ORIFICE PLATE FLOW INDICATOR
U6 SERIE

- **Mounting in all positions**
- **Construction: cast iron or stainless steel**
- **For pipes from ND 40 up to ND 300 mm**
- **Scale amplification from 2 to 10**
- **Accuracy: ± 2.5 %**
- **Optional: High or/and Low flow switches**

PRINCIPLE

The orifice plate flow indicators U6 are specifically designed for the measurement of high flow rates. They are suitable for pipes with a diameter equal or over 2".
The direct reading is done on a variable area flow meter.
For an optimal accuracy, the diaphragm characteristics are calculated against the process parameters *(see further on)*.

TECHNICAL FEATURES

Measuring range:	1 to 1600 m^3/h [Water at 20°C]
	180 to 200 000 Nm^3/h [normo m^3/h of air]
Accuracy:	± 2.5% full scale
Repeatability:	± 0.5% reading
Scale amplification:	from 2 to 10 - Linear scale
Temperature limits:	0 ... 90°C, sealing in Buna
	0 ... 150°C, sealing in FPM
Pressure limit:	21 bar as a maximum

MATERIALS

Wetted parts:	Cast iron and brass *(standard)*
	Stainless steel 316 *(on request)*
Diaphragm:	Stainless steel 316
Flow indicator:	Borosilicate glass tube
Diver:	Stainless steel 316 SS (*liquids)*
	Aluminium (gases)
Thrusts:	Stainless steel 316
Sealing:	O-rings in Buna N as standard; FPM on request

OPTIONS

Alarm contacts:	*(low or high flow rate)*
Inductive contact:	Mono or bi-stable
Operating temperature:	Ambient from -25°C to 60°C
Protection:	IP 67
Protection relay:	Relay S112A

764

BAMO MESURES
22, Rue de la Voie des Bans - Z.I. de la Gare - 95100 ARGENTEUIL
Tél : (+33) 01 30 25 83 20 - Web : www.bamo.fr
Fax : (+33) 01 34 10 16 05 - E-mail : info@bamo.fr

Scales [Water at 20°C]										
P and H /mbar										
P	100		160		250		400		630	
DN	m^3/h	H	m^3/h	H	m^3/h	H	m^3/h	H	m^3/h	H
50	16	35	20	55	25	88	32	140	40	220
80	36		46		57		72		90	
100	62		78		98		124		155	
150	136		172		215		272		340	
200	245		310		385		485		610	

Scales [Air in Normo m3/h]								
P and H /mbar								
P	16		25		40		160	
DN	Nm^3/h	H	Nm^3/h	H	Nm^3/h	H	Nm^3/h	H
50	180	5	220	8	280	13	560	53
80	450		560		710		1430	
100	700		880		1120		2250	
150	1600		2000		2500		5000	
200	2820		3500		4500		8650	

P: measuring differential pressure / H: pressure loss

Flow rates herein above are for U6 according to the internal diameter of the pipe.

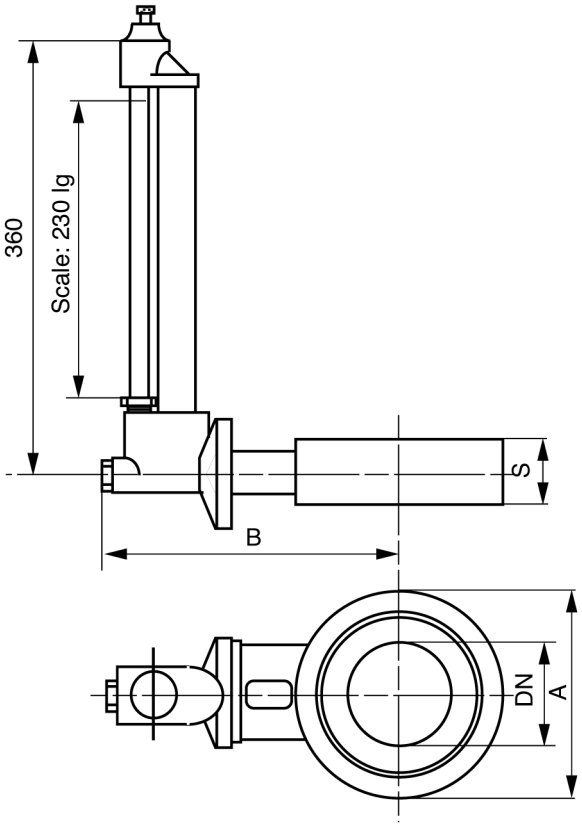
For air, flow rates are in Normo m3/h, operating pressure and temperature should be confirmed with the order.
The air should be dry without humidity to prevent condensation in the reading tube.

MOUNTING

The specific connection *(jointed coupling)* between the diaphragm and the flow indicator allows mounting of U 6 unit on vertical or horizontal pipe *(with any flow direction)*.
Special mention is necessary for the reading scale: over or below the pipe axis.

