SERVIÇO MUNICIPAL DE ÁGUA E ESGOTO
AUTARQUIA MUNICIPAL – PIRACICABA - SP

TERMO N.º 021/2023

TERMO DE COOPERAÇÃO TÉCNICA celebrado entre **SEMAE** e **AGÊNCIA DAS BACIAS PCJ,** nos autos do processo n.º 4861/2022.

O **SERVIÇO MUNICIPAL DE ÁGUA E ESGOTO – SEMAE**, com sede na cidade de Piracicaba, estado de São Paulo, na Rua XV de Novembro, n.º 2.200, Autarquia Municipal criada pela Lei n.º 1.657, de 30 de abril de 1969, representado pelo seu Presidente, Artur Costa Santos, de nacionalidade portuguesa, viúvo, inscrito no CPF/MF sob n.º 686.215.668-34 e portador da cédula de identidade n.º W6191332, doravante denominado **SEMAE**;

AGÊNCIA DAS BACIAS PCJ, inscrita no CNPJ/MF sob n.º 11.513.961/0001, com sede na Rua Alfredo Guedes, n.º 1949, Edifício Racz Center, sala 604, Piracicaba/SP, CEP 13416-901, Piracicaba/SP, neste ato representada por seu seu Diretor-presidente, **Sergio Razera,** brasileiro, economista, casado, portador da cédula de identidade RG n.º 12.201.787-0 e do CPF sob n.º 015.929.298-00, residente e domiciliado nesta cidade de Piracicaba/SP, na Avenida Dona Lidia, n.º 900, bloco Colibri, apto n.º 64, Bairro Vila Rezende, CEP 13.405-235, doravante denominada **AGÊNCIA DAS BACIAS PCJ** e

MUNICÍPIO DE PIRACICABA, inscrito no CNPJ/MF sob n.º 46.341.038/0001-29, com sede na Rua Antonio Correa Barbosa, n.º 2.233, Bairro Chácara Nazareth, CEP 13.400-900, na cidade de Piracicaba/SP, neste ato representado por seu Prefeito Municipal em exercício, LUCIANO SANTOS TAVARES DE ALMEIDA, brasileiro, empresário, casado, portador da cédula de identidade RG n.º 6.523.171-5-SSP/SP, e do CPF sob n.º 102.930.088-76, residente e domiciliado nesta cidade de Piracicaba/SP, na Avenida Itália, n.º 130, Bairro Cidade Jardim, CEP 13.416-490, na qualidade de titular dos serviços, doravante denominado **ANUENTE.**

Resolvem, de comum acordo, firmar o presente **TERMO DE COOPERAÇÃO TÉCNICA**, em conformidade com o "Projeto piloto para fortalecer o monitoramento e avaliação do

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saneamento urbano em duas bacias hidrográficas prioritárias no Brasil" (Anexo I), mediante cláusulas e condições seguintes:

CLÁUSULA PRIMEIRA – DO OBJETO

1.1. O presente Termo de Cooperação tem como objeto a realização das atividades contidas no Projeto MARU (Monitoramento das Águas Residuais Urbanas), que visa implantar o "Projeto piloto para fortalecer o monitoramento e avaliação do saneamento urbano em duas bacias hidrográficas prioritárias no Brasil" (Anexo I), **mediante monitoramento através de sondas, da qualidade das águas dos rios Piracicaba e Corumbataí, nos pontos de captações de água bruta do SEMAE, conforme Anexo IV, sendo coordenadora e beneficiária do projeto a AGÊNCIA DAS BACIAS PCJ.**

1.2. O referido projeto visa o fortalecimento da eficiência do monitoramento do esgotamento sanitário e do impacto da poluição pelas águas residuais urbanas nos corpos d´água, de forma a melhorar a identificação das ações a implementar e proteger a qualidade dos recursos hídricos e dos ambientes aquáticos.

CLÁUSULA SEGUNDA – DAS OBRIGAÇÕES

2.1. São obrigações do **SEMAE**:

I. Oferecer condições de acesso para o desenvolvimento das atividades planejadas para instalação, manutenção e calibração dos equipamentos analíticos e de transmissão de dados nos postos de monitoramento;

II. Oferecer contrapartida de fornecimento de energia elétrica para o funcionamento dos equipamentos de análises;

III. Disponibilizar três servidores para acompanhamento das atividades a serem desempenhadas, conforme Memorando DTA nº 060/2023 (Anexo V);

IV. Permitir publicações técnicas científicas dos dados a serem obtidos no monitoramento da qualidade das águas dos rios Piracicaba e Corumbataí, nos pontos de captações de água do **SEMAE**.

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2.2. São obrigações da **AGÊNCIA DAS BACIAS PCJ**:

I. Desenvolver o projeto de acordo com o projeto piloto (Anexo I) e demais diretrizes técnicas contidas no Anexos II a IV;

II. Instalar os equipamentos de acordo com os croquis contidos no Anexo IV;

III. Comunicar o **SEMAE** previamente à instalação das sondas;

IV. Informar o **SEMAE** acerca do desenvolvimento do projeto;

V. Disponibilizar para o **SEMAE** os dados e estatísticas obtidos no monitoramento;

VI. Transmitir os dados de forma regular em servidor FTP – File Transfer Protocol, disponibilizado pela **AGÊNCIA DAS BACIAS PCJ**, com duplicação pela duração do projeto em um servidor FTP da OiEau, gestora do projeto, para análise e processamento, sendo que se o servidor FTP da **AGÊNCIA DAS BACIAS PCJ** não estiver operacional no momento das transmissões de dados, serão enviados diretamente para o servidor FTP da OiEau, conforme definido no projeto piloto (Anexo I);

VII. Gerenciar a execução do projeto e realizar suas atividades em acordo com as normas técnicas vigentes, exigências legais e demais regulamentações aplicáveis;

VIII. Cumprir fielmente suas obrigações de acordo com as normas aplicáveis, incluindo, mas não se limitando, àquelas relativas a direitos autorais e de imagem, proteção do patrimônio histórico e ambiental, obras e serviços, posturas municipais, do Corpo de Bombeiros e da Defesa Civil, responsabilizando-se, na forma do artigo 186, do Código Civil, por todos e quaisquer acidentes, danos ou prejuízos materiais e/ou pessoais que vier a dar causa por conta da execução ou inexecução do Projeto;

IX. Executar às suas expensas, eventuais adequações para instalação dos equipamentos;

X. Retirar os equipamentos após a finalização do projeto;

XI. Comunicar com antecedência o **SEMAE**, nos casos que detectado no monitoramento alteração na qualidade das águas dos rios;

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XII. Arcar com os ônus decorrentes da incidência de todos os tributos, taxas e contribuições nacionais (federal, estadual, municipal), ou estrangeiras (quando aplicáveis) para a realização do projeto;

XIII. Se responsabilizar por eventuais danos nos equipamentos instalados, furto ou roubo, tendo em vista que o **SEMAE** não dispõe de segurança no local, bem como de nenhum sistema de monitoramento nas captações que serão instalados os equipamentos, eximindo o **SEMAE** de qualquer responsabilidade.

CLÁUSULA TERCEIRA - DA RESPONSABILIDADE SOCIAL

3.1. Buscando assegurar o cumprimento da legislação vigente e das boas práticas ambientais, trabalhistas e éticas, a **AGÊNCIA DAS BACIAS PCJ** se compromete a:

I. Não adotar práticas de trabalho análogo ao escravo e trabalho ilegal de crianças e adolescentes no cumprimento do presente Termo;

II. Não empregar trabalhadores menores de 16 (dezesseis) anos de idade, salvo na condição de aprendiz a partir de 14 (quatorze) anos de idade, nos termos da Lei nº 10.097, de 19.12.2000, e da Consolidação das Leis do Trabalho;

III. Não empregar adolescentes até 18 (dezoito) anos de idade, em locais prejudiciais à sua formação, ao seu desenvolvimento físico, psíquico, moral e social, bem como em locais e serviços perigosos ou insalubres, em horários que não permitam a frequência à escola e, ainda, em horário noturno;

IV. Proteger e preservar o meio ambiente, bem como a prevenir contra práticas danosas ao meio ambiente, executando seus serviços em observância dos atos legais, normativos e administrativos relativos à área de meio ambiente e correlatas, emanadas das esferas Federal, Estaduais e Municipais, incluindo, mas não se limitando ao cumprimento da Lei Federal nº 6.938/81 (Política Nacional do Meio Ambiente) e da Lei nº 9.605/98 (Lei dos Crimes Ambientais), implementando ainda esforços nesse sentido junto aos seus respectivos fornecedores de produtos e serviços, a fim de que estes também se comprometam a conjugar esforços para proteger e preservar o meio ambiente, bem como a prevenir contra práticas danosas ao meio ambiente, em suas respectivas relações comerciais.

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CLÁUSULA QUARTA – DOS RECURSOS FINANCEIROS

4.1. Para execução do projeto, o **SEMAE** compromete-se a arcar com as despesas decorrentes da utilização da energia elétrica e da disponibilização dos servidores para acompanhamento das atividades a serem desempenhadas, cujas despesas correrão por conta das dotações específicas constantes no orçamento do **SEMAE**.

4.1.1. Não haverá transferência de recursos financeiros entre os partícipes para a execução do presente Termo de Cooperação Técnica, sendo que os serviços decorrentes do presente termo serão prestados em regime de cooperação mútua, não cabendo aos partícipes quaisquer remunerações pelos mesmos.

CLÁUSULA QUINTA – DA VIGÊNCIA

5.1. Este Acordo de Cooperação terá **vigência de 24 (vinte e quatro meses)**, contados a partir da data da sua assinatura.

5.1.1. A vigência poderá ser prorrogada mediante solicitação da **AGÊNCIA DAS BACIAS PCJ**, desde que devidamente justificada, a ser apresentada ao **SEMAE** em, no mínimo, 30 (trinta) dias antes do término da sua vigência.

CLÁUSULA SEXTA – DA RESCISÃO

6.1. Este Termo de Cooperação poderá ser rescindido quando:

I. Ocorrer o descumprimento de qualquer das obrigações ou condições nela estabelecidas;

II. Pela superveniência de normas legais ou razões de interesse público que a torne formal ou materialmente inexequível.

CLÁUSULA SÉTIMA - CONDIÇÕES GERAIS

7.1. Fica expressamente convencionada a proibição de cessão ou transferência do presente Termo a terceiros, a qualquer título, gratuito ou oneroso, temporária ou

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definitivamente, no todo ou em parte, bem como modificar as suas características, salvo prévia, expressa e escrita concordância do **SEMAE**.

7.2. Nenhuma responsabilidade de qualquer natureza, especialmente aquelas de natureza financeira, trabalhista, previdenciária, civil, criminal ou tributária, incluindo indenizações por acidentes de trabalho, será imputada ao **SEMAE**.

7.3. Qualquer comunicação entre o **SEMAE** e a **AGÊNCIA DAS BACIAS PCJ,** relacionada ao presente instrumento ou às atividades que dele advirão, deverá ser feita através dos e-mails eribeiro@semaepiracicaba.sp.gov.br (Elaine Contiero Ribeiro), aobelleza@semaepiracicaba.sp.gov.br (André Ometto Belleza), lsantiago@semaepiracicaba.sp.gov.br (Leticia dos Santos Santiago Matos) e jkforti@semaepiracicaba.sp.gov.br (Joseli Karina Forti).

CLÁUSULA OITAVA - DOCUMENTOS INTEGRANTES

8.1. Integram o presente Contrato os seguintes documentos:

Anexo I – Projeto MARU-Brasil - "Projeto piloto para fortalecer o monitoramento e avaliação do saneamento urbano em duas bacias hidrográficas prioritárias no Brasil";

Anexo II – Manual dos equipamentos;

Anexo III – Documentação técnica dos fabricantes e equipamentos;

Anexo IV – Croqui de instalação dos equipamentos de monitoramento na captação do Rio Piracicaba e Corumbataí;

Anexo V - Memorando DTA nº 060/2023.

CLÁUSULA NONA – DO FORO

9.1. Não logrando êxito na tentativa de conciliação e solução administrativa, fica eleito o foro da Comarca de Piracicaba/SP para dirimir os conflitos decorrentes deste instrumento, com renúncia expressa de qualquer outro, por mais privilegiado que seja.

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E, por estarem acordados com os termos dessa parceria as partes firmam em 3 (três) vias de igual teor e forma o presente instrumento

Piracicaba, 28 de abril de 2023.

Artur Costa Santos
SEMAE

Sergio Razera
AGÊNCIA DAS BACIAS PCJ

Luciano Santos Tavares de Almeida
MUNICÍPIO DE PIRACICABA

Testemunhas:

João Vitor Santos Roesner
CPF 356.567.978-64

Elaine Contiero Ribeiro
CPF 127.042.828-46

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ANEXO I

Ficha de resumo do projeto MARU-Brasil[1]

Projeto piloto para fortalecer o monitoramento e avaliação do saneamento urbano em duas bacias hidrográficas prioritárias no Brasil

- **Contexto**

Embora o Brasil tenha mais de 210 milhões de habitantes, menos de um quarto do esgoto produzido no país é tratado e quase 50% da população urbana não está conectada a uma rede de saneamento.

O impacto dessa falta de saneamento básico é cada vez mais forte: em certas áreas de alta concentração urbana, a poluição dos cursos d'água agravada por déficits hídricos ligados às mudanças climáticas gera, em particular, um problema de segurança dos recursos hídricos para o abastecimento em agua potável e causa uma degradação da biodiversidade aquática.

Figura 1- Rio Paraíba do Sul e barragem de Funil no fundo, em Itatiaia/RJ

Diante desse desafio, o governo federal desenhou uma revisão do Marco Regulatório do saneamento básico de 2007 que o Congresso brasileiro aprovou em julho de 2020. Essa nova legislação estabelece objetivos para a universalização dos serviços de água e esgoto, além dos resíduos sólidos para o país inteiro, baseados em 4 principais pilares, planejamento, regulação, regionalização e competição, promovendo assim uma maior participação do setor privado e retirando os privilégios das empresas públicas que prestam os serviços para 90% da população urbana brasileira.

- **Objetivo do projeto MARU[1] Brasil**

Contribuir ao **fortalecimento da eficiência do monitoramento do esgotamento sanitário e do impacto da poluição pelas águas residuais urbanas nos corpos d'água**, de forma a melhorar a identificação das ações a implementar para proteger a qualidade dos recursos hídricos e dos ambientes aquáticos.

- **Financiamento**

Financiamento França/FASEP de €800.000 aprovado pelo Ministério da Economia e das Finanças francês por um período de 22 meses (agosto de 2021 a junho de 2023).

- **Parceiros e beneficiários**

Este projeto é pilotado pela **OiEau** em conjunto com **um clube de cerca de dez empresas francesas** que, dependendo das necessidades e decisões dos beneficiários, podem ser encarregadas de atividades a serem subcontratadas a partir de prestação de serviços ou de fornecimento de materiais.

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[1]MARU: "Monitoramento das Águas Residuais Urbanas"

Os **principais beneficiários** serão as agências de bacia parceiras do projeto:

- A **Associação Pró-Gestão das Águas da Bacia Hidrográfica do Rio Paraíba do Sul (AGEVAP),** que atua em duas das bacias piloto do projeto: a bacia do rio Paraíba do Sul e a bacia do Guandu, ambas contribuindo para o abastecimento de água da cidade do Rio de Janeiro
- A **Fundação Agência das Bacias Hidrográficas dos Rios Piracicaba, Capivari e Jundiaí (Agência das bacias PCJ),** que atua numa das bacias piloto do projeto: a bacia dos rios "Piracicaba, Capivari e Jundiaí", que contribui para o abastecimento de água da cidade de São Paulo.

Os **beneficiários indiretos** serão os órgãos federais (incluindo a ANA), estaduais e municipais envolvidos na gestão dos recursos hídricos e do saneamento básico urbano.

Figura 2 – Área de atuação das agências PCJ e Agevap no âmbito do programa MARU (NB: a área verde da AGEVAP representa as áreas das bacias Paraíba do Sul e Guandu)

- **Clube de empresas deste projeto Fasep**

As empresas francesas que confirmaram o interesse em fazer parte do clube e participar do projeto são: Aqualabo, Aquassay, Bioceanor, EFS, EGIS/Brasil, Eurofins, Hydroconseil, IRD, Matec, NKE, Suez Pole Mer & Milieux Aquatiques , bem como o cluster de competitividade "France Water team".

- **Instrumentos jurídicos de parceria**

A implementação deste projeto é o objeto de um **protocolo de intenções** firmado no dia 25 de julho de 2021: « Protocolo de intenções que entre si celebram a Associação Pró-Gestão das Águas da Bacia Hidrográfica do Rio Paraíba do Sul (AGEVAP), a Agência das Bacias dos Rios Piracicaba, Capivari e Jundiaí (Agencia das Bacias PCJ) e o Escritório Internacional da Água (OiEau) para o projeto piloto de fortalecimento do monitoramento e avaliação das águas residuais urbanas em duas bacias hidrográficas prioritárias no Brasil ».

Um **memorando de entendimento** foi assinado no dia 26 de julho de 2022, em decorrência do Protocolo de Intenções, com o objetivo de definir as condições em que a OiEau, como gestora do projeto, a AGEVAP e a Agência das bacias PCJ, como principais beneficiárias do projeto, e a FCTH (Fundação Centro Tecnológico de Hidráulica da Universidade de São Paulo) colaborarão para a aquisição, instalação, manutenção e operação de equipamentos de monitoramento no âmbito do projeto MARU.

- **Atividades planejadas**

Em um contexto de múltiplos atores, este projeto prevê:

- Trabalhar com as agências de bacia AGEVAP e Agência das Bacias PCJ, que são os principais beneficiários do projeto;
- Promover a colaboração interinstitucional relativa ao monitoramento das ações de esgotamento sanitário urbano e seu impacto nos ambientes aquáticos, entre as agências e as principais partes interessadas nos âmbitos federal, estadual, municipal das bacias impactadas por essas. Essas últimas são as beneficiárias indiretas do projeto;

- Fortalecer:
  - O monitoramento do funcionamento das estações de tratamento de esgoto e dos lançamentos de águas residuais urbanas (ARU) de 6 a 8 municípios pilotos (3 a 4 municípios por bacia) com o fornecimento de equipamentos de monitoramento em 2 municípios principais e, opcionalmente, de forma mais leve, em 4 a 6 municípios adicionais;

Figura 3 - Rio Piracicaba em Piracicaba/SP

  - O monitoramento da qualidade das águas superficiais receptoras dos lançamentos com, por um lado, a instalação de equipamentos de monitoramento "in situ", e, por outro, o desenvolvimento de processos de aproveitamento das imagens de satélites permitindo um acompanhamento regular e global com o fornecimento de informações complementares sobre a qualidade das águas de superfície.
- Organizar o gerenciamento compartilhado e a coleta de dados para permitir uma valorização cruzada dos dados sobre os lançamentos e sobre o monitoramento dos corpos receptores, e desenvolver a produção de informações úteis para as diversas partes interessadas em função de suas necessidades, seja para a tomada de decisão (monitoramento do impacto dos investimentos, gestão operacional), dos sistemas de alerta e prevenção de poluição (caso da gestão das estações de captação de água potável para informação do público...).

- **Zoom na atividade de fortalecimento do monitoramento de estações de tratamento de esgoto, de lançamentos de águas residuais urbanas e da qualidade das águas superficiais receptoras dos lançamentos por equipamentos de monitoramento "in situ"**

O memorando de entendimento-assinado no dia 26 de julho de 2022, com o objetivo de definir as condições em que a OiEau, como gestora do projeto, a AGEVAP e a Agência das bacias PCJ como principais beneficiárias do projeto, e a FCTH colaborarão para a aquisição, instalação, manutenção e operação de equipamentos de monitoramento no âmbito do projeto MARU, visa possibilitar:

- O monitoramento contínuo da qualidade das águas do rio Piracicaba junto à captação do SEMAE em Piracicaba, conforme acordo com o SEMAE;
- O monitoramento contínuo do estado do rio Corumbataí junto à captação do SEMAE em Piracicaba, conforme acordo com o SEMAE;
- O monitoramento contínuo da qualidade do afluente, do efluente e a detecção de transbordo da ETE Anhumas em Campinas, conforme acordo com a SANASA;
- O monitoramento contínuo da qualidade das águas do rio Paraíba do Sul na saída da barragem do reservatório de Funil da empresa FURNAS em Itatiaia, conforme acordo com FURNAS;
- O monitoramento contínuo da qualidade das águas do rio Paraíba do Sul junto à captação da ETA Belmonte do SAAE em Volta Redonda, conforme acordo com o SAAE;

Figura 4 - Captação da SEMAE no Rio Corumbataí em Piracicaba/SP

- O monitoramento contínuo da qualidade das águas do reservatório do Vigário, junto à estação de quantidade da empresa LIGHT localizada no desemboque do canal de Vigário, à montante da transposição para a UHE Fontes em Piraí, conforme acordo com a LIGHT.

Opcionalmente, e se as condições financeiras permitirem, pontos de monitoramento adicionais poderão ser acrescentados à lista acima, inclusive prioritariamente:

- O monitoramento contínuo da qualidade das águas do rio Jaguari junto à estação "Jaguari Pires" do DAEE em Extrema, conforme acordo com SABESP;
- O monitoramento contínuo da qualidade do afluente, do efluente e detecção de transbordo da ETE Gil Portugal do SAAE em Volta Redonda, conforme acordo com o SAAE.

Os equipamentos de monitoramento correspondentes serão adquiridos junto às seguintes 3 empresas integrantes do clube de empresas do projeto Fasep: Aqualabo, EFS, NKE. A instalação será realizada por empresas brasileiras parceiras das empresas francesas e pela FCTH. A FCTH assegurará a manutenção preventiva e corretiva das estações de monitoramento por um período mínimo de 1 ano em parceria com (e/ou sob o controle da) empresa EGIS que será contratada pela OiEau para acompanhar as etapas da instalação e vistoriar o bom funcionamento dos processos de produção de dados durante o período de duração do projeto.

As medidas serão realizadas a cada 15 minutos e os dados serão retransmitidos de forma regular em um servidor FTP[2] disponibilizado por cada agência com duplicação pela duração do projeto em um servidor FTP da OiEau para análise e processamento (observa-se que se o servidor FTP de uma das 2 agências não estiver operacional no momento do início das transmissões de dados, os dados podem ser enviados diretamente para o servidor FTP da OiEau).

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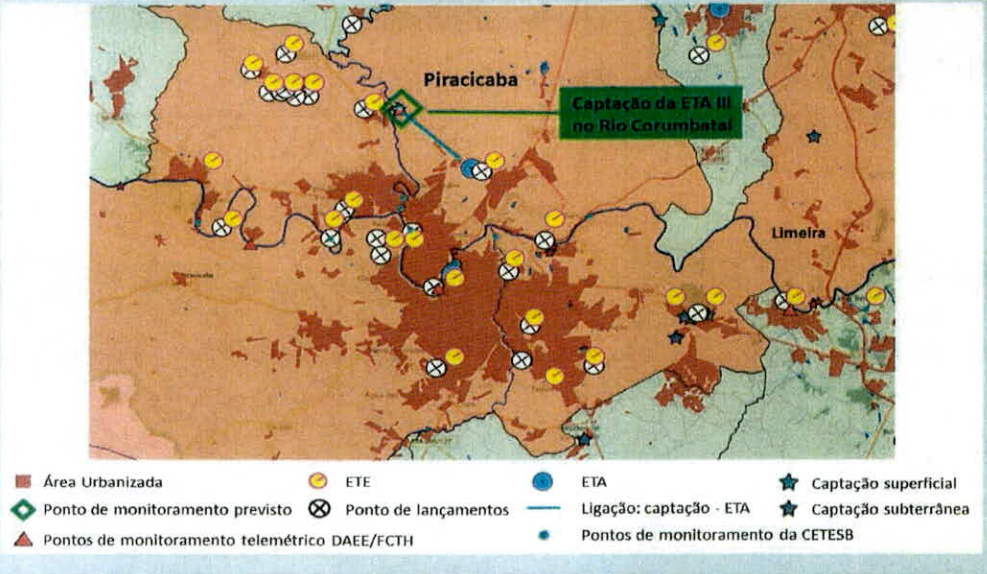
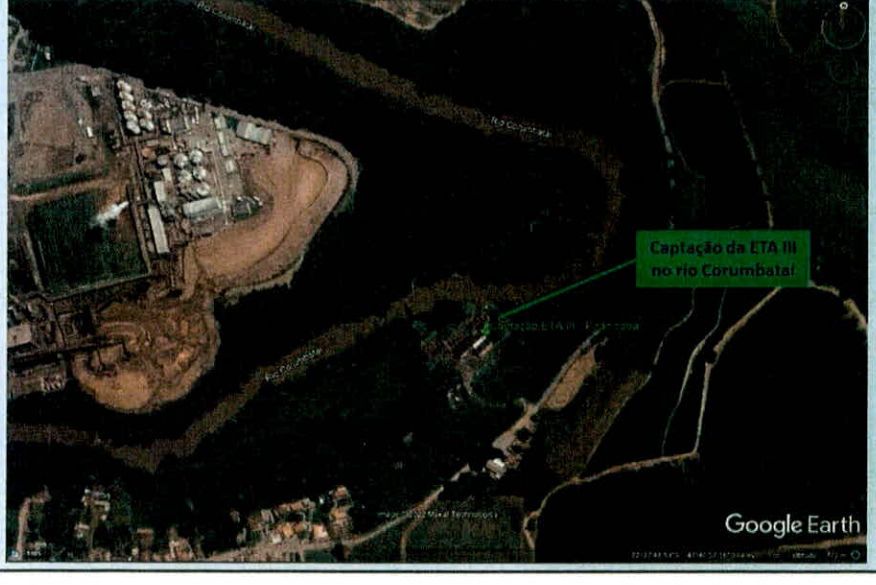
[2] FTP é a sigla para **File Transfer Protocol**, um termo que, traduzido para o português, significa **Protocolo de Transferência de Arquivos**. Ele é basicamente um tipo de conexão que permite a troca de arquivos entre dois computadores conectados à internet.

Anexo 2a - Ficha de instalação de equipamento de Piracicaba / captação (Rio Corumbataí)	
Ordem de prioridade	1
Bacia	PCJ
Questão chave	Área urbana de Piracicaba (sede) - captação (Rio Corumbataí)
ID	D
Local de monitoramento	Rio a montante da área urbana, junto à estação DAEE na captação do município de Piracicaba
Corpo d'Água	Rio Corumbataí
Coordenadas do local de monitoramento previsto	-22.63284;-47.67758
Operador de serviços de água e esgotos	SEMAE Piracicaba
IQA estimado	Boa (2020)
IAP estimado	Regular (2020)
Variáveis a medir	Condutividade, SST, COT, DBO, CAS560 (OD, pH, Turbidez já medidos pela SEMAE)
Fornecedor de equipamento	EFS
Tipo de equipamento previsto	1 x Sonda multi-parâmetros UV-Probe 245+ (SST, COT, DBO, CAS560) 1 x Conductivity probe C4E
Instalador	FCTH
Operador	FCTH
Gestão das estações	SEMAE Piracicaba

Esquema global do local



Zoom no local de monitoramento previsto



Fotos do local de monitoramento previsto

Estação pluviométrica DAEE

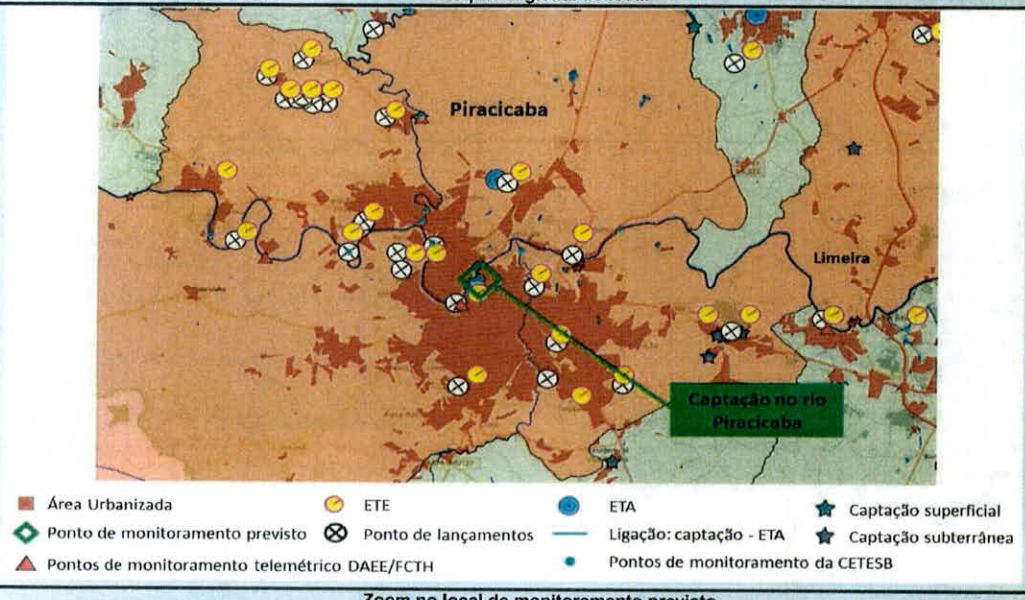
Captação

Afluente da captação

Rio Corumbataí

Anexo 2b - Ficha de instalação de equipamento de Piracicaba / captação (Rio Piracicaba)	
Ordem de prioridade	1
Bacia	PCJ
Questão chave	Área urbana de Piracicaba (sede) - Captação (Rio Piracicaba)
ID	E
Local de monitoramento	Rio no centro da área urbana, na captação do município de Piracicaba
Corpo d'Água	Rio Piracicaba
Coordenadas do local de monitoramento previsto	-22.632911,-47.677658
Operador de serviços de água e esgotos	SEMAE Piracicaba
IQA estimado	Regular (2020)
IAP estimado	Péssima (2020)
Variáveis a medir	pH, Temperature, Turbidity, Conductivity, TOC, COD and BOD
Fornecedor de equipamento	Aqualabo
Tipo de equipamento previsto	1 x Sonda PONCEL com 5 sensores (pH, UV254, Turbidity, Conductivity, Oxygen)
Instalador	Aqualabo e parceiro
Operador	Parceiro da Aqualabo e depois FCTH
Gestão das estações	SEMAE Piracicaba

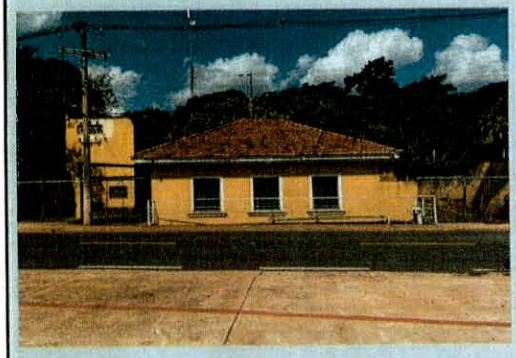
Esquema global do local



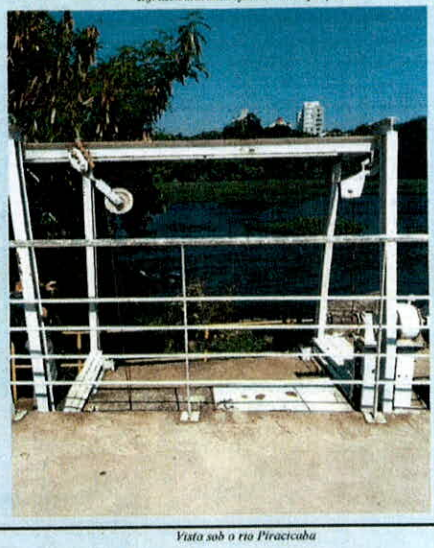
Zoom no local de monitoramento previsto

Fotos do local de monitoramento previsto

Infraestrutura da captação



Infraestrutura do afluente na captação



Entrada do afluente

Vista sob o rio Piracicaba

ANEXO II

EFS

ENGINEERING • FABRICATION • SERVICE

DESIGNER AND MANUFACTURER

Innovative solutions development
Dedicated systems manufacturing

Activities

Development, industrialization and manufacturing of mecatronic equipments on requirements in small and medium series (10 to 10000 units per year).

Innovations

40 years of expertise in the fieds of electronics, mechanics, embedded softwares, electrotechnics, optoelectronics, hydraulics and plastics.

Services

Specifications establishements, technical advices, proof of concept (POC), tests, standards, certification, manufacturing, logistic, calibration, after sales service.

Fields

Automotive, construction, electrical equipments, environment, industrial equipments, railway, maritime, health, telecommunications.

ISO 9001 : 2015

Design, manufacturing, sales and after-sales
of **innovative technical products**
based on electronics, mechanics, optic and software.

