



ITEM A - HIGH PRESSURE MACHINE ECOPlus 100

The OMS EcoPlus series of high pressure metering units provides the ideal solution for every PU application. Reliability, ease of operation and attractive price-performance ratio are the key points of this new series of machine. Particular attention has been paid to the incorporation of up-to-date design and technology during the development of our EcoPlus:

	<ul style="list-style-type: none">* Reliability of all elements;* Reduced maintenance operations;* Easy access to all elements;* Compact overall dimensions;* No need for solvent or other head cleaning agents;* Simple, user friendly setting of machine and working parameters;* Reduction in materials consumption and elimination of contaminated waste;* Maximum flexibility
<p>The OMS design concept for the control system, adopted for this brand new series of high pressure machine, is based on Siemens S7 300 series PLC interfaced with an operator panel through which all machine variables and working parameters are set and displayed.</p> <p>The standard configuration for this series of high pressure machine is equipped with fixed output RHL axial rotary piston pumps driven by a three-phase electric motor with variable speed inverter allowing output variation without any manual intervention on the pumps. This solution also permits the chemical components to be kept in constant recirculation through the mixing head at a pre-set lower output avoiding sudden pressure peaks.</p>	

The installation of optional modulating nozzles will, in addition to providing automatic self-adjustment of pouring pressures, also permit the recycle of chemical components through the mixing head at a preset lower output, thus avoiding sudden pressure peaks.

Another characteristic of the EcoPlus is that the machine day tanks are of the pressurized type with jacket and low speed agitator to keep the chemical components thermoregulated and agitated without running the metering pumps resulting in energy savings, less wear, fewer maintenance operations and higher safety level.

Main characteristics of ECOPlus 100

Model	Ecoplus 100
Base Ratio	1:1 variable
Ratio adjustment	Variable through inverter
Output in l/min with RHL pumps fitted.	R 1:1 85-33
Iso Motor Speed –RPM	1450/500 variable by inverter
Pol Motor Speed –RPM	1450/500 variable by inverter
Iso Pump Capacity (RHL)	33 cc
Pol Pump Capacity (RHL)	33 cc
Working Pressure	120 – 180 bar depending on the raw materials
Min. Cycle Time	Time between end of pouring and start of next pouring 10 sec.
Minimum Time	Minimum pouring time 0.5 sec.
Metering Accuracy	1% for minimum 1 second pouring
Calibration	In head with suitable cycle
Tank Capacity	100l
Tank Working Pressure	4 bar. – PED tested
Manufacturing material	Carbon steel with external insulation in Armaflex
Temperature Conditioning	Jacketed component tanks with integral electrical resistance heaters and cooling water solenoid valves within the tank jacket
Hydraulic Motor Power	7.5 kW
Hydraulic Unit Output	16 l/min
Hydraulic Unit Tank Capacity	80 litre
Oil Accumulator Volume	6 litre
Working Pressure	200 bar
Logic Control	Siemens PLC S7 – 300
Operator panel	6” Touch screen
Installed Power Excluded Chiller & Optional Items	45 kW
Gross Weight (Kg)	900 -1100
Working Voltage	400VAC; 60 Hz; 3-phase + neutral + earth
Compressed Air	Pressure: dry industrial air at 6- 8 bar Duty: 200 NI/min duty
Working Temperature	+10°C - +35°C

Note: all output data assumes raw material viscosity between 50cps and 2000cps at 20°C.

This ECOPlus high pressure machine is composed of the following main elements:

1. **Polyol metering line**
 - 1.a Tank
 - 1.b Metering pump
2. **Isocyanate metering line**
 - 2.a Tank
 - 2.b Metering pump
3. **Hydraulic unit**
4. **Control panel**
5. **Framework**
6. **Mixing head**
7. **Assembly, commissioning and training**
8. **Optional Included In The Machine Supply**
9. **Optional**

1. POLYOL METERING LINE

1.a Tank

- * **100 Lt.** vertical jacketed cylindrical tank with removable lid pressurized according to **PED** (working pressure 4 bar), complete with Armaflex insulation;
- * heating by means of electric resistances inside the tank jacket and on/off solenoid valve for cooling by cold water;
- Remark:** Water compressor chiller is not included.
- * PT 100 probe for temperature control;
- * slow-speed agitator driven by a motor reducer;
- visual level;



