

Multiple Monitoring Systems

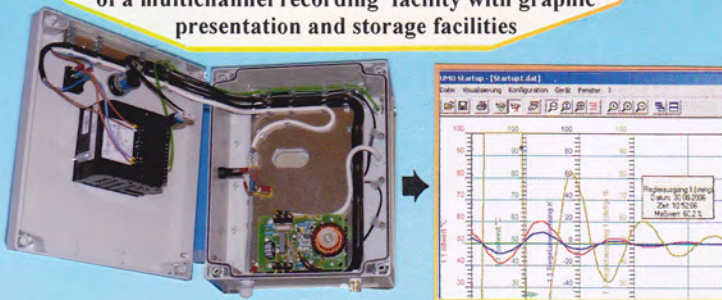
Heat exchange fouling monitors with multifunctional flow units



Wherever heat exchange problems take place, it is very likely that they are due to biofouling, scale or corrosion. Such detrimental phenomena are closely intercorrelated and decrease heat transfer efficiency.

Multiple Monitoring Systems consist of several flow units mounted in series (1)+(2)+(3) – The last one, (4) is the heat exchange fouling module on which the water flows in the annulus between glass tube and heat exchange fouling tube. A high performance heating element driven by a control unit provides adjustable heat flux up to 176 kW/m². The process value shown in the temperature controller is the Tw, that is, the temperature between heat source and heat exchange surface. Just by increasing set value correspondingly, heating takes place continuously. The temperature controller hysteresis is programmed in such a way that if flow stops no overheating can take place. The basic differentiation parameter is the increase of Tw, which under constant flow conditions, is proportional to the heat transfer deterioration. Moreover, the heat exchange tube can be weighed before and after exposure.

The temperature controller is equipped with an interface and a converter USB/TTL – A windows software consists of a multichannel recording facility with graphic presentation and storage facilities



The HEAT FLUX is adjustable up to 176 kW/m²

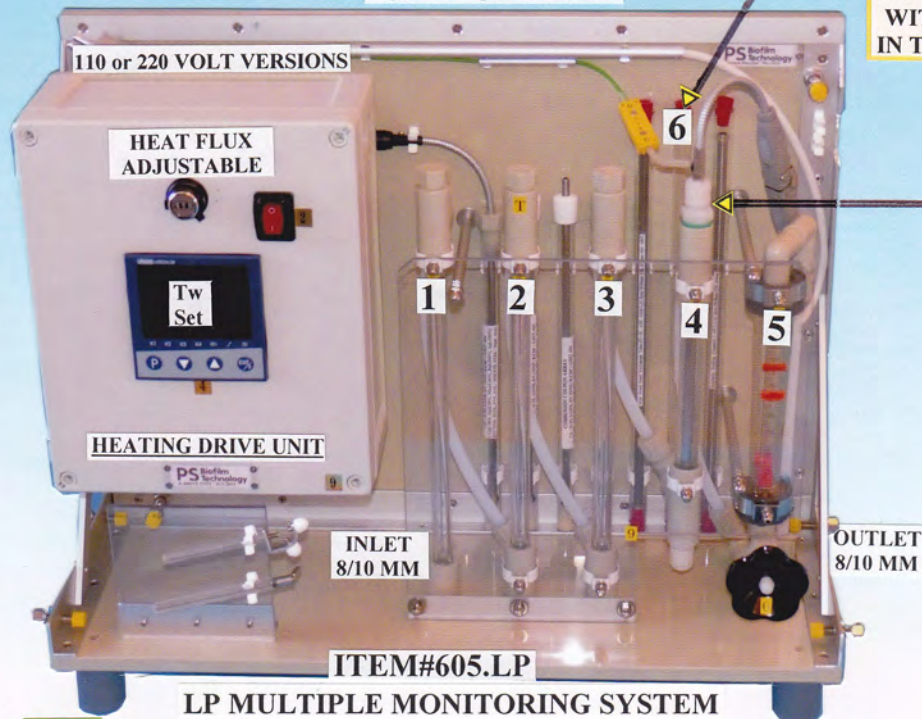
SEE ADDITIONAL INFORMATION AT PAGES 37+38