40 years
of innovation

Our innovations

Our **engineering** and **production** departments offer ***expertise, knowledge, versatility*** and ***flexibility***, for support during your all project.

100 %
of your project made
in one site


VLC geolocation indoor


EMI3 rack


IFR600 flowmeter


UV254+ probe

Our solutions

- Water quality analysis monitoring
- Fuel injection test systems
- Sensors & intelligent instrumentation
- Test benches & test equipments
- Energy conversion & power electronics
- Connected objects, IIoT, M2M
- Electronic obsolescence treatment

ELECTRONICS
- CAD
- Analog, digital, power, radio frequency.

MECHANICS
- CAD
- General mechanics,
- Precision mechanics,
- Plastics, thermoforming, 3D printing technology.

ENGINEERING

SOFTWARES
- Embedded software,
- HMI software,
- Database.

OPTOELECTRONICS
- Optical spectrum treatment,
- LED power control,
- Image processing.

ELECTROTECHNICS
- Design and integration of electrical and automation solutions.

HYDRAULICS
- Pneumatic cabinet manufacturing,
- hydraulic installation on test system from -0,5 to 3000 bar.

PROTOTYPING

- Mechanical workshop
- Standard & SMD soldering, wiring
- Bench assembly
- Over-moulding

INDUSTRIALIZATION

- Assembling process definition
- Molds
- Test tools
- Supply chain

TEST ET VALIDATION

- Thermal, climatic, vibrating tests
- Leakage test, pressure test
- EMC prequalification
- Functional validation

CERTIFICATION

- Certification for pressured equipements directive 2014/68/UE
- Production (EN 60079-0, IEC 60079-0) directive ATEX 2014/34/UE - IECEx
- Maritime certification directive 2014/90/UE - DAHMAS
- Normative marking UL, CSA, RoHs

PRODUCTION

Small and medium series of 10 to 10000 units per year

100 %
of the production
in our workshops
at Montagny

CERTIFIE BCS ISO 9001:2015

Our customers

START-UP

Support for the development and industrialization of first product

Man Over Board beacon

SME

Design and manufacture of product to complete a range or to improve an existing product

Wireless diagnostic plug for automotive production line control

FIRM

Test for prototypes characterization, test for new market concepts, IIoT for production monitoring

Optical fiber temperature measurement system

Our structure

40 years of innovation

50 % engineering

50 % production

60 % export

70 collaborators

A subsidiary established in China (Hangzhou) for 20 years to provide technical support as installation, training & maintenance.

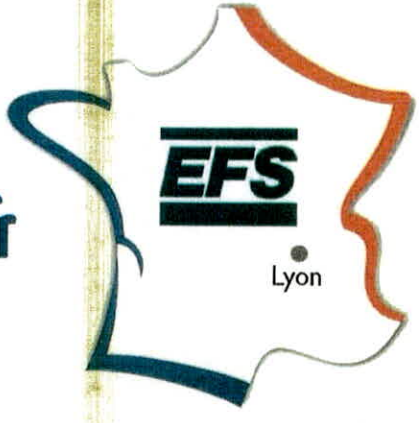
Our distributors

USA • Germany •
India • Vietnam • Taiwan

Contact us

ZAC du Baconnet
192, Allée des Chênes
69700 - MONTAGNY
FRANCE

www.efs.fr



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EFS 8489

MEASUREMENT PROBE
UV PROBE 254 +

Multi-parameter measurement probe

COD • BOD • TOC • TSS • SAC 254 • SAC 560

PRESENTATION

The UV-Probe 254+ is a multi-parameter online measurement probe for continuous and independent quality control of water and effluent. It measures the SAC 254 and the SAC 560 directly.

It also provides by correlation the measurement of the TOC or COD or BOD and the suspended solids from the SAC measurements and laboratory measurements.

APPLICATION AREAS

- Release to aquatic environment
- Water treatment plant
- Drinking water production
- Waste water treatment plan
- Process water and effluents

ADVANTAGES

- **MULTI-PARAMETERS**:
  LED technology (UV visible)
- **ULTRA LOW RUNNING COST**:
  No re-agent or prior filtration, self-cleaning measuring cell (cleaning box option)
- **ROBUST**: Stainless steel 316L, water-resistant IP68 (probe and connector).

MEASUREMENT PROBE UV PROBE 254+

EFS
ENGINEERING • FABRICATION • SERVICE

	MEASUREMENT RANGE
COD	0 - 1000 mgO2/L (±1 %)
BOD	0 - 500 mgO2/L
TOC	0-400 mgC/L
TSS	0 - 1000 mg/L (±1 %)
SAC 254	0-600 UA/m
SAC 560	0-600 UA/m

MEASUREMENT PRINCIPLE

The sample to be analyzed undergoes to separate radiations. The first is emitted in the ultra-violet range at a precise wavelength of 254 nm, the second is generated in the visible range of the electromagnetic spectrum at a wavelength of 560 nm.

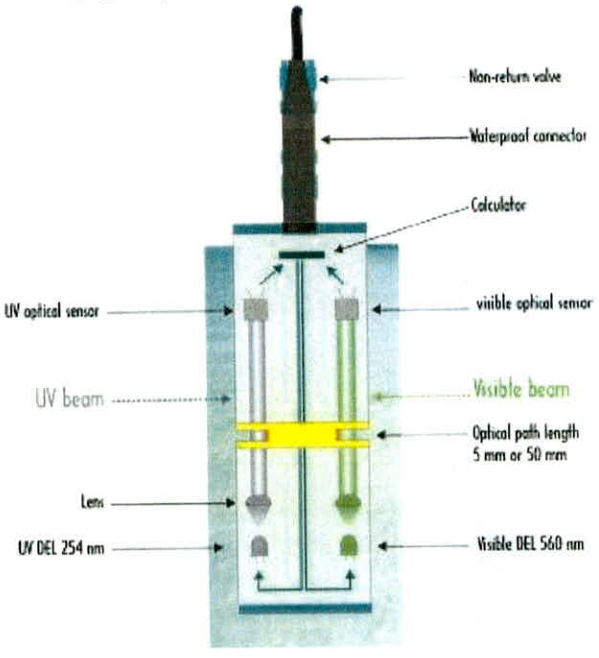
Depending on its chemical composition, the sample will absorb different degrees of radiation at these two wavelengths. The quantity of light absorbed in the UV at 254 nm is termed the SAC 254 and the proportion of light absorbed at 560 nm is termed the SAC 560.

Beer-Lambert's law defines the relation between the measured absorption (SAC) and the sample concentration.

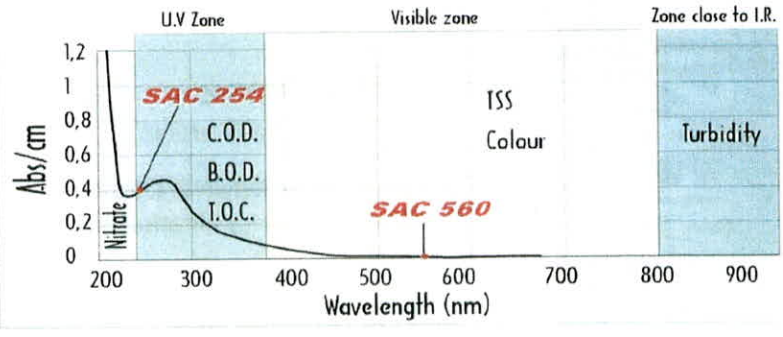
The values are calculated automatically by the device which determines the regression line according to the calibration.

ANALYZED PARAMETERS

- COD (mgO2/L): Chemical Oxygen Demand
  Total quantity of oxygen consumed by chemical means.
- BOD (mgO2/L): Biochemical Oxygen Demand
  Total quantity of oxygen consumed by biochemical means.
- TOC (mgC/L): Total Organic Carbon
  Total quantity of organic carbon by chemical means.
- Total Suspended Solids: (mg/L): Mass of non-soluble particles found in the water with a dimension of between 1 and 100 mm.
- SAC 254 (UA/m): Spectral Absorption Coefficient
  Optical absorption of the effluent at a wavelength of 254 nm.
- SAC 560 (UA/m): Spectral Absorption Coefficient
  Optical absorption of the effluent at a wavelength of 560 nm.
- Color (mgPt/L) : color measured at 560 nm.



Absorption spectrum of residual water



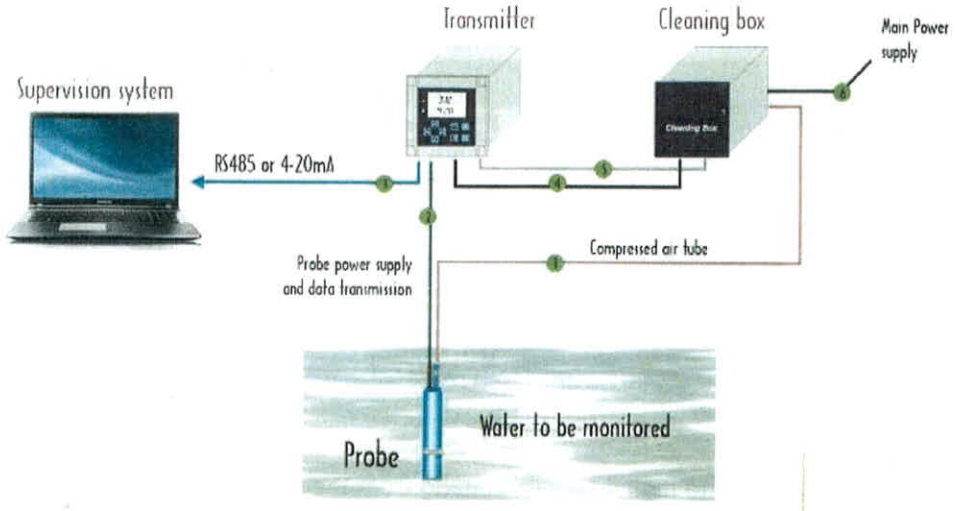
SAC 254 : Absorption Coefficient at 254 nm
SAC 560 : Absorption Coefficient at 560 nm

La FRENCH FAB

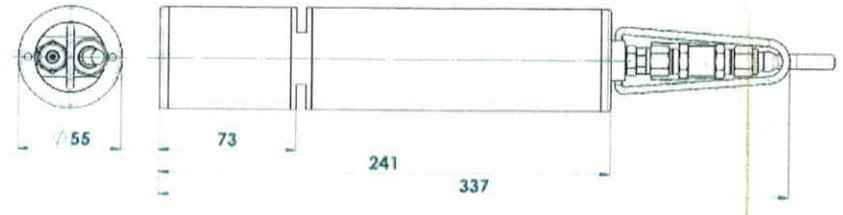
HOW TO USE

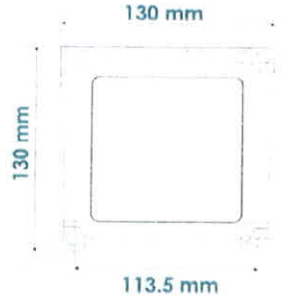
PLUG AND PLAY SYSTEM

The probe can be plunged directly in the effluent to be analysed or installed in a measurement chamber. The cable between the probe and the transmitter is of the submarine type (IP68).
It offers perfect reliability for continuous and safe running (power supply and data transmission). il is dedicated for all water type.



1 - Compressed air tube	ø ext. 6 mm - ø int. 4 mm	length: 10 m	Ref: 8492-P01-V1
2 - Transmitter to probe cable	ø ext. 8 mm max	length: 10 m	Ref: E8489-C01-V2
3 - Communication cable	RS 485 link	---	Customer equipment
4 - Cleaning box command cable	ø ext. 7.8 mm max - 2x 1.5²	length: 4 m	Ref: E8492-C01-V1
5 - Main power cable to connect E8490	ø ext. 7.8 mm max - 3G 1.5²	length: 4 m	Ref: E8492-C02-V1
6 - Main power cable	ø ext. 7.8 mm max	---	Customer equipment





PROBE

This is a 316L stainless steel probe:

- The lower part has two grooves in which the liquid to be analyzed will circulate.
- On the upper part there is an electric cable for connection to the transmitter and also a non-return valve. The valve serves as a connector for the E8492 compressed air cleaning module (optionnal).

The optical measurements are carried out directly inside the probe by a microprocessor system. The optical signals are immediately converted into digital values and are relayed to the transmitter.

	CHARACTERISTICS
Dimensions	Ø 55 mm and 250 mm length
Enclosure	Stainless steel - 316L
Protection	IP 68 - 1 bar - 10 meters
Weight	5 kg
Ambient temperature	0 - 40 °C
Power supply	90-240 V - 50/60 Hz - 15 W
Light source detector	LED

TRANSMITTER

This is an IP65 electronic box. It collects the digital signals coming from the probe and processes them in order to collect the SAC and determine the concentrations in COD and Suspended Solids.

	CHARACTERISTICS
Dimensions	130 x 130 x 110 (mm)
Material box	Polycarbonate
Protection	IP 65
Keypad	Sensitive
Sampling time	1 min
Input	Two logical inputs
Output	Two 4-20 mA, two alarm relays (250 V / 8A)
On site communication	Display and keyboard, USB key for data recovery, RS 485 with MODBUS protocol
Data memory	Several years of data recording at maximum measuring frequency.

REFERENCES

ref : E8489-5	Probe (E8489) + transmitter (E8490) + cable
ref : 8492P	Cleaning box with independent compressed air system
ref : 8492E	Cleaning box directly connected to the customer's compressed air system

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ENGINEERING • FABRICATION • SERVICE
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SONDE DE MESURE POUR L'EAU

EFS 8489

UV-PROBE 254+

Sonde de mesure multi-paramètres
DCO • DBO • COT • MES • CAS254 • CAS560

PRESENTATION

L' UV-Probe 254+ est une sonde autonome de mesure multi-paramètres en ligne destinée au contrôle en continu de la qualité de l'eau. Elle mesure le CAS 254 et le CAS 560.

Elle analyse et détermine par corrélation les paramètres DBO, DCO et COT à partir de ses mesures CAS et des prélèvements de laboratoire de référence.

APPLICATIONS

- Rejet vers milieu aquatique
- Station de traitement et d'épuration
- Industrie de process et effluents

AVANTAGES

- UV led (très longue durée de vie)
- 100% autonome et fiable (analyse continue)
- Sans réactif ni filtration préalable (technologie propre)
- Acier inoxydable 316L (robuste)
- Etanchéité IP 68 (sonde et connecteur)
- Cellule de mesure auto-nettoyante (air comprimé)
- Installation aisée (branchement rapide)
- Coût d'exploitation faible (OPEX)
- Aucune pièce de rechange (maintenance allégée)
- Fabrication française (French Fab)

EFS privilégie le développement de produits techniques innovants qui concourent à la santé, la sécurité et le bien-etre de l'humanité ainsi qu'à la réduction de l'empreinte environnementale des activités humaines.

EFS

ISO 9001: 2015

Conception et fabrication de produits techniques innovants à base d'électronique, mécanique, optique et logiciel.

	PLAGE DE MESURE
DCO	0 - 1000 mgO2/L (±1 %)
DBO	0 - 500 mgO2/L
COT	0-400 mgC/L
MES	0 - 1000 mg/L (±1 %)
CAS 254	0-600 UA/m
CAS 560	0-600 UA/m

PRINCIPE DE MESURE

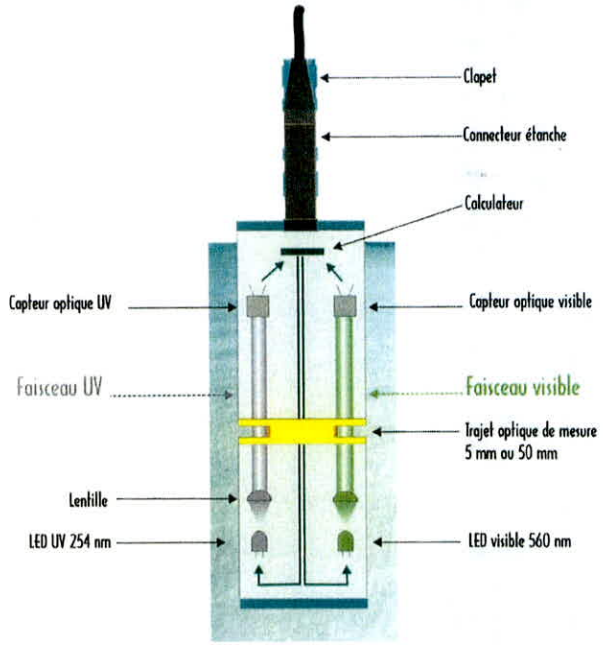
L'échantillon à analyser est soumis à deux rayonnements. Le premier rayonnement est émis dans le domaine de l'ultra violet à une longueur d'onde précise de 254 nm, le second est généré dans la région visible du spectre électromagnétique à la longueur d'onde de 560 nm.

Suivant sa composition chimique, l'échantillon va absorber plus ou moins le rayonnement à ces deux longueurs d'onde. On appelle C.A.S. 254 la quantité de lumière absorbée dans l'UV à 254 nm et C.A.S. 560 la proportion de lumière absorbée à 560 nm.

La loi de Beer-Lambert définit la relation entre l'absorbance mesurée (CAS) et la concentration des échantillons. L'étalonnage est calculé automatiquement par l'appareil qui détermine la droite de régression entre les CAS et les valeurs obtenues en laboratoire pour les différents échantillons.

PARAMETRES ANALYSES

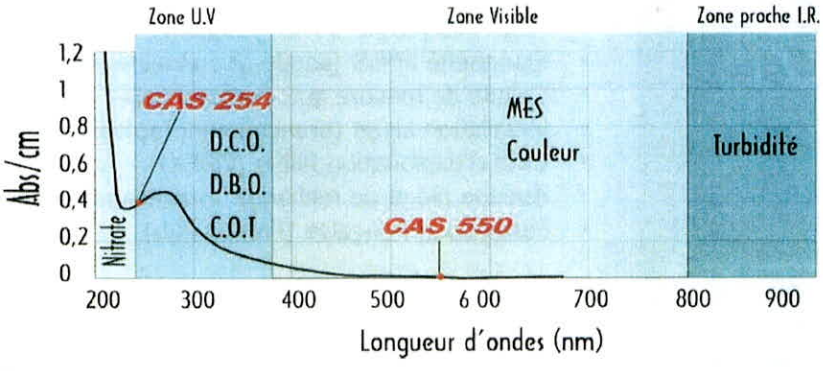
- DCO (mgO2/L) : Demande Chimique en Oxygène
  Quantité totale d'oxygène consommée par voie chimique
- DBO (mgO2/L) : Demande Biochimique en Oxygène
  Quantité totale d'oxygène consommée par voie biochimique
- COT (mgC/L) : Carbone Organique Total
  Quantité totale de carbone consommée par voie chimique.
- MES (mg/L): Matières En Suspension
  Masse des particules non solubles que l'on trouve dans l'eau avec une dimension comprise entre 1 et 100 µm
- CAS 254 (UA/m) : Coefficient d'Absorption Spectral
  Absorption optique de l'effluent à la longueur d'onde 254 nm.
- CAS 560 (UA/m) : Coefficient d'Absorption Spectral
  Absorption optique de l'effluent à la longueur d'onde 560 nm
- Couleur (mgPt/L) : Couleur mesurée à 560 nm.



CAS 254 :
Coefficient d'absorption à 254 nm

CAS 560 :
Coefficient d'absorption à 560 nm

Spectre d'absorbance d'une eau résiduaire



SONDE

Il s'agit d'une sonde en inox 316L de 250 mm de longueur et de 55 mm de diamètre. La partie inférieure présente une rainure dans laquelle passe le liquide qui est analysé. Sur la partie haute, il y a un câble électrique de raccordement au transmetteur et un clapet anti-retour. Le clapet sert de raccord pour la connexion au module de nettoyage à air comprimé E8492 (optionnel).
Les mesures optiques sont directement réalisées à l'intérieur de la sonde par un système microprocesseur. Les signaux optiques sont directement transformés en valeurs numériques envoyées au transmetteur.

	SONDE
Dimensions	Diamètre : 55 mm - longueur : 250 mm
Matériaux	Acier inoxydable - 316L
Protection	IP 68 - 1 bar - 10 metres
Poids	5 kg
Temperature ambiante	0 - 40 °C
Alimentation	90-240 V - 50/60 Hz - 15 W
Detecteur source lumineuse	LED

TRANSMETTEUR

Il s'agit d'un boîtier électronique IP65 de dimensions 130 mm x 130 mm x 100 mm. Il a pour rôle de collecter les signaux numériques qui proviennent de la sonde et de les traiter afin de fixer les C.A.S. et déterminer les concentrations en DCO et MES.

	TRANSMETTEUR
Dimensions	130 x 130 x 110 (mm)
Materiau du coffet	Polycarbonate
Protection	IP 65
Clavier	Sensible
Temps d'échantillonnage	1 min
Entrée	Deux entrées logiques
Sortie	Deux relais d'alarme 4-20 mA (250 V / 8A)
Communication sur site	Ecran et clavier, clé USB pour la récupération de données, RS485 avec protocole Modbus
Mémoire de données	Plusieurs années d'enregistrement de données à la fréquence de mesure maximales

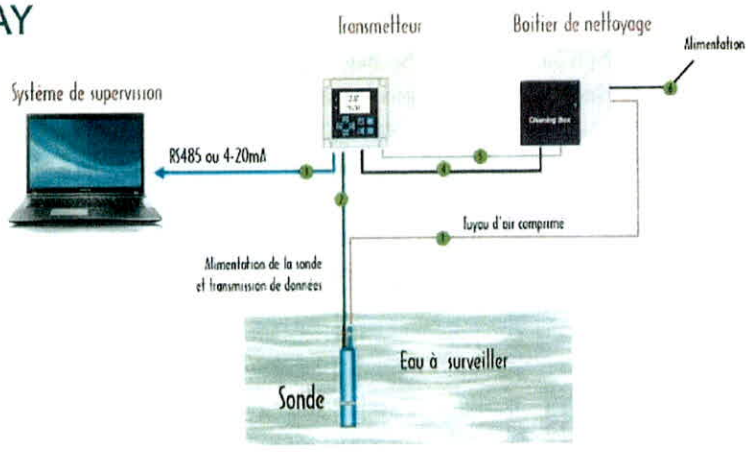
CABLE D'ALIMENTATION ET DE TRANSMISSION

Il s'agit d'un câble IP68 qui comprend un connecteur résistant à l'eau côté sonde.
Le câble de type sous-marin assure une sécurité totale de l'alimentation ainsi que la transmission des données. Il offre une parfaite fiabilité pour un fonctionnement en continu et en toute sécurité. Il est utilisable dans tous les types d'eaux.

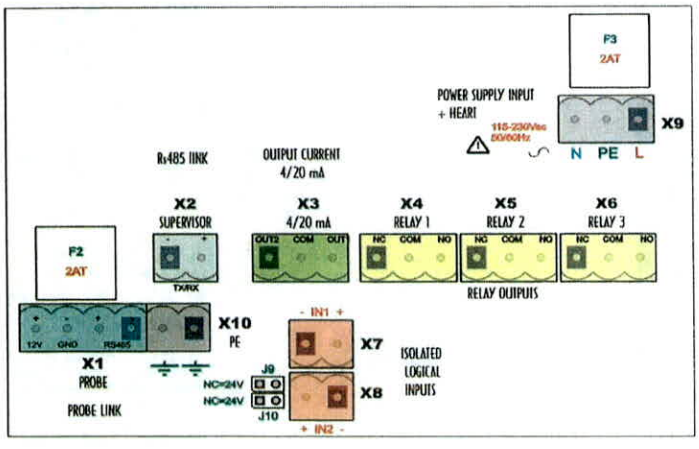
SYSTEME PLUG AND PLAY

PRET A MESURER

La sonde peut être plongée directement dans l'eau à analyser ou installée dans une chambre de mesure.



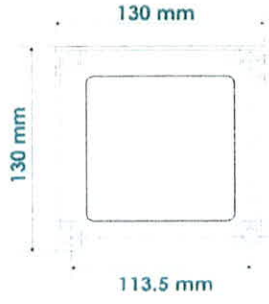
1 - Tuyau d'air comprimé	ø ext. 6 mm - ø int. 4 mm	longueur : 10 m	Ref: 8492-P01-V1
2 - Câble de liaison sonde - transmetteur	ø ext. 8 mm max	longueur : 10 m	Ref: E8489-C01-V2
3 - Câble de communication vers PC	RS 485 link	---	Equipement client
4 - Câble de commande coffret de nettoyage	ø ext. 7.8 mm max - 2 x 1.5²	longueur : 4 m	Ref: E8492-C01-V1
5 - Câble secteur vers boîtier 8490	ø ext. 7.8 mm max - 3G 1.5²	longueur : 4 m	Ref: E8492-C02-V1
6 - Câble entrée secteur	ø ext. 7.8 mm max	---	Equipement client



CONNEXION

X1 - Liaison avec la sonde (E8490C01V1)
X2 - Liaison RS485 avec le PC Superviseur
X3 - 2 sorties courant 4/20mA
X4 - Sortie Relais 1
X5 - Sortie Relais 2
X6 - Sortie Relais 3 (liaison avec E8492)
X7 - Entrée Opto-couplée 1
X8 - Entrée Opto-couplée 2
X9 - Secteur + terre
X10 - Terre

INTEGRATION



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nbaddams@efs.fr
www.efs.fr

EFS Etude Fabrication Service

La FRENCH FAB — LES INDUSTRIELS EN MOUVEMENT

Concepteur et fabricant d'équipements depuis 40 ans, EFS sait instrumenter, diagnostiquer, collecter des informations et les remonter vers les supervisions. Nos systèmes sont conçus principalement pour être connectés, communicants et énergiquement autonomes. Nos solutions et mises en oeuvre sont bonnes du premier coup.

Notre expertise est basée sur la maîtrise de briques technologiques pour toutes mesures physiques ou chimiques : Détection de phénomènes transitoires ou continus • Diagnostic, intelligence, analyse des données • Asservissement rapide, régulation • Gestion d'environnement sévère • Gestion intelligente de l'énergie • Intégration mécanique dédiée • Sûreté de fonctionnement • IoT, M2M, géolocalisation.

ACTIVITÉS

Etude

Concept
- Spécifications
- Recherche de concepts innovants
- Choix du meilleur concept
- Validation du concept

Solution
- Conception
- Choix des composants et fournisseurs
- Prototypes ou POC
- Validation de la solution

Fabrication

Industrialisation
- Conception détaillée
- Qualification composants et fournisseurs
- Définition outillage et moyens de production
- Prototype
- Dossier produit
- Validation industrielle

Production
- Production et support dans la durée
- Série jusqu'à 5000 pièces par an
- Logistique personnalisée
- Livraison monde entier

Service

Service après-vente
- Service après-vente
- Etalonnage
- Calibration
- Tests

Prestations
- Maintenance de produits
- Mise en service sur site
- Dépannage sur site
- Gestion obsolescence

DOMAINES

Electronique de puissance • Electronique analogique • Electronique numérique • Optoélectronique • Logiciel embarqué • Informatique industrielle • Automatisme • Electricité • Mécatronique • Mécanique • Hydraulique • Prototypage • Essais électriques, CEM, thermiques et vibratoires.

SECTEURS

Aéronautique • Automobile • BTP • Electricité • Environnement • Ferroviaire • Industrie • Médical • Naval • Spatial • Télécommunications.

CERTIFICATIONS

ENTREPRISE CERTIFIÉE CE

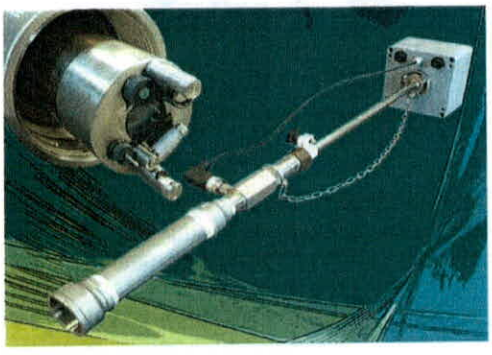
ISO 9001 : 2015

- Production
  ATEX et IECEx 2014/34/UE
- Certification maritime
  Marine MED 2014/90/UE – DAHMAS
- Certification pour les équipements sous pression
  DESP 2014/68/UE

Toute l'expertise d'un acteur clé de la conception et de la fabrication de produits intelligents pour la gestion de l'eau.

EFS - ZAC du Baconnet - 192, allée des chênes - 69700 Montagny (France)
www.efs.fr ☎ : 06 85 31 64 87 @ : nbaddams@efs.fr

SONDES D'ANALYSE DE LA QUALITE DE L'EAU

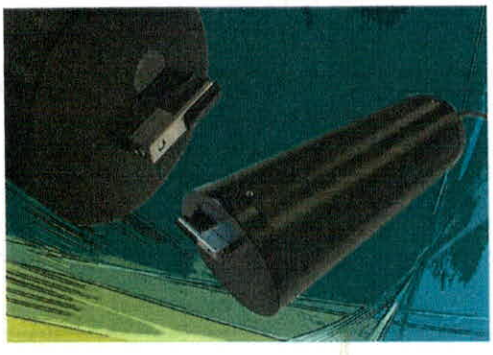


Sonde multi-paramètres **Multi-Probe+**

- Sonde autonome à insertion unique en charge
- Surveillance en continu et mesure temps réel
- Etanchéité et fonctionnement jusqu'à 16 bars
- Intégration contrainte de 9 capteurs dans un ∅ 40 mm
- Serveur Web intégré
- Communication en RS485, GPRS Wi-Fi
- Turbidité, conductivité, pH, redox, débit, pression, vitesse, température, tension batterie, 2 entrées analogiques 0-10V.

Sonde multi-paramètres **UV-Probe 254+**

- Sonde technologie UV/visible par spectre d'absorbance
- Mesure en ligne sans réactif ni filtration préalable
- Longue durée de vie avec corps en inox 316L et UV led
- Transmetteur de collecte et de traitement de données
- Boîtier optionnel de nettoyage à air comprimé
- DCO, DBO, COT, MES, CAS254, CAS560.



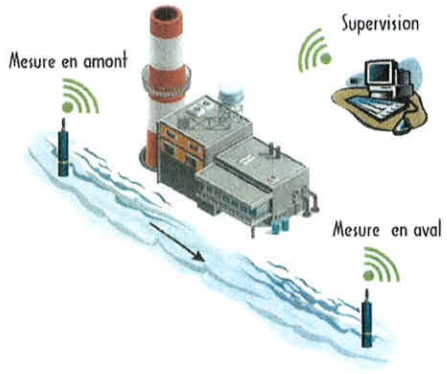
Sonde de turbidité **Turbi-Probe 4000+**

- Turbidimètre néphélométrique à immersion
- Large plage de mesure entre 0 et 4000 NTU
- Etalonnage simplifié et mise en opération aisée
- Enregistreur de données intégré et transmission numérique
- Nettoyage automatique des fenêtres par essuie-glace
- Mesure selon norme ISO 7027 / EN27027.

SOLUTION CLE EN MAIN

Stations d'analyses avec chaîne de mesures complètes

- Surveillance de la qualité de l'eau
- Mesures pour la gestion des effluents
- Analyse de paramètres en ligne et suivi continu
- Renvoi vers supervision et gestion des alertes
- Logiciels et interfaces dédiés
- Système autonome sécurisé
- Installation et maintenance.



Toute l'expertise d'un acteur clé de la conception et de la fabrication de produits intelligents pour la gestion de l'eau.

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EFS

Engineering
Fabrication
Service

Contact:
Nicolas J. Baddams
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nbaddams@efs.fr

INSTRUMENTATION & INTELLIGENT WATER QUALITY MONITORING SYSTEMS

EFS is a 40 years experienced designer & manufacturer in instrumentation, diagnostic, data collection & communication to supervision. We produce innovating & powerful industrial equipments featuring connection, communication & autonomy. Our solutions & systems are studied to aim the goal at first shot since the project start.