Fitting: wafer type, between flanges PN 10 bar *(standard flanges supplied on request)*.

Type	ND	A	B	S
U 6 - 3000	40	88	167	34
U 6 - 3100	50	100	174	34
U 6 - 3200	65	115	184	34
U 6 - 3300	80	130	194	34
U 6 - 3400	100	155	204	34
U 6 - 3600	150	210	234	38
U 6 - 3800	200	265	264	38
U 6 - 4000	250	315	294	38
U 6 - 4200	300	370	324	38



Details to confirm with an inquiry

Fluid: . . . . . .
Pressure: . . . . . bar
Temperature: . . . . . °C
Specific weight: . . . . . kg/L or kg/Nm^3
Maximal flow rate: . . . . . m^3/h or Nm^3/h
Pipe O. D: . . . . . mm
Pipe thickness: . . . . . mm
Pipe material: . . . . . .

764

BAMO MESURES
22, Rue de la Voie des Bans - Z.I. de la Gare - 95100 ARGENTEUIL
Tél : (+33) 01 30 25 83 20 - Web : www.bamo.fr
Fax : (+33) 01 34 10 16 05 - E-mail : info@bamo.fr

ORIFICE PLATE FLOW INDICATOR
U6 SERIE
07-05-2010 764 I1 01 B

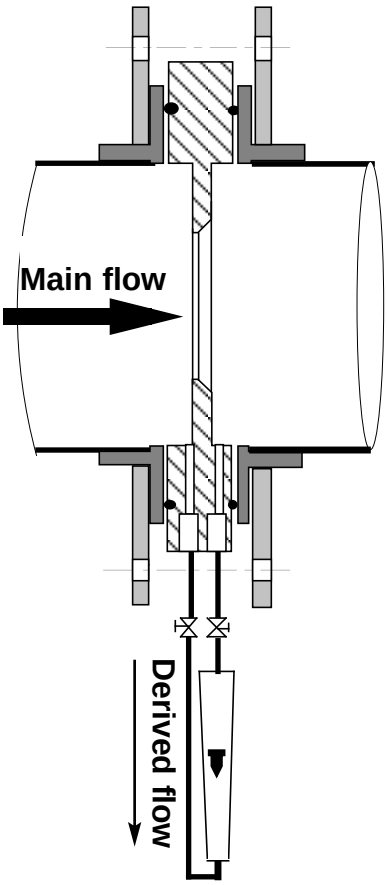
DEB
764-01/2

ORIFICE PLATE FLOWMETER
DB SERIE

- **Designed for agressive fluids**
- **Direct reading indicator**
- **From ND 50 up to ND 200 pipes**
- **Scale amplification from 2 to 10.**
- **Mounting in all positions**
- **Standardized with NF X 10-102 Norm**
- **Accuracy: ± 2,5 % full scale**
- **Option: Electrical switch counter**

PRESENTATION

Diaphragm is inserted between 2 flanges in the main duct. The differential pressure is transmitted to the exterior via 2 pressure ports on each diaphragm face. This pressure is proportional to the flow rate square in circulation inside of the duct. A flowmeter, mounting in derivation allow a direct reading of the flow rate. To obtain a strictly proportional to the main flow rate, a BORDA injector is insert before or after flowmeter.
This flowmeter can be replaced by a counter, allowing a totalization. Orifices can be only delivered in stainless steel 316 L, or with pressure ports directly on steel or stainless steel. Their accuracy is 1%, diameters are from 50 and 60 mm. We supply flowmeter with special graduation for derivated measure on all existing diaphragm, only if specifications are given before graduation.



SPECIFICATION

Measuring range	: From 2 to 350 m^3/h (see table on the back)
Accuracy	: ± 3 % (DB/IDP) ± 4 % (DB/PDP)
Repeatability	: ± 0,3 % (DB/IDP) ± 0,4 % (DB/PDP)
Scale amplification	: 2 to 10 (DB/IDP) 2,5 to 10 (DB/PDP)
Max. temperature	: 50°C - PVC 90° - PPH 120°C - PVDF
Max. pressure	: 10 bar (20°C)

MATERIALS

Diaphragm	: PVC - PPH - PVDF
Flowmeter associated	: PVC (DB/IDP-V - DB/PDP-V) : Trogamid (DB/IDP-T - DB/PDP-T) : Polysulfon (DB/IDP-P - DB/PDP-P)
Float	: PVDF
Supply line	: PVC - PPH - PVDF
Stop valves	: PVC - PPH - PVDF
O-Ring	: EPDM (standard) - FPM (on request)
BORDA injector	: PVC - PPH - PVDF

OPTION

For DB/IDP	: Electrical switch ZE 951
For DB/PDP	: Electrical switch ZE 951

765

BAMO MESURES
13, rue Pasteur - 95 100 ARGENTEUIL - FRANCE
Tél : (+33) 01 30 25 83 20 - E-mail : info@bamo.fr
Fax : (+33) 01 34 10 16 05 - Site : http://www.bamo.fr

SCALES

Ranges indicated on the attached board, for DB/PDP flowmeters , are not contractual, but can be modified within flow rate or diameter.
For DB IDP, minima flow rates have to be multiplied by 1,25.
Flow rates are indicated for PVC NP 10 pipes. In all events, the thickness and the exact interior diameter pipe have to be specified, so we may assure the specifications of the system.

