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SLUDGE CONCENTRATION
MES-METER APF-MES

REF : PONAPFMES-TRANS

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User Manual
Including installation and use of MES5 sonde

MES-TRANS meter with MES5 sonde

PONCIR-MES5-S10
Absorbsion Infra red sonde
(5 mm optical sonde)

Water under your control

TABLE of CONTENT

Water under your control

ASSEMBLY, SET UP AND INSTALLATION OF APF-MES-TRANS METER and MES5-S10 SONDE

1. INSTALLATION OF SONDE MES5-S10.

This sensor is delivered with a standard 10 meter cable (-S10) sealed to the sensor, allowing up to 5 bar water pressure for 50 meter depths.

For a fixed installation in a basin or in an open canal, we supply PVC perches (50mm tubes) and fixtures allowing to perform the measures in optimal conditions. You can also get them directly from your domestic market. Please consult us for more information or before mounting sensors inside pipes.

Note 1:
This perch is 2,60 meter long, straight or elbowed and can be cut to your size. The sensor is fixed to the perch through a BP3P-50 connecting joint.

Note 2 :
For optimal results, please follow these suggestions :

- The sensor must be at least 30 cm under the water surface
- Avoid dead areas without any water flow.
- If there is a water flow in one particular direction, it is recommended to position the optical slot of the sensor in the same direction.

2. INSTALLATION OF THE APF-MES-TRANS METER

See external dimensions in Annexe 4 « TECHNICAL SPECIFICATIONS».

The APF-MES-TRANS box can be fixed indoors or outdoors (protection IP 659 with cover closed), high enough not to be flooded.

Note :
Avoid putting this equipment in an environment with strong electromagnetic fields.

For instance, do not fix the sensor cable together with high intensity power supply cables, like pumps : commutations, frequent on and off commands of power elements can be disturbing despite the excellent shielding of our cables.

In order to allow easy access for calibrations, the APF-MES-TRANS box should be placed at eyes height and the installation should take in account the need to easily open the transparent front cover (see appendix).

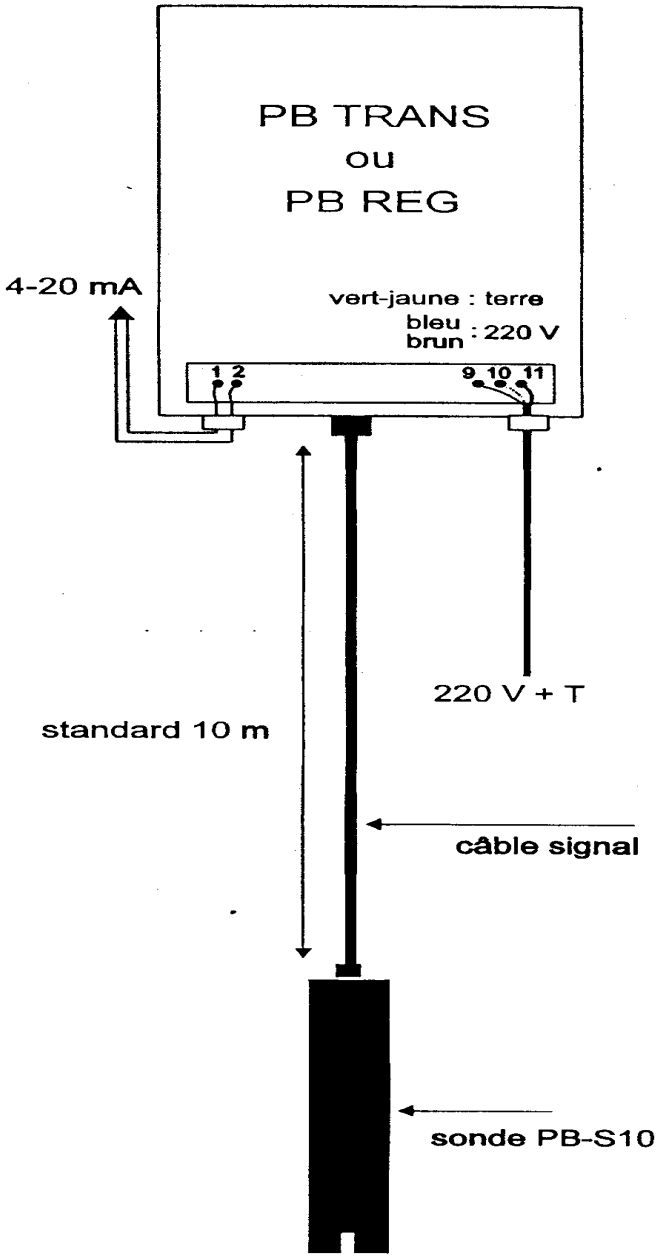
The APF-MES-TRANS box has 4 feet to fix it to any vertical surface with 4 screws (∅ 5mm) which are not supplied.