Our experience is based on technological expertise & technical knowledge for all physical & chemical measurements : Permanent & transitory state detection • Intelligence & analysis data processing • Fast enslavement & control regulation • Energy processing management • Safety & secured functionalities • Mechanical integration in harsh environment • Internet Of Things • Machine To Machine • Geolocation

ACTIVITIES

Engineering

Concept
- Technical specifications
- Research for innovating
- Best concept choice
- Concept approbation

Solution
- Design
- Components choice
- Prototype
- Solution validation

Fabrication

Industrialization
- Detailled design review
- Qualification of suppliers
- Tools & facilities definition
- Prototype
- Manufacturing product file
- Industrial validation

Production
- Dedicated production & support
- 5'000 units /year serial batch capability
- Dedicated & personalized logistic
- Worldwide deliveries & Incoterm

Service

After Sales
- After sales service
- Calibration
- Reparation
- Test

Miscellaneous
- Commissioning
- Maintenance
- Assistance
- Obsolescence advise

DOMAINS

Power electronic • Analogic electronic • Digital electronic • Opto electronic • Embedded software • Automation • Electricity • Mechatronic • Mechanical • Hydraulic • Prototype • Tests (electrical, electromagnetical, heat, vibration)

FIELDS

Aeronautic • Automative • Construction • Electricity • Environnement • Industry • Health • Naval • Railway • Transport • Spatial • Telecommunication

CERTIFICATIONS

ENTREPRISE CERTIFIÉE

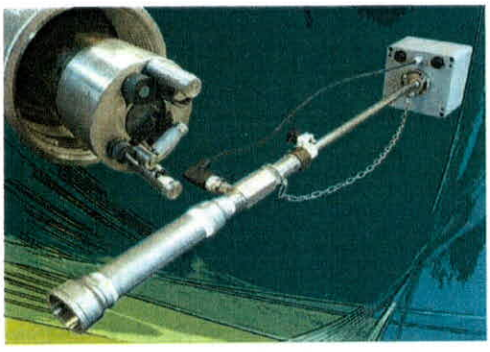
ISO 9001 : 2015

Production : **ATEX et IECEx 2014/34/UE**

Maritime : **Marine MED 2014/90/UE – DAHMAS**

Pressure : **DESP 2014/68/UE**

WATER QUALITY MEASUREMENT PROBES



Multi-parameters probe Multi-Probe+

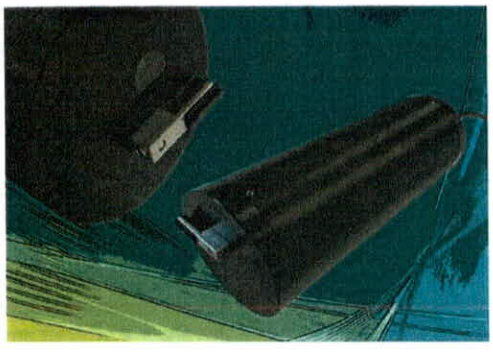
- Autonomous probe for direct insertion in pressured pipe
- On-line continuous realtime measurement for monitoring
- Waterproof probe & connexions to 16 bars
- 9 sensors in a ∅ 40 mm head
- Integrated web server
- ModBUS RS485, GPRS or Wi-Fi
- Turbidity, Conductivity, pH, Redox, Pressure, Temperature, Speed, Flow, Battery voltage, 2 free analogic 0-10V inputs

Dedicated for drinking water / distribution network applications

Multi-parameters probe UV-Probe 254+

- Ultra Violet visible technology by spectral absorption
- On-line measurement without re-agent or prior filtration
- Data collection & analysis with autonomous transmitter box
- Ultra long life with 316L stainless steel body & UV led
- Self-cleaning measurement cell with compressed air
- Light maintenance without spare parts to manage
- BOD, COD, TOC, TSS, SAC254, SAC560

Dedicated for industrial effluent or fresh water / treatment plant water



Turbidity meter Turbi-Probe 4000+

- On-line turbidity measurement by nephelometry
- Integrated datalogger with fast & easy calibration
- Integrated digital data recorder & transmitter
- Glass wiper automatic cleaning
- Battery option for energy autonomy
- Measurement according to ISO 7027 / EN27027 Standard
- Wide range from 0 to 4000 NTU, 0.01 NTU resolution

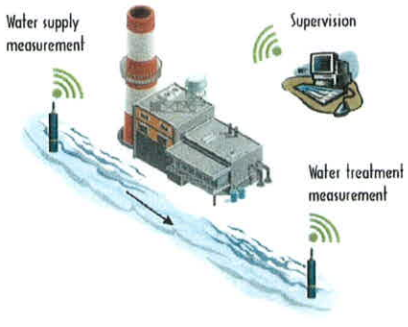
Dedicated for waste water or industrial effluent / sewage or process network

TURN KEY SOLUTIONS

Dedicated analysis stations for complete measurements

- Water quality monitoring
- Industrial effluent measurement
- On-line parameters monitoring & continuous process
- Supervision dispatch & alerts management
- Dedicated interface display & software
- Self-secured autonomous system
- Installation & maintenance

Dedicated for waste water & industrial effluent / all process industries types



Designer & manufacturer of industrial instrumentation equipments & intelligent water quality monitoring systems
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EFS

MEASUREMENT PROBE

UV-Probe 254+

User manual

EDITION: 05 June 2019 - VERSION: 7.1

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CONTENTS

Chapter 1
INTRODUCTION

1. INTRODUCTION

The ***UV-Probe 254+*** is a multi-parameter online measurement probe for continuous and independent quality control of water and effluent. It measures the SAC 254 and the SAC 560 directly. It also provides an estimation of the **TOC** or **COD** or **BOD** and the **suspended solids** through correlation of the SAC measurements and laboratory measurements.

1.1. PARAMETERS ANALYZED

- **TOC (mgC/L): Total Organic Carbon**
  Total quantity of organic carbon by chemical means.
- **COD (mgO2/L): Chemical Oxygen Demand**
  Total quantity of oxygen consumed by chemical means.
- **BOD (mgO2/L): Biochemical Oxygen Demand**
  Total quantity of oxygen consumed by chemical means.
- **Suspended Solids: (mg/L)**
  Mass of non-soluble particles found in the water with a dimension of between 1 and 100 µm.
- **SAC 254 (UA/m): Spectral Absorption Coefficient**
  Optical absorption of the effluent at a wavelength of 254 nm.
- **SAC 560 (UA/m): Spectral Absorption Coefficient**
  Optical absorption of the effluent at a wavelength of 560 nm.
- **COLOR (mgPt/l :** color measured at 560 nm.

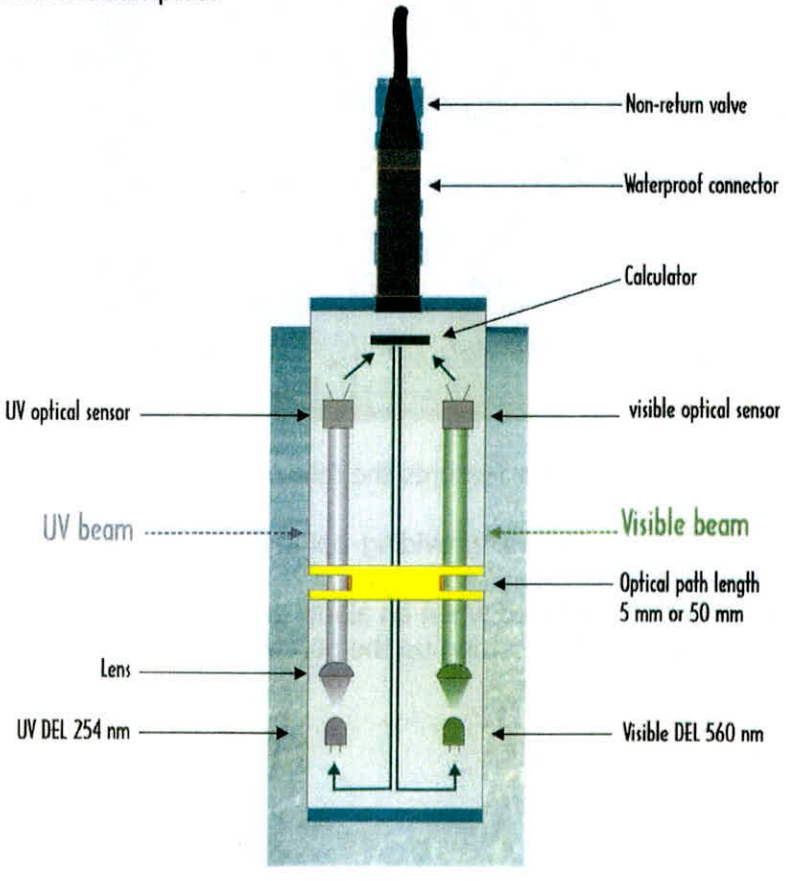
1.2. APPLICATION FIELDS

- Natural water
- Used water
- Industrial effluent

1.3. MEASUREMENT PRINCIPLE

The sample to be analyzed undergoes to separate radiations. The first is emitted in the ultra-violet range at a precise wavelength of 254 nm, the second is generated in the visible range of the electromagnetic spectrum at a wavelength of 560nm. Depending on its chemical composition, the sample will absorb different degrees of radiation at these two wavelengths. The quantity of light absorbed in the UV at 254 nm is termed the SAC 254 and the proportion of light absorbed at 560 nm is termed the SAC 560.

Beer-Lambert's law defines the relation between the measured absorption (SAC) and the sample concentration. The calibration is calculated automatically by the device which determines line of regression between the SAC and the values obtained in a laboratory setting for the different samples.



1.4. EQUIPMENT DESCRIPTION

The ***UV-Probe 254+*** system is made up of a measurement probe, a transmitter and an optional module for compressed air cleaning (E8492 - ***UV-Probe 254+ Cleaning Box***).

1.4.1. The transmitter

This is an IP65 electronic box with dimensions of 130 x 130 x 100mm. It collects the digital signals coming from the probe and processes them in order to determine the SAC and the concentrations in COD and Suspended Solids.

The transmitter includes a "datalogger" function allowing several years' worth of data to be stored at the maximum measuring frequency. This data can easily be transferred to a USB flash drive.

The front panel of the transmitter features the following elements:

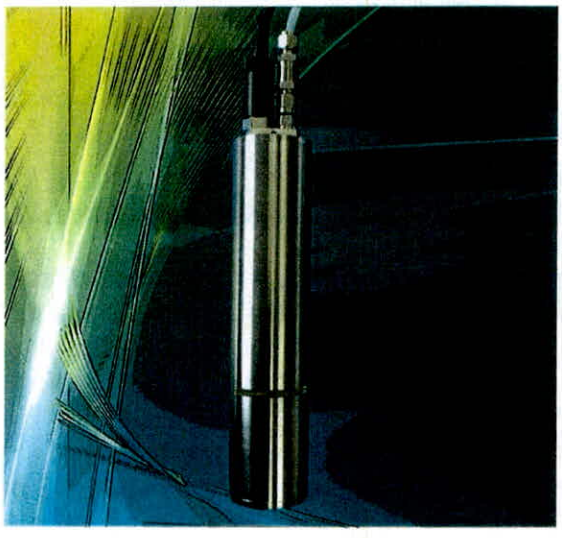
- a 132x64 rear-lit **LCD display** providing optimal visibility and displaying the results in large easy-to-read characters.
- two **alarm** lights that show red when an alarm threshold set up by the user is exceeded.
- a **tactile 8-key keypad** for setting up the parameters.

The **lower part** features 4 cable inputs equipped with cable glands for the following connections:

- the power supply (110V-220V)
- the measurement probe
- the optocoupled inputs and the relay outputs
- the 4-20mA current outputs
- the E8492 cleaning module

On the side, a hermetic USB port allows the user to retrieve the data recorded by the device quickly and easily using a USB flash drive.

1.4.2. The probe



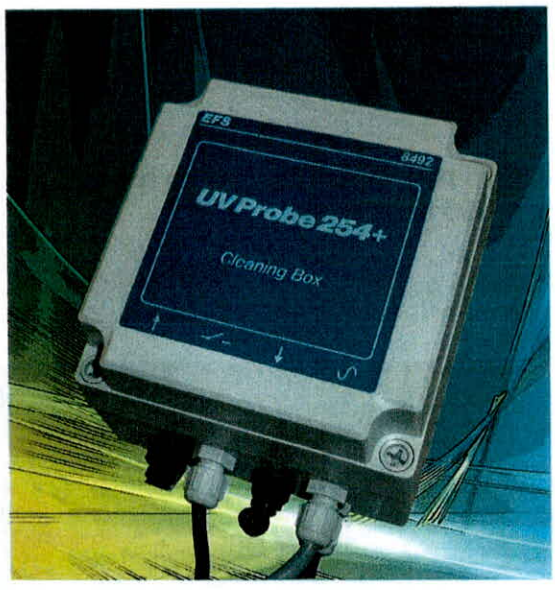
This is a 316L stainless steel tube that is 25 cm long and 55 mm wide.

The lower part has two grooves in which the liquid to be analyzed will circulate. On the upper part there is an electric cable for connection to the transmitter and also a non-return valve. The valve serves as a connector for the E8492 compressed air cleaning module.

The optical measurements are carried out directly inside the probe by a microprocessor system. The optical signals are immediately converted into digital values and are relayed to the transmitter.

1.4.3. The cleaning module

Compressed air cleaning system is optional but recommended in order to keep the measurement optics clean the longest and minimize the maintenance frequency. The compressed air cleaning module offers two versions: E8492-P and E8492-E.



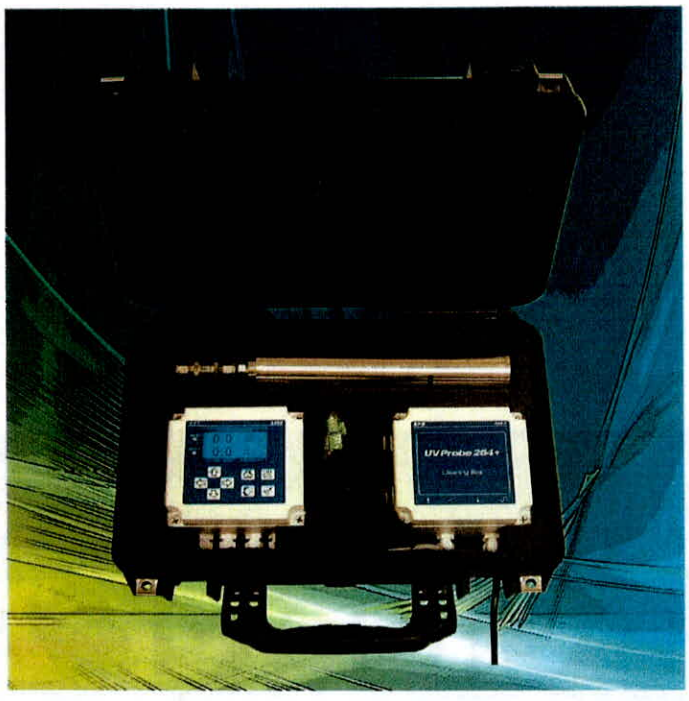
- **E8492-P**: this module features an independent compressed air generator system driven by the transmitter. This system is dedicated for installations without a compressed air network close by. Yet, the pressure of the generated compressed air cannot exceed 1.2 bar what limits the immersion depth of the probe to a maximum of 10 meters.
  Maximal pressure
  - Input: forbidden, must stay at atmospheric pressure.
  - Output: maximum pressure generated by the module: 1.2 bar.

- **E8492-E**: This model features a normally closed electrovalve driven by the transmitter during the cleaning periods/times. The module air input is directly connected to the local compressed air network and at the output of the non-return valve on the probe.
  Maximal pressure
  - Input: 5 bar max
  - Output: 5 bar maxi

If you do not use the cleaning module E8492 (P or E), the maximum allowed pressure on the probe compressed air connection is 5 bar.

Chapter 2
INSTALLATION

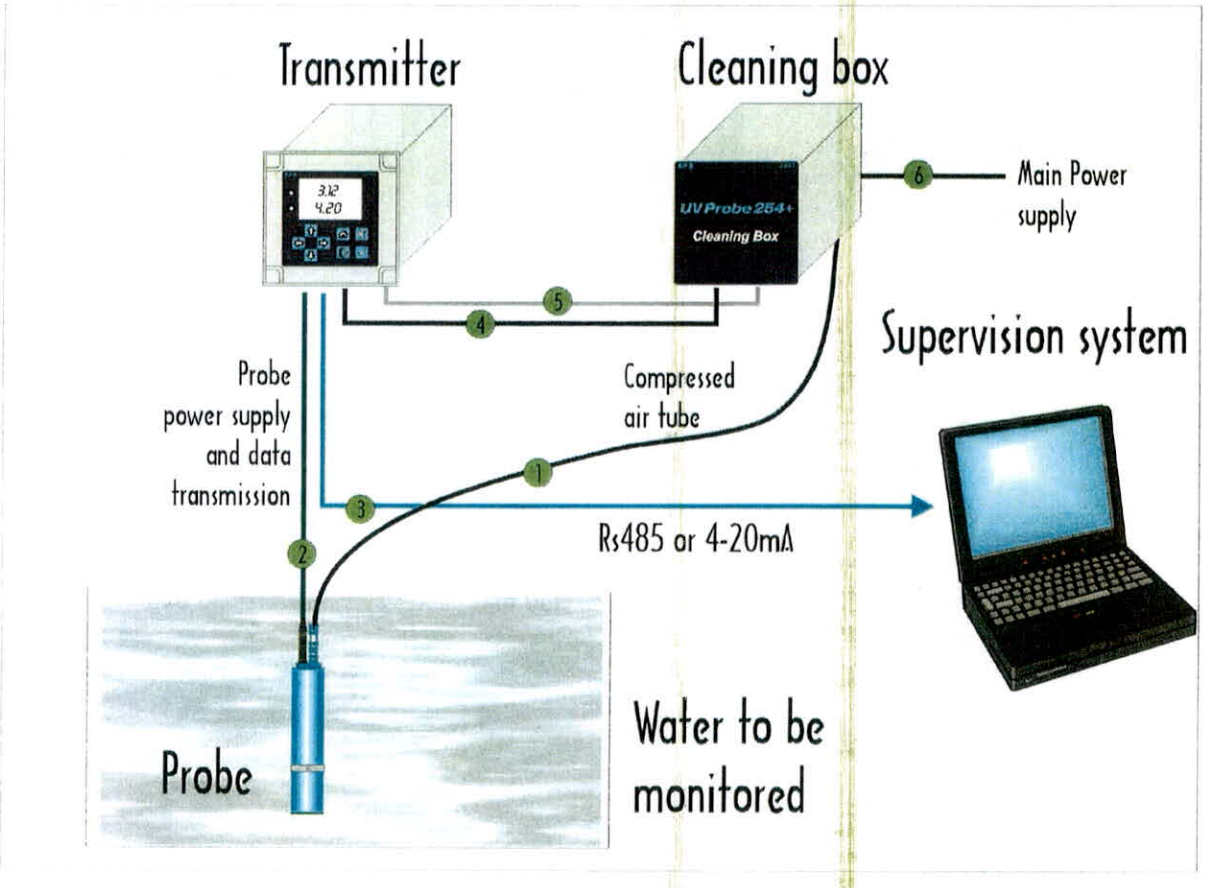
2. INSTALLATION



List of material provided:

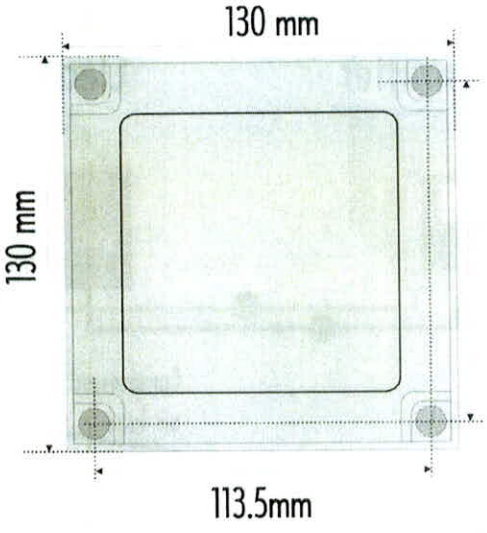
- an E8489 stainless steel probe complete with 10 metres of cable
- an E8490 transmitter
- an E8492 cleaning module (optional)
- 10 metres of plastic tubing for the compressed air (optional)
- the cabling connections
  - 3 x 2-pin female screw terminals,
  - 5 x 3-pin female screw terminals,
  - 1 x 4-pin female screw terminal
- a cleaning brush
- a USB flash drive
- a user manual

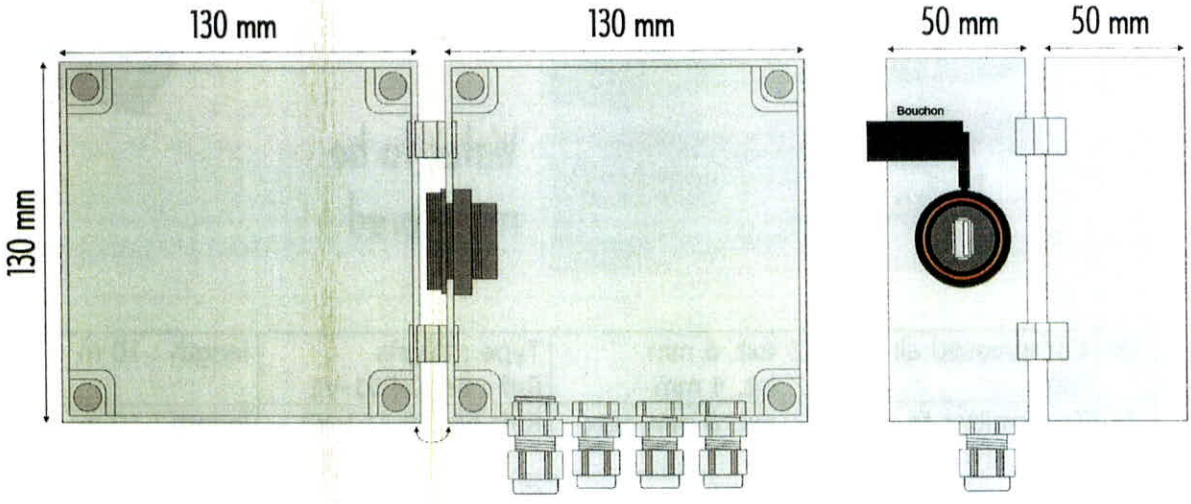
2.1. INSTALLATION SYNOPTIC



1	Compressed air tube	∅ ext. 6 mm ∅ int. 4 mm	Type : Legris Ref : 8492-P01-V1	length : 10 m
2	Transmitter to probe link	∅ ext. 8 mm max	Ref: E8489-C01-V2	length : 10 m
3	Communication link	RS485 link	Customer equipment	
4	Cleaning box command link	∅ ext. 7,8 mm max 2x 1.5²	Ref: E8492-C01-V1	length : 400 mm
5	Main power cable to connect E8490	∅ ext. 7,8 mm max 3G 1.5²	Ref: E8492-C02-V1	length : 400 mm
6	Main power cable	∅ ext. 7,8 mm max	Customer equipment	

2.2. ASSEMBLING THE TRANSMITTER





2.3. POWER SUPPLY CONNECTION

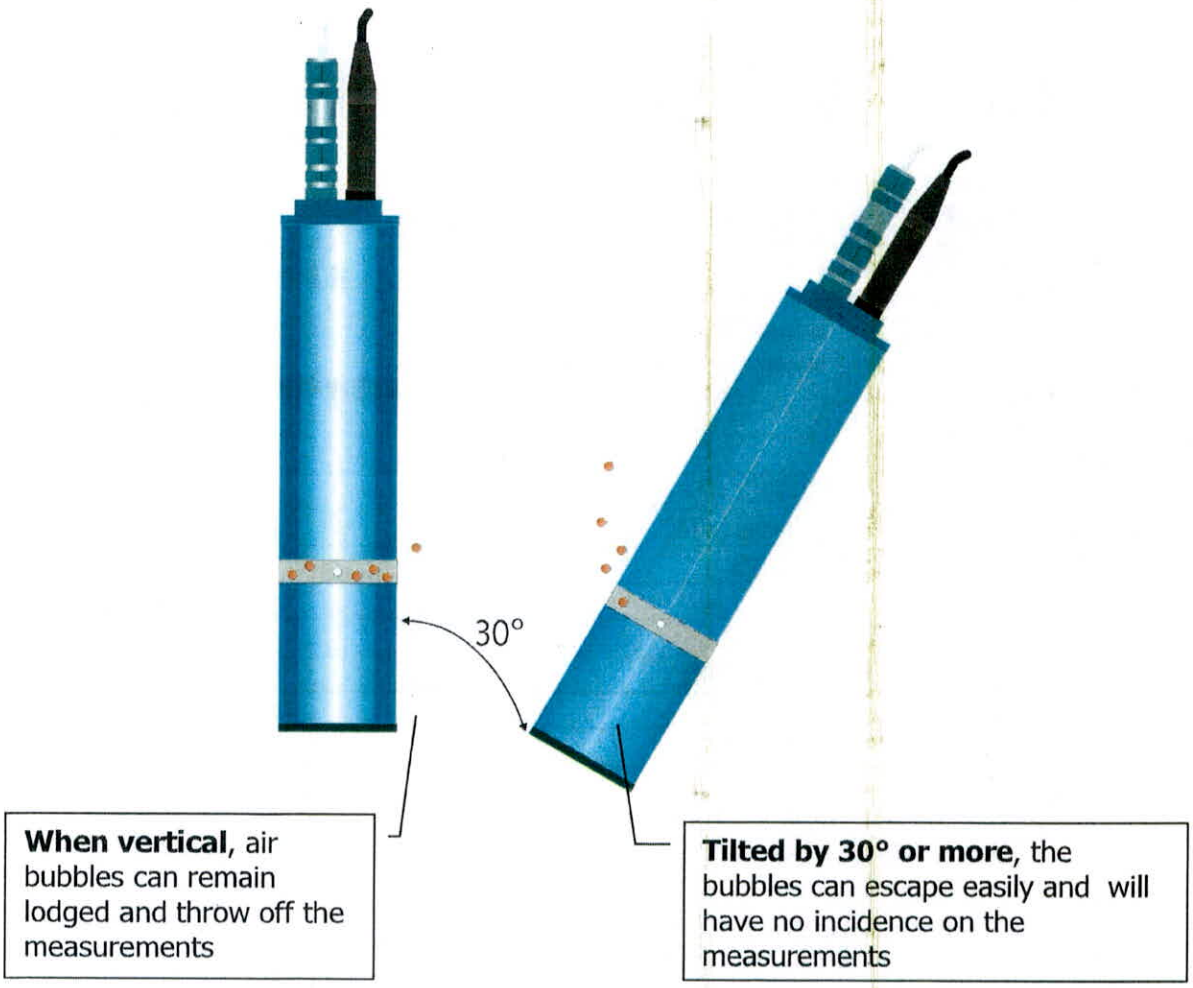
If both transmitter and cleaning box are used, main power should be connected first to the cleaning box. Then a second electrical cable must link the Cleaning box supply to the transmitter supply connector.

2.4. POSITIONING THE PROBE

IMPORTANT

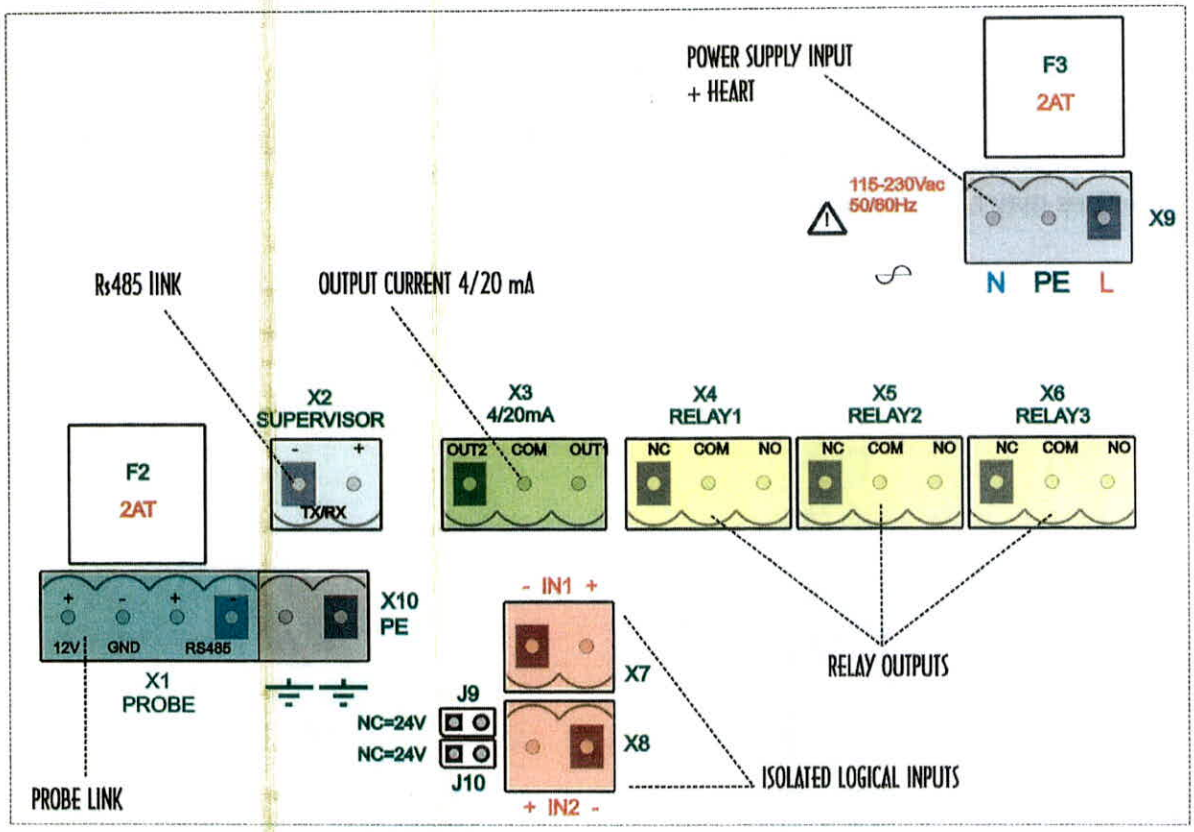
The probe carries out optical measurements so **it is important to protect the measurement head from direct light**. Sunlight or lamplight close to the measurement orifices may have an impact on the results.

When the cleaning module is used, it is recommended that the probe be inclined at least 30° degrees from its vertical position to prevent air bubbles from becoming trapped in the measurement grooves.



2.4.1. ELECTRIC CONNECTIONS

2.4.2. overall view of the connectors



X1	Link with the probe (E8490C01V1)
X2	RS485 link with the Supervisor PC
X3	Two 4/20mA current outputs
X4	Relay output 1
X5	Relay output 2
X6	Relay output 3(links with E8492)
X7	Opto-coupled input 1
X8	Opto-coupled input 2
X9	Mains + earth
X10	Earth
J9	Jumper to select logical input level (5V : ON or 24V : OFF)
J10	Jumper to select logical input level (5V : ON or 24V : OFF)
F3	Protective fuse on the mains input
F2	Protective fuse on the probe power supply

2.4.3. Mains connection

The transmitter requires an AC sinusoidal power supply (50 to 60Hz) of between 115V and 230V using connector X9.

X9 wiring		
Pin	Name	Description
1	Phase	Mains phase
2	Earth	Earth
3	Neutral	Mains neutral

2.4.4. ModBus Link

The ModBus link of the ***UV-Probe 254+*** is designed for use in RS485 mode: 1 differential pair (2 wires).

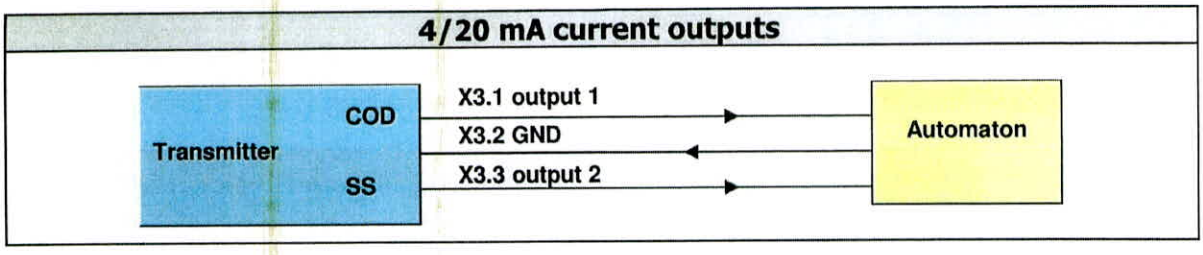
With 2-wire cabling, the same pair of wires is used to transmit requests from the supervisor to the ***UV-Probe 254+*** and to transmit the devices responses.

	RS485 Supervisor	Transmitter 1	Transmitter 2	Transmitter n
	TX+ / RX+ (A)	TX+ / RX+	TX+ / RX+	TX+ / RX+
	TX- / RX- (B)	TX- / RX-	TX- / RX-	TX- / RX-
Terminal resistor	Yes	No	No	Yes
Terminal resistor	Une seule paire sur tout le réseau, généralement au niveau du superviseur.			