- * pressurization system with dry air complete with pressure regulation valve and manometer (air dryer not included);
- * safety relief valve for maximum tank pressure;
- * outlet relief valve for dry air during filling;
- * connection piping to the metering pump;

1.b Metering Pump

- * No **1** fixed output axial piston pump equipped with safety pressure relief valve on the feed line with by-pass on the return line;
- * Pump horizontally mounted and coupled with a dedicated a.c. motor (one motor for each pump);
- * Pump output variation through motor speed variation with inverter controlled by PLC;



- * Double seal pump and relative lubricating circuit;
- * No **1** cartridge filter on the suction side of the pump;
- * Digital pressure gauge, double contact type, on delivery side of the metering pump to control the mixing pressure;
- * Digital pressure gauge, single contact type, to control minimum feeding pressure to the suction side of the metering pump;

2. ISOCYANATE METERING LINE

2.a Tank

- * **100 Lt.** vertical jacketed cylindrical tank with removable lid pressurized according to **PED** (working pressure 4 bar), complete with Armaflex insulation;
- * heating by means of electric resistances inside the tank jacket and on/off solenoid valve for cooling by cold water;
Remark: Water compressor chiller is not included.
- * PT 100 probe for temperature control;
- * slow-speed agitator driven by a motor reducer;
- * visual level;



- * pressurization system with dry air complete with pressure regulation valve and manometer;
- * safety relief valve for maximum tank pressure;
- * outlet relief valve for dry air during filling;
- * connection piping to the metering pump;

2.b Metering Pump

- * No **1** fixed output axial piston pump equipped with safety pressure relief valve on the feed line with by-pass on the return line;
- * Pump horizontally mounted and coupled with a dedicated a.c. motor (one motor for each pump);
- * Pump output variation through motor speed variation with inverter controlled by PLC;



- * Double seal pump and relative lubricating circuit;
- * No **1** cartridge filter on the suction side of the pump;
- * Digital pressure gauge, double contact type, on delivery side of the metering pump to control the mixing pressure;
- * Digital pressure gauge, single contact type, to control minimum feeding pressure to the suction side of the metering pump;

3. HYDRAULIC UNIT

- * No **1 7.5 kW** hydraulic unit for opening/closing of the cleaning and dispense pistons of the self-cleaning head, positioned on the machine frame and including:
 - * oil reservoir, 80 litre capacity;
 - * Hydraulic solenoid valves;
 - * Heat exchanger with thermostatic valve for cooling with central water refrigeration
 - * oil electric-distributors;
 - * hydraulic accumulator, 6 litre capacity;
 - * filter on the suction side of the pump;
 - * manometer to measure working pressure;
 - * pressure gauge with contact for switching off the hydraulic unit once the working pressure is reached;

4. CONTROL PANEL

The OMS design concept for the control system adopted for this brand new ECOPlus series of high pressure machine is innovative and is based on Siemens S7 300 series PLC for reliability and world wide service and parts availability. All machine variables and working parameters are set through a mono-chromatic touch screen operator panel functioning as an interface between the PLC and the operator.

The main difference relates to the control system; in fact, the machine is self-diagnostic and checks that all variables are within their pre-set working range.

Should a variable exceed pre-set limits, the machine itself will signal an alarm status by triggering a clear text message and, at the same time, all the necessary interventions (depending on the type of alarm) to ensure safe working conditions.

All data will be displayed and a working page can be retained during the working process should the operator decide so.

Main Functions

- * Timers: set and display the status of the machine handling and controlling timers;
- * Meters: set and display the status of the machine handling and controlling meters;
- * Cycle mode selection: Working - Iso calibration - Polyol calibration - High pressure recycle
- * Pouring mode selection: Time mode - Start/Stop from external unit (optional);
- * Head cleaning mode selection: ON/OFF (in case of nozzle extension provided with air cleaning);
- * Head lubricating mode selection: ON/OFF;
- * Set up of automatic loading levels (optional);
- * Set up of either of PID temperature control point values on working temperature;

Remark

The control panel also handles a series of settings, depending on the optional equipment fitted.