3. Cabling the APF-MES-TRANS meter and fixing the SONDE MES5-S10 to the meter (see drawing 1)

Once the meter firmly fixed on a wall or any vertical surface, proceed like follows:.

1. Pull away the complete transparent front cover of the meter box after having unscrewed the 4 screws.
2. Pull away the lower part which protects the electrical contacts after having unscrewed the 2 screws: the contacts are now unprotected.

Only 5 out of the available 11 contacts are to be used..



Drawing 1

Cabling the APF-MES-TRANS meter and fixing the SONDE MES5-S10 to the meter

3.1. Power supply:

Use a three threads power supply cable (220 V / 50 Hz / 40 VA / 3 x 1,5 mm^2) , pass it through the watertight right entry on the bottom face of the box, and use contacts 9 – 10 – 11 on the right side (green-yellow for earth, blue and brown for 220 V).

Note :
It is essential to check that the 220 V power supply complies with existing norms, knowing that a lot of disturbances in measuring processes have their source in an incorrect power supply.

3.2. Cabling of the 4-20mA output:

The 4-20 mA output has its own power supply and will not deliver more than 24 mA in order not to harm any remote equipment.

1. Use a telephone pair cable, pass it through the watertight left entry on the bottom face of the box, and use contacts 1 – 2 on the left side (contact 1 : – / contact 2 : +)

2. Screw back the contacts protection and the front cover of the meter.

Note :
Maximum allowed load on the 4-20 mA curl is 500 Ω.

Drawing of the contacts in APF-MES-TRANS

4. CONNECTING THE SENSOR TO THE METER.

Simply stick the sensor cable termination into the central plug of the bottom face of the meter and screw.

The equipment is ready for calibration.

FRONT USER INTERFACE OF APF-MES-TRANS

1. DESCRIPTION OF THE FRONT FACE OF APF-MES-TRANS (drawing II)

1.1. « M/A » switch (ON/OFF), « MARCHE » (ON) watch led, « FUS » fuse.

When the "M/A" switch is on "M" the meter is powered, the "MARCHE" led is permanently lit.
The fuse « **FUS** » if needed, should be replaced by a 1 A fuse.

1.2. Digital screen:

The screen is a LCD3 $^{1/2}$digits (2 000 points). It will count up to 75,00 or 78,00, suspended matters being measured in g/l as units. Above that value, it will saturate.

1.3. Potentiometer «ETAL ».

The use of this potentiometer is described in the chapter « CALIBRATION OF THE MES-METER WITH ITS SENSOR", setting the SLOPE..

1.4. Push-button « MEM ».

The use of this button is described in the chapter « CALIBRATION OF THE MES-METER WITH ITS SENSOR", setting the SLOPE.