DB / PDP Serie - water 20 °C				
ND	Range 1 m^3/h	Range 2 m^3/h	Range 3 m^3/h	Range 4 m^3/h
50	2 - 10	5 - 25		
65	2 - 10	6 - 30		
80	3 - 15	6 - 30	10 - 50	
100	4 - 20	6 - 30	16 - 80	
125	136	6 - 30	16 - 80	30 -150
150	245	10 - 50	20 -100	40 - 200
200		20 - 100	40 - 200	70 - 350

PRESSURE LOSS

The loss of charge is the difference of pressure between upstream and dowmstream unrecoverable, create by the orifice.
This loss of charge can be calculated on request.

INSTALLATION REQUIREMENTS

The installation conditions are useful to warrant a coherent measure in the range of precision.
The straight pipe lenghts upstream of the orifice, undermentioned, are given for indication.

	Number of D
SImple elbow at 90° or T (flow rate by one branch)	7
2 elbows at 90° in 2 different plans	17
Reducing from 2 D to D on lenght 1,5 D to 3 D	7
Valve completly open (type membran valve or ball valve)	7
Downstream	3

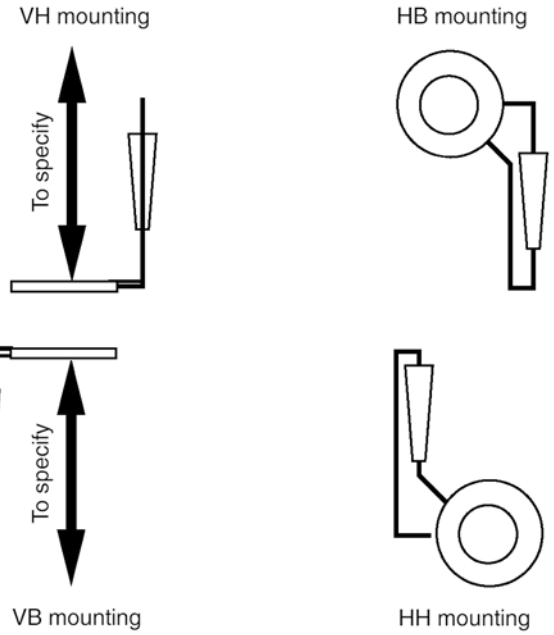
The straight pipe lenght upstream depend to relation between intern pipe diameter (D), and the diameter orifice.
The exact lenght to respect for conserving the precision of whole measure are communicated after each case study.

FIXATION FLANGES

The union nuts will be center with the flange of fixation as precisely as possible. The union nut arrest boards should be of the same diameter than intern diameter of tube, to avoid perturbation in liquid flow.
On resquest, we can deliver union nuts, flanges and screew.

TO SPECIFY FOR ANY COMMAND ORDER

Fluid	: .....
Pressure	: .....bar
Temperature	: .....°C
Volumic mass	: .....Kg/m^3 or Kg/Nm^3
Max flow to measure	: .....m^3/h or Nm^3 /h
Diameter of main duct	: .....mm
Thickness of duct	: .....mm
Material of the duct	: .....
Sense of circulation	: HB mounting, Left / Right
	: HH mounting, Left / Right
	: HB mounting, Right / Left
	: HH mounting, Right / Left
Circulation	: VB mounting, From bottom to top
	: VH mounting, From bottom to top
	: VB mounting, From top to bottom
	: VH mounting, From top to bottom



765

BAMO MESURES
13, rue Pasteur - 95 100 ARGENTEUIL - FRANCE
Tél : (+33) 01 30 25 83 20 - E-mail : info@bamo.fr
Fax : (+33) 01 34 10 16 05 - Site : http://www.bamo.fr

FLOWRATE MEASURE PROBE
DEBIX serie

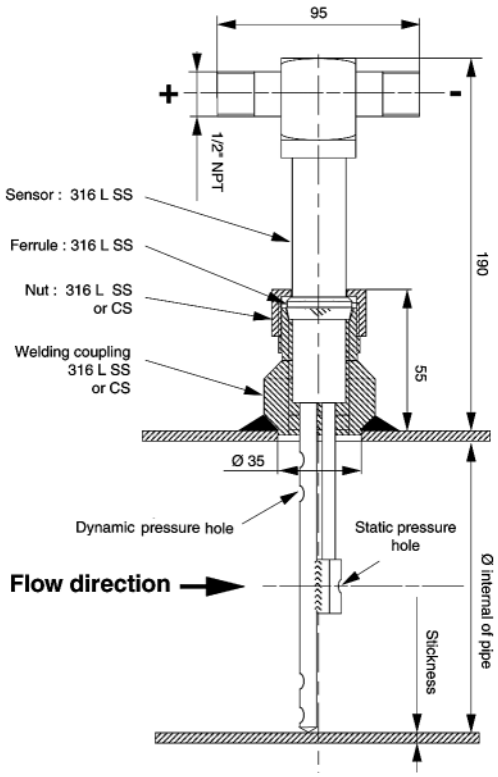
- **For pipes: ND 15 up to ND 3000**
- **Very low pressure loss**
- **Flow = (f) √ΔP**
- **For liquids, gazs and steams**
- **Permanent accuracy ± 1%**
- **Excellent repeatability: 0.1 %**
- **Proof against impurities**
- **Fast installation**