Commands

All machine variables and working parameters are set directly on the mixing head display through the mono-chromatic touch screen panel. The particular arrangement of this panel allows the operator to carry out all operations without leaving the working site.

In case of two mixing heads, the panel will be positioned on the main control panel.

The following commands are handled:

- * Start pouring button;
- * Selection and display of the pouring program through touch screen (in case of two mixing head will be through a selector on each mixing head);
- * Emergency stop button;
- * Auxiliary start button;
- * Main switch;
- * Start temperature conditioning of the components – agitator will automatically start (through touch screen);
- * Start metering pumps (through touch screen);
- * Start tanks loading (through touch screen);
- * Switch off warning alarm (through touch screen);
- * Working cycle selection (through touch screen);
- * Alarm reset (through touch screen).

MAIN FUNCTIONS AND DISPLAY

All machine variables and working parameter settings are displayed on the touch screen operator panel.

All working pages are retrieved by suitable commands or in automatic mode (i.e.: in case of alarm or malfunction warning).

- * General data settings;
- * 19 standard working programs (in case of two mixing heads: 12 working programs);
- * Automatic loading level parameters (optional);
- * Component thermoregulation parameters;
- * Pouring data display (if machine with IOV);
- * Alarm readout;
- * Alarm record readout and maintenance warning message;
- * Programmable maintenance warning message readout.



No 4 levels of password protection are provided:

- a) No limit except for the pre-set range fixed by the manufacturer;
- b) Working parameters changeable by the operator through a first level password;
- c) Working parameters changeable by the head of production through a second level password;
- d) Working parameters changeable by the manufacturer only.

ALARMS

Full control and operation of all machine functions is by a PLC which, in case of anomalies, gives an acoustic warning with a clear text message display identifying the related problem and possible solution.

All functions controlled by the PLC are constantly monitored through pre-set minimum and maximum alarm set point values.

- * Iso minimum level *;
- * Pol minimum level *;
- * Iso maximum level *;
- * Pol maximum level *;
- * Thermal overload on agitators;
- * Iso minimum temperature;
- * Iso maximum temperature;
- * Pol minimum temperature;
- * Pol maximum temperature;
- * Iso maximum recycle pressure;
- * Pol maximum recycle pressure;
- * Iso minimum recycle pressure;
- * Pol minimum recycle pressure;
- * Thermal overload on pump motors;
- * PLC battery alarm;
- * Head does not open;
- * Head does not close;
- * Plunger does not open;
- * Plunger does not close;
- * Thermal overload on hydraulic unit motor;
- * Iso minimum pouring pressure;
- * Iso maximum pouring pressure;
- * Pol minimum pouring pressure;

- * Pol maximum pouring pressure;
- * Problem on Pol loading circuit;
- * Problem on Iso loading circuit;

() These alarms are related to the utilisation of some optional items.*

PROGRAMMED MAINTENANCE OPERATION MESSAGE

The system automatically controls the status of the machine by signalling appropriate maintenance operations. On the basis of the number of working hours or working cycles completed by the machine, there will be an acoustic and text alarm message which will identify the element to be serviced.

Some maintenance operations can be re-set through a second level password only, bringing back to normal the status of maintenance and preventing the stop of production.

Below is an example of some text messages handled by the ECOPlus series of high pressure machine:

- * Discharge condensed air out of the compressor;
- * Check pump seal and lubrication unit;
- * Carry out component calibration and fill in related card;
- * Check water level of the chiller unit;
- * Check condition of tanks and clean them if needed;
- * Check condition of pipes and hoses;
- * Check air filter;
- * Check filters fitted on the component lines;
- * Accurate cleaning of the mixing head;
- * Replace mixing head seals;
- * Clean motor and chiller cooling fans;
- * Check security of wiring connection;
- * Clean electric control panels and related junction boxes;
- * Call for programmed maintenance

OVER NIGHT CYCLE

When enabled, this cycle maintains the materials at the right temperature and moving through the machine piping circuit.

It is possible to select the following functions:

- tank temperature control
- material recycle up to the flow valve (if fitted)
- material recycle up to the mixing head

All functions will have a dedicated timer in