1.5. Potentiometer « Z ».

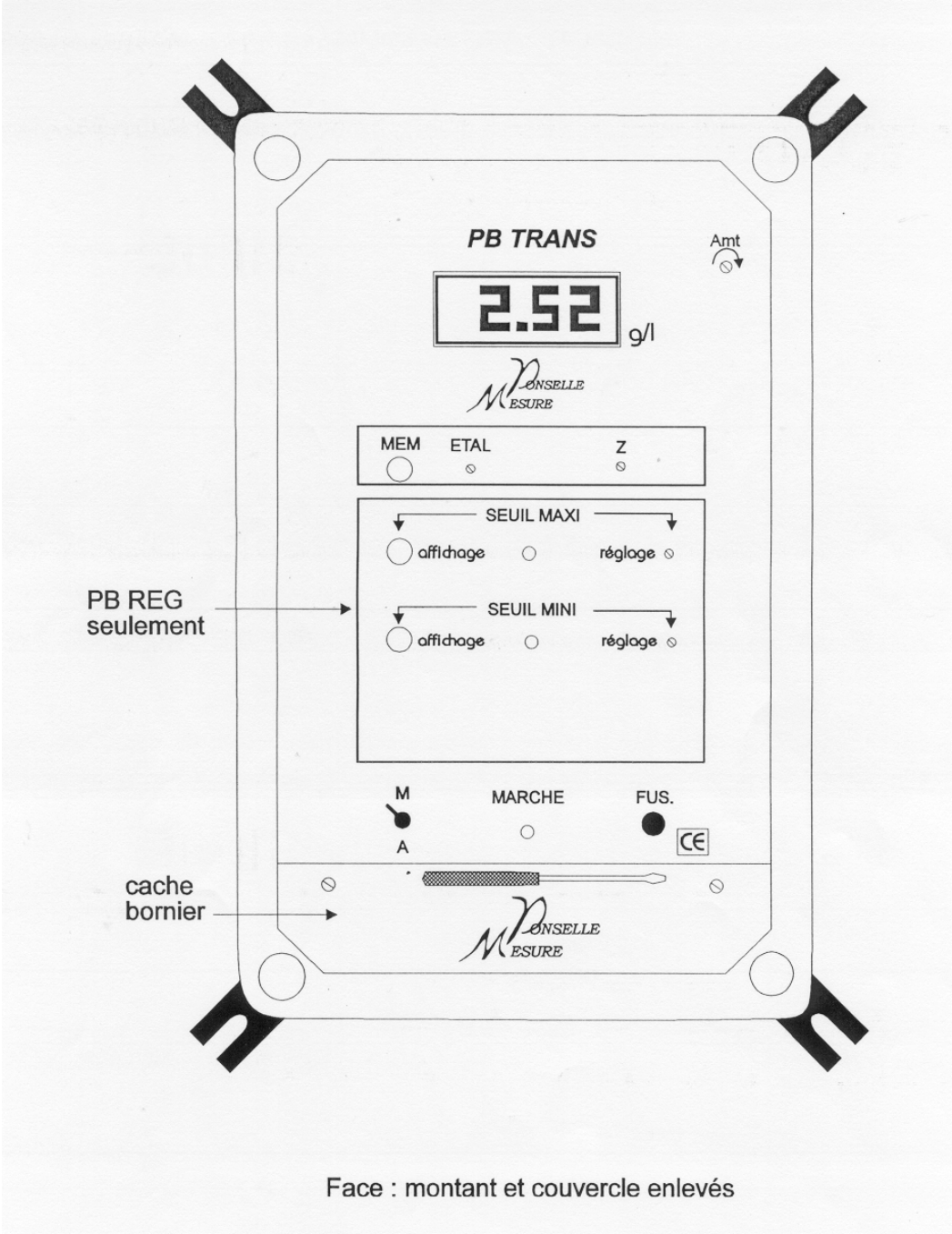
The use of this button is described in the chapter « CALIBRATION OF THE MES-METER WITH ITS SENSOR", setting the ZERO.

1.6. Potentiometer « Amt ».

Access to this potentiometer requires taking off the complete cover. It is located on the right upper part in the box.

This potentiometer allows amortizing the signal when calibrating or measuring.

Turning « **AM** » clockwise will decrease instability.



Face : montant et couvercle enlevés

Drawing 2
Front face of APF-MES-TRANS/REG

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CALIBRATION OF THE MES-METER WITH ITS SENSOR

1. Setting the ZERO

1. First of all, clean the MES5-S10 sensor. The optical glasses of the slot must be cleared from any dirt or dry sludge.(clean the optical slot with a wet cloth). Then immerse the sensor in clear water (tape water for instance).

2. wait eventually during a few minutes for the temperature compensation to be stabilized, (account for 10 sec./° C temperature spread between sensor and measured medium, i.e. 5 minutes for $\Delta \pm 30°C$).

2. Turn potentiometer « Z » until screen displays « 0.00 » (+/- 0.01).

3. Setting the SLOPE

1. Setting the slope of the instrument is required before measuring in g/l units suspended solids concentration in any new medium or sludge. Once this slope is set, no more slope calibration will be needed for this environment. It requires a laboratory service able to perform a normalized analysis by filtration or centrifugation

2. Take a sample of the medium to be measured significant enough in size in order to allow to immerse completely the sensor (a bucket for instance)

3. Immerse the sensor in the bucket and gently stir in order to maintain the suspension.

4. Take a note of :

   - The value « a » or its average which is displayed on the screen of the meter.
   - The value of the slope « x_1 »displayed on the same screen when the « MEM » button on the left of the "Z" potentiometer is pushed and kept in this pushed position in order to unable a stable reading.

