bore ball valve in brass (or 316 stainless steel) and a 2" threaded pipe nipple. A bleed valve and three ethylene-polypropylene O-Rings shall be incorporated into the mounting adapter portion of the sensor. A removable installation tool shall be attachable to the sensor for insertion or removal of the flow sensor from the pipe. Insertion of the sensor into any pipe size shall be a fixed 1 ½" depth from the inside wall to the end of the sensor housing. The sensor shall operate in line pressures up to 400 psi and liquid temperatures up to 220° F, and operate in flows of 1 foot per second to 30 feet per second in pipe of 3" diameter up to 40" diameter with linearity of ± 1%. This sensor shall be Data Industrial Model 226. The detachable installation tool shall be Model HTT.



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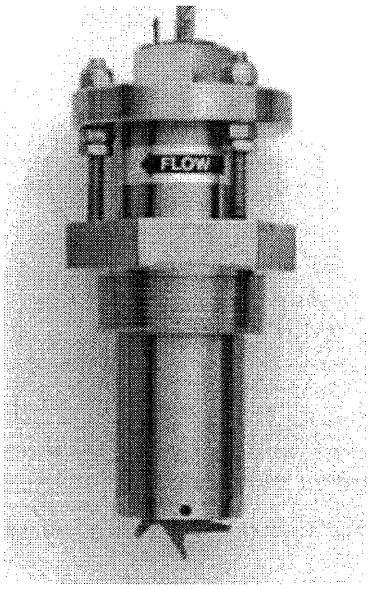
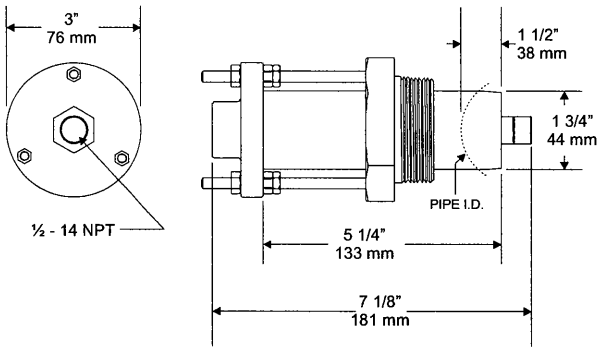
Series 200
Insertion Flow Sensors

The Data Industrial Series 200 flow sensors feature a six bladed impeller design with a proprietary non-magnetic sensing mechanism. The forward swept impeller shape provides higher, more consistent torque and is less prone to be fouled by water borne debris. The forward curved shape coupled with the absence of magnetic drag provides improved operation and repeatability even at lower flow rates. This is especially true where the impeller is exposed to metallic or rust particles found in steel or iron pipes. As the liquid flow turns the impeller, a low impedance square wave signal is transmitted with a frequency proportional to the flow rate. The signal can travel up to 2000' between the flow sensor and the display unit without the need for amplification. All sensors except irrigation versions are supplied with 20' of Belden type 9320 two conductor shielded cable.