RS485 : 1 master (supervisor) and several slaves (transmitters)

X2 wiring		
Point	nom	Description
1	TX - / RX -	Negative signal
2	TX+ / RX+	Positive signal

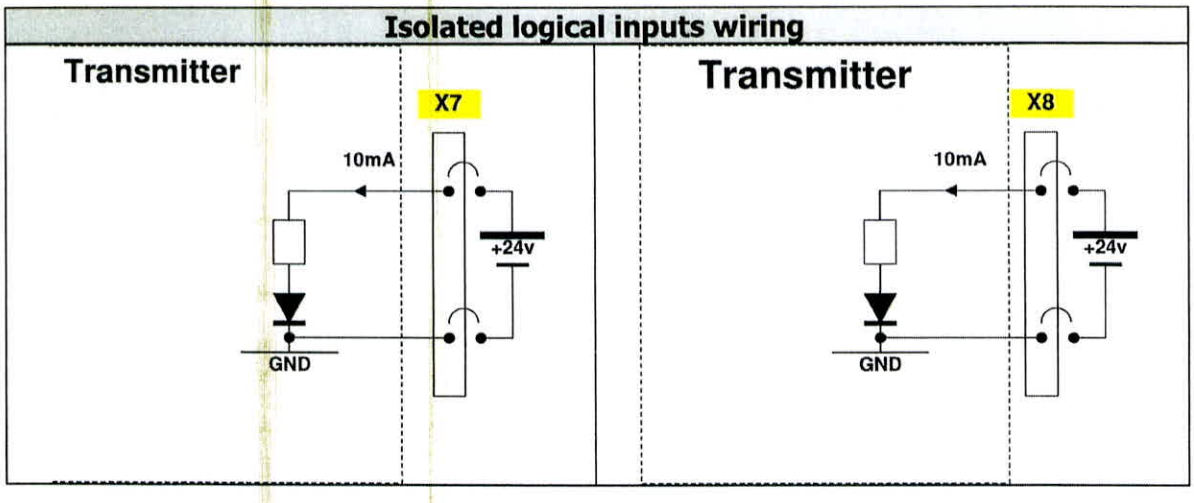
2.4.5. 4/20mA current ouputs



X3 wiring		
Pin	Name	Description
1	Output 1	Current loop output 1
2	GND	Current loop 1 and 2
3	Output 2	Current loop output 1

4-20mA outputs are isolated from the ground.

2.4.6. Isolated logical inputs



X7 wiring		
Pin	Name	Description
1	GND	Ground
2	IN1	24 V or 5 V input

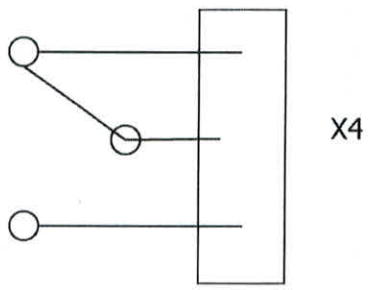
X8 wiring		
Pin	Name	Description
1	GND	Ground
2	IN1	24 V or 5 V input

Jumpers configuration		
J9	NC	24 V input
	C	5 V input
J10	NC	24 V input
	C	5 V input

2.4.7. Isolated relay outputs

The 3 ***UV-Probe 254+*** relay outputs transmit alarms to the external world. Each threshold is settable independently. The 3 relays are isolated together. They can each short-circuit a line with 8 amps and 240 V AC maximum. The relay 3 is dedicated to the cleaning box. It starts and stops the cleaning following the setting.

Relay output wiring



X4 wiring		
1	NF	Normally closed contact
2	COM	Common
3	NO	Normally opened contact

X5 wiring		
1	NF	Normally closed contact
2	COM	Common
3	NO	Normally opened contact

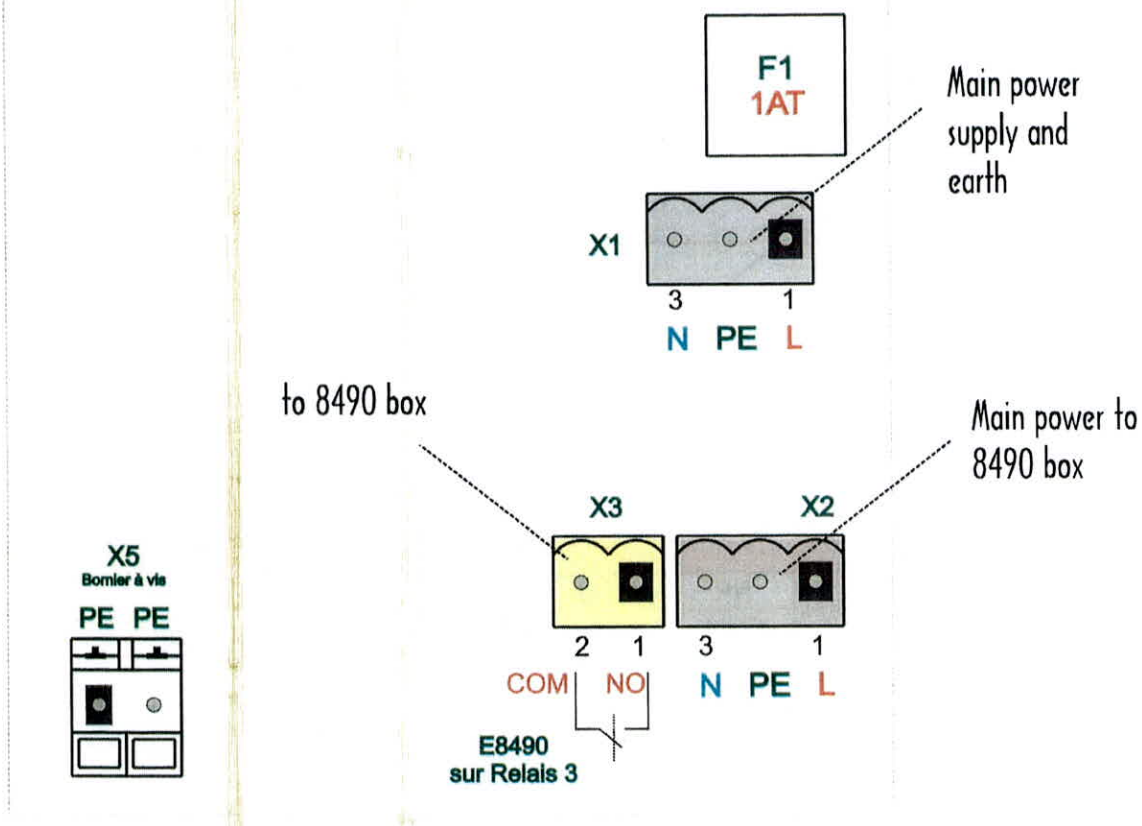
Relay output #3 is dedicated to the cleaning module driving n°3 (X6).

X6 wiring		
1	NF	Normally closed contact
2	COM	Common
3	NO	Normally opened contact

2.4.8. Probe connection (X1)

X1 wiring		
1	RX/TX-	Serial link (black)
2	RX/TX+	Serial link (white)
3	GND	Ground (red)
4	+12V	Probe power supply 12V DC (green)

2.4.9. Cleaning module wiring E8492



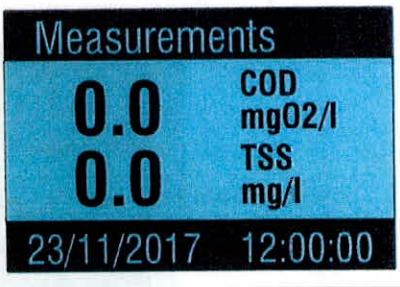
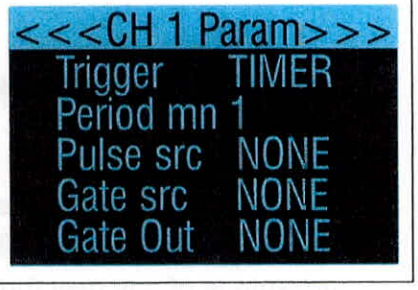
X1	Main power supply 115-230Vac
X2	Main power to E8490 via 3G1.5² cable reference **E8492C02V1**
X3	Cleaning box command connection, thanks to transmitter relay 3 and via **cable** reference **E8492C01V1**
X5	Earth connection
F1	Main power fuse 1AT

Chapter 3
CONFIGURATION

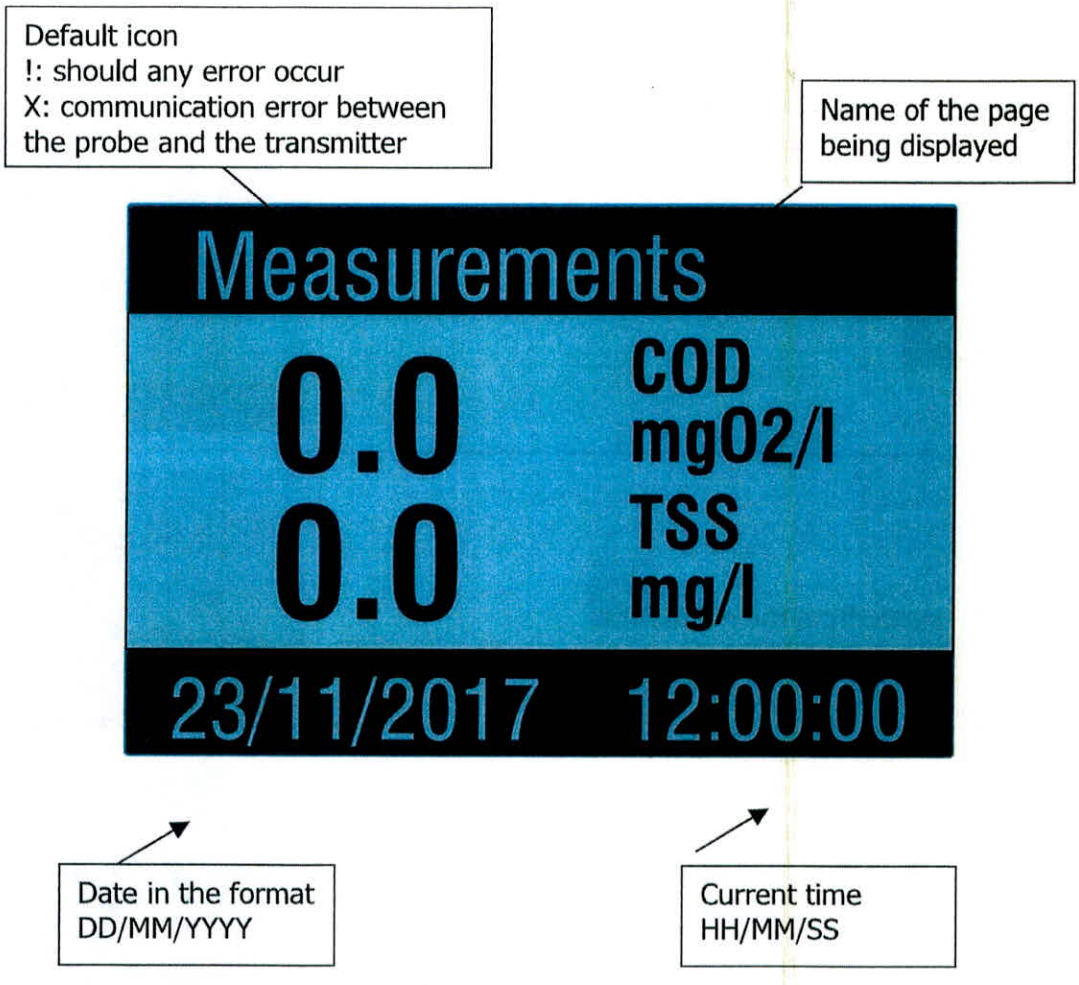
3.4. STEP BY STEP CONFIGURATION

It is not necessary to set up all the parameters of the device since a large proportion of these parameters are the settings for the inputs/outputs, alarms and advanced functions. It is always possible to refine the set-up at a later date.

The "typical configuration" given below outlines the main parameters.

Once the device has been switched on, the set-up mode can be accessed from any measurement screen. • Press 	
• Choose **SETUP** from the menu 	
• Choose **ANALYSE** from the menu  and 	
	

3.3. ICON BARS ON THE SCREEN



Press  then "**setup**"

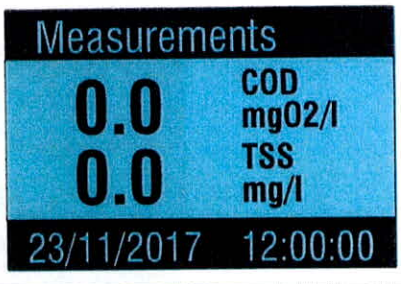
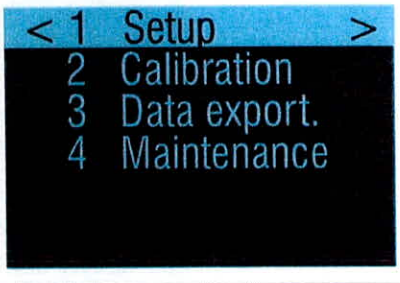
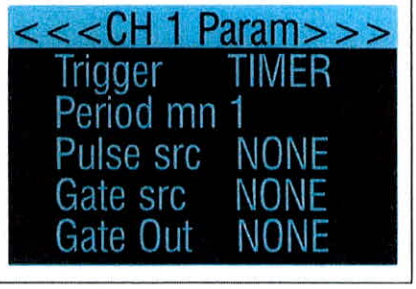
Once the probe has been installed, the probe must be set up in order to take into account all the specifics of the installation so as to obtain the best performance possible.

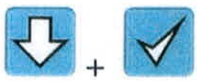
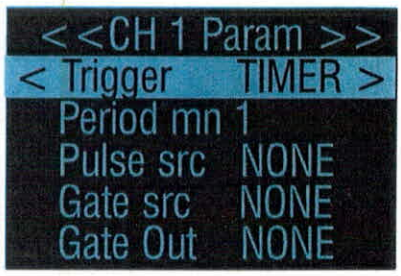
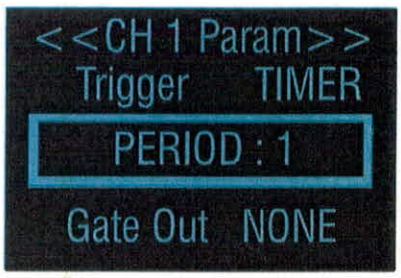
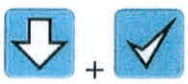
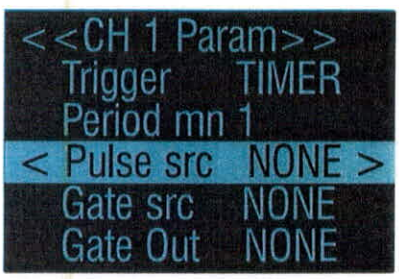
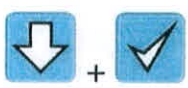
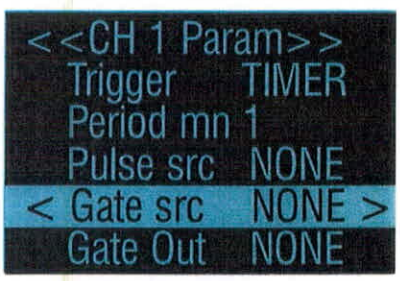
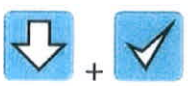
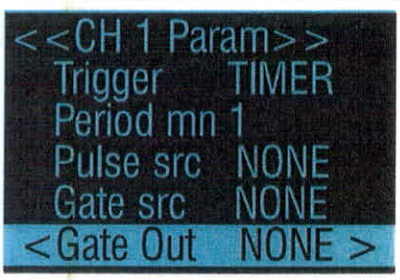
Similarly, we recommend verifying the set-up after software update so as to best take advantage of any new functions.

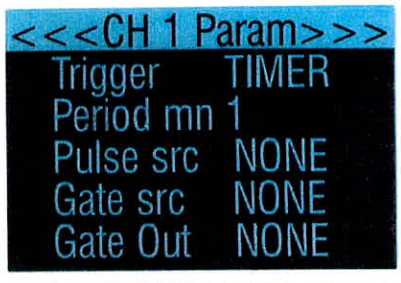
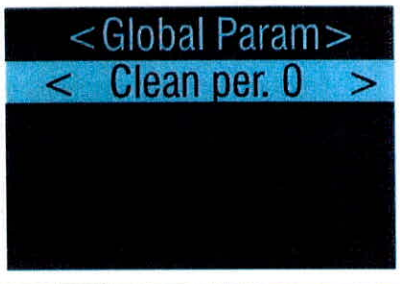
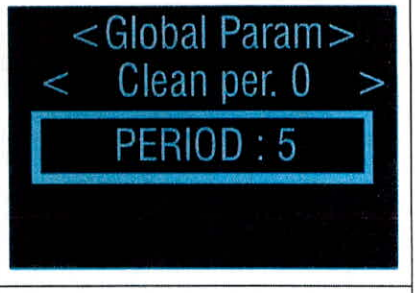
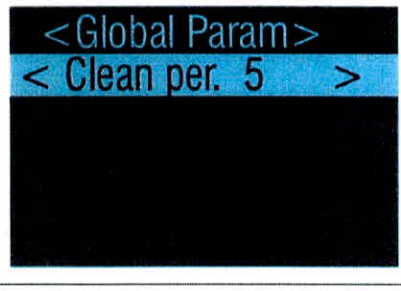
3.4. STEP BY STEP CONFIGURATION

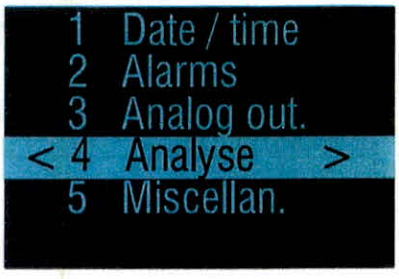
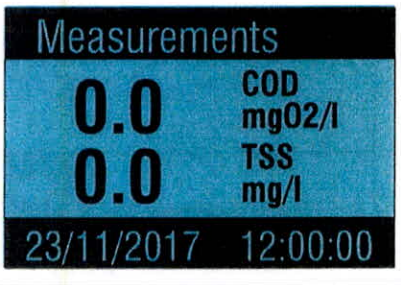
It is not necessary to set up all the parameters of the device since a large proportion of these parameters are the settings for the inputs/outputs, alarms and advanced functions. It is always possible to refine the set-up at a later date.

The "typical configuration" given below outlines the main parameters.

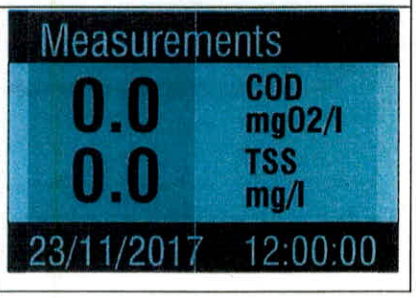
Once the device has been switched on, the set-up mode can be accessed from any measurement screen. • Press 	
• Choose **SETUP** from the menu 	
• Choose **ANALYSE** from the menu  and 	
	

• Set the parameter **TRIGGER** to **TIMER**  **(NONE-TIMER-PULSE).**	
• Set the **TIMER PERIOD** to the required measurement frequency (one analysis every minute in the example opposite). 	
• Set the **PULSE SOURCE** to NONE. 	
• Set the **GATE SOURCE** to NONE.  **(DI1 – DI2 - NONE)**	
• Set the **GATE OUT** to NONE.  **(DI1 – DI2 - NONE)**	

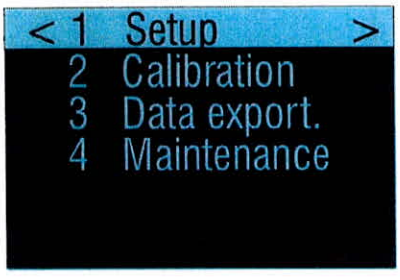
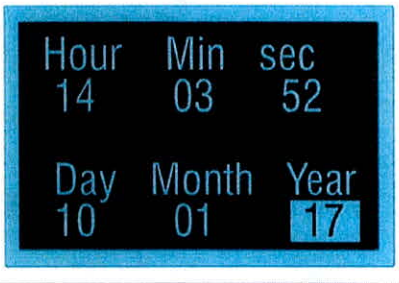
• Select the line **CHANNEL1 PARAMETERS** with ⇧ then validate with ✓ The set-up common to all the analysis channels is displayed.	
• Choose **CLEANING PERIOD** ⇩ + ✓	
• Set **CLEANING PERIOD** 5 mins. (for example one cleaning every 5 minutes). ⇧ + ✓	
	

• Press  to return to the ANALYSE menu	
• Press  to return to the SETUP menu	
• Press  to return to the MEASUREMENT screens. **Message "Saving parameters please wait ..."**	

3.5. CONTRAST SETTINGS

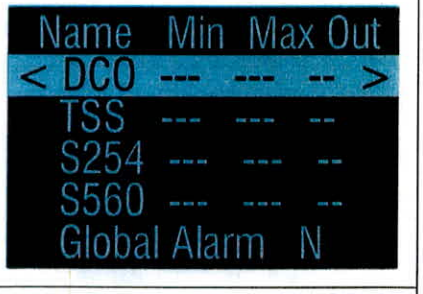
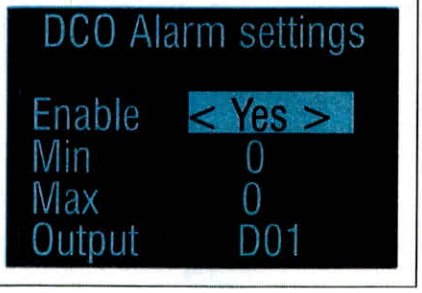
	
To change the contrast settings of the screen: • Hold down the  key • Adjust with the arrow keys  and  .	

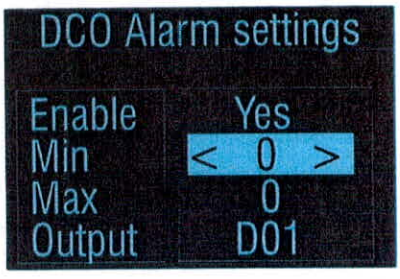
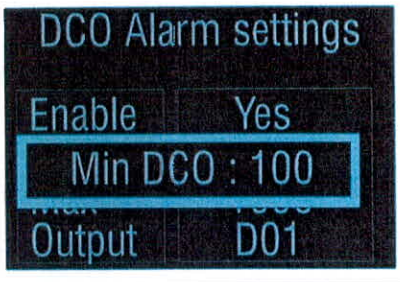
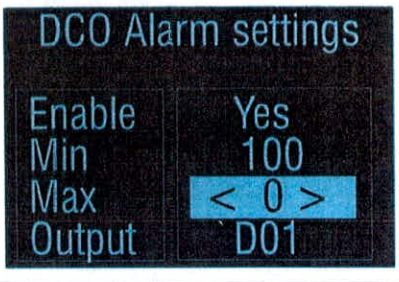
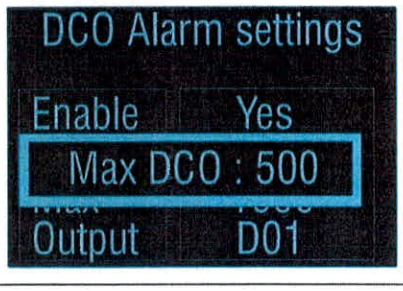
3.6. SETTING THE DATE AND TIME

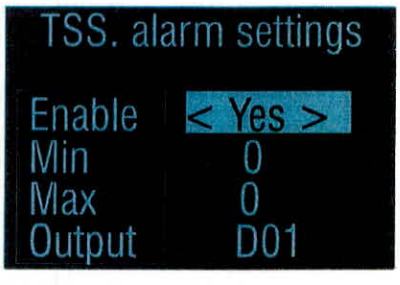
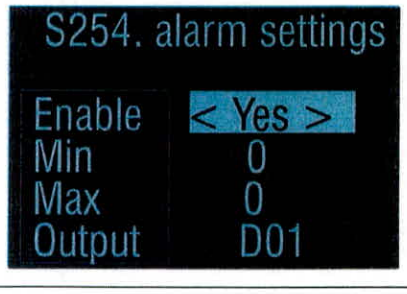
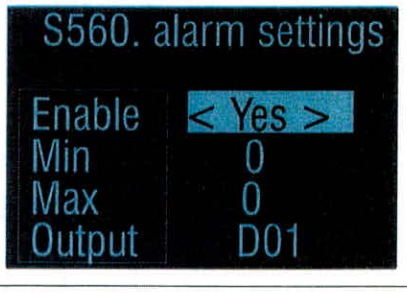
→ setup → date / time	
• Choose **SETUP** from the menu	
• Choose **DATE / TIME** with	
• Use the arrow keys and to move the cursor around • Adjust with the arrow keys and . • Validate with .	

Don't forget to change the time on the transmitter for the hour change between summer and winter, where appropriate

3.7. SETTING UP THE ALARM THRESHOLDS

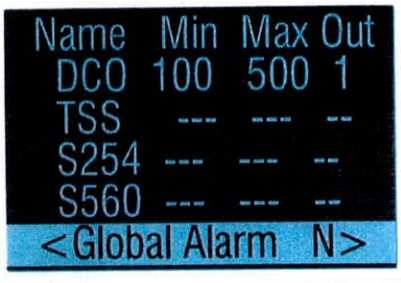
→ setup → Alarms	
The ***UV-Probe 254+*** can only monitor the parameters measured within a pre-determined range and will alert the user if this range is exceeded. • Choose **SETUP** from the menu	
To set up this surveillance, select the parameter required and validate. • Choose **ALARMS** +	
ALARM SETTINGS	
COD ALARM SETTINGS	
COD: Chemical Oxygen Demand • Press the key	
Enable: active surveillance YES, inactive NO. • Use to choose Yes or NO	

Min: Minimum thresholds. • Press the keys ↓ + ✓	
• Press the keys ↑ and → • Validate with ✓	
Max: maximum thresholds. • Press the keys ↓ + ✓	
• Press the keys ↑ and → • Validate with ✓.	
Output: Relay output to be activated if a threshold is exceeded (min. or max.) • Press the keys ↓ • Use ✓ to choose DO1, DO2 or NONE	

DCO ALARMS SETTINGS	
Alarm settings for DCO parameter - Mimimum: 100 - Maximum: 500 - Out: DO1 Quit this menu with 	
TSS ALARMS SETTINGS	
TSS = suspended solids TSS: mass of non soluble particles to be found in the water whose dimension is between 1 and 100 µm. • To setting up the TSS alarms, use the same procedure.	
S254 ALARMS SETTINGS	
SAC 254: Optical absorption of the effluent at a wavelength of 254 nm. • To setting up the SAC 254 alarms, use the same procedure.	
S560 ALARMS SETTINGS	
SAC 560: Optical absorption of the effluent at a wavelength of 560 nm. • To setting up the SAC 560 alarms, use the same procedure.	

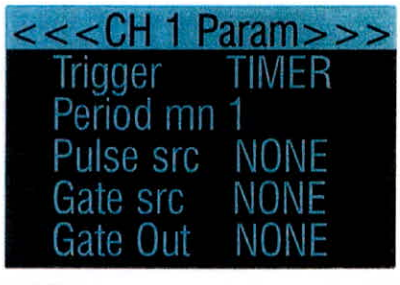
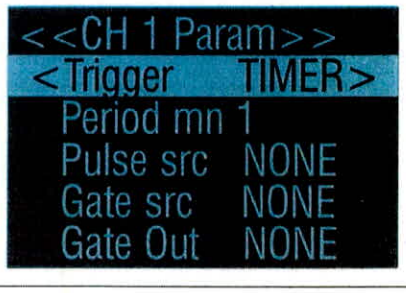
GLOBAL ALARMS SETTINGS

Global alarm : This function is used to assign the general error to one of the 4 relay outputs (any error arising from either the transmitter or the probe).



- Use the keys and to choose between NONE, DO1 or DO2
- Validate with

3.8. SETTING UP THE ANALYSIS CYCLES

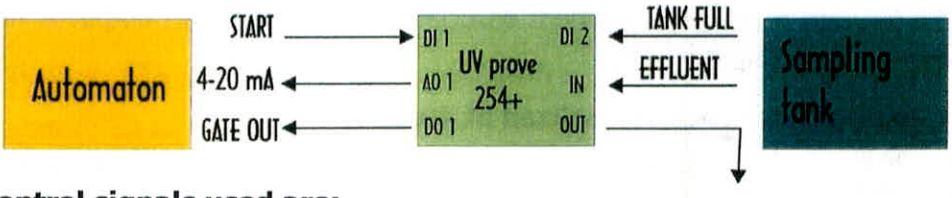
→ setup → Analyse	
Setting up the analysis cycles enables you to set up your transmitter according to your requirements and to your particular installation. • Choose **SETUP** from the menu	
The main parameters concern: - triggering the analyses: either periodically or via an external pulse. - setting up the validation gate: authorizing and preventing measurements. - cleaning cycle frequency. • Choose **ANALYSE** +	
Channel selection: **CHANNEL** • Press to scroll through the set-up pages for the input channels in turn, as well as the general parameters page. Each measurement channel can be set up separately.	
Analysis triggering type: **TRIGGER** **NONE**: no analysis of this channel. **TIMER**: periodical analysis triggering. **PULSE**: triggering via an external contact.	

Measurement frequency: **PERIOD.** • Press ✓ to enter the analysis frequency of this measurement channel in minutes. this menu is only active if **Trigger** is set to **PERIOD.** The measurement frequency **PERIOD** cannot exceed 99 minutes.	<<CH 1 Param>> Trigger TIMER < Period mn 1 > Pulse src NONE Gate src NONE Gate Out NONE
External triggering: PULSE SRC. • Press ✓ to scroll through the 2 On-Off inputs in turn. This menu is only active if **TRIGGER** is set to **PULSE.** See the chapter 2.4.6	<<CH 1 Param>> Trigger TIMER Period mn 1 < Pulse src NONE > Gate src NONE Gate Out NONE
Validation gate: GATE SRC. • Press ✓ to scroll through the 2 inputs in turn. This function enables you to temporarily inhibit measurements on a channel depending on the status of an on-off input on the transmitter. See chapter 2.4.6	<<CH 1 Param>> Trigger TIMER Period mn 1 Pulse src NONE < Gate src NONE > Gate Out NONE
Analysis relay outputs: GATE OUT. • Choose the relay output to be activated during the analysis cycles.	<<CH 1 Param>> Trigger TIMER Period mn 1 Pulse src NONE Gate src NONE <Gate Out NONE >
Cleaning period: **CLEAN PER. (page 2)** • Choose the cleaning frequency of the measurement cell using compressed air.	<Global Param> < Clean per. 5 >

3.9. CONTROL SIGNALS

Example of how control signals are used.

Supposing that the probe is analyzing an effluent in a tank equipped with a dry contact level sensor. If the tank is empty, then the contact is open and the probe should not be measuring. The analyses are triggered by a dry contact output on the automated system every 30 minutes. The result of the COD measurement is transmitted to a 4-20mA output.



The three control signals used are:

- **PULSE SOURCE (DI1)**: input for triggering an analysis
- **GATE SOURCE (DI2)**: validation gate input of an analysis (takes priority over PULSE SOURCE)
- **ANALYSE GATE OUT (DO1)**: analysis gate output (active when an analysis is underway).
- **OUTPUT 4-20 N°1 (A01)**: monitoring of the COD measurement to the automated system.

Device set-up screens	
The output START of the automated system is connected to the input DI1 of the transmitter (Trigger = PULSE, PULSE SRC = DI1) and the signal indicating the presence of water to the input DI2 (GATE SRC = DI2).	<<CH 1 Param>> Trigger PULSE Period mn ---- Pulse src DI1 < Gate src DI2 > Gate Out NONE
The automated system is informed that an analysis is underway by the signal GATE OUT which is directed to the output DO1 (ANALYSE GATE OUT = DO1).	<<CH 1 Param>> Trigger PULSE Period mn ---- Pulse src DI1 Gate src DI2 < Gate Out DO1 >

3.10. ANALOG OUTPUTS

	**→ setup → Analog output**

The two analog outputs will enable you to transmit the measurements in analog form (current loop) to an external device (eg: an automated system).

Each output can be separately associated with one of the parameters being measured, in the range desired. If the measurement associated with a 4-20 mA output is not available, this output will indicate 4 mA.

The analog outputs are initialized at 4 mA:

- when the device starts up
- if a measurement error should occur

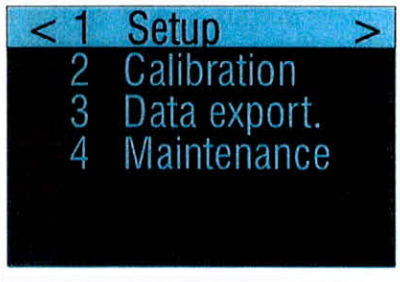
The analog outputs keep the same value:

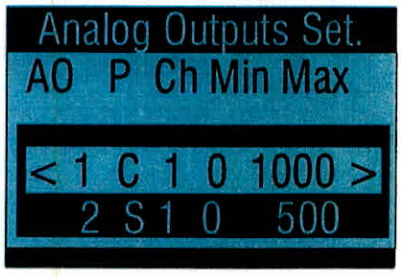
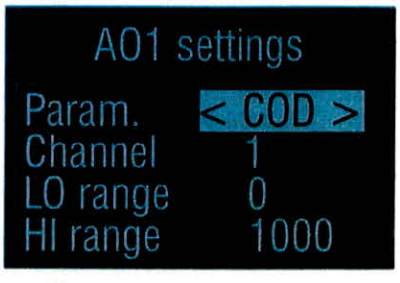
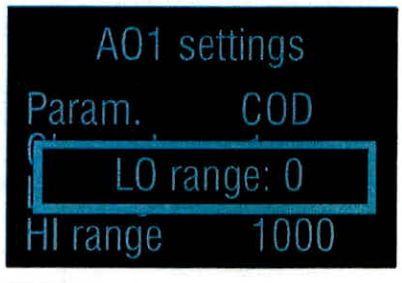
- during the measurement cycles
- during and after the cleaning cycles
- if an analysis gate is set up and the measurement is ignored.