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5. Hand over the sample to the Laboratory service which will perform a normalized analysis by filtration or centrifugation and give back an accurate value of the suspended solids concentration in g/l .

   If necessary, you can ask for several results and take in account only the average value.

6. If the difference between the result of the Laboratory analysis and the value « a » read previously on the screen is considered as too important, introduce the slope correction as follows :

If :	a (mg/l)	:	the initial concentration value displayed on the screen.
	X_1	:	the initial value of the slope .
	b (mg/l)	:	the Laboratory value for the medium concentration.
	x_2	:	the new value of the slope.

$$a / x_1 = b / x_2 \rightarrow x_2 = x_1 . (b / a)$$

Push the « MEM » button and while keeping it pushed, turn the potentiometer « ETAL » until x_2 is displayed on the screen

MAINTENANCE OF THE MES5-S10 SENSOR

Periodically, clean the sensor head with a water spray, insisting particularly on the surfaces inside the optical slot.

Note :
It is practically impossible to recommend a given frequency for cleaning the sensor, numerous parameters interfering in the process, among which the quality of the sludge most importantly.

In certain applications, cleaning once a month is enough, in others, it is necessary to clean every second day.

Progressive and continuous drift in measuring values very often mean the optical surfaces have been tarnished or covered by a biofilm.

1. Clean carefully the optical surfaces.
2. Control and reset if needed the ZERO (see : calibration, setting the ZERO).

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OTHER INFORMATIONS

1. MAXIMUM PRESSURE LIMIT IN USE:

The sensor is perfectly water tight, thanks to the excellent sealing between the cable and the sensor.

Still, we recommend 5 bars as the maximal pressure for permanent use.

For higher pressures, please contact us.

2. FIXING THE SENSOR INSIDE PIPES:

We have a lot of experience using our sensors in various applications which necessitate special mountings and fixtures.

Please contact us for:

- Insertion in pipes with or without pressure;
- Use in special aggressive mediums;

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Caractéristiques techniques	MES10–S	MES5–S	TU20–S
références pour piquage	MES10–Sp	MES5–Sp	TU20–Sp
Paramètres mesurés	M.E.S.	M.E.S.	FTU / M.E.S
Plage de mesure (à choisir à la commande)	0–10	0/20 à 100	0–2000
unités	g/l	g/l	FTU et mg/l
Précision de mesure	+/– 0,5% VL (valeur lue) +/– 1 digit		
Compensation de température	Automatique par CTN de +5 à 40°C		
Matériaux en contact avec le milieu	Delrin Verre spécial Polyuréthane		
Longueur d'onde d'émission	950 nm	950 nm	880 nm
Type d'émission	Pulsée. Fréquence de récurrence 10Hz, régulée.		
Longueur du trajet optique (mm)	10	5	20
Poids	• environ 500 g		
Dimensions du capteur (hors tout) l x diam.	196 x 63	196 x 63	245 x 64
Connecteur	7 broches 'mâle', type Hirschman		
Type de câble	7 fils, blindé par tresse extérieure, gainé polyuréthane		
Poids du câble	40 g / mètre linéaire		
Longueur de câble (x mètres en standard)	5/10	10	5/10
Indice de protection	IP 68		
Contraintes :			
Pression hydrostatique	max . 20 bars		
Température	max. 80°C		
Options	Perche porte capteur fixe Accessoires de montage en piquage		