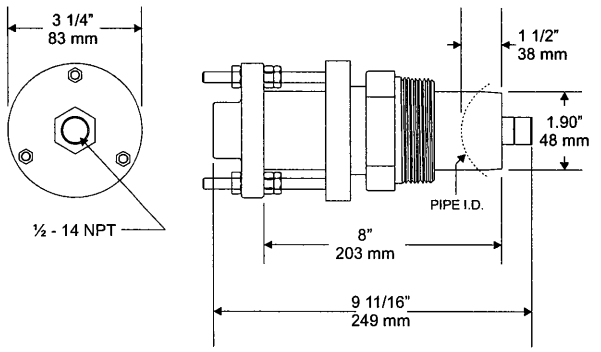
Dimensions 220BR, 220SS



Model 220BR (Brass) and 220SS (Stainless Steel) Sensor

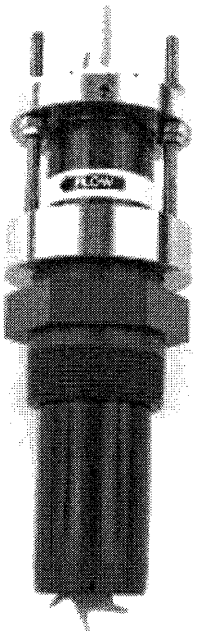
The Model 220B and 220SS sensors are used in most general flow measuring applications in metallic or non-metallic pipes. The sensor mounts in a 2" NPT pipe saddle or Threadolet® for installation in pipe sizes from 3" to over 40". Positioning nuts on the three threaded retaining rods allow the sensor to be accurately positioned to a standard insertion depth of 1½" into the pipe. When this insertion depth is maintained, and there is at least 10 upstream and 5 downstream diameters of straight uninterrupted flow, an accuracy of +/-1% of full scale can be obtained from flow velocities of 0.5 to 30 feet/second (± 4.0% of reading within calibration range).

Dimensions 220PVS



Model 220PVS

The Data Industrial 220PVS flow sensor is an insertion style flow sensor constructed of non-metallic materials for all wetted parts. These sensors are designed for service in corrosive liquids. The metallic trim, in non-wetted areas, is 316 stainless steel. The sensor mounts in a 2" NPT thread and may be attached to the pipe with a saddle or other types of mounting hardware.



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Specifications

Wetted Materials for all sensors
- (see ordering matrix)

Sensor Sleeve and Hex Adapter for 220BR
- Sleeve: Admiralty Brass, UNS C44300; Hex Adapter: Valve Bronze, UNS C83600

Sensor Sleeve and Hex Adapter for 220SS
- 316 Series Stainless Steel

Temperature Ratings
- Standard Version:
  221°F (105°C) continuous service
- Irrigation Version:
  150°F (66°C) continuous service
- PVC Version:
  140°F (60°C) continuous service
- High Temperature Version: (not available in PVC)
  285°F (140.6°C) continuous service
  305°F (150°C) peak temperature
  (limited duration)

Pressure Ratings

Metallic Sensor	At 100°F	At 300°F
220BR	400 psi	325 psi
220SS	400 psi	325 psi

Plastic Sensor	At 100°F	At 300°F
220PVS	100 psi	N/A

Recommended Design Flow Range
- 0.5 to 30 ft/sec
- Initial detection below 0.3 ft/sec

Accuracy
- ± 1.0% of full scale over recommended design flow range
- ± 4.0% of reading within calibration range

Repeatability
- ± 0.3% of full scale over recommended design flow range

Linearity
- ± 0.2% of full scale over recommended design flow range

Transducer Excitation
- Quiescent current 600uA@8VDC to 35VDC max.
- Quiescent voltage (V_{high})
  Supply Voltage -(600uA*Supply impedance)
- ON State (V_{Low}) Max. 1.2VDC@40mA current limit (15Ω+0.7VDC)

200 Series Insert Style Matrix (sizes 3" and up)

	Example:	2	20	BR	00	0	5	-	1	2	1	1
STYLE												
Short Insert			20									
MATERIAL												
Brass				BR								
Stainless Steel				SS								
PVC Sleeve w/Stainless Steel Trim				PVS								
Size												
Insert Style					00							
Electronics Housing												
PPS						0						
ELECTRONICS												
Magnetic							2					
FM/CSA Approved							4					
Standard							5					
IR-Irrigation							6					
High Temperature							8		0	2	2	3
O-RING												
Viton									0			
EPDM									1			
Kalrez									2			
Food Grade Silicon									3			
Neoprene									4			
Chemraz									5			
Teflon Encapsulated Viton									6			
Teflon Encapsulated Silicone									7			
Buna N									8			
SHAFT												
Zirconia Ceramic										0		
Hastalloy C										1		
Tungsten Carbide										2		
Titanium										3		
Monel										5		
316 Stainless Steel										6		
Tantalum										7		
IMPELLER												
Nylon											1	
Tefzel											2	
BEARING												
Pennlon												1
Tefzel												2
Teflon												3

Output Frequency
- 3.2 Hz to 200 Hz

Output Pulse Width
- 5 msec ±25%

Electrical Cable for Standard Sensor Electronics
- 20 feet of 2-conductor 20 AWG shielded U.L. type PTLC wire provided for connection to display or analog transmitter unit. Rated to 105°C. May be extended to a maximum of 2000 feet with similar cable and insulation appropriate for application.