The analog outputs are refreshed pro-rata with the associated measurement:

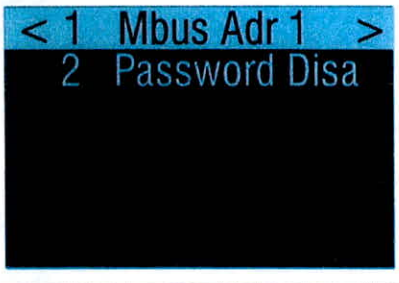
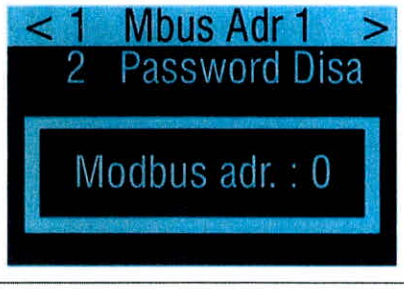
- at the end of each measurement cycle
- always before the end of the signal "**analyse Gate out**" (if used)

If necessary, use the output "**analyse Gate out**" to synchronize your external equipment with the analysis cycle.

• Choose **SETUP** from the menu 	
• Choose **ANALOG OUT**	

The analog outputs are respectively associated with the COD and TSS measurements of channel 1. The output range will represent the ranges 0-1000 for the COD and 0-500 for the suspended solids. **AO: output 1 or 2** **P**: measurement assigned to the 4/20mA output. **Ch**: use the measurements from channel 1. **Min**: COD value for 4mA. **Max**: COD value for 20mA.	
• Use  to select between DCO, suspended solids ...	
• Select LO range with  • Enter the value with  and  • Valid with 	
• Select HI range with  • Enter the value with  and  • Valid with 	

3.11. MODBUS LINK

→ setup → Miscellaneous	
• Choose **SETUP** from the menu	
• Choose **MICELLANEOUS**	
Setting up the ModBus RS485 link. **ModBus Address**: address of the probe on the ModBus network. This address must be unique on the ModBus network.	
Communication settings: - Modbus RTU protocol - 9600 bauds - 8 bits data - 1 stop bit - even parity	

A supervisor software must use MODBUS function code 03 to read the data and code 16 to write the data.

Refer to Modicon Modbus Reference Guide for complete information about Modbus communication standard.

All registers are **READ ONLY** and encoded as 32 bits floating datas. This means that two 16 bits registers are used to encode one 32 bits data. (For more information, refer to IEEE Standard for Floating-Point Arithmetic (IEEE 754) which is a technical standard established by the Institute of Electrical and Electronics Engineers (IEEE) and the most widely used standard for floating-point computation).

EXAMPLE:

To display COD value, supervisor as to read 16 bits registers 5 and 6.
Register 5 contains the 16 LSB of the floating data and register 6 contains the 16 MSB of the floating data.

Register 5 value: 0x0000
Register 6 value: 0x4120

32 bits floating register is: 0x41200000 which represent IEEE754 decimal value 10.0

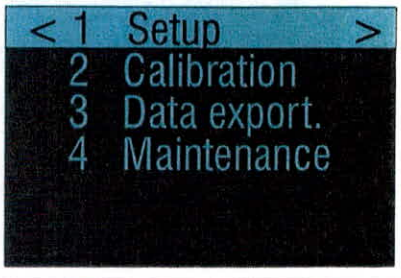
MODBUS REGISTER TABLE				
Address		Acces (*)	Unit	Function
DEC	HEX			
0	0	R		Reserved
1	1	R		Global_alarm (0=no alarm 1=alarm)
2	2	R		Reserved
3	3	R		Reserved
4	4	R		Reserved

5	5	R	(mg/l)	COD → 16 LSB
6	6	R	(mg/l)	COD → 16 MSB
7	7	R	(mg/l)	TSS → 16 LSB *(see page 44)*
8	8	R	(mg/l)	TSS → 16 MSB
9	9	R	UA/cm	SAC 254 → 16 LSB *(see page 58)*
10	A	R	UA/cm	SAC 254 → 16 MSB
11	B	R	UA/cm	SAC 560 → 16 LSB *(see page 58)*
12	C	R	UA/cm	SAC 560 → 16 MSB
13	D	R		Reserved
14	E	R		Reserved
15	F	R		Reserved
149	95	R		Mode (0=measurements 1=settings)

(*) R = Read W = Write

3.12. PASSWORD PROTECTION

You can choose to limit access to the set-up functions of the device by using a password. This will allow any user to visualize the measurements while restricting access to complex functions except for qualified personnel.



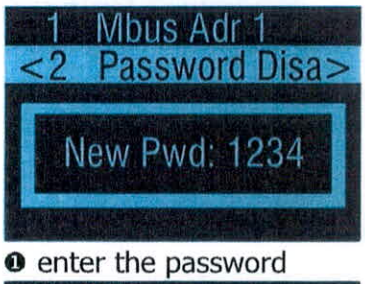
- Choose **SETUP** from the menu 

- Choose **MICELLANEOUS** 

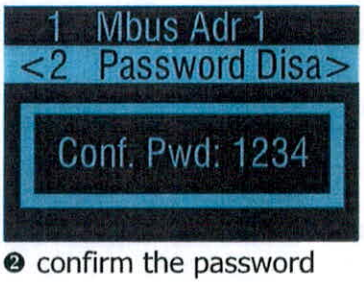
- Press the keys  +  to choose **PASSWORD**

The password is a 4-digit number.
Example of a password: 1234

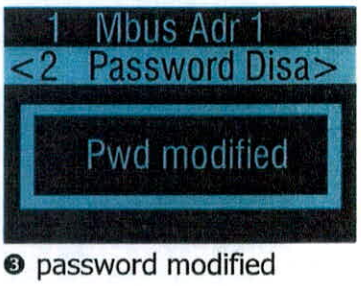
3.12.1. Enter a password



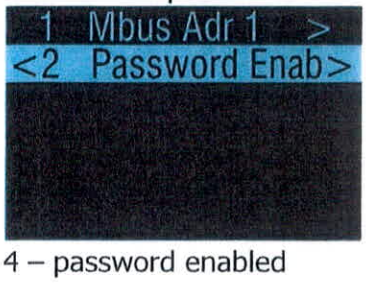
❶ enter the password



❷ confirm the password

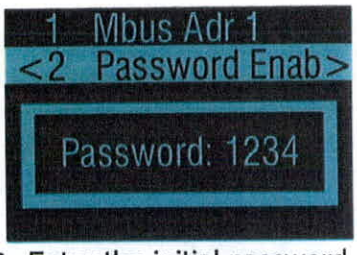


❸ password modified

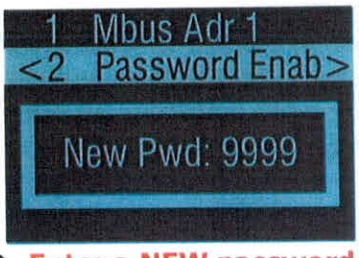


4 – password enabled

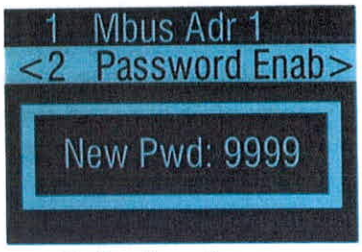
3.12.2.Modify a password



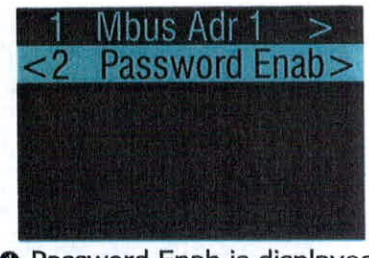
❶ Enter the initial password



❷ **Enter a NEW password**

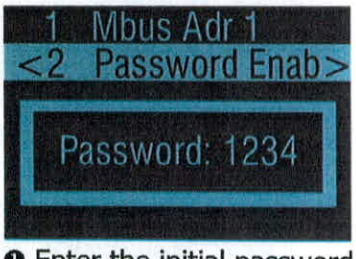


❸ Confirm the new password

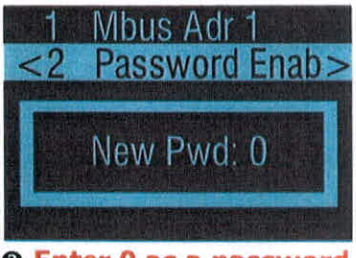


❹ Password Enab is displayed

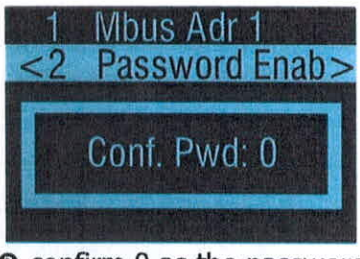
3.12.3.Invalidate a password



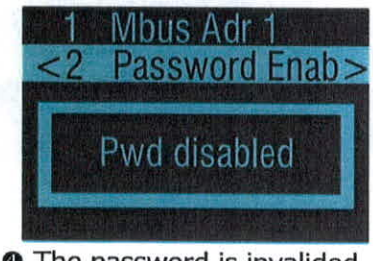
❶ Enter the initial password



❷ **Enter 0 as a password.**



❸ confirm 0 as the passworc



❹ The password is invalided

❹ – Password *Disa* is displayed

Chapter 4
CALIBRATION - procedure N°1

4. CALIBRATION - PROCEDURE N°1

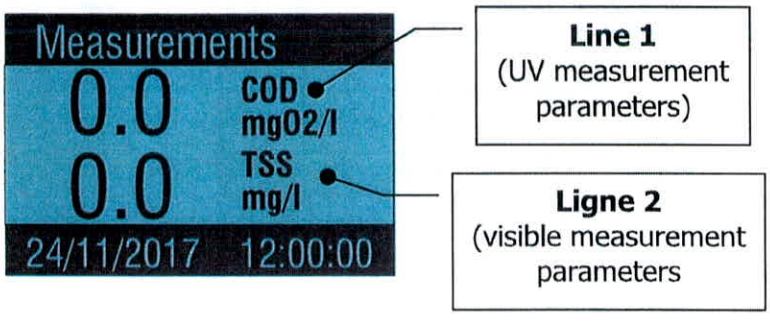
4.1. PRINCIPLE

The calibration procedure is what allows the correlation coefficients to be determined between the optical measurements **CAS 254** and **CAS 560** and the overall pollution measurements **TOC, COD, BOD** and **TSS**.

The ***UV-Probe 254+*** measures the concentration in organic matter of the effluent and from this calculates the equivalent in COD. This correlation depends on the composition of the samples analyzed. The calibration procedure allows the device to calculate this relationship (calibration coefficients) for your effluent by comparing the optical measurements to laboratory measurements.

> This calibration should be carried out at least once after the device has been installed and may be repeated from time to time to ensure that the system is working properly. Before beginning, check the ***UV-Probe 254+*** probe set-up and that it is working normally.

This procedure is used to calibrate parameters displayed on "MEASUREMENT" screen.
Parameters are chosen before ordering. • one parameter between TOC, COD, BOD (line 1) • The TSS parameter (line 2)



Parameters	Parameters displayed
TOC: Total Organic Carbon	**= TOC**
COD: Chemical Oxygen Demand	**= COD**
BOD: Biochemical Oxygen Demand	**= BOD**
TSS: Suspended Solids	**= TSS**
CAS 254: Spectral Absorption Coefficient	**= SAC 254**
CAS 560: Spectral Absorption Coefficient	**= SAC 560**
COLOR	**= COLOR**

4.2. EQUIPMENT REQUIRED

- a container filled with 2 litres of clear water for rincing the probe
- a sample of approximately 5 litres of the effluent
- an appropriate container for the sample that will go to the laboratory.

4.3. CALIBRATION PROCEDURE

The calibration procedure can be broken down into 4 steps:

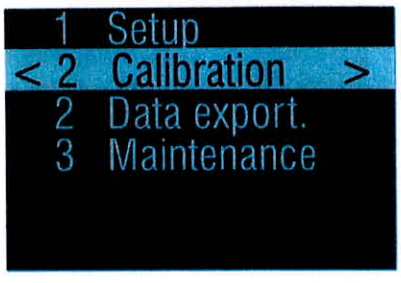
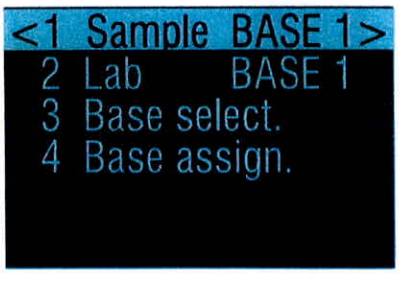
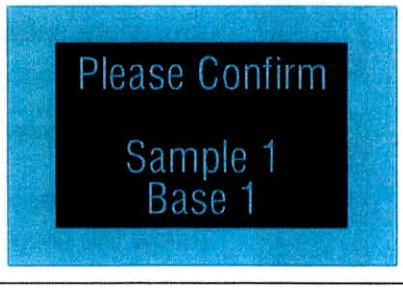
Step 1	**Sampling the effluent to be analyzed.** • Take a sample of the effluent as close as possible to the ***UV-Probe 254+***. This sample will be used both for the laboratory measurements and the probe measurements (take 2 litres for the probe plus the volume necessary for the laboratory. • Verify that the sample is homogenous: if necessary, shake the container gently without creating an emulsion.
Step 2	**Laboratory analysis of the sample.** • Put the quantity required for the laboratory analysis into an appropriate container. • If the analysis cannot be carried out quickly, maintain the sample at temperature of 4°C.
Step 3	**Analysis by the *UV-Probe 254+* of the sample.** • The remainder of the sample will be analyzed by the ***UV-Probe 254+***: follow the procedure outlined in chapter 4.4.
Step 4	**Enter the laboratory measurement.** • Enter the measurement obtained from the laboratory into the ***UV-Probe 254+***: follow the procedure outlined in chapter 4.5.

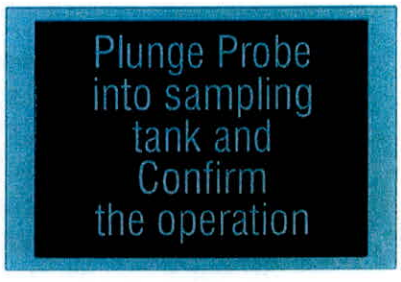
4.4. SAMPLE ANALYSIS

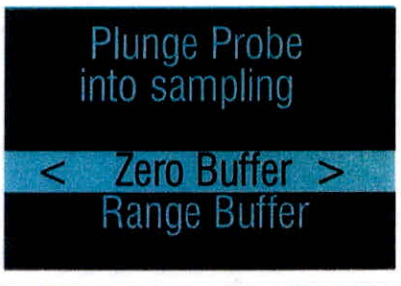
 → calibration → Sample

Before starting to analyze a sample, make sure that you have followed the right calibration procedure.

The calibration of the ***UV-Probe 254+*** is based on the comparison between the laboratory measurements and those of the probe. The analysis of the sample is an essential step in the calibration process. The system will guide you through the different phases so as to reduce as much as possible the risk of user error.

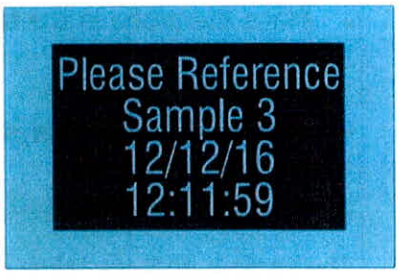
• Choose **CALIBRATION** from the menu	
This command allows you to analyze a sample and obtain the values measured by the device. In this example, the analysis of the sample will be added to the correlation base number 1 • Choose **SAMPLE BASE1** from the menu	
The ***UV-Probe 254+*** numbers the samples automatically. This number increases each time a new sample analysis is added. • Confirm the analysis  or abandon with  .	

The measurement of the « white » takes a few seconds.	
Analyze the sample • Place the probe in the tank containing the sample to be analyzed, • then validate the analysis with ✓.	
The sample analysis takes a few seconds.	

Reference the sample If the measurement is carried out correctly, the device will ask you to specify whether the sample analyzed is a reference solution for calibrating the zero setting or a point of a known concentration.	
	

After the analysis and with the exception of zero setting, the ***UV-Probe 254+*** displays the references of the sample. This is made up of a number, and the date and time of the analysis.
Make a note of this information because it will make it easier to find this particular analysis in the list of measurements when you enter the laboratory measurements.

- Finish with 

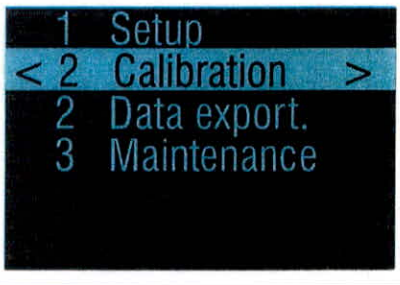
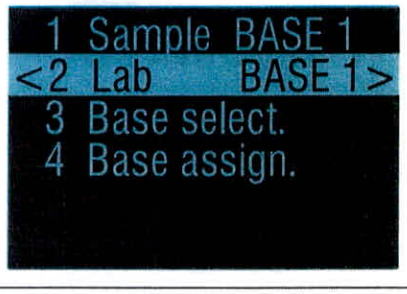
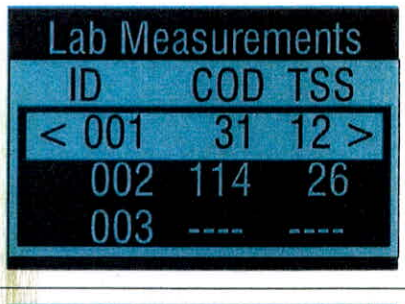
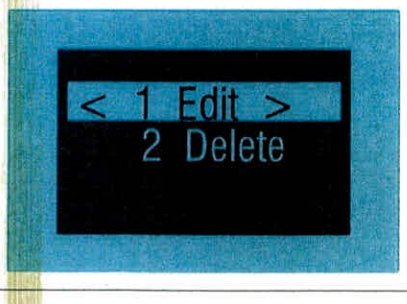


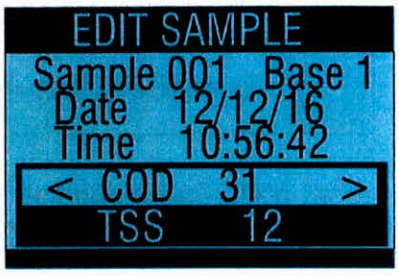
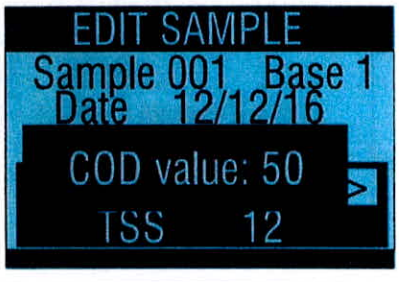
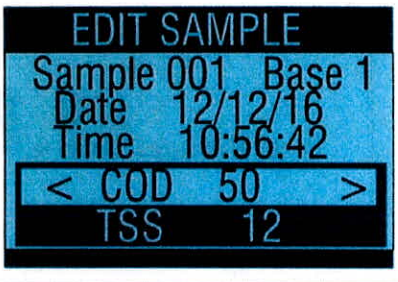
If the absorption of the sample is too high to allow a correct measurement (saturation), the *UV-Probe 254+* will indicate this with an error message. The sample must then be diluted in order to carry out the calibration.

4.5. ENTERING THE LABORATORY MEASUREMENTS

	→ calibration → Lab → Edit

After analyzing a sample of your ***UV-Probe 254+***, you must enter the "laboratory" measurements corresponding to the sample.

• Choose **CALIBRATION** from the menu Press the keys  + 	
• Choose **LAB BASE1** from the menu Press the keys  + 	
• From the list, choose the sample whose information you are adding and valid with  *In the example opposite, the laboratory values of COD and TSS have been entered for samples 1 and 2.*	
• Press  to select **Edit**	

• Enter the laboratory measurements of COD and SS corresponding to the sample. If a field is left empty, it will not be taken into account in the correlation.	
• Enter COD value then validate 	
• To quit, Press  .	

4.6. DELETING A SAMPLE

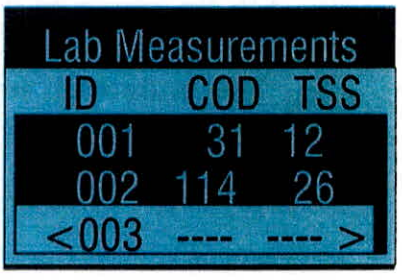
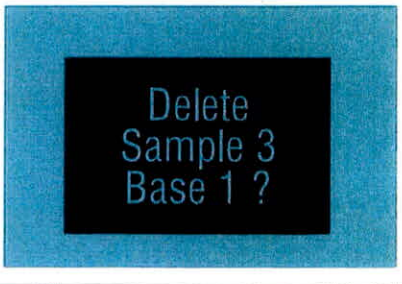
	→ calibration → Lab → Delete

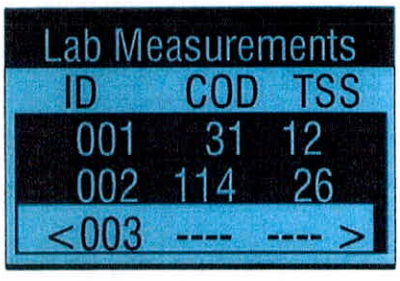
If necessary, you can delete the measurements of a sample analyzed by the *UV-Probe 254+*.

This procedure may be necessary for deleting a test sample, eliminating a sample that is not representative of the effluent, doing the correlation again of the device at the beginning. You can work with two independent correlation bases. Each one can contain up to 10 samples.

It is preferable to change the correlation base in the following cases, rather than deleting the samples if your goal is to:

- Calibrate the device for a different effluent.
- Compensate for a temporary change in the nature of the effluent.

• Choose the sample you wish to delete from the list	
• Select "**Delete**". **ATTENTION**: the deletion of a sample is definitive.	
• Once you have confirmed that you wish to delete, the sample is removed from the list.	

Analysis 003 has been deleted.	

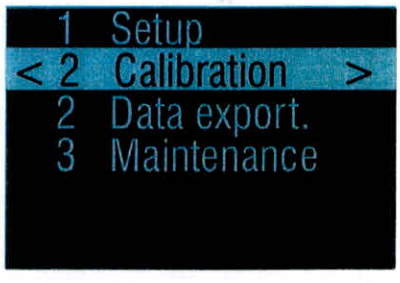
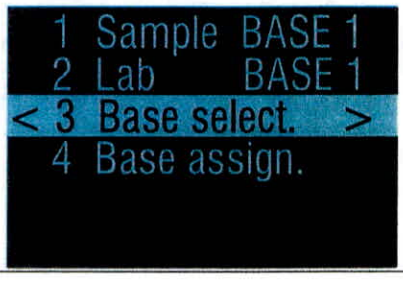
4.7. MANAGING THE CALIBRATION BASES

The ***UV-Probe 254+*** allows you to work with 2 independent calibration bases. In this way, you can calibrate your device for two different types of effluent or use a different calibration depending on the time of year.

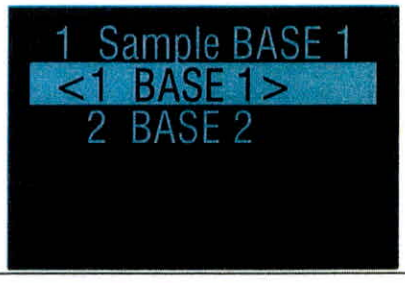
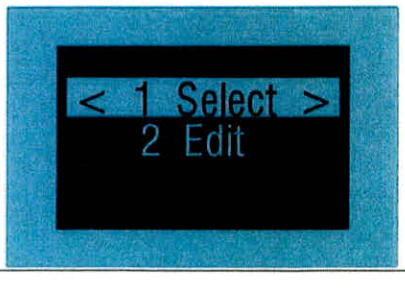
The active base is the one in which all the results of the sample analyses will be placed, which you will then be able to edit using the menu **Lab measurements**.

The calibration used during automatic mode analyses is independent of the active base. See chapter 4.10 .

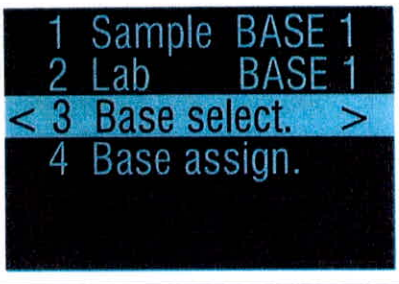
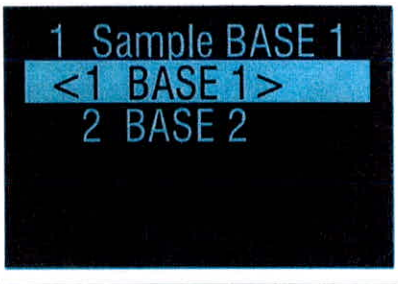
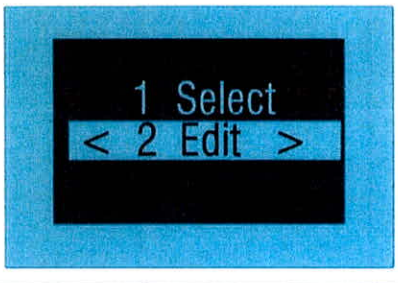
4.8. SELECTING THE ACTIVE CALIBRATION BASE

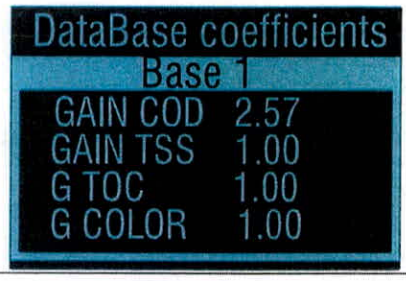
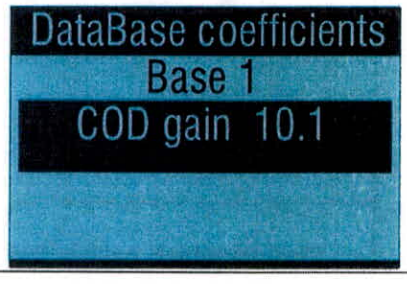
→ calibration → base selection→Select	
• Choose **CALIBRATION** from the menu	
• Select the calibration base to be used for the sample analyses and for entering the laboratory measurements and choose **Select**	

NOTE: this base will be the one used for the sample analyses and for entering the lab measurements, but it will not modify the calibration base used for the measurement cycles.

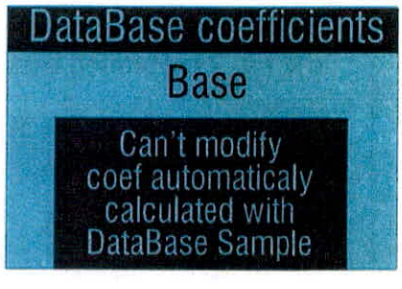
	
	

4.9. MANUAL ENTRY OF CALIBRATION COEFFICIENTS

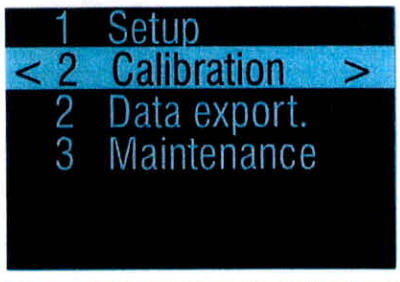
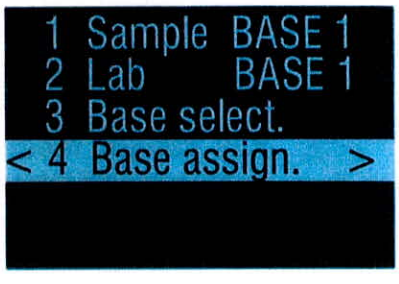
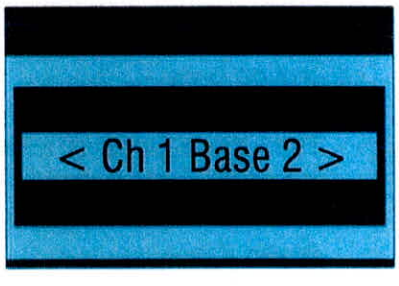
→ calibration → base selection→Edit	
• Choose **CALIBRATION** from the menu Press the keys +	
• Select the base you wish to edit and choose **Edit.** Press the keys +	
• For example, choose BASE 1	
• Press to select **Edit**	

In this way, you can visualize or modify manually the calibration coefficients of this base. • Select the coefficient you wish to modify (COD or TSS coefficient) • validate with  .	
	

You cannot modify a coefficient calculated by the device using sample analyses and laboratory measurements.

In order to enter a coefficient manually, there must be no laboratory measurements for this parameter in the calibration base. • The calibration is either **automatic**: in this case, the coefficients between the sample analyses and the laboratory measurements are calculated by the ***UV-Probe 254+***, • or the calibration is **manual**: you enter the coefficients for each parameter manually.	

4.10. ASSIGNING CALIBRATION BASES TO MEASUREMENT CHANNELS

 → calibration → channel assignment	
• Choose **CALIBRATION** from the menu	
• Choose which calibration base should be used by the measurement probe.	
• In the example opposite, the UV-Probe 254+ is using the no. 2 calibration base. • Then validate with 	

Chapter 5
CALIBRATION – procedure n°2

5. CALIBRATION - PROCEDURE N°2

5.1. PRINCIPE

The calibration procedure is what allows the correlation coefficients to be determined between the optical measurements SAC 254 and SAC 560 and the overall pollution measurements **COD or BOD or TOC and COLOR.**

> This calibration should be carried out at least once after the device has been installed and may be repeated from time to time to ensure that the system is working properly. Before beginning, check the ***UV-Probe 254+*** probe set-up and that it is working normally.

For measurements SAC254 and SAC560, no calibration is needed. Only measurements **TOC, COD, BOD** ou **COLOR** needs calibration.

Unlike calibration 1 procedure which determines calibration coefficients automatically, coefficients are calculated manually.

This procedure is used to calibrate parameters displayed on "ABSORPTION" screen.
Parameters are chosen before ordering. • one parameter between TOC / COD / BOD / SAC 254 parameter • one parameter between SAC 560 / COLOR / TSS parameter.

Line 1 (UV measurement parameters)

Line 2 (visible measurement parameters)

Parameters	Parameters displayed
TOC: Total Organic Carbon	**= TOC**
COD: Chemical Oxygen Demand	**= COD**
BOD: Biochemical Oxygen Demand	**= BOD**
TSS: Suspended Solids	**= TSS**
SAC 254: Spectral Absorption Coefficient	**= SAC 254**
SAC 560: Spectral Absorption Coefficient	**= SAC 560**
COLOR	**= COLOR**

5.2. EQUIPMENT REQUIRED

- a container filled with 2 litres of clear water for rincing the probe
- a sample of approximately 5 litres of the effluent
- an appropriate container for the sample that will go to the laboratory.

5.3. CALIBRATION PROCEDURE

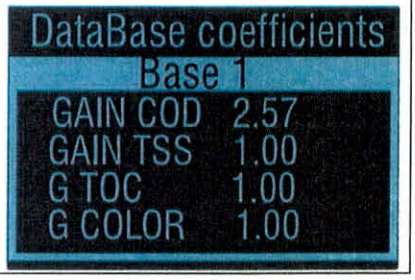
The calibration procedure can be broken down into 4 steps:

Step 1

Before starting calibration, coefficients must be set to 1.

- Set to value 1.0 the calibration gain on the third and fourth line.

Use the the procedure on the next page



Step 2

Sampling the effluent to be analyzed.

- Take a sample of the effluent as close as possible to the ***UV-Probe 254+***. This sample will be used both for the laboratory measurements and the probe measurements (take 2 litres for the probe plus the volume necessary for the laboratory.
- Verify that the sample is homogenous: if necessary, shake the container gently without creating an emulsion.