GENERALITIES

The main advantages in regard of other primary flow sensor as ventury tube and orifice plate are very characteristic.
DEBIX flow sensor can be used on all usual such liquids as water, petrol, oil or such gases as air, butane. Over heated or saturated steam flowrates can be measured to make energy balance.
The DEBIX probe allows measures in all kind of pipe such as carbon steal or concrete and all various forms (circular, square or rectangular).

PRINCIPE

Flow = f(√ΔP) - *Extension of Bernoulli theorem*.



DESCRIPTION AND FUNCTIONING

HP side: static P + dynamic P
Facing the flow, 4 ports are localised cutting the surface in 4 sections of equal flowrate. These 4 measured pressures are averaged and get added with static pressure into the pipe.
LP side: static P
Opposite flow, a 5th port get static pressure .
So, on the connection head, it is possible to get a differential pressure image of the flow as:

ΔP = (HP - LP) = stat. P + dyn. P - stat. P = dyn. P

COMPLETE MEASURING LINE

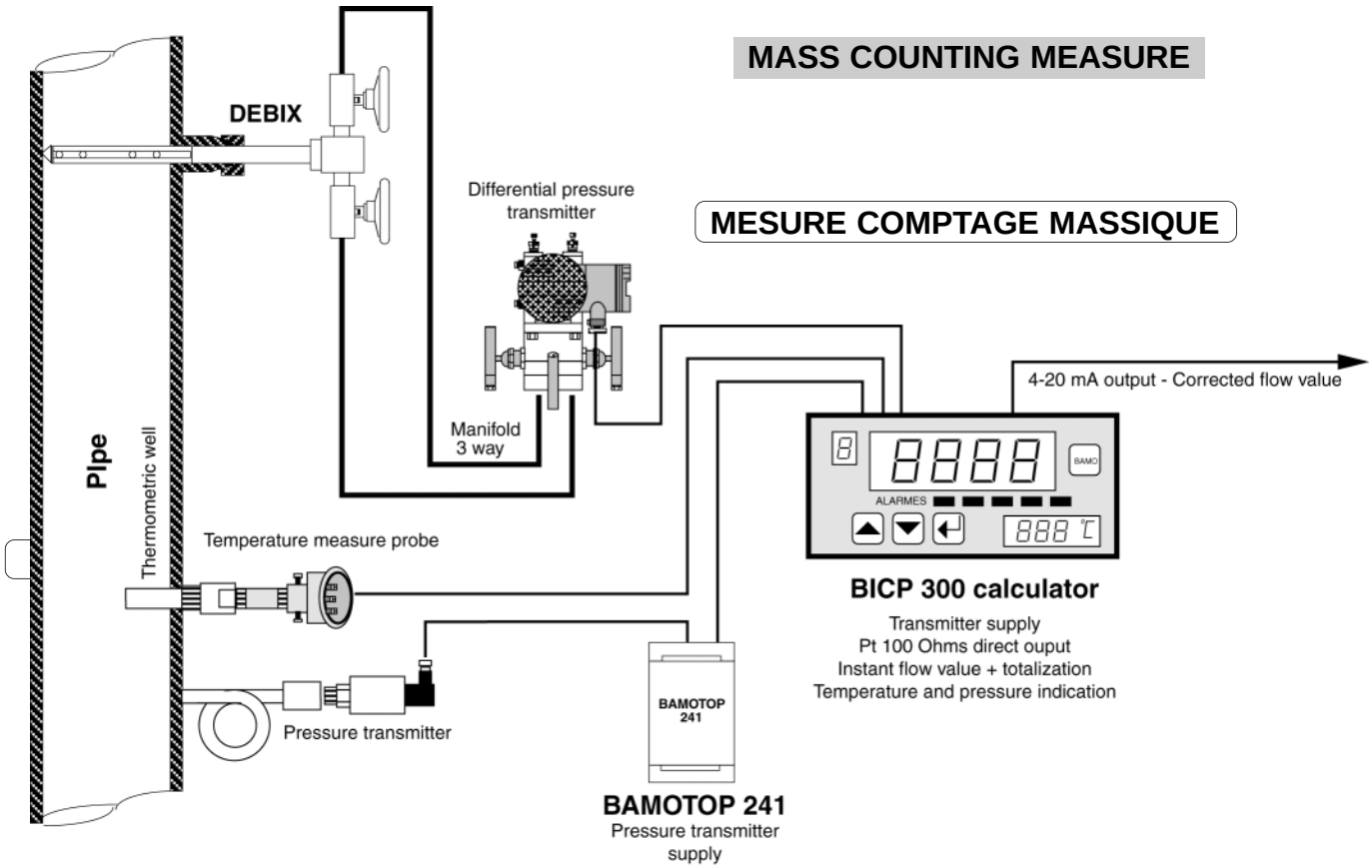
1) DEBIX flow sensor (following: pipe DIA and general conditions)
2) 2 insulation ball valves for High and Low Pressures (or manifold).
3) 1 ΔP electronic measure transmitter with 4-20 mA output, coupled with √ extractor.
4) 1 indicator + calculator, totalizer...