ATTACHEMENTS

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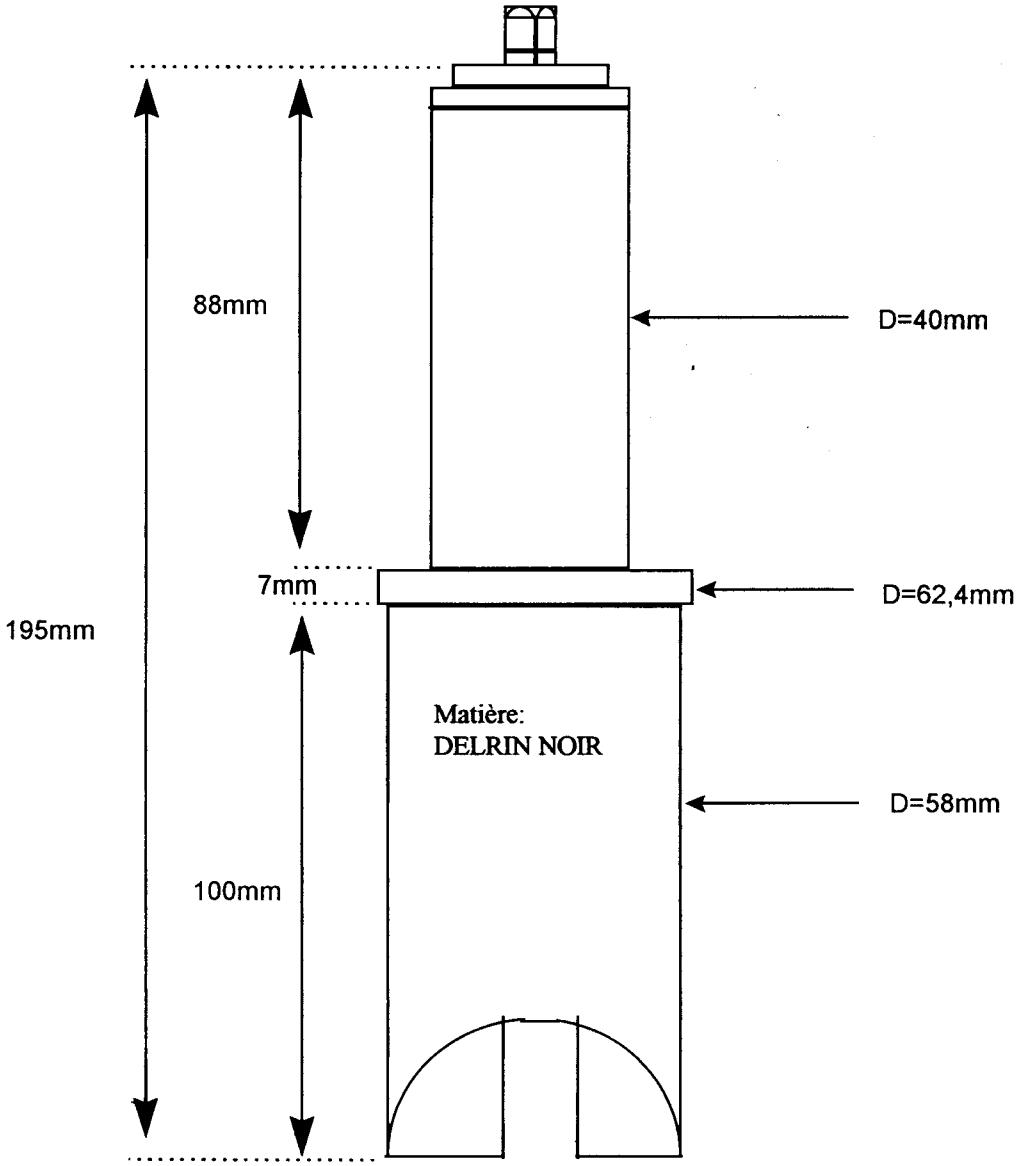

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CONSOMMATION ELECTRIQUE

Sur secteur : Puissance consommée : maximum **80 mA** (lorsque la 4-20mA est sur 20 mA)

La sonde PB-S est conforme à la directive européenne 89/336/CEE sur la compatibilité électromagnétique et la sécurité électrique basse tension.

CARACTERISTIQUES MECANIQUES ET PHYSIQUES

Constitution :

- Sonde à corps en DELRIN® .
- Câble blindé gaine polyuréthane pour l'acquisition et la transmission du signal de mesure.

Matériaux au contact du milieu de mesure : alimentaires (DELRIN noir . POM, polyuréthane)

Températures de service : -10°C à +50°C.

Pression max. de service : 5 bars (entièrement submersible avec câble : protection IP68 50)

Dimensions extérieures : H= 210 mm
Ø = 43 mm

Poids : sonde standard sur 10 m de câble : 1 kg environ.

CARACTERISTIQUES OPTOELECTRONIQUES

Gammes de travail du capteur : 0-20 g/l (moyenne sur boues urbaines en aération prolongée vraie)

Longueur d'onde émission/réception : λo = 880 nm. Trajet optique de 5 mm.