Electrical Cable for IR Sensor Electronics
- 48 inches of U.L. Style 116666 copper solid AWG 18 wire w/direct burial insulation. Rated to 105°C.

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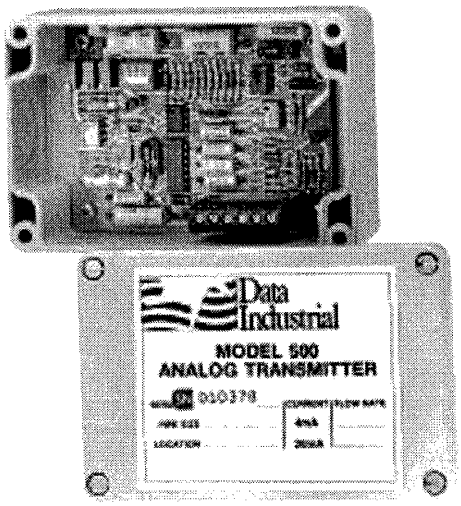
Data Industrial®

Series 500 Analog Signal Transmitter



The Series 500 Analog Transmitter is a 4-20mA current converter. It is normally used as a loop-powered device for use with all Data Industrial non-magnetic flow sensors. The transmitter is equipped with an on-board calibration frequency source. This source allows the unit to be field calibrated. It has two frequency span ranges (high and low) to provide for high resolution of the 4-20mA signal to a specific flow range.

Product Features

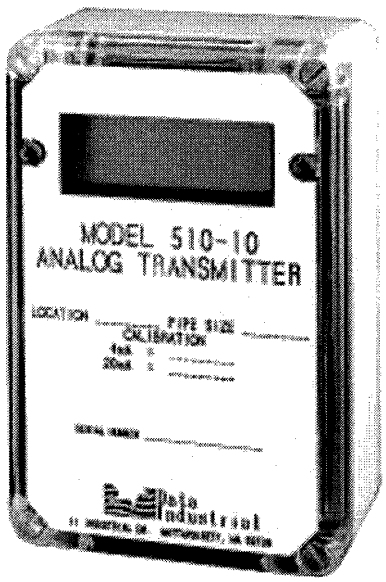
1. **User Adjustable Scale -** The user can select the resolution of the 4-20mA signal from the ranges of the various pipe size configurations.
2. **Maximum Signal Resolution -** To maximize the resolution of the 4-20mA signal the 4mA value can be set to values other than Zero. The 20mA value can also be adjusted to reflect the minimum or maximum range of flow required to interface to other equipment with the analog signal.
3. **Power Supply Options -** The Series 500 is normally loop-powered, drawing the necessary power from the loop itself. If there is no loop power available, an independent power supply is available from Data Industrial.
4. **Mounting Options -** The Series 500 is enclosed in a NEMA 4X, waterproof enclosure. The Model 550 is available as an open-chasis circuit board for mounting inside another panel or enclosure.
5. **Optional Display -** The Model 510 features a 3½ digit LCD display visible through a clear cover. The display is equipped with adjustable span and offsets for field calibration.

Applications

The Series 500 is intended for use with any device that requires a 4-20mA input signal; to log or display flow rate; or as the input to a flow based process control system, PLC or CPU.