NiCrNi SENSOR IN CONTACT WITH JACKET IN THE MIDDLE

ITEM#675 HIGH PERFORMANCE HEATING ELEMENT 110 or 220 VOLT

HEATING CARTRIDGE



110 or 220 VOLT VERSIONS

HEAT FLUX ADJUSTABLE

Tw Set

HEATING DRIVE UNIT

INLET 8/10 MM

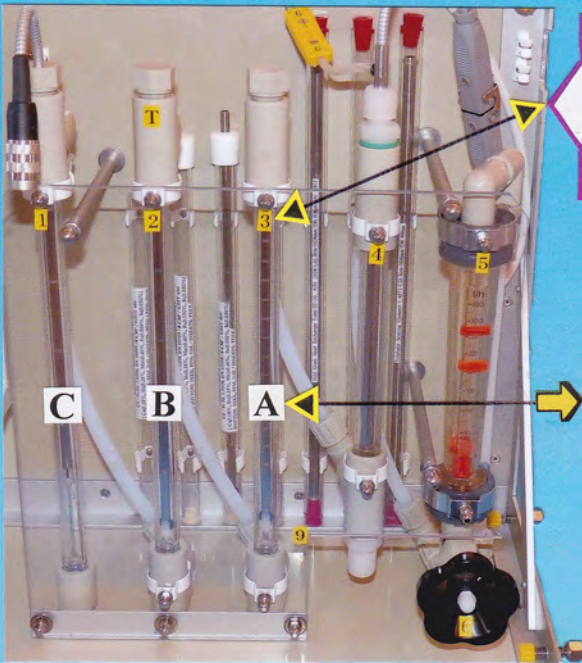
OUTLET 8/10 MM

ITEM#605.LP

LP MULTIPLE MONITORING SYSTEM

Heating element fits perfectly in the middle of the tube. Surface under heat exchange: 25 cm²

ITEM#685 HEAT EXCHANGE FOULING TUBES available in CS or SS



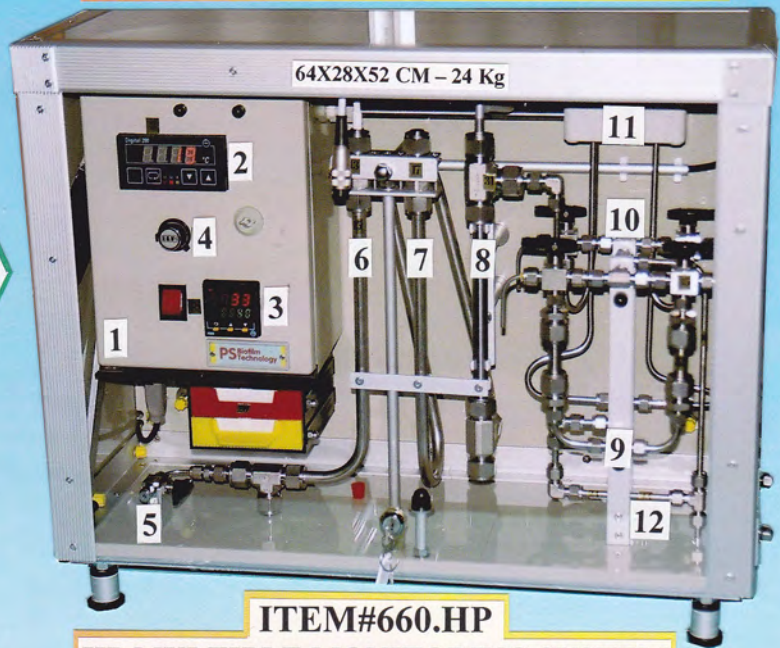
- 1 – ELECTROCHEMICAL CORROSION FLOW UNIT
- 2 – GRAVIMETRIC CORROSION FLOW UNIT
- 3 – BIOFILM FLOW UNIT
- 4 – HEAT EXCHANGE FOULING MODULE
- 5 – FLOW CONTROL (ADJUSTMENT + MEASUREMENT)

SENSORS FOR MULTIPLE MONITORING SYSTEMS

- A – ITEM#640 – LP or HP BIOFILM ARRAY 14 CS COUPONS 2 CM²
 - B – ITEM#645 – LP or HP GRAV. CORR. ARRAY 4 CS COUPONS 8 CM²
 - C – ITEM#131 – LP or HP LPR PENCELL PROBE 3 CS ELEMENTS 8 CM²
- (See details in Pages 31+32+33)

HP MULTIPLE MONITORING SYSTEM

A complex combination of high pressure heat exchange fouling, biofilm, internal corrosion monitoring with heated capillaries and sand pack assemblies



ITEM#660.HP

HP MULTIPLE MONITORING SYSTEM

- 1 – HEATING DRIVE UNIT
- 2 – TEMPERATURE CONTROLLER FOR HEAT EXCHANGE ELEMENT
- 3 – TEMPERATURE CONTROLLER FOR CAPILLARY BOX
- 4 – POTI TO ADJUST HEAT FLUX
- 5 – CHEMICAL INJECTION POINT
- 6 – CORROSION FLOW UNIT
- 7 – BIOFILM FLOW UNIT
- 8 – HP HEAT EXCHANGE MODULE
- 9 – SAND PACK ASSEMBLY-2
- 10 – CAPILLARY ASSEMBLY-2
- 11 – HEATED BOX FOR CAPILLARIES
- 12 – FLOW CONTROLLING SECTION

Field research instrumentation to determine the most appropriate flow units to monitor the system – To control the efficiency of chemicals during field trials.
To screen water treating chemicals:

- Corrosion inhibitors
- Scale inhibitors
- Biocides

in most close field conditions.



ITEM#630.LP

LP SINGLE HEAT EXCHANGE FOULING MONITOR
Consist only of an electrically driven (1) heat exchange module (2), flow adjustment (3) and flow meter (4)