Step 3

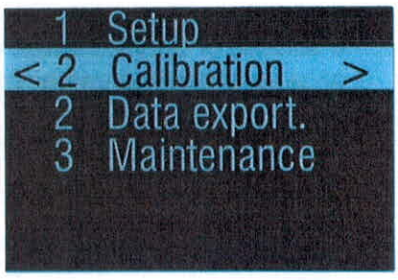
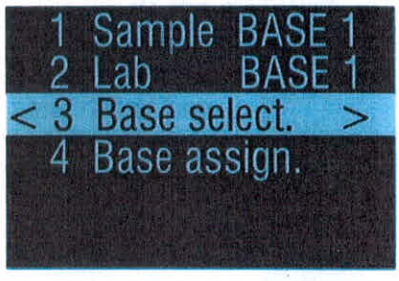
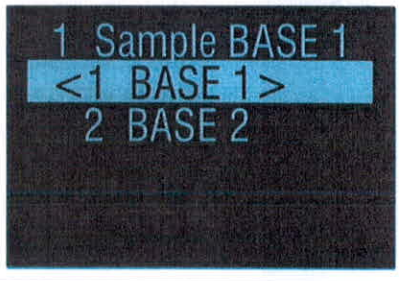
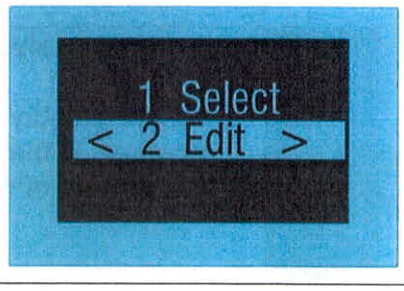
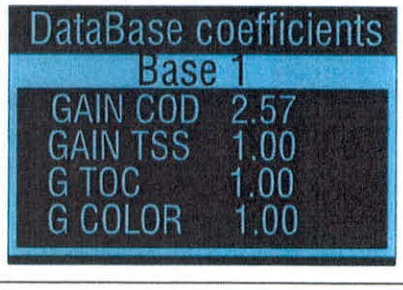
Laboratory analysis of the sample.

- Put the quantity required for the laboratory analysis into an appropriate container. If the analysis cannot be carried out quickly, maintain the sample at temperature of 4°C.

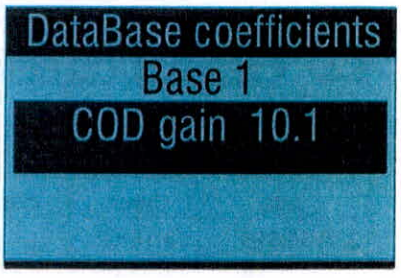
Step 4

Analysis by the *UV-Probe 254+* of the sample.

- Plunge the probe into the sample and let the probe make several measurements in normal mode operation (1 measurement each 2 minutes). Record date and time. If you have several samples, repeat the analyze for each sample.

 → calibration → base selection→Edit	
• Choose **CALIBRATION** from the menu. • Press the keys  + 	
• Select the base to edit • Press the keys  + 	
• For example, choose the BASE 1	
• Use  to choose **Edit**	
You can visualize or modify manually the calibration coefficient for this procedure.	

- Select the coefficient you want to modify (DCO coefficient or suspended solid),
- Validate with ✓.

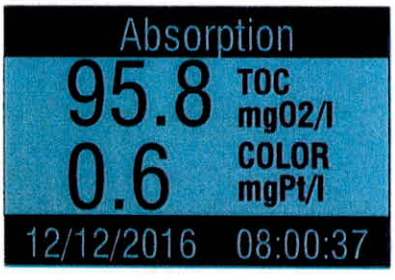


5.4. COEFFICIENTS DETERMINATION

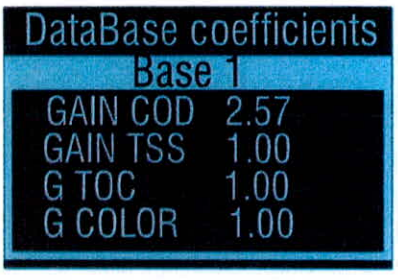
1 - export measurement data file and read samples measurements values

date	hour	channel	COD (mg02/l)	TSS (mg/L)	TOC (mgO2/L)	COLOR (mgPt/L
27/10/2016	14:18:52	1	244.7	0.6	95.931	0.555
27/10/2016	14:20:51	1	244.7	0.6	95.939	0.579
27/10/2016	14:22:51	1	244.6	0.6	95.929	0.575
27/10/2016	14:24:51	1	244.4	0.6	95.839	0.567

Sample



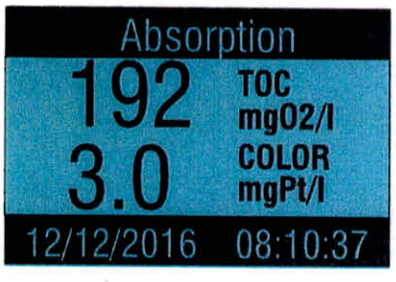
2 - enter gain coefficients for each parameter



Here, for example, we enter gain of 2 for TOC and gain of 5 for COLOR.

date	hour	channel	COD (mg02/l)	TSS (mg/L)	TOC (mgO2/L)	COLOR (mgPt/L
27/10/2016	14:18:52	1	244.7	0.6	95.931	0.555
27/10/2016	14:20:51	1	244.7	0.6	95.939	0.579
27/10/2016	14:22:51	1	244.6	0.6	95.929	0.575
27/10/2016	14:24:51	1	244.4	0.6	95.839	0.567
27/10/2016	14:29:34	1		0.6	191.693	2.804
27/10/2016	14:31:34	1		0.6	191.658	2.886
27/10/2016	14:33:34	1		0.6	191.458	2.959

Calibrated values



Chapter 6
USE

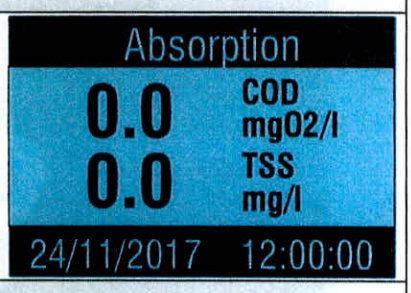
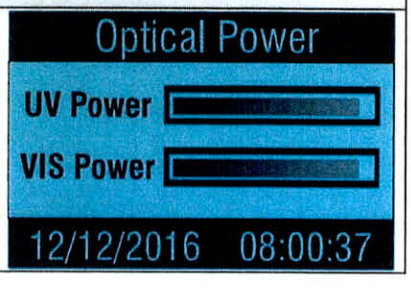
6. USING THE TRANSMITTER

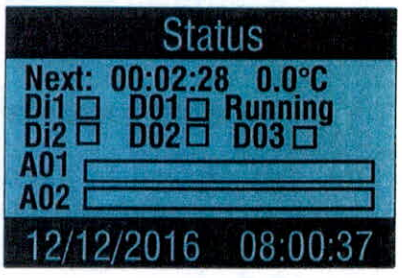
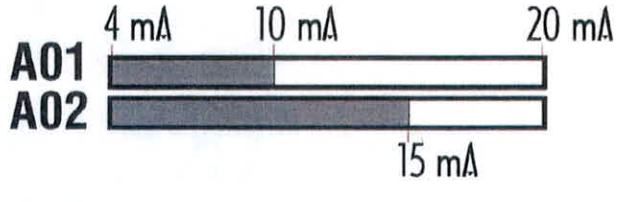
6.1. MEASUREMENT DISPLAYS

	**→ measurement**

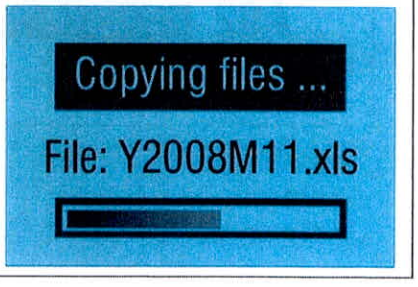
Once switched on, the UV-Probe 254+ displays measurement page 1.The measurements of the probe cover 4 pages.

- To **change the active page**, use  and 
- To **choose the measurement channel** to be displayed, use  and. 

Page 1: overall parameters	
COD (mgO2/l): **C**hemical **O**xygen **D**emand **TSS: S**uspended **S**olids Each measurement displayed on screen "measurement" must be calibrated using "Calibration 1 procedure.	
Page 2: Absorptions	
SAC 254: absorption of the effluent by cm in the UV zone. **SAC 560**: absorption of the effluent by cm in the visible zone. Each measurement displayed on screen "Absorption" must be calibrated using "Calibration 2 procedure.	
Page 3: Optical Power	
UV Power indicates the power of the UV LED **VIS Power** indicates the power of the Visible LED.	

Page 4: Status	
Information on the system status are displayed on this page: - time of the next analysis - temperature of the probe in °C - wait mode, analysis or cleaning (waiting, running, cleaning) - date and time	
- status of the on-off inputs DI1 and DI2 DI1 ■ activated, DI2 ☐ not activated	
- Status of the relay outputs DO1, DO2, DO3 DO1 ■ activated, DO2 ■ activated, DO3 ☐ not activated	
- bar graph indicating the level of the 4-20mA outputs Example AO1 : 10 mA AO2 15 mA 	

6.2. SAVING MEASUREMENTS TO A USB FLASH DRIVE

→ data exportation	
The data exportation function allows you to save the data from the ***UV-Probe 254+*** onto a USB flash drive in order to work on them with a PC. The ***UV-Probe 254+*** can store several years' worth of measurements. We recommend that copying these measurements regularly onto a USB flash drive. • Choose **DATA EXPORT** from the menu	
• Define the period of measurements you wish to save onto the USB flash drive (start and end date).	
• Insert the flash drive into the port situated on the left hand side of the transmitter, then validate with .	
• The data will be copied onto the flash drive. The device creates a data file for each month so as to avoid files becoming to voluminous. The file names are given in the format **Y2008M11.xls**. They can be used directly with Microsoft Excel © or a compatible spreadsheet.	

If the data is not recognized by your computer, verify the configuration of the decimal point.

6.3. DISPLAYING THE DATA USING MICROSOFT EXCEL©

To display the data in a curve using Microsoft Excel:

- Open the data file and click on column **D** (COD).

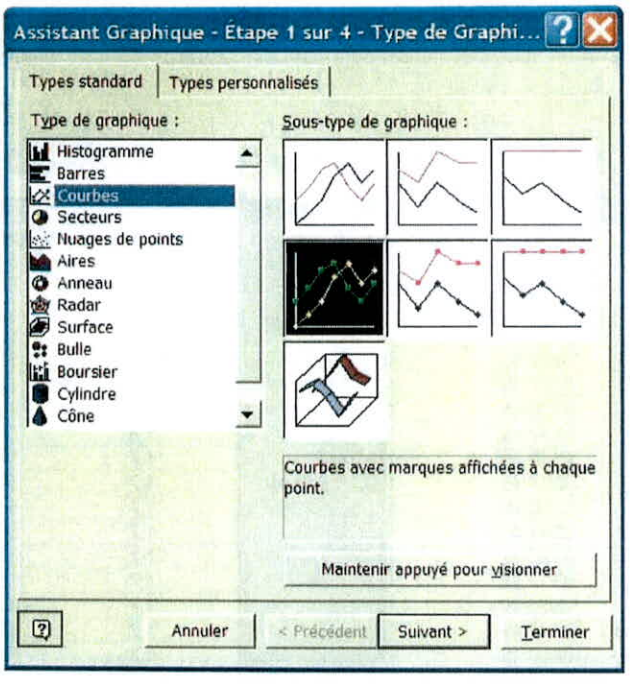
Microsoft Excel - ficher Y2017M11.xls

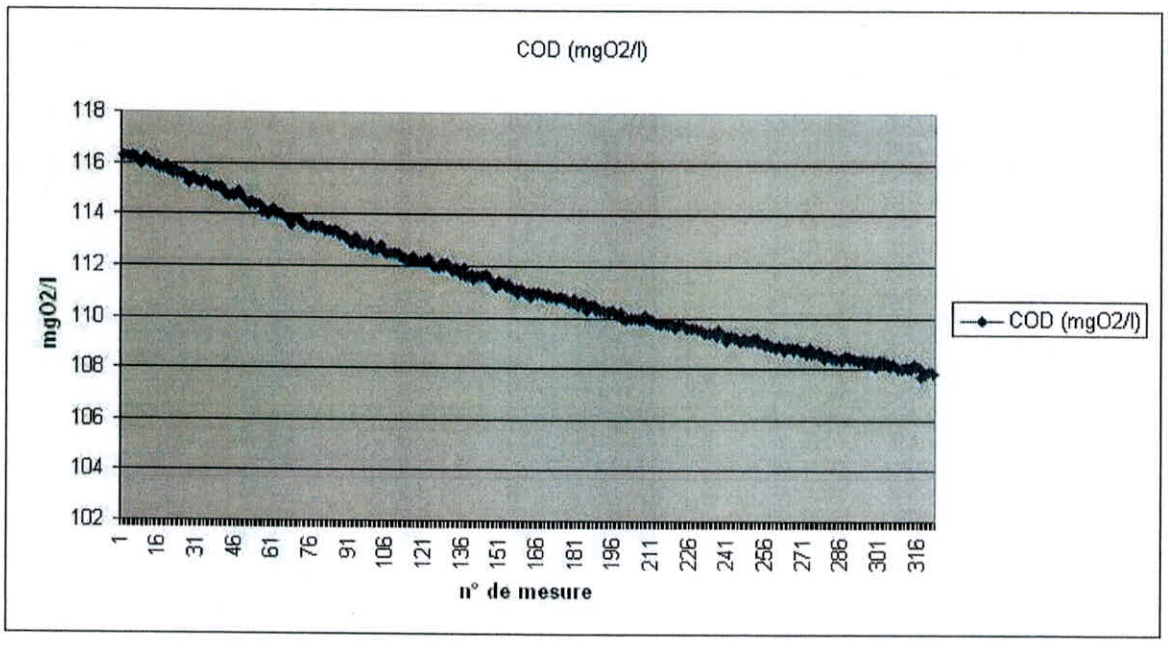
Fichier Edition Affichage Insertion Format Outils Données Fenêtre ? Adobe PDF

D1 = COD (mgO2/l)

	A	B	C	D	E	F	G
1	date	hour	channel	COD (mgO2/l)	TSS	SAC 254(UA/m)	SAC 560 (UA/m)
2	01/01/2016	00:02:45	1	116,3	1,6	52,578	1,59
3	01/01/2016	00:17:45	1	116,3	1,6	52,545	1,581
4	01/01/2016	00:32:45	1	116,3	1,6	52,591	1,598
5	01/01/2016	00:47:45	1	116,2	1,6	52,525	1,596
6	01/01/2016	01:02:45	1	116,3	1,6	52,585	1,615
7	01/01/2016	01:17:45	1	116,2	1,6	52,538	1,62
8	01/01/2016	01:32:45	1	116,1	1,6	52,501	1,627
9	01/01/2016	01:47:45	1	116	1,6	52,502	1,64
10	01/01/2016	02:02:45	1	116	1,7	52,503	1,656
11	01/01/2016	02:17:45	1	116,2	1,7	52,571	1,66
12	01/01/2016	02:32:45	1	116,1	1,7	52,557	1,658
13	01/01/2016	02:47:45	1	116	1,7	52,511	1,671
14	01/01/2016	03:02:45	1	116	1,7	52,534	1,688
15	01/01/2016	03:17:45	1	115,9	1,7	52,499	1,686
16	01/01/2016	03:32:45	1	115,9	1,7	52,477	1,696
17	01/01/2016	03:47:45	1	115,8	1,7	52,438	1,704
18	01/01/2016	04:02:45	1	115,8	1,7	52,466	1,725
19	01/01/2016	04:17:45	1	115,9	1,7	52,521	1,721
20	01/01/2016	04:32:45	1	115,7	1,7	52,462	1,74
21	01/01/2016	04:47:45	1	115,8	1,7	52,473	1,739
22	01/01/2016	05:02:45	1	115,6	1,8	52,41	1,754
23	01/01/2016	05:17:45	1	115,7	1,8	52,485	1,757
24	01/01/2016	05:32:45	1	115,6	1,8	52,455	1,782
25	01/01/2016	05:47:45	1	115,6	1,8	52,47	1,783
26	01/01/2016	06:02:45	1	115,6	1,8	52,458	1,785
27	01/01/2016	06:17:45	1	115,5	1,8	52,411	1,789
28	01/01/2016	06:32:45	1	115,2	1,8	52,317	1,81
29	01/01/2016	06:47:45	1	115,4	1,8	52,379	1,809
30	01/01/2016	07:02:45	1	115,5	1,8	52,442	1,824
31	01/01/2016	07:17:45	1	115,3	1,8	52,369	1,831
32	01/01/2016	07:32:45	1	115,3	1,8	52,363	1,847
33	01/01/2016	07:47:45	1	115,2	1,9	52,361	1,859
34	01/01/2016	08:02:45	1	115,3	1,9	52,415	1,87
35	01/01/2016	08:17:45	1	115,3	1,9	52,386	1,865
36	01/01/2016	08:32:45	1	115,2	1,9	52,383	1,887
37	01/01/2016	08:47:45	1	115,1	1,9	52,344	1,878
38	01/01/2016	09:02:45	1	115,1	1,9	52,339	1,901
39	01/01/2016	09:17:45	1	115,1	1,9	52,348	1,919
40	01/01/2016	09:32:45	1	115	1,9	52,348	1,933
41	01/01/2016	09:47:45	1	115,1	1,9	52,353	1,916
42	01/01/2016	10:02:45	1	114,9	1,9	52,285	1,935
43	01/01/2016	10:17:45	1	114,8	2	52,276	1,951
44	01/01/2016	10:32:45	1	114,7	2	52,246	1,958
45	01/01/2016	10:47:45	1	114,8	2	52,274	1,951

- Click on the icon ,
- Select [Courbes] and Validate by clicking on [terminer].





Chapter 7
MAINTENANCE

7. MAINTENANCE

	→ **maintenance**

Maintenance operations are necessary to keep the device functioning correctly. They ensure that the measurements made are sound as well as prolonging the lifespan of the device.

The ***UV-Probe 254+*** only requires minimum maintenance.

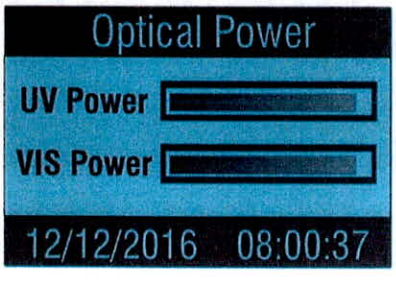
7.1. ROUTINE MAINTENANCE

Care of the measurement head

- Remove the probe from the liquid in which it is immersed
- Rinse the probe with clean water
- Clean the measurement windows with a fine brush
- Reposition the probe

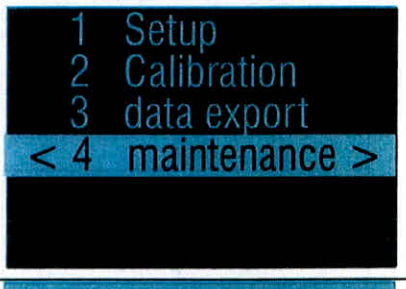
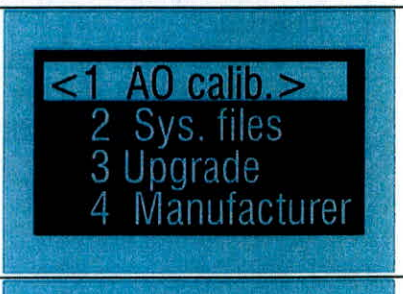
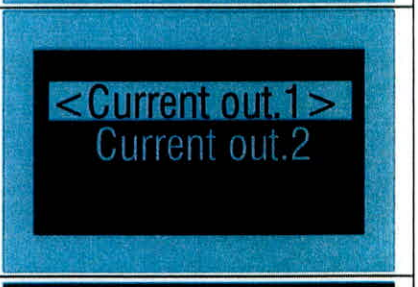
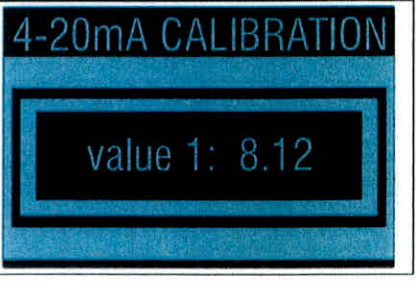
Condition of the UV LED and the Visible LED

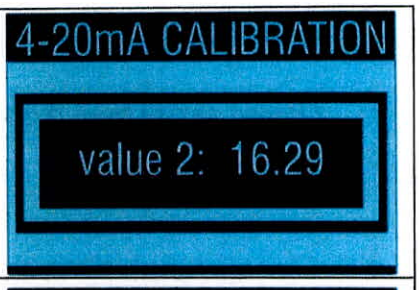
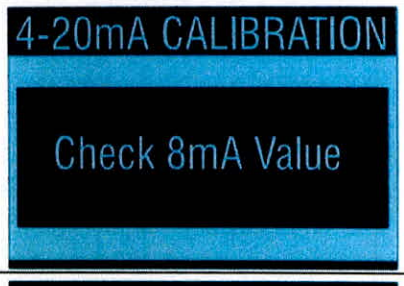
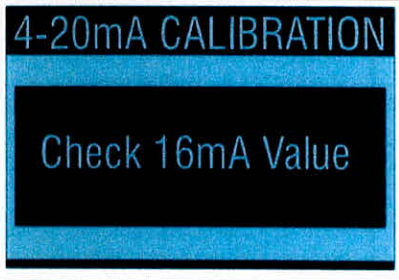
The luminosity levels of the LEDs should be verified every two months to ensure that they do not need replacing. To do this, access the STATUS pag of the measurement menu.



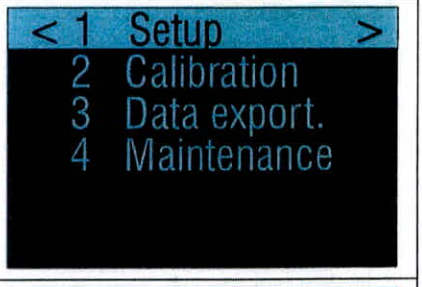
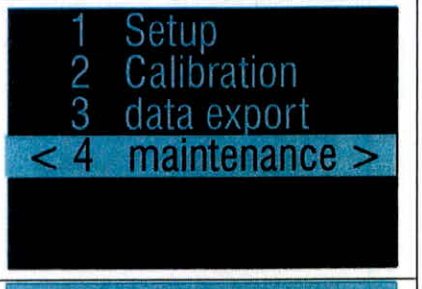
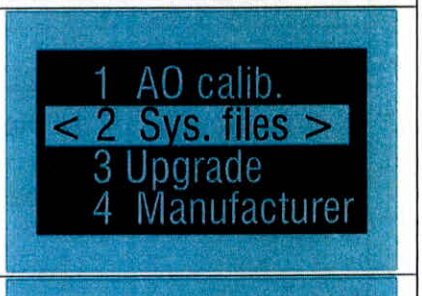
The "UV Power" level bar indicates the power of the UV LED.
The "VIS Power" level bar indicates the power of the VIS LED.

7.2. CURRENT OUTPUT CALIBRATION

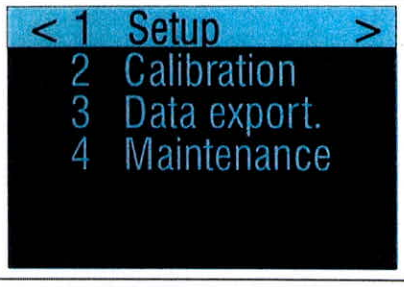
• Choose **SETUP** from the menu	
• Choose **MAINTENANCE**	
• Choose **AO CALIB.**	
• Choose the **CURRENT OUTPUT NO.**1 or **CURRENT OUTPUT NO.2.**	
Once the channel has been selected, the transmitter generates a first current value close to 8mA on the output. • Measure this current with an ammeter and enter the exact value into the dialogue box.	

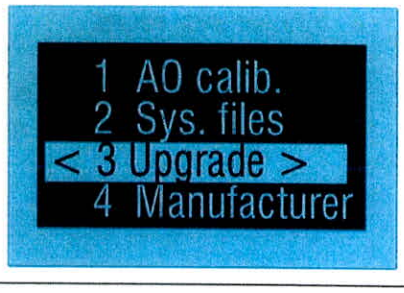
The transmitter will then generate a second current of close to 16 mA on the output. • Measure this current with an ammeter and enter the exact value into the dialogue box to 2 decimal places	
Once the two values of the currents measured have been entered, the device calculates the calibration and asks for verification. • Verify the 8 mA value	
• Verify the 16 mA value - If the two points are correct, then the calibration is finished. - If there is too large a gap (> ± 0.04mA) between the value measured and the value displayed by the transmitter, the calibration procedure must be repeated.	

7.3. SYSTEM FILES

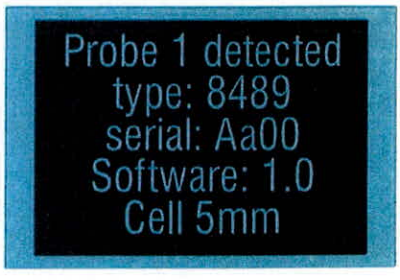
• Choose **SETUP** from the menu	
• Choose **MAINTENANCE**	
• Choisir **SYS. FILES.** Le menu SYS. FILES. menu is used to generate a file that will be used by EFS in case of maintenance operation.	
• Enter the start and end date of the file	
• Insert the flash drive into the port situated on the left hand side of the transmitter, then validate with  .	

7.4. SOFTWARE UPGRADES

<table>
<tr><td colspan="2">  → maintenance → Upgrade</td></tr>
<tr><td>• Choose SETUP from the menu</td><td> 
</td></tr>
<tr><td>• Choose MAINTENANCE</td><td> 
</td></tr>
<tr><td>The Upgrade menu will enable you to install the software updates provided by the manufacturer.

Select this line from the menu and initiate the update process.</td><td> 
</td></tr>
<tr><td>Steps involved in an update:

1. the system reinitializes
2. the transmitter searches for a USB flash drive containing the update file (during this phase, the alarm 1 signal light flashes at approximately twice a second).
3. if the flash drive is not present or if the update file is not found on the flash drive, the system restarts as usual with the same version of the software.
4. if the flash drive is detected and the update file is found, the update begins (during the update process, the alarm signal lights 1 and 2 flash alternately several times a second).
5. when the update is complete, the system restarts with the new version of the software.</td><td> 
</td></tr>
</table>

Note 1: When you start up the transmitter, you can find out which version of the software is being used. The version is shown at the bottom right of the start-up screen.

Note 2: When starting up, the transmitter also detects the presence of the measurement probe and indicates its characteristics.

7.5. MANUFACTURER

Function reserved to EFS.	

Chapter 8
APPENDICES

8. APPENDICES

8.1. TECHNICAL SPECIFICATIONS

	Min	Typical	Max	Unit
Relay outputs				
Maximum current			8	Amp
Maximum voltage			250	Volt AC
24V or 5V inputs				
Voltage contact open (depending on jumper position J9/J10)		24/5	30/8	V
Current contact closed		13		mA
4-20mA Outputs				
Output current	4		20	mA
Output voltage			7	V
Load	0	250	350	ohms
ModBus Liaison				
Theoretical range at 9600bps on an adapted twisted pair		1000		metres
Line termination impedance (can be disactivated)		120		Ohms
Line polarization impedance (can be disactivated)		470		Ohms
Housing				
Height		130		mm
Width		130		mm
Depth		100		mm
Weight		1kg		Kg
Protection IP66 (NEMA 4X)				
Probe				
Height		250		mm
Diameter		55		mm
Weight		5		Kg
Protection IP68 16 bars			10	bars
Measurement range				
Measurement range	0		2500	/m
Absorption resolution		0.1		/m
COD measurement range on solution KC8H5O4	0		1000	mg/l
COD resolution on solution KC8H5O4		1.0		mg/l
Environment				
Ambient temperature	5	25	45	°C
Power supply				
Current	110		230	V AC
Voltage	50		60	Hz

Information pertaining to a probe UV-prob-254+ equipped with software version 1.00. The characteristics of the equipment, as well as its documentation may be modified by the manufacturer without prior consultation.

8.2. MAINTENANCE SHEET

Intervention						
Maintenance date						
User name						
Serial number of the probe						
Verifications						
Transmitter condition		Good		Average		Problem
Probe linking cable condition		Good		Average		Problem
Cleanliness of probe head		Good		Average		Problem
Cleanliness of measurement cell		Good		Average		Problem
Cleaning module condition		Good		Poor		Problem
UV LED level		Good		Poor		Problem
VISIBLE LED Level		Good		Poor		Problem
Cleaning						
Probe head cleaning		Yes		No		
Long term disuse						
		Yes		No		
Notes						
		Yes		No		

•••

EFS

OVERFLOW DETECTOR

E8781

User manual

EDITION: 03 January 2019 - VERSION: 2.0

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CONTENTS

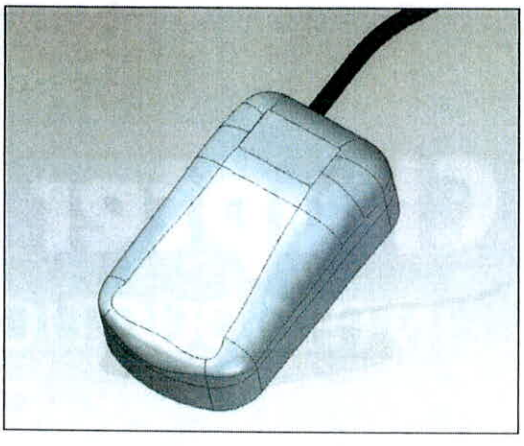
Chapter 1
INTRODUCTION

1. INTRODUCTION

This innovative ***E8781*** type sensor is intended to be used as liquid detector. It is specially designed for fouling water.

It uses a patented ultrasonic measurement technology to achieve robust detection. All sensitive elements are embedded inside the apparatus plastic enclosure and therefore are totally protected from possible external stresses.

The E8781 equipment is made up of a single casing with attached to a maximum 50 meters cable length. The housing is IP68 at 1bar for one hour with approximative dimensions of 125 x 72 x 46 mm. Casing is designed with hydrodynamic shapes to avoid fouling.



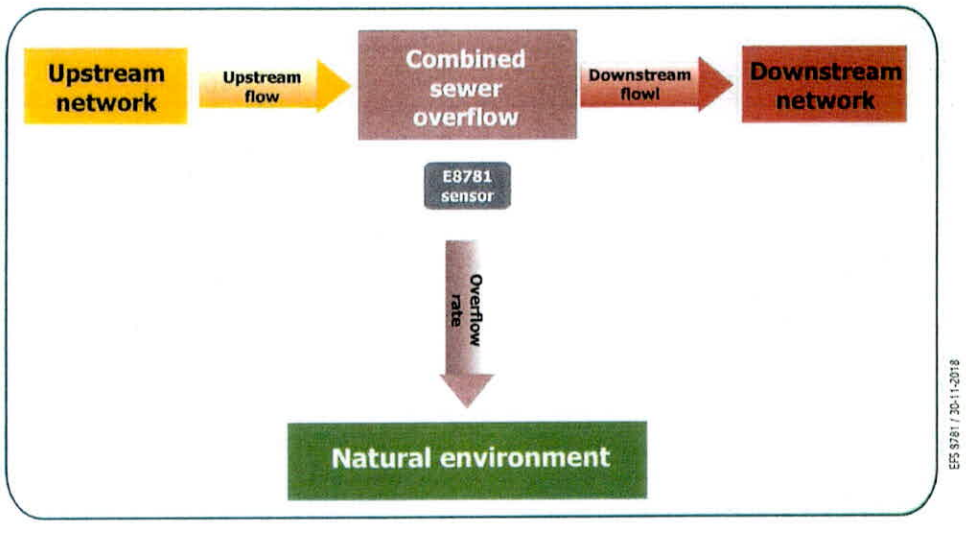
1.1. MAIN FUNCTIONS

- Embedded datalogger
- Two open collector outputs for water detection and fault
- RS485 serial link.

1.2. APPLICATION FIELDS

- Sewerage networks
- Industrial effluent
- Surface water.

1.3. INSTALLATION EXAMPLE



In this application example, the sensor is used to detect polluted discharge from a Combined Sewer Overflow. All the waste water which passes through the downstream network will reach the treatment plant. During storm or raining days, the amount of waste water is very important and the treatment plant capacity is not sufficient.

To avoid plant overload, the Combined Sewer Overflow spills a part of waste water into natural environment. Overflows induce pollution. The sensor can be used to detect and record overflows.

Overflow start time and duration are saved into internal memory and can be read by a supervisor using RS485 serial link. The sensor also includes an open collector output to transmit overflow detection signal in real time.

An second open collector output is also available for cell fault reporting.

1.4. SPECIAL CONDITIONS FOR SAFE USE

The ambient temperature range is comprised between –20 °C and +60 °C.
Battery used must be from EVE manufacturer and type 26500M.