Typical examples of the kinds of systems and equipment requiring a flow signal proportional to 4-20mA are:

- Chemical Feed Systems
- Batch Control Systems
- Mixing/Blending Systems
- Data Logger Systems
- SCADA & Recorder Systems
- Energy Management Systems
- BTU Measuring Systems
- Irrigation Control Systems
- Heat Exchanger Systems



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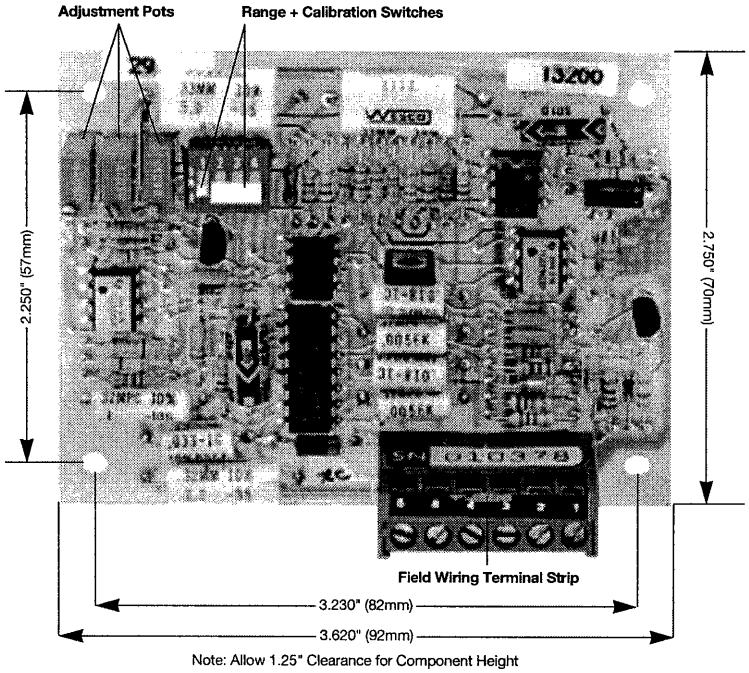
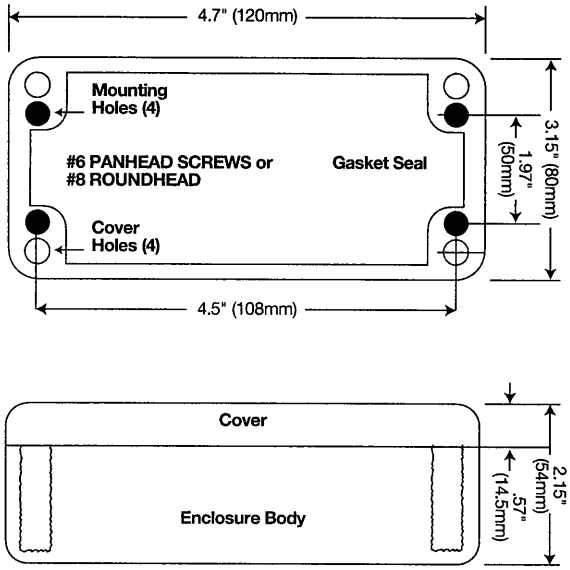


Note: Allow 1.25" Clearance for Component Height



Series 500 Watertight Enclosure

Specifications

Operating Range:
— 4-20mA Loop output, 0-110Hz square-wave frequency input.

Loop Voltage:
— 10V minimum, 35V maximum.

Linearity:
— Better than 1%.

Electrical:
— Meets ISA requirements, Classes L, H, and U. Non-isolated.

Load Resistance:
— Max. 650 Ω @ 23 Volts.

Power Requirements:
— 4-20mA loop voltage or 10VDC min. 35VDC max.

Device Output Ripple:
— Less than 0.25% of full scale for a fully stable sensor input.

Output Response Time:
— Six seconds (typ.), 10-90% step response.

Operating Temperature Range
500/550:
— -20°F to +150°F (-29°C to +65°C)
510:
— -32°F to +122°F (0°C to +50°C)

Storage Temperature Range
500/550:
— -40°F to +185°F (-40°C to +85°C)
510:
— -14°F to +140°F (-10°C to +60°C)

Conformal Coating:
— Circuits are coated with a clear colorless coating meeting Mil-spec Mil-146058C, Type AR, for humidity, moisture and fungus resistance.