760

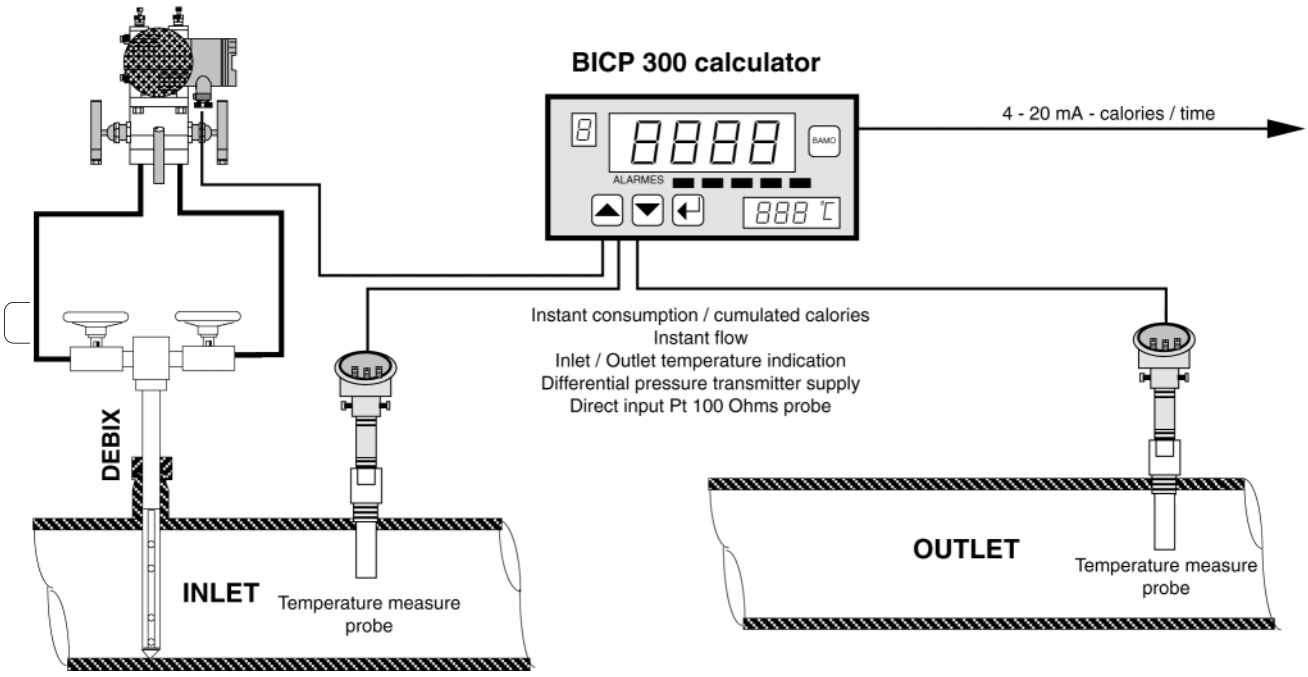
BAMO MESURES
22, Rue de la Voie des Bans - 95 100 ARGENTEUIL - FRANCE
Tél : (+33) 01 30 25 83 20 - E-mail : info@bamo.fr
Fax : (+33) 01 34 10 16 05 - Site : http://www.bamo.fr

MASS COUNTING MEASURE

MESURE COMPTAGE MASSIQUE



COUNTING OF CALORIES



760

BAMO MESURES
22, Rue de la Voie des Bans - 95 100 ARGENTEUIL - FRANCE
Tél : (+33) 01 30 25 83 20 - E-mail : info@bamo.fr
Fax : (+33) 01 34 10 16 05 - Site : http://www.bamo.fr

07-12-2004

FLOW SENSOR
DEBIX

760 I1 01 D

DEB

760/2

FLOWRATE MEASURE PROBE
DEBIX RO 215 - 220 - 225 - 226

TECHNICAL CHARACTERISTICS

Manufacture : 316 L Stainless steel
Connection : 1/4" or 1/2" M NPT
Fixing : Iron steel welding coupling with compression ferrule
Accuracy : ± 1 %
Repeatability : 0,1 %
Max. pressure : 16 bar (for P > 16 bar : see RB series)
Max. temperature : 400 °C

OPTIONS - ACCESSORIES

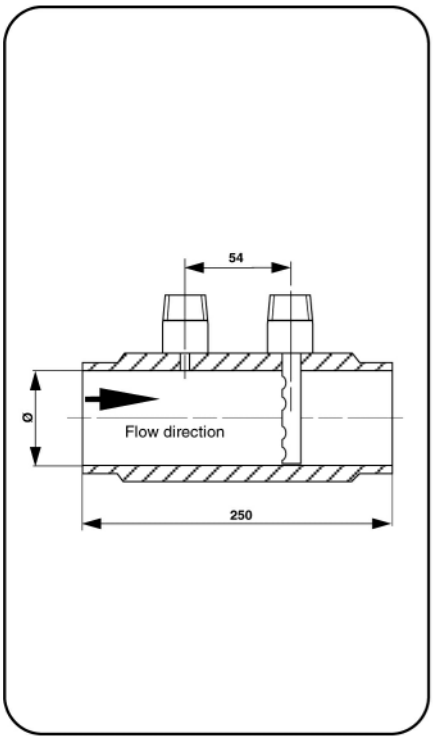
Connection : 1/4" M NPT
Fixing : Stainless steel welding coupling with compression ferrule
Ball valve : According to operating conditions
Needle valve : ..... identical .....
3 way manifold : ..... identical .....

RB 215 - 220 - 225 - 226 DEBIX Serie

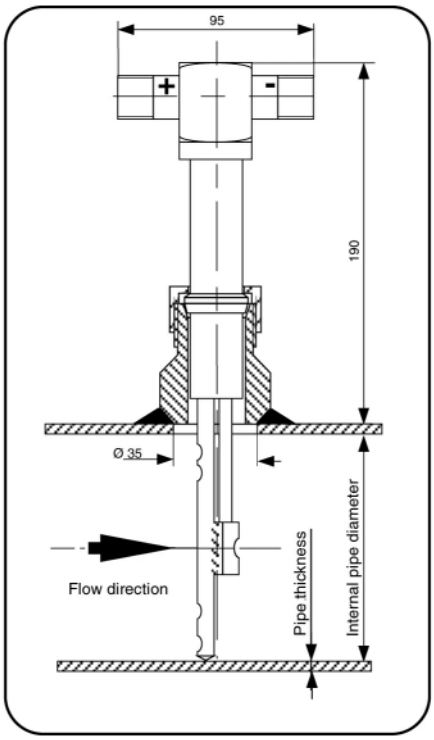
Max. pressure : 40 bar
Max. temperature : 400 °C
Fixing : By mounting flanges DN 32 PN 40
Max. flowrate : The same as RO serie

MAXIMUM FLOWRATE

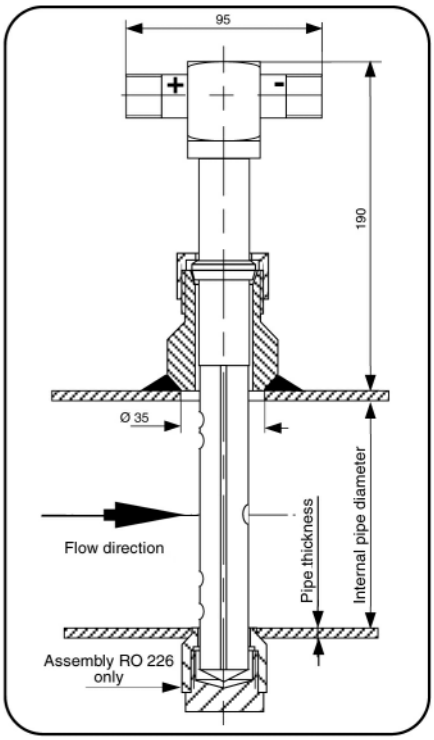
int. Ø	Flow in m3/h - Water - 20 °C			
25	30			
35	40			
40	50			
50		80		
60		100		
75		120		
90		150		
100		170		
125		220		
150			690	
200			950	
250			1220	
300			1480	2880
350			1730	3360
400			1980	3850
450			2220	4320
500			2460	4800
600			2890	5800
750			3580	7340
900			4610	8650
1050			5440	9940
1200				11590
1500				14330
1800				18470
	RO 215	RO 220	RO 225	RO 226



DEBIX RO 215



DEBIX RO 220



DEBIX RO 225 / 226

760

BAMO MESURES
22, Rue de la Voie des Bans - 95 100 ARGENTEUIL - FRANCE
Tél : (+33) 01 30 25 83 20 - E-mail : info@bamo.fr
Fax : (+33) 01 34 10 16 05 - Site : http://www.bamo.fr

07-12-2004
FLOW SENSOR
DEBIX
760 I1 01 D
DEB
760/3

STEAM FLOWRATE MEASURE PROBE
DEBIX ROV 215 - 220 - 225 - 226

TECHNICAL CHARACTERISTICS

Manufacture : 316 L Stainless steel
: Condensing cup: Iron steel (std)
: Insulating taps: Iron steel (std)
Connection : 1/2" F NPT on condensing cup
Fixation : Iron steel welding coupling with compression ferrule
Accuracy : ± 1 %
Repeatability : 0,1 %
Max. pressure : 16 bar (for P > 16 bar : see RBV series)
Max. T° C : 400 °C

OPTIONS - ACCESSORIES

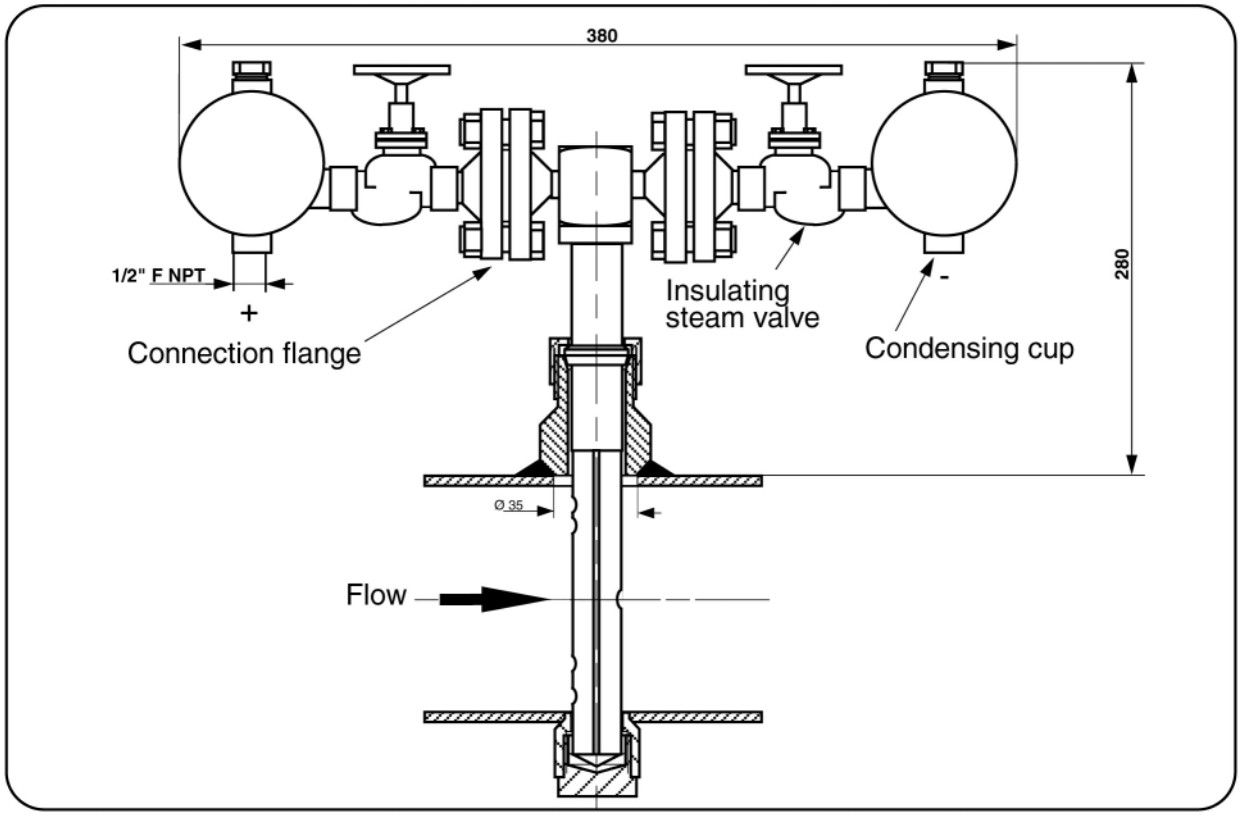
Fixing : 316 L stainless steel welding coupling with compression ferrule
Insulating taps : Stainless steel

RBV 215 - 220 - 225 - 226 DEBIX Serie

Max. pressure : 400 bar
Max. T° C : 400 °C
Fixing : Nipple and flanges ND 32 PN 25 up to PN 400
ΔP Max. : The same as RO serie

ΔP MAX. DIFFERENTIAL PRESSURE

int.Ø	Differential pressure in mbar			
25	3000			
30	1500			
40	1000			
50		1250		
60		800		
75		520		
90		400		
100		300		
125		200		
150			1250	
200			750	
250			500	
300			350	1250
350			250	900
400			20	700
450			150	550
500			100	450
600			70	300
750			50	200
900			40	150
1050			35	125
	ROV 215	ROV 220	ROV 225	ROV 226