The apparatus is IP68/1bar/1h. To guarantee waterproofing when replacing the cell, the user must replace the gasket and tighten all the screws with the appropriate torque of 0.65 Nm+-0.05 Nm.

The manufacturer gasket reference is: **E8781-10204V3.**

1.5. TECHNICAL SPECIFICATIONS

	Min	Typical	Max	Unit
Housing				
Height		46		mm
Width		72		mm
Depth		125		mm
Weight		0.5		Kg
Protection IP.. / 1 bar / 1 hour		68		
Environment				
Ambient temperature	-20	25	60	°C
Power supply				
Embedded 3,6V Lithium Thyonile cell	2	3.6	3.9	VDC

1.6. MARKING

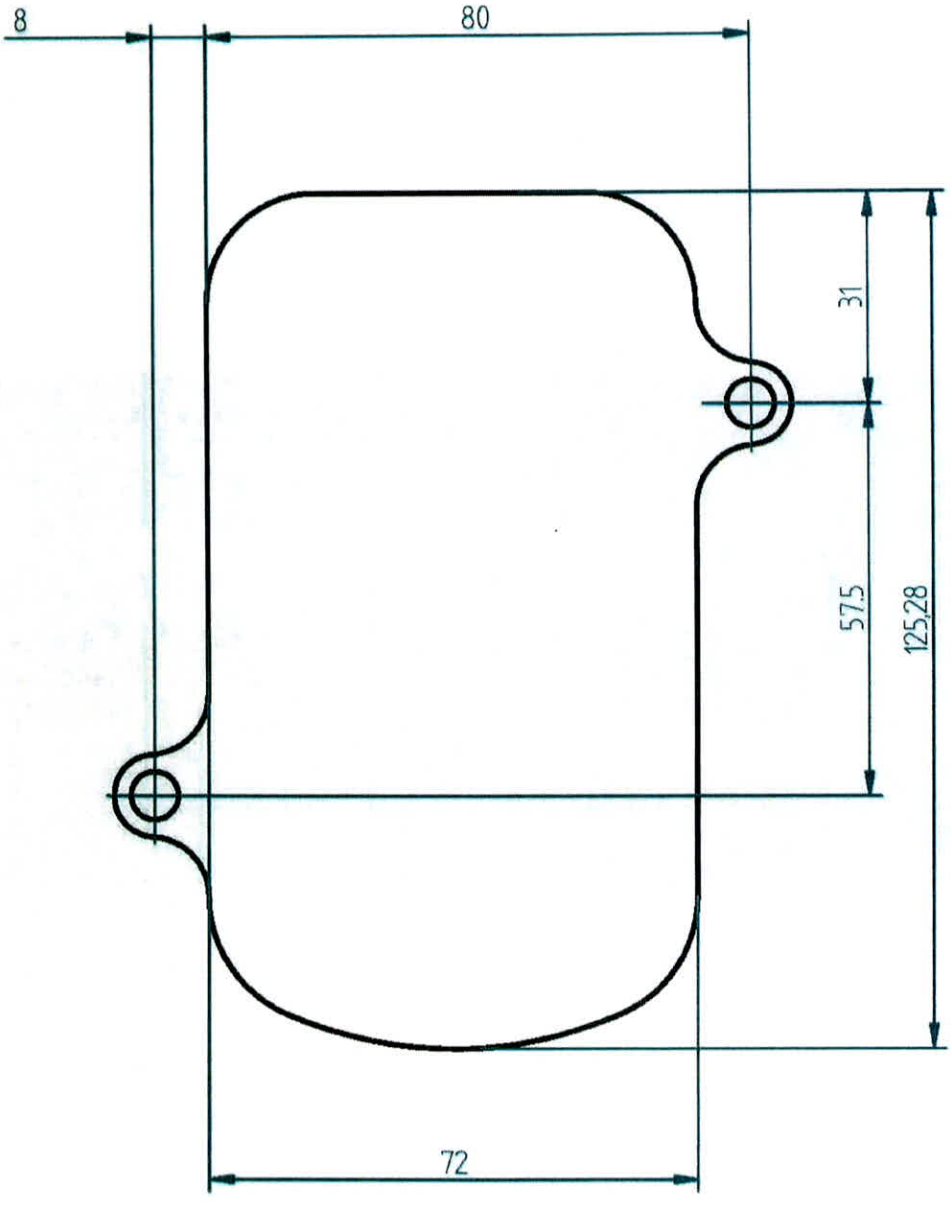
The marking is composed of the following indications:

EFS	**ZAC du Baconnet** **192, allée des chênes** **69700 MONTAGNY** **FRANCE**
Type designation	***E8781***
Year of construction / Serial number	**8781YYWWNNN** (*) **8781:** type **YY:** year of construction **WW:** week of the year **NNN:** production batch number
Marquage	CE
IP level	**IP68 @ 1bar / 1 h**

Chapter 2
INSTALLATION

2. INSTALLATION

2.1. DRILLING PLAN



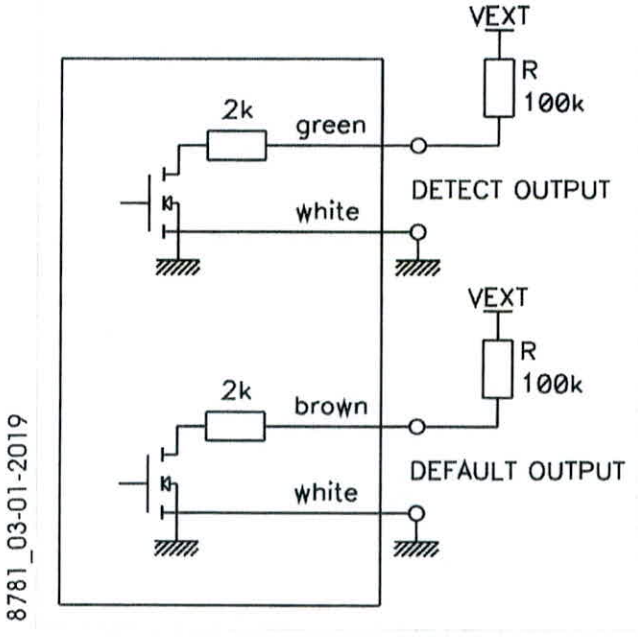
Soleplate Drilling template

The sensor is mounted on a stainless steel soleplate which allow easy and robust fixation.
Le plan above shows the dimensions (mm) needed to set up.

2.2. ELECTRICAL CONNECTIONS

Cable connection		
COLOR	**NAME**	**DESCRIPTION**
Orange	TX-/RX-	RS485 positive live
Blue	TX+/RX+	RS485 negative line
Green	Overflow	Open collector detection output
Brown	Battery Fault	Open collector battery fault output
White	Ground	Ground
White	Ground	Ground
White	Ground	Ground
White	Ground	Ground
Black	Braid shield	Ground
Black	Braid shield	Ground

Open collector outputs equivalent diagram



Vext: external power supply used for open collector outputs polarization.

R: recommended pull-up resistor value is 100 kΩ.

Chapter 3
CONFIGURATION

3. SETTING UP THE SENSOR

3.1. MODBUS LINK

Communication settings:

- 9600 bauds
- 8 bits data
- 1 stop bit
- No parity
- Modbus RTU protocol

A supervisor software must use MODBUS function code 03 to read data and function 16 to write data.

To limit power consumption induced by excessive modbus request frequency, the supervisor should ensure, if possible, a maximum time interval between each request. (one request per second or less).

Refer to Modicon Modbus Reference Guide for complete information about Modbus communication standard.

E8781 Modbus register table - 03/08/2016 Version 1.11

MODBUS REGISTER TABLE						
Address		Access	Format	Range	Unit	Function
DEC	HEX			*Min / max*		
Probe Identifiant						
0	00	R	unsigned int	**8781**	none	Sensor ID
1	01	R	char + char	Alphanum.	none	Sensor serial number (11 characters + \0: ABCDEFGHIJKLMNO\0) character AB With A: LSB and B: MSB

2	02	R	char + char	Alphanum	none	Character CD
3	03	R	char + char	Alphanum	none	Character EF
4	04	R	char + char	Alphanum	none	Character GH
5	06	R	char + char	Alphanum	none	Character IJ
6	06	R	char + char	Alphanum	none	Character K + /0
7	07	R	char + char	Alphanum	none	Reserved
8	08	R	char + char	Alphanum	none	Reserved
9	09	R	unsigned int	1.00/255.255	none	Software version

PARAMETERS

Address		Access	Format	Range - default value	Unit	Function
18	12	R/W	unsigned int	1-99 1	none	Modbus address
19	13	R/W	unsigned int	1-60 5	second	Average length
20	14	R/W	unsigned int	0-1 0	none	Data mode
21	15	R/W	unsigned int	0-1 0	none	Output detection polarity 0: NO 1: NC
22	16	R/W	unsigned int	0-1 0	NA	Output fault polarity 0: NO 1: NC
23	17	R/W	unsigned int	0-1 0	NA	Fault output mode (0) : fault (1) : detect

RESULTS							
Address		Access	Format	Range	Unit	Function	
28	1C	R	unsigned int	0-59 0-59	none	MSB: minutes LSB: seconds	Overflow start time
29	1D	R	unsigned int	0-6 0-24	none	MSB: day of the week LSB: hour	
30	1E	R	unsigned int	1-12 1-31	none	MSB: month LSB: day of the month	
31	1F	R	unsigned int	2000-2100	none	Year	

Address		Access	Format	Range	Unit	Function	
32	20	R	unsigned int	0-59 0-59	none	MSB: minutes LSB: seconds	Overflow end time
33	21	R	unsigned int	0-6 0-24	none	MSB: day of the week LSB: hour	
34	22	R	unsigned int	1-12 1-31	none	MSB: month LSB: day of the month	
35	23	R	unsigned int	2000-2100	none	Year	

Address		Access	Format	Range	Unit	Function	
36	24	R	unsigned int	0-4.10^9	seconds	MSW: current overflow length	Overflow length
37	25	R	unsigned int	0-4.10^9	seconds	LSW: current overflow length	
38	26	R	unsigned int	0-4000	mV	Battery voltage	
39	27	R	unsigned int	-4000 / 8000	1/100 °C	Temperature (*)	

Address		Access	Format	Range	Unit	Function	
40	28	R	unsigned int	0-59 0-59	none	MSB: minutes LSB: secondes	Current time
41	29	R	unsigned int	0-6 0-24	none	MSB: day of the week LSB: hour	
42	2A	R	unsigned int	1-12 1-31	none	MSB: month LSB: day of the month	
43	2B	R	unsigned int	2000-2100	none	Year	

(*) This is the temperature inside the apparatus plastic casing for information only. Temperature sensor accuracy is ± 2 °C.

Address		Access	Format	Range	Unit	Function	
44	2C	R	unsigned int			Not used	
45	2D	R	unsigned int			Not used	
46	2E	R	unsigned int			Not used	
47	2F	R	unsigned int			Not used	
48	30	R	unsigned int	0-65535		FIFO memory number of recorded data	

Address		Access	Format	Range	Unit	Function	
49	31	R	unsigned int			**Fault output state:**	

If fault output mode = 0, (register 23 = 0)

If polarity = 0, (register 22)
- 0: no fault (open collector output)
- 1: fault (open collector output pull to ground)

If polarity = 1, (register 22)
- 0: fault (open collector output)
- 1: no fault (open collector output pull to ground)

If fault output mode = 1, (register 23 = 1)

If polarity = 0, (register 21)
- 0: no overflow (open collector output)
- 1: overflow (open collector output pull to ground)

If polarity = 1, (register 21)
- 0: overflow (open collector output pull to ground)
- 1: no overflow (open collector output)

Address		Access	Format	Range	Unit	Function	
50	32	R	unsigned int			**Overflow output state**	

If polarity = 0 (register 21)
- 0: no overflow (open collector output)
- 1: overflow (open collector output pull to ground)

If polarity = 1
- 1: no overflow (open collector output)
- 0: overflow (open collector output pull to ground)

MODBUS READ EXAMPLE:

Modbus frame to read register 19 (0x13) -> parameter AVERAGE LENGTH

01 03 00 13 00 01 75 CF

01: modbus slave address
03: modbus read holding register command
00 13: read start address 19d -> 0x13
00 01: number of register to read 1
75 CF: modbus CRC

Answer from the sensor: **01 03 02 00 05 78 47**

01: modbus slave address
03: modbus read holding register command
02: number of byte read
00 05: read register value
78 47: modbus CRC

MODBUS WRITE EXAMPLE:

Modbus frame to write register 19 (0x13) with value 5 -> parameter AVERAGE LENGTH

01 10 00 13 00 01 02 00 05 64 F0

01: modbus slave address
10: modbus write holding register command
00 13: write start address 19d -> 0x13
00 01: number of register to write
02: number of byte to write (2 for one 16 bits register)
00 05: register value to set (5)
64 F0: modbus CRC

Answer from the sensor: **01 10 00 13 00 01 F0 0C**

01: modbus slave address
10: modbus write command
00 13: write start address 19d -> 0x13
00 01: number of 16bits register written
F0 0C: modbus CRC

3.2. SETTING THE DATE AND TIME

COMMAND							
Address		Access	Format	Range	Unit	Function	
51	33	R/W	unsigned int	1-5	none	1: read next recorded data 2: time setting 3: save sensor parameter 4: clear FIFO memory	Only command number 2 needs parameters
52	34	R/W	unsigned int	0-1	none	Command execution status(**) 0: OK 1: NOK	
53	35	R/W	unsigned int	0-65535	none	Parameter n°1 (hour)	
54	36	R/W	unsigned int	0-65535	none	Parameter n°2 (minute)	
55	37	R/W	unsigned int	0-65535	none	Parameter n°3 (second)	
56	38	R/W	unsigned int	0-65535	none	Parameter n°4 (day of month)	
57	39	R/W	unsigned int	0-65535	none	Parameter n°5 (month)	
58	3A	R/W	unsigned int	0-65535	none	Parameter n°6 (year)	
59	3B	R/W	unsigned int	0-65535	none	Parameter n°7 (day of the week)	

The sensor is delivered ready to use, no special setting is required but user could change the date and time if needed.

Example: Setting **2015/06/23 13 :15 :30** as the current date.

Register 53 = 13
Register 54 = 15
Register 55 = 30
Register 56 = 23
Register 57 = 6
Register 58 = 2015

Write register 51 = 2 to valid new current time into the sensor.

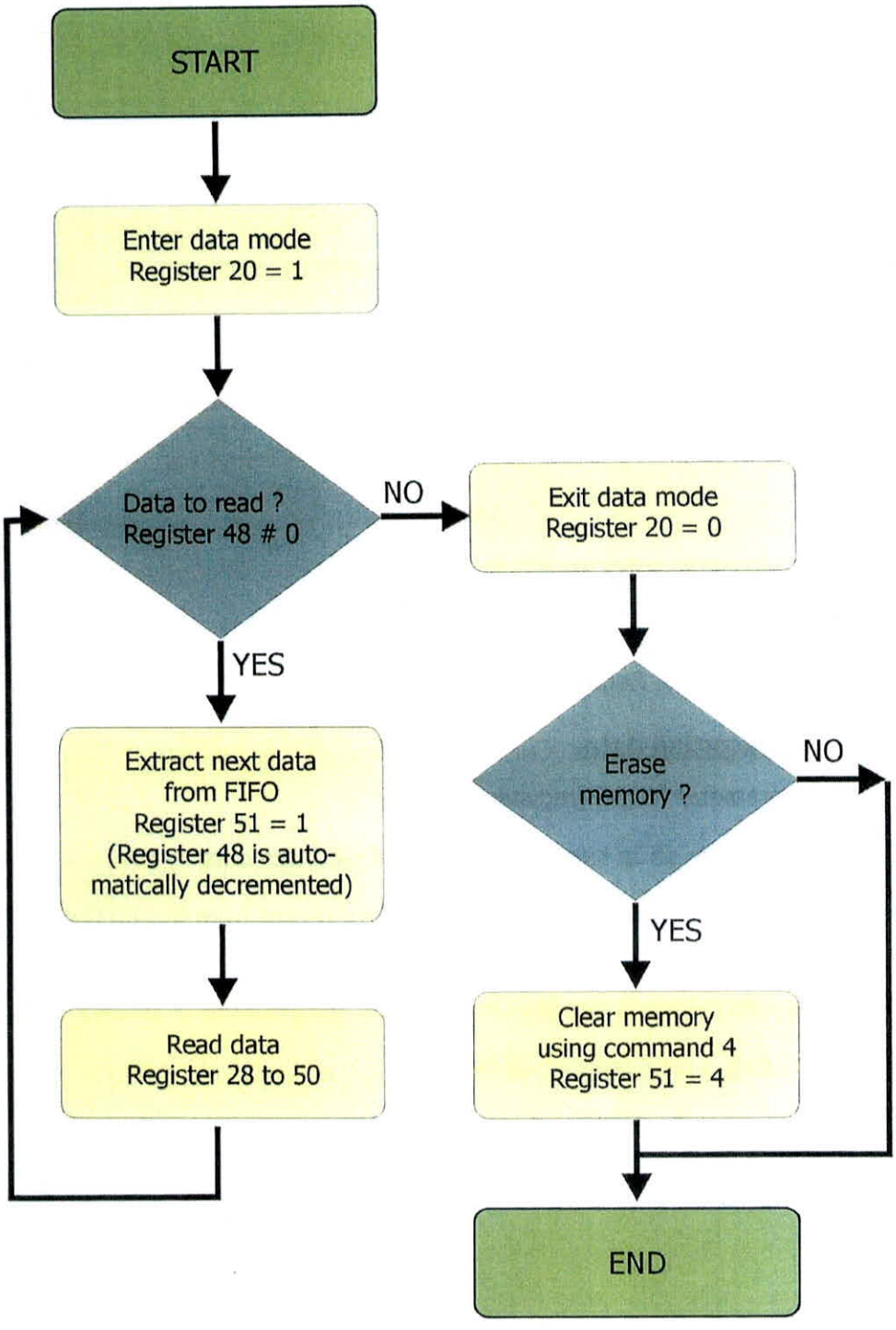
(**) If a command has been done without any fault then register 52 = 0. (STATUS) else register 52 = 1.
STATUS register 52 is reset each time a new command is send to the sensor and refreshed after command treatment.

3.3. RETREIVING RECORDED DATA

Each time an overflow ends, the start time, end time and length of the overflow are saved into the FIFO memory. Register 48 is also incremented.

To retrieve recorded data:

1. Set parameter MODE (register 20 = 1)
2. Read register 48 to know the number of recorded data
3. Set command register 51 = 1 to get a new record from the FIFO memory
4. Read registers 28 to 37 to get the results. Registers 38 to 50 could also be read if more information is needed (for example: temperature or battery voltage).
5. Go to step 3 until register 48 reach 0.
6. Reset parameter MODE (register 20 = 0).


START
Enter data mode
Register 20 = 1
Data to read ?
Register 48 # 0
NO
Exit data mode
Register 20 = 0
YES
Extract next data
from FIFO
Register 51 = 1
(Register 48 is auto-
matically decremented)
Read data
Register 28 to 50
Erase
memory ?
NO
YES
Clear memory
using command 4
Register 51 = 4
END

Chapter 4
MAINTENANCE

4. MAINTENANCE

4.1. FAULT OF THE APPARATUS

No maintenance operations is necessary to keep the device functioning correctly. It is always useful to clean the sensor head when possible. In case of faults of the apparatus, this one must be send to EFS company.

EFS
ZAC du Baconnet
192, allée des chênes
69700 MONTAGNY
FRANCE

4.2. BATTERY REPLACEMENT

Battery used must be from EVE manufacturer and type 26500M.

The apparatus is IP68/1bar/1h. To guarantee waterproofing when replacing the cell, the user must replace the gasket and tighten all the screws with the appropriate torque of 0.65 Nm+-0.05 Nm.

The manufacturer gasket reference is: E8781-10204V3.

ANEXO III

Concepteur et fabricant d'équipements industriels, EFS vous accompagne dans votre projet de A à Z.

Activité

Développement, industrialisation et fabrication d'équipements mécatroniques en petites et moyennes séries (10 à 5000 pièces/an) pour des sociétés tierces.

Bureau d'études

avec force de proposition technique dans les domaines de l'électronique, la mécanique, l'informatique, l'électrotechnique, l'optoélectronique, l'hydraulique et la plasturgie.

Certification

Formalités de certification, veille normative et réglementaire, suivi satisfaction client.

Domaines d'application

Aéronautique, automobile, BTP, électricité/électronique, équipements industriels, ferroviaire, médical, naval, spatial, télécommunications.

EFS

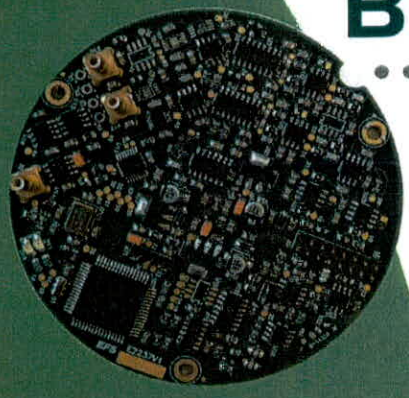
ISO 9001 : 2008

Conception et fabrication de produits techniques innovants à base d'électronique, mécanique, optique et logiciel

ENTREPRISE CERTIFIÉE LNE
ISO 9001:2008
n°16977-3

EFS privilégie le développement de produits techniques innovants qui concourent à la santé, la sécurité et le bien-être de l'humanité ainsi qu'à la réduction de l'empreinte environnementale des activités humaines».

Bureau d'études



Notre bureau d'études met à votre disposition son savoir-faire, sa polyvalence et sa souplesse, pour vous accompagner dans toutes les phases de votre projet.

100 %
de votre projet réalisé sur un seul site

Electronique
Conception CAO électronique, analogique, numérique, puissance, radiofréquence

Mécanique
Conception CAO avec suivi FAO, mécanique générale, mécanique de précision, tôlerie.

Logiciel
Logiciel embarqué, IHM, base de données.

Hydraulique
Fabrication d'armoires pneumatiques, montage hydraulique dans bancs d'essai de -0,5 à 3000 bars.

Electrotechnique
Conception et intégration de solutions électrotechniques et d'automatisme.

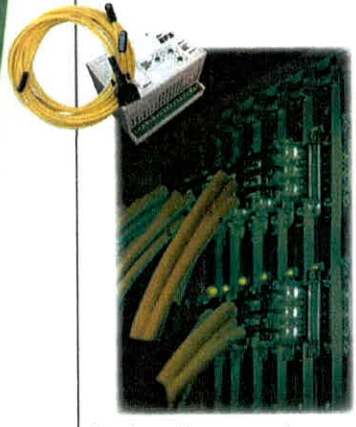
Optoélectronique
Traitement de spectre optique, pilotage led de puissance, traitement d'images.

Plasturgie
Moulage de pièces plastiques, surmoulage de sondes et capteurs, collage, étanchéité.

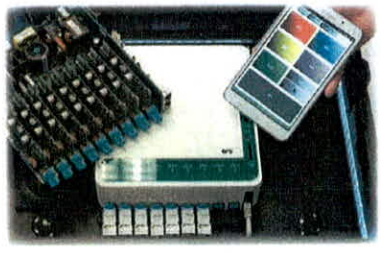
Nos clients ?

Multinationale

- Développement d'équipements spécifiques de mesure et de test pour la mise au point et la caractérisation de prototypes,
- configuration et contrôle en série sur ligne de production,
- développement de nouveaux concepts pour tester un nouveau marché •



Système de mesure de température par fibre optique.



LedBox, produit issu d'un partenariat avec **Schneider Electric** (projet FUI).

ETUDE PROTOTYPAGE

Prototypage

- Atelier mécanique
- Câblage CMS, traversant, filaire
- Montage machine
- Surmoulage

Test validation produits

- Essais thermiques, climatiques, vibratoires
- CEM préqualification
- Test d'étanchéité,
- Test sous pression
- Validation fonctionnelle •

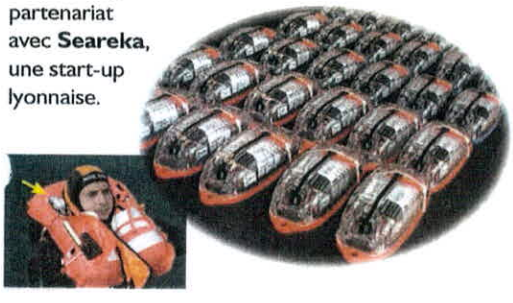
Certifications

- Production ATEX cat I directive 94/9/CE
- Marquage CE médical ISO 13485 directive 93/42/CE
- Certification pour les équipements sous pression directive 97/23/CE
- Certification maritime SMS.W.11./94098/A.0

Start-up

Accompagnement pour le développement et pour l'industrialisation d'un premier produit •

Balise Mob, partenariat avec **Seareka**, une start-up lyonnaise.



PME

Conception et fabrication d'un produit pour compléter une gamme ou pour améliorer un produit existant •

Production

Petites et moyennes série de 10 à 5000 pièces par an.

CERTIFICATION FABRICATION

EFS Structure

Votre contact

40% de l'effectif au **bureau d'études**

40% de l'effectif en **production**

FILIALE

Implantée en Chine depuis 15 ans à Hangzhou pour assurer le support technique (installation, formation, maintenance).

Nous contacter

Parc d'activité du Baconnet
192, Allée des Chênes
MONTAGNY (69700)
FRANCE

☎ +33 (0)4 72 49 27 72
🖷 +33 (0)4 72 49 27 77

www.efs.fr

Plaquette EFS-V1.2-17-03-2017

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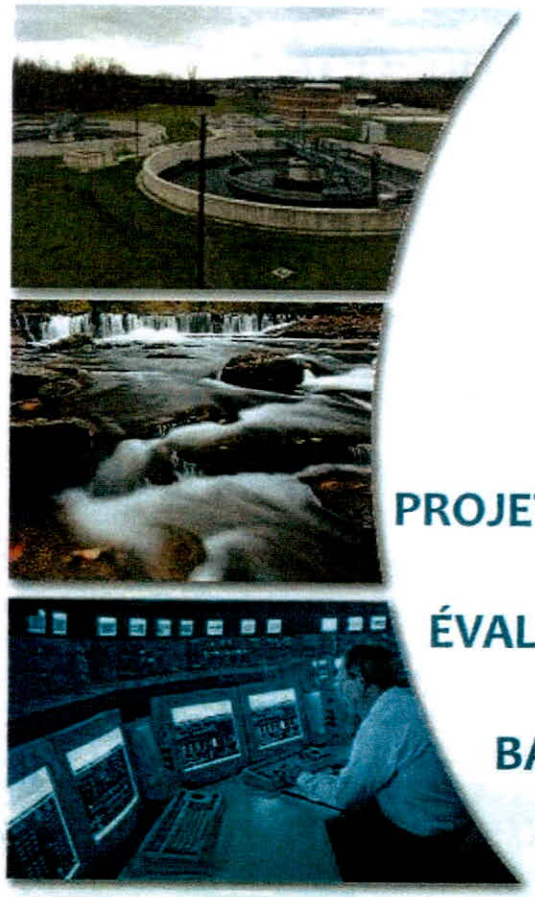

M.A.R.U

OiEau

Projet FASEP / M.A.R.U.
PROJET PILOTE DE RENFORCEMENT DU SUIVI ET ÉVALUATION DE L'ASSAINISSEMENT URBAIN DANS DEUX BASSINS HYDROGRAPHIQUES PRIORITAIRES DU BRÉSIL

EXCLUSIVE DISTRIBUTOR

microLAN Supratec

ORCHIDIS BY AQUALABO

SECOMAM BY AQUALABO

PONSEL BY AQUALABO

AQUALYSE BY AQUALABO

QUEM SOMOS NÓS ?

DESDE 2007

AQUALABO

Fabricante francês de equipamentos e reagentes
para análise e controle de água

Smart Water Solutions

QUEM SOMOS NÓS ?