Enclosure:
— Polycarbonate with tongue/groove neoprene sealed cover. Meets NEMA 1, 2, 3, 4, 4X, 5, 12, and 13 specifications.

Ordering Information

500-10
— Transmitter in NEMA-4 housing
510-10
— Transmitter in NEMA-4 housing with LCD display
550-10
— Unhoused Circuit Board Only
A-501
— Plug-in Power Supply 120VAC/24VDC
A-502
— Barrier Strip Power Supply 120VAC/24VDC

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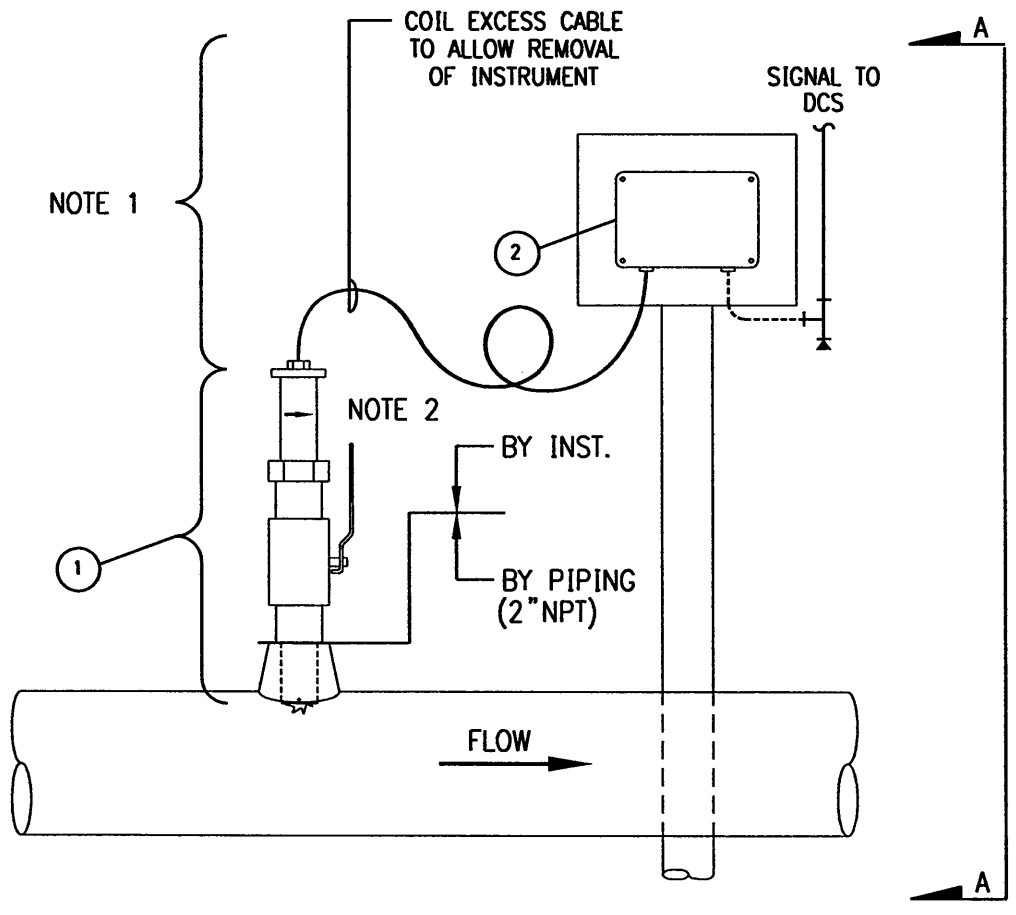
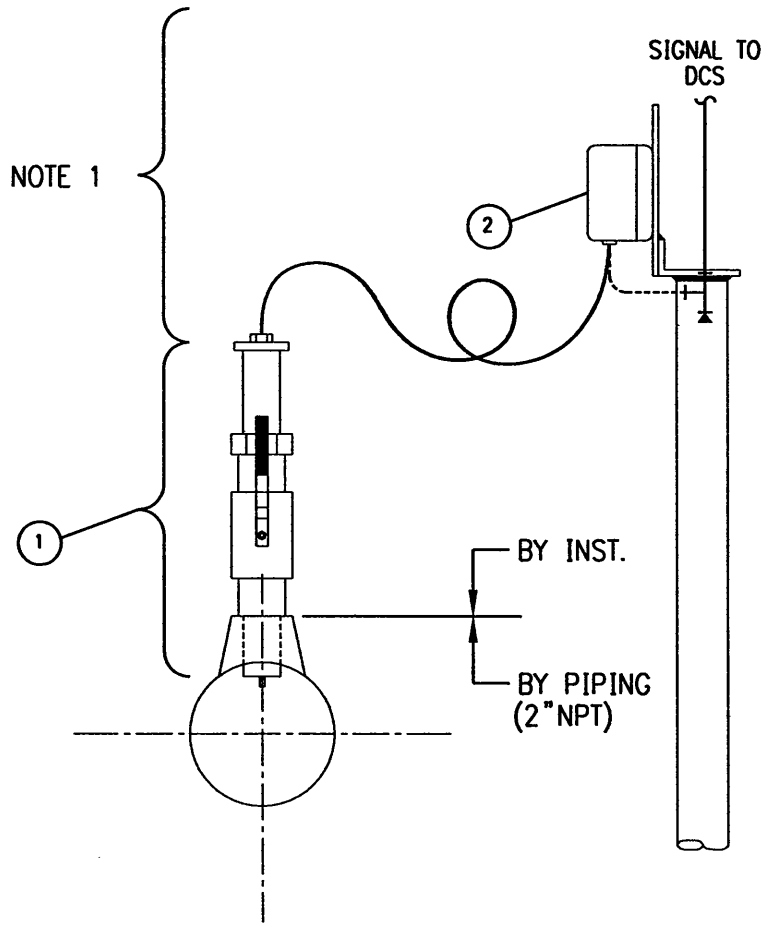
BILL OF MATERIAL