Mode d'émission : pulsé .

Fréquence de récurrence : 10 Hz.

Signal transmis : intensité de la lumière transmise à 0° (signal démodulé continu basse impédance 0-1 V) ; insensibilité totale à la lumière du jour.

Electronique de modulation-démodulation avec :

- pré-amplification et asservissement optique* intégrés dans le manche du capteur.
(*L'émission de lumière infrarouge est régulée : un asservissement optique avec photodiode de rétroaction assure une émission lumineuse constante . Une thermistance réalise une dernière correction.)
- alimentation nominale ± 5 V.

Compensation de température : réponse compensée instantanément en température de -5°C à +45°C.
(Eviter les chocs thermiques trop violents ; ne pas dépasser 60 °C)

Longueur max. de câble signal du capteur : 100 m et plus (nous consulter) .

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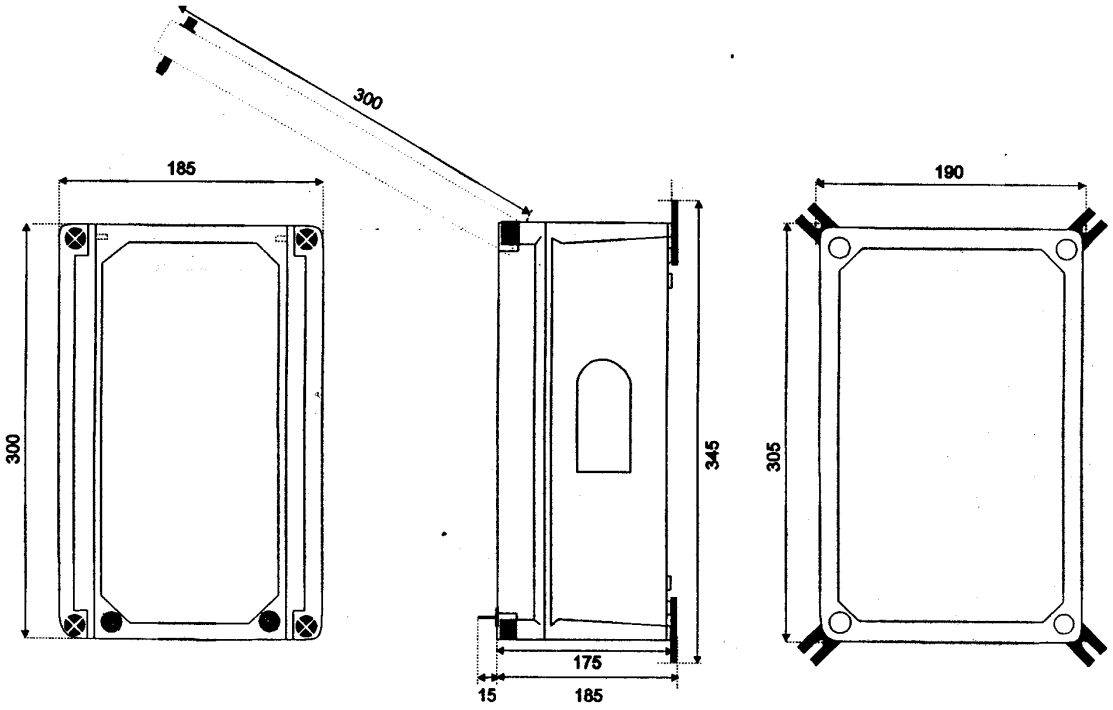
CARACTERISTIQUES MECANIQUES ET ENCOMBREMENT

Matériaux :	Coffret polyester renforcé fibre de verre. Couvercle polycarbonate transparent. Pattes supports polyamide. Embase de connecteur PA 66-GF 25 et presses-étoupes. Platine métallique alu. laqué bleu. *(Mise à la terre).*
Blindage :	Par cage de Faraday en tôles métalliques alu. d'épaisseur 2 mm.
Protection :	IP 65 (ouïe de ventilation latérale).
Encombrement :	H x l x p = 300 x 185 x 175 mm (hors pattes). couvercle : h = 300 mm
Entraxes pattes supports de fixation :	305 x 190 mm
Poids :	env. 3 kg



Face avec couvercle et montant

Profil droit
(couvercle fermé / ouvert)

Face : montant et couvercle enlevés