O Aqualabo é o resultado da fusão de 4 empresas, todas com mais de 40 anos no mercado

EXCLUSIVE DISTRIBUTOR

microLAN Supratec Instrumentation GmbH

ORCHIDIS BY AQUALABO

SECOMAM BY AQUALABO

PONSEL BY AQUALABO

AQUALYSE BY AQUALABO

4 Marcas +

Distribuidor oficial exclusivo das marcas Supratec de instrumentação e microLAN

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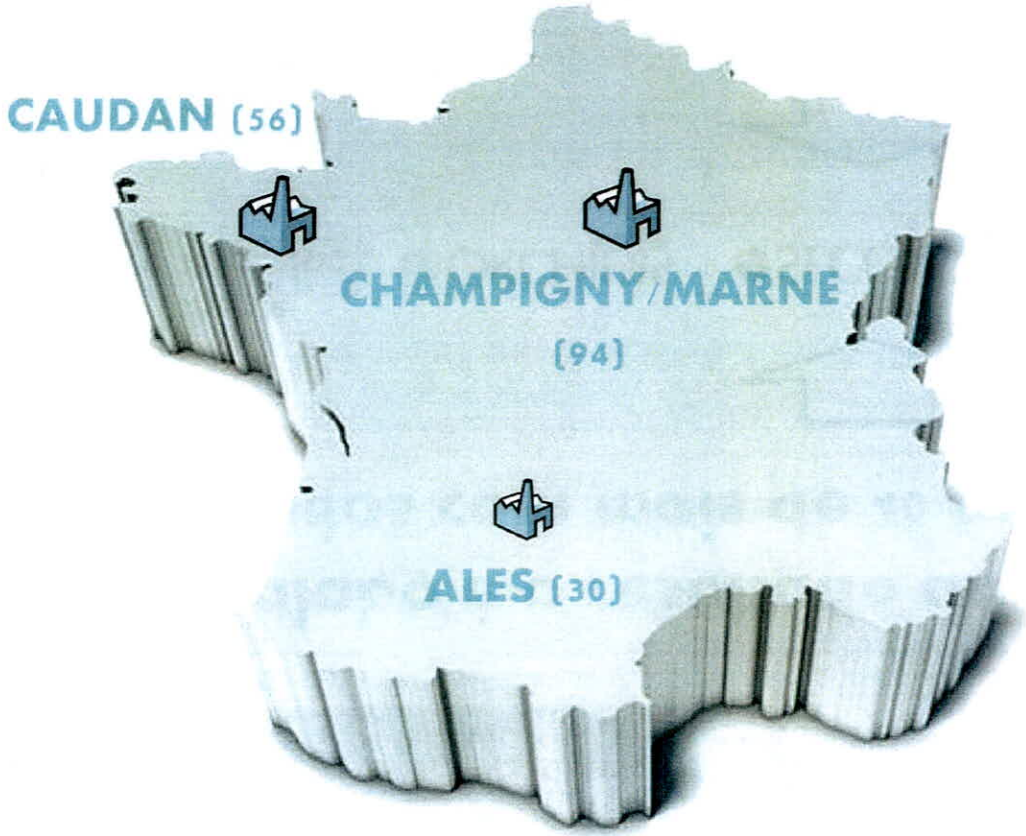
LOCALIZAÇÃO



3 implantaçãos

Fabricação 100%
na França

PRESENÇA

7 gerentes de vendas de área

3 escritórios (Colômbia, China, Índia)

Smart Water Solutions

PRESENÇA

Mais de 100 distribuidores em todo o mundo

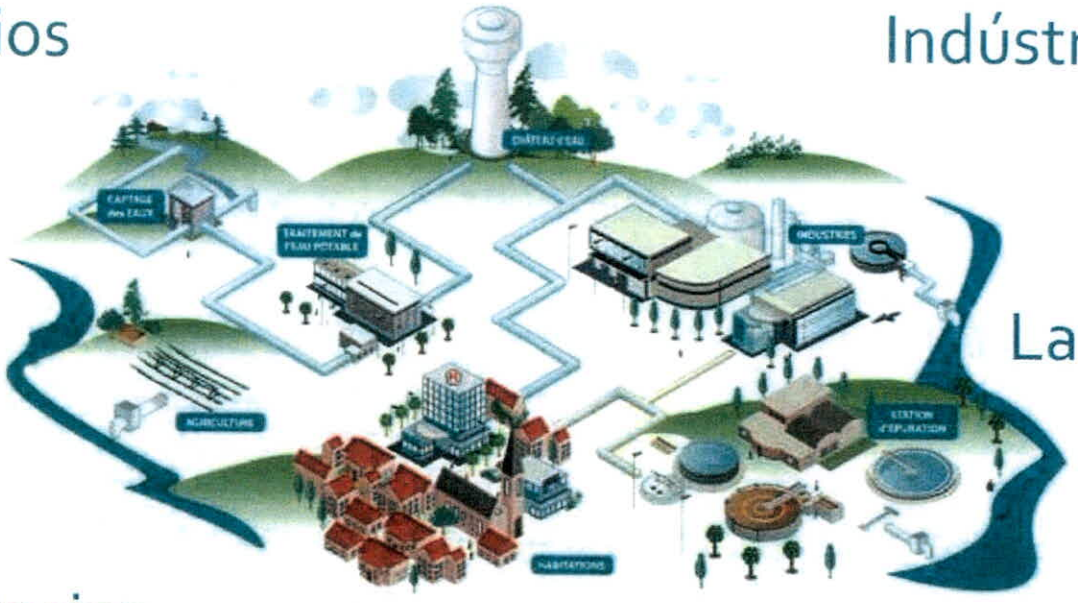
Diversos distribuidores no brasil para suporte técnico e treinamento

Smart Water Solutions

CLIENTES

Municípios

Indústrias



Agências de controle

Laboratórios

Agências estatais

Escritórios de Engenharia

Operadores

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PRODUTOS

Nossa estratégia para a implementação de estações de monitoramento é baseada em muitos anos de experiência e foca em:

- Confiabilidade e melhor custo de propriedade
- Sensores monoparâmetros proporcionando operação e manutenção mais fáceis com o melhor custo
- Integrabilidade em todas as plataformas graças aos protocolos de comunicação abertos

Oferecemos vários níveles de acordo com os parâmetros a serem monitorados e orçamento disponível:

- Nível 1: parâmetros físico-químicos, os parâmetros mais necessários
- Nível 2: sensores UV ou analisadores para medição de matéria orgânica
- Nível 3: parâmetros avançados, como contaminação fecal ou toxicidade

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PRODUTOS

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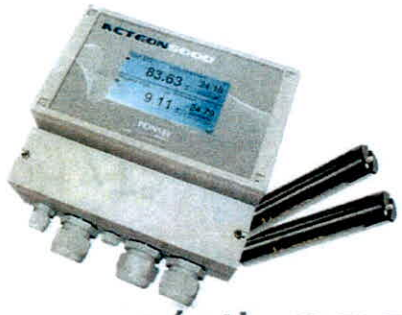
BY AQUALABO

Parâmetros físico-químicos

Medição online: Sensores digitais, transmisores



Medição portátil: ODEON

Todos os nossos sensores e soluções oferecem as seguintes vantagens:

- Sensores inteligentes (digitais)
- Comunicação digital Modbus RS485 ou SDI12
- Coeficientes de calibração armazenados no sensor
- Alta confiabilidade da medição
- Sensores robustos e estanques (IP 68): os sensores foram projetados para aplicações em ambientes adversos e para resistir em situações difíceis
- Sensores que requerem muito poucos consumíveis: apenas uma substituição do cartucho (sensores de PH e ORP) e membrana óptica para o sensor OPTOD

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PRODUTOS

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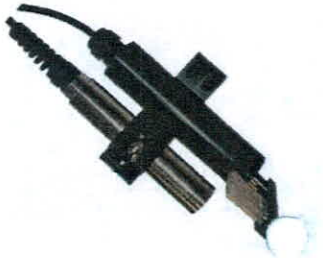
BY AQUALABO

Parâmetros disponíveis

- OPTOD: oxigênio dissolvido
- PHEHT: pH y T°
- NTU: turbidez
- C4E e CTZ: condutividade
- MES5: sólidos em suspensão e lodo
- EHAN: redox anular

Sistemas de limpeza automática para melhor estabilidade e baixa manutenção



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PRODUTOS

PONSEL
BY AQUALABO

Solução de comunicação IoT para sensores

O AQUAMOD é um dispositivo plug and play à prova d'água com:

Conexão de 1 sensor DIGISENS da Aqualabo

Fonte de alimentação do sensor de 2 a 5 anos

Transmissão de dados LoRa® começando em 5 min

Registro de dados local (500 leituras)

Uma interface html simples e abrangente disponível via WiFi para gerenciamento do dispositivo e calibração do sensor

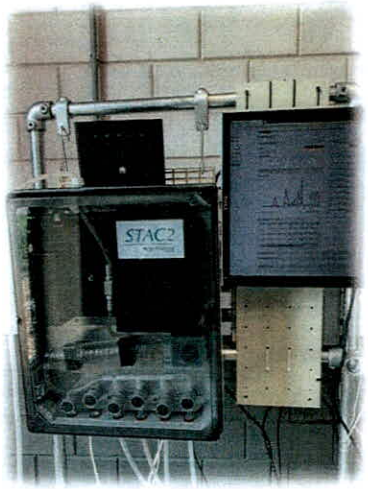
Essa é uma solução ideal se você tiver uma rede radio LoRaWAN disponível

Smart Water Solutions

PRODUTOS

Soluções avançadas de alerta precoce e monitoramento:

- Contaminação orgânica (DBO, DQO, COT, UV254)
- Contaminação global (toxicidade)
- Contaminação fecal (E.Coli, Coliformes, Atividad Total)

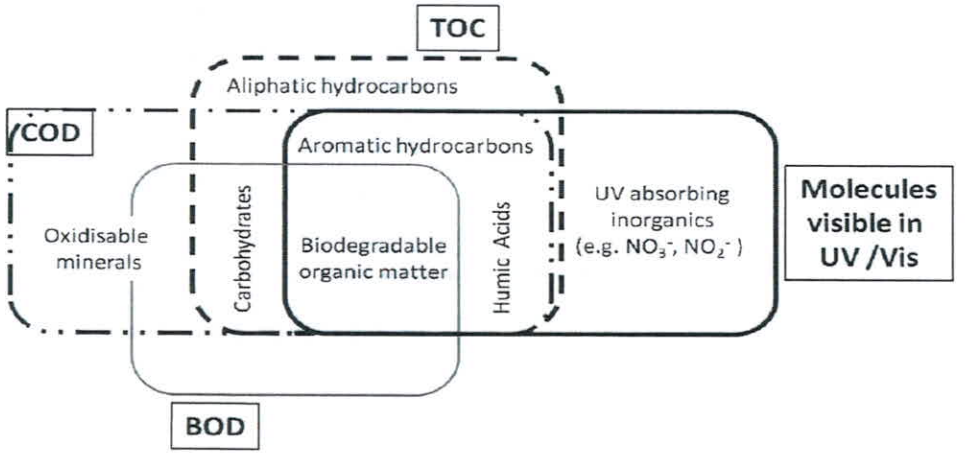


PRODUTOS

PONSEL
ST AQUALABO

Contaminação orgânica (DBO, DQO, COT, UV254):

Medição online: STACSENSE



A relação entre a resposta UV e os parâmetros orgânicos

Van den Broeke et al, in Press

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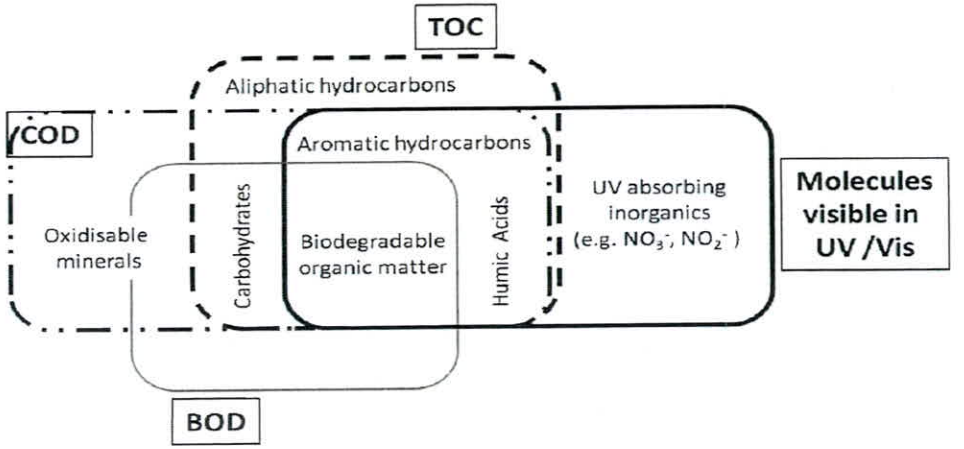
PRODUTOS

SECOMAM
BY AQUALABO

Contaminação orgânica (DBO, DQO, COT, UV254, Cor):

Medição online: STAC2



Medição portátil: Pastel UV

A relação entre a resposta UV e os parâmetros orgânicos.

Van den Broeke et al, in Press

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PRODUTOS

microLAN

On-line Biomonitoring Systems

Contaminação fecal (E.Coli, Coliformes, Atividade Total)

Medição online: BactControl

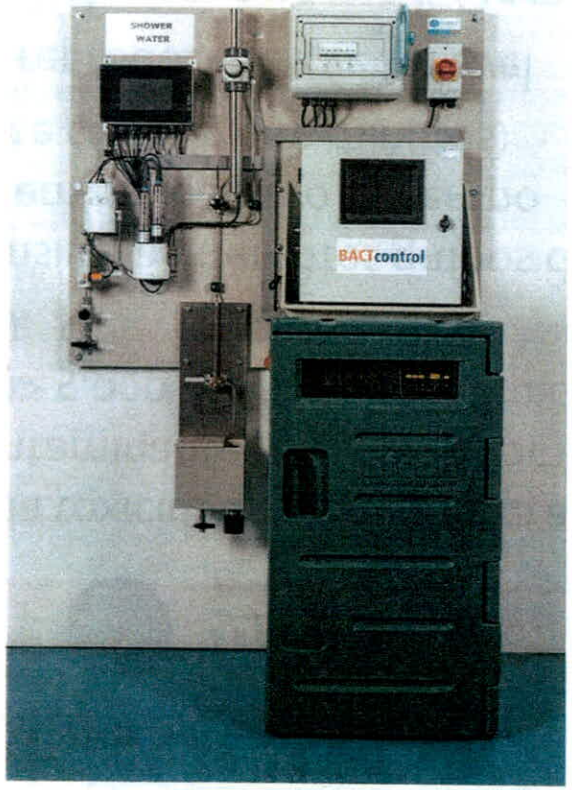
Com base na medição fluorescente patenteada da atividade enzimática específica:

- ß-Glucuronidase-> indica atividade de E. coli
- ß-Galactosidase-> indica atividade coliforme
- Fosfatase Alcalina -> Atividade Total

Filtração / concentração única em um filtro de cerâmica reutilizável de 0,45 mícron

Detecção: 1-5 cfu por 100ml (dependendo do volume da amostra), volume da amostra até 1.000 ml

Modificações na matriz de amostra também podem ser monitoradas!



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PRODUTOS

microLAN
On-line Biomonitoring Systems

Contaminação global (toxicidade)

Medição online: ToxControl

Medição portátil: MicroTox

A medição da toxicidade reage a uma ampla gama de contaminantes tóxicos -> foram testados em> 5.000 substâncias químicas (Kaiser et al).

O teste é sensível a diferentes grupos de substâncias em um período de tempo relativamente curto (5 a 15 minutos)

- Robusto, reproduzível e verificável
- Conformidade com a norma ISO 11348 parte 1 usando bactérias recém preparadas
- Amostras de controle positivas e negativas
- Branco para controle negativo
- $ZnSO_4$ (10 mg / L) como controle positivo

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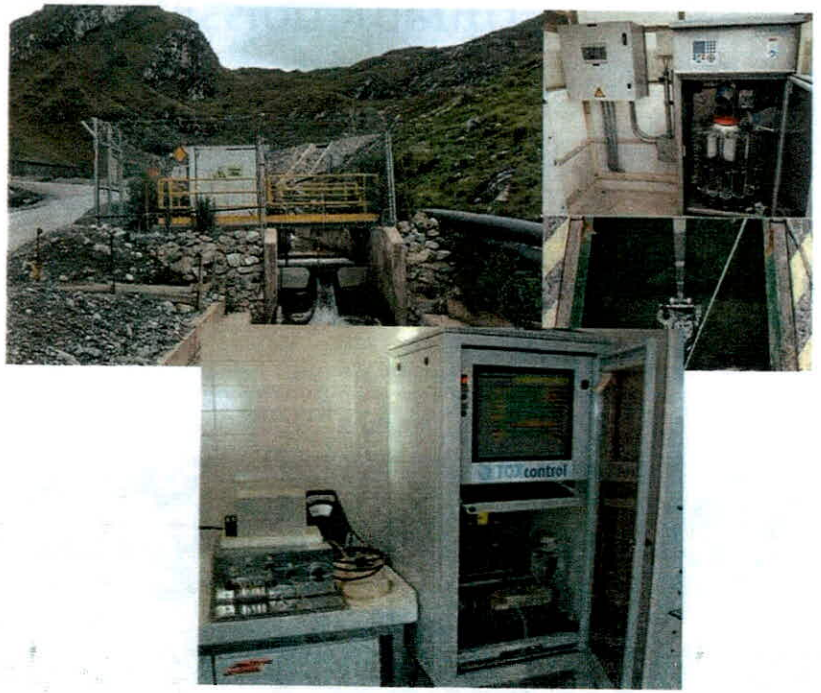
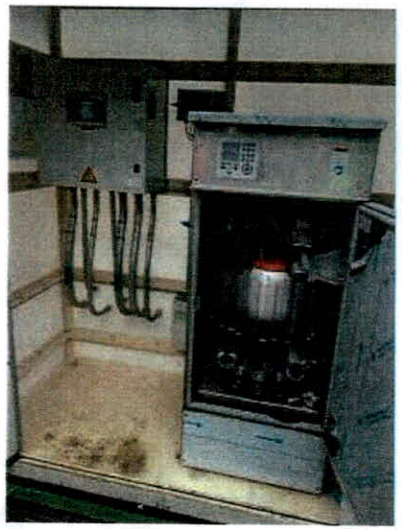
SOLUÇÕES

Exemplos de referências:

Estações de monitoramento de águas naturais, residuais e industriais





SERVIÇOS

No Brasil temos representantes e distribuidores capazes de fornecer :

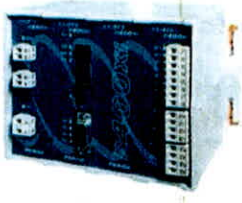
- Suporte de instalação e comissionamento
- Treinamento técnico
- Suporte pós-venda
- Sanutenção e suporte de operação

AQUALABO
CONTRÔLE

DIGITAL SENSORS DIGISENS

SMART SENSORS FOR WATER CONTROL

Mono or multi-parameter handheld device



Remote Control

Transmitter Display

Data loggers Recorders

DIGITAL INPUT SYSTEM

DIGITAL COMMUNICATION
MODBUS RS485
SDI12

DIGITAL OUTPUT SENSOR

- Universal communication Modbus RS485 / SDI-12
- Compatible with all types of transmitters, recorders, remote control, controller equipped with a RS485 input or SDI-12 ...
- Integrated transmitter (recording of calibration data, history and measurement processing in the sensor)
- Ultra-low power technology

MADE IN FRANCE

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DIGITAL COMMUNICATION

The DIGISENS sensors can connect to any type of recorder, transmitter or controller with a Modbus RS485 input, making data transfer more reliable.
The digital signal processing combined with the pre-amplification of the measurement allow high reliability.

INTEGRATED TRANSMITTER

All calibration data for (offset, slope), history, users and measures be processed directly in the sensor and transmitted via Modbus RS-485 or SDI-12.

MECHANICAL

Digital sensors are compact, rugged and light. They are made of stainless steel or PVC materials for portable or stationary use in the most fouling environments.

SPECIFICATIONS

	Parameter	Dimensions	Range	Accuracy	Sensor
PH/ORP/T°C	Temperature	Diameter : 27 mm Lenght without cable : 159 mm Weight : 350 g (sensor + cable)	0,00 - + 50,00 °C	± 0,5°C	CTN
	pH		0,00 - 14,00 pH	± 0,1	Combined electrode (pH /reference) : special glass Reference Ag/ AgCl. Electrolyte plastogel (KCl)
	ORP		- 1000,0 to + 1000,0 mV	± 2 mV	Combined electrode (Redox/reference) : Platinum electrode, Reference Ag/AgCl. Electrolyte plastogel (KCl)
EHAN	ORP Temperature	Diameter: 27 mm Lenght without cable : 324 mm Weight : 350 g (sensor + cable)	- 1000,0 to + 1000,0 mV	± 10 mV	Combined electrode (ORP/reference) : platinium ring, Reference Ag/AgCl. Gelled electrolyte (KCl)
OPTOD	Dissolved Oxygen/T°C	Diameter : 25 mm Lenght without cable : 146 mm Weight : 450 g (sensor + cable)	0,00 - 20,00 mg/L 0,0 - 200,0 % SAT	± 0,1 mg/L ± 1 %	PONSEL OPTOD® optical luminescence technology ASTM D888 – 05 Compliance
C4E	Conductivity	Diameter : 27 mm Lenght without cable : 177 mm Weight : 350 g (sensor + cable)	0,0 - 200,0 µS/cm 0 - 2 000 µS/cm 0,00 - 20,00 mS/cm 0,0 - 200,0 mS/cm AUTOMATIC Range	± 1 % of the full scale	C4E Technology 4 electrodes (2 platinum and 2 graphite)
	Salinity		0,00-150,00 ppt	± 1 % of the full scale	C4E Technology 4 electrodes (2 platinum and 2 graphite)
CTZN	Conductivity	Diameter: 39.80 mm Lenght without cable : 258.6 mm Weight : 700 g (sensor + cable)	0,0 – 100,0 mS/cm	< 5%	Inductive conductivity sensor compensated in temperature
	Salinity		5-60 g/Kg		
NTU	Turbidity	Diameter : 27 mm Lenght without cable : 170 mm Weight : 300 g (sensor + cable)	0,00 - 50,0 NTU 0,0 - 200,0 NTU 0 - 1000 NTU 0 - 4000 NTU AUTOMATIC Range	± 1 % of the full scale NTU	IR 90° technology ISO 7027 compliance
MES5	Turbidity Sludge blanket	Diameter 64 mm Lenght without cable : 281 mm Weight : 750 g (sensor + cable)	0-50 g/L 0-4000 FAU 0-100%	MES < 10% Turbidity ± 5% FAU VB ± 2%	Optical IR (870 nm) based on absorptiometry
VB5	Sludge blanket		0-100%	VB ± 2%	

- **Interface signal:** RS485 Modbus and SDI12
- **Sensor power supply:** 5-12 volts / 5-28 volts (CTZN, MES5 VB5)
- **Pressure max.:** 5 bars
- **Cable 9 armored connectors,** polyurethane sheath, bare wire
- **Protection:** IP 68

APPLICATION AREAS

- Wastewater
- Industrial effluent
- Monitoring of surface water
- Fish farming
- Drinking water

PONSEL AQUALABO GROUP

PONSEL • AQUALABO GROUP
ZA de Bellevue - 35 rue Michel Marion - 56850 CAUDAN
Tél : +33 (0)1 72 87 97 90 - www.aqualabo-group.com

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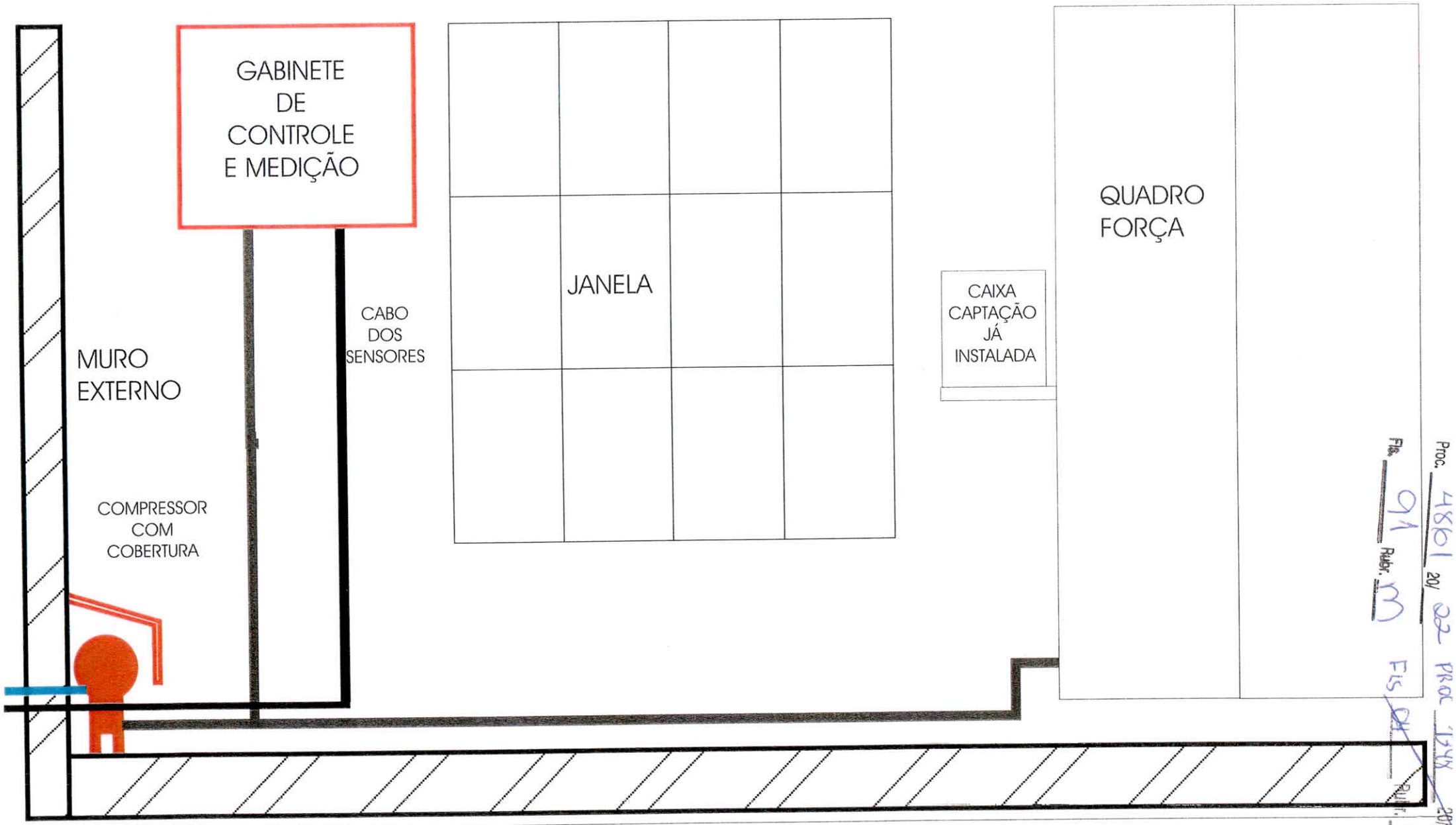
ANEXO IV

CABO DA SONDA
TUBULAÇÃO ELÉTRICA
TUBULAÇÃO DE AR COMPRIMIDO

PROJETO MARU
INSTALAÇÃO PIRACICABA

VISTA FRONTAL DA INSTALAÇÃO
PARTE INTERNA DO LOCAL

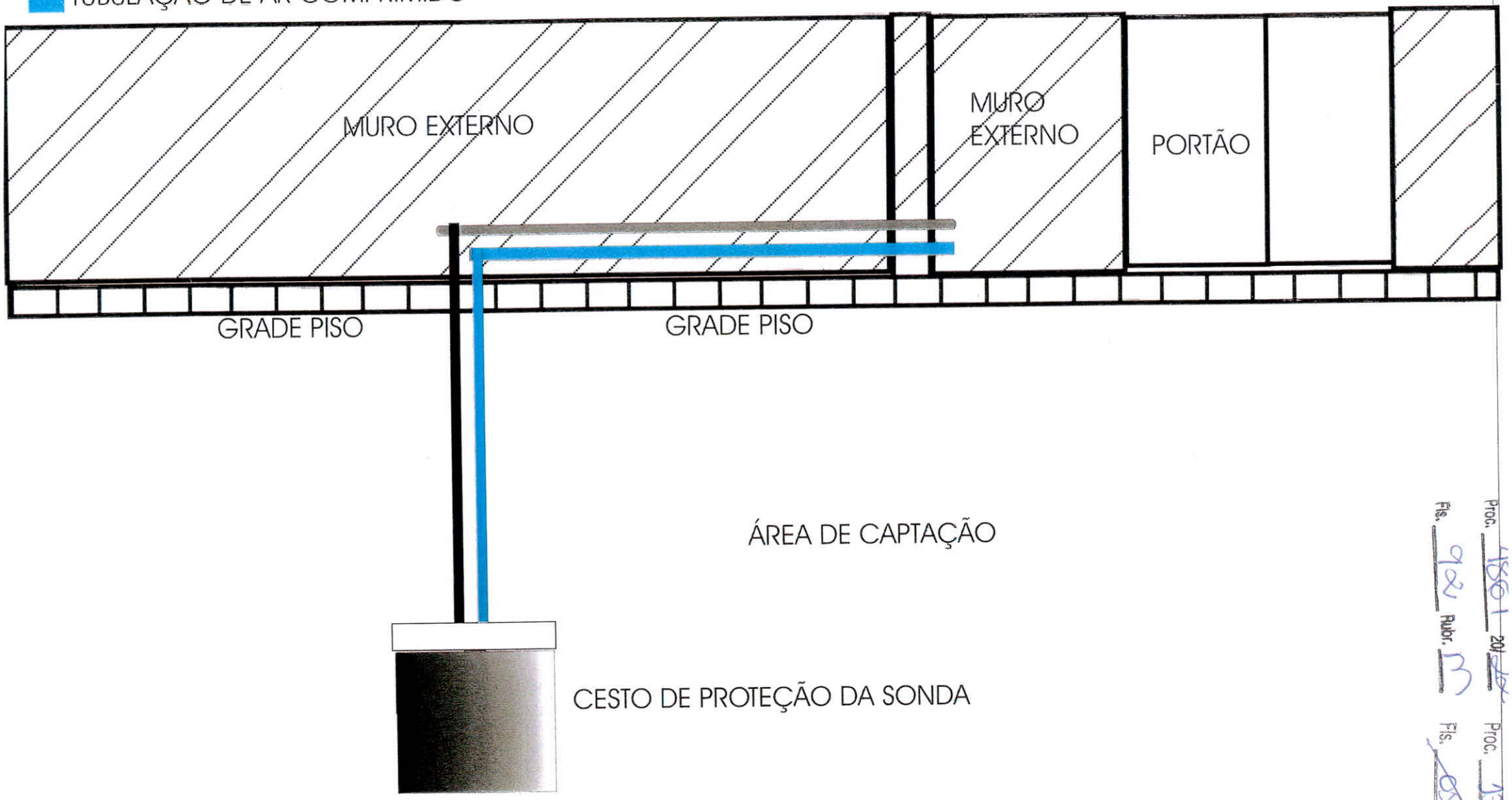


PoliControl

CABO DA SONDA
TUBULAÇÃO ELÉTRICA
TUBULAÇÃO DE AR COMPRIMIDO

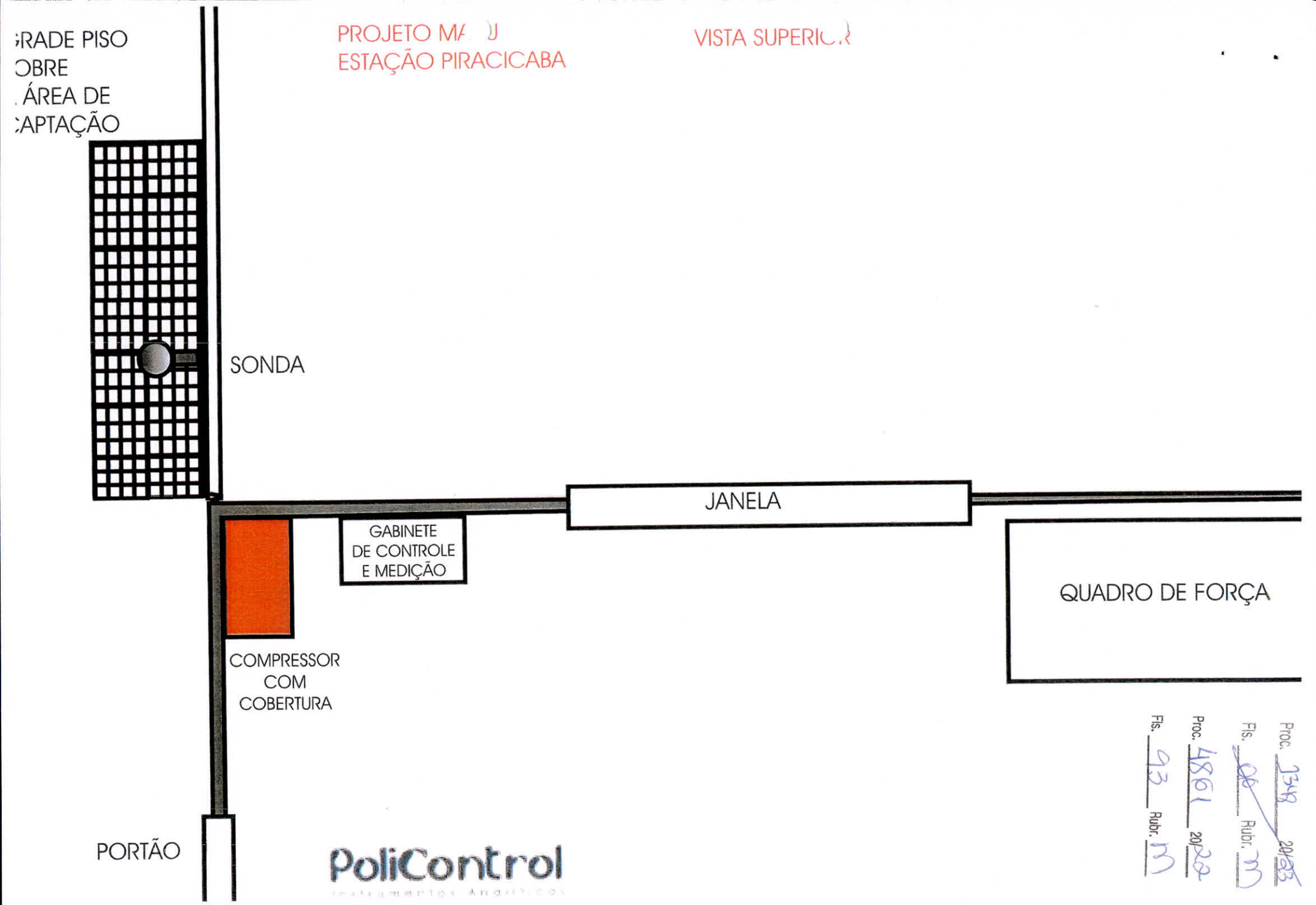
PROJETO MARU
INSTALAÇÃO PIRACICABA

VISTA LATERAL DA INSTALAÇÃO
LOCAL ONDE SERÁ INSTALADA A SONDA



PoliControl
Instrumentos Analíticos

Proc. 48601 20/
Fls. 92 Rubr.
Proc. 13948 20/08
Fls. 105 Rubr.



Proc. 348 20[illegible]
Fls. 96 Rubr.
Proc. 4861 20[illegible]
Fls. 93 Rubr.

Um tubo de PVC ou Polietileno com 140mm a 150mm de diametro e aproximadamente 3 metros de comprimento será instalado, preso a grade vertical que já se encontra no meio do Rio Corumbataí.
O modem (a prova d'água) será fixado na parte superior do tubo.

Precisamos de autorização para instalarmos o equipamento neste local.

Ao Setor de Protocolo

Apensar o expediente de fls. 02 a 07 e entranhar ao PUE. 4861/2022 por se tratar do mesmo objeto.

Mayra Lima de Deus
Nº Funcional: 2.060-7

ANEXO V

Proc. 4861 20/22
Fls. 95 Rubr.

Memorando DTA n° 060/2023

Piracicaba, 12 de abril de 2023.

Ao Senhor

Artur Costa Santos

Presidente do SEMAE

Ref.: Processo n° 4861/2022 - Projeto piloto MARU – Monitoramento da Qualidade das Águas, rios Piracicaba e Corumbataí

Senhor Presidente

Informamos que, para que haja a concordância com a instalações dos equipamentos de análises de água nas Estações de Captações do SEMAE (rios Piracicaba e Corumbataí), conforme solicitação via Ofício Agência das Bacias PCJ Nº 051/2023, entendemos que se faz necessário a celebração de um Acordo de Cooperação Técnica e para tanto sugerimos o que consta no Ofício nº 006/2023.

Para o acompanhamento do projeto indicamos os seguintes servidores do DTA:

Servidor	Nº Funcional	Cargo
André Ometto belleza	17642	Chefe da Divisão de Tratamento Piracicaba
Leticia dos Santos Santiago Matos	21269	Chefe da Divisão de Tratamento Corumbataí
Joseli Karina Forti	23202	Chefe do Setor de Controle de Qualidade dos Sistemas Produtores de Água

Respeitosamente,

Elaine Contiero Ribeiro
Departamento de Tratamento de Água