DEBIX RO 225 WITH CONDENSING CUPS

760

BAMO MESURES
22, Rue de la Voie des Bans - 95 100 ARGENTEUIL - FRANCE
Tél : (+33) 01 30 25 83 20 - E-mail : info@bamo.fr
Fax : (+33) 01 34 10 16 05 - Site : http://www.bamo.fr

FLOWRATE MEASURE PROBE
DEBIX RF 110 - 112 - 113 - 118

TECHNICAL CHARACTERISTICS

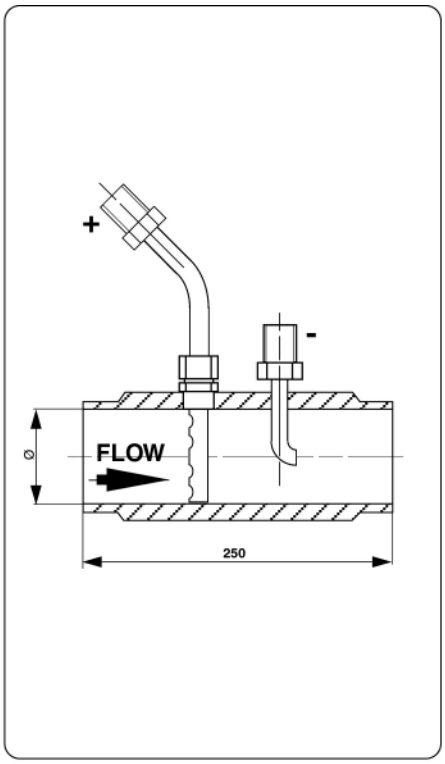
Manufacture : 316 L stainless steel
Connection : 1/4" M NPT
Fixing : According to type
Accuracy : ± 3 %
Repeatability : 0,3 %
Max. pressure : 16 bar
Max. temperature : 200 °C

OPTIONS - ACCESSORIES

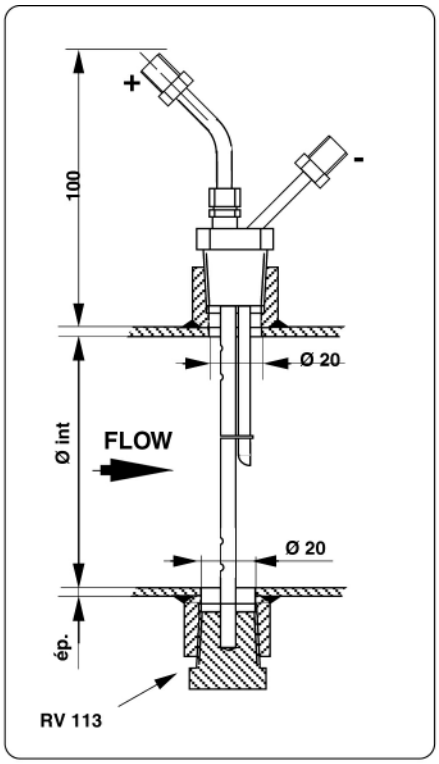
Connection : 1/2" M NPT
Ball valve : According to operating conditions
3 way manifold : ..... identical .....

MAXIMUM FLOWRATE

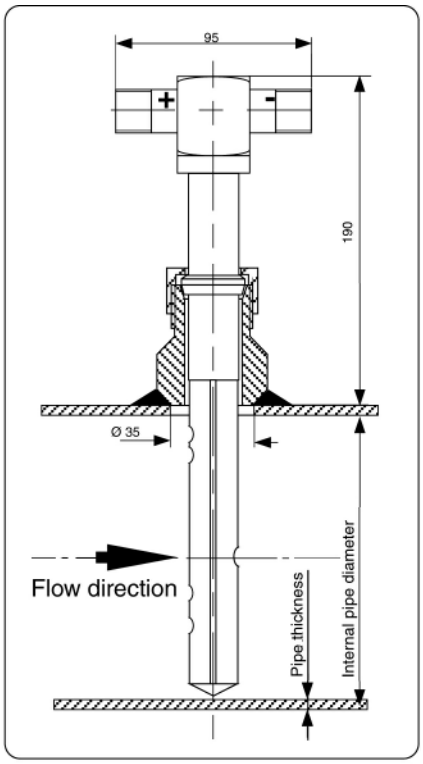
int. Ø	Flow in m³/h - Water 20 °C			
25	30			
30	35			
40	45	70		
50	65	89		
65	90	125		
75		135	295	
90		155	350	
100		175	390	
125		220	490	
150		265	590	820
175		300	640	950
200		350	790	1200
225		410	910	1350
250		510	1020	1500
300		650	1220	1840
400				2400
550				3090
600				3890
	RF 110	**RF 112**	**RF 113**	**RF 118**



DEBIX RF 110



DEBIX RF 112 - 113



DEBIX RF 118

760

BAMO MESURES
22, Rue de la Voie des Bans - 95 100 ARGENTEUIL - FRANCE
Tél : (+33) 01 30 25 83 20 - E-mail : info@bamo.fr
Fax : (+33) 01 34 10 16 05 - Site : http://www.bamo.fr