ITEM	QUANTITY	SIZE	SPEC	RATING	DESCRIPTION
1	1	---	---	---	HOT TAP FLOW ELEMENT W/BALL VALVE, DATA INDUSTRIAL PN 226SS
2	1	---	---	---	SERIES 500 ANALOG TRANSMITTER, DATA INDUSTRIAL PN 500-10





SECTION 'A-A' VIEW
(INSTR. ORIENTATION)

(NOTE 8)

TAG NO
0FE1442
0FT1442

GENERAL NOTES:

1. A MINIMUM OF 35" OF CLEARANCE ABOVE OUTSIDE WALL OF PIPE IS REQUIRED FOR REMOVAL AND INSERTION OF SENSOR.
2. MAINTAIN PROPER FLOW DIRECTION. FLOW SENSOR IS DIRECTION SPECIFIC.

PROGRESS PRINT

JUN 2 4 2002

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Document Control

REFERENCE DRAWING
0516 P040 WASTEWATER SYSTEM P&ID

REFERENCE SPEC.
SP-E490 ELECTRICAL INSTALLATION
SP-P200 PIPING MATERIAL AND VALVES

REVISION	DATE		BY	CHECKED	PROJ. ENG.	APPROVED	PROJ. MGR.
A	6/11/02	ISSUED FOR CONSTRUCTION	TB	PW	FHB	JTF	FB
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SCALE: NONE	DATE: 20 Jun 2002 9:38am

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CALEDONIA GENERATING PROJECT

SOUTHAVEN POWER, LLC - SOUTHAVEN, MS
CALEDONIA GENERATING, LLC - CALEDONIA, MS

INSTRUMENT INSTALLATION DETAIL
PADDLEWHEEL FLOW TRANSMITTER

DWG. NO. 0516 ID0160-12 REV A

11"x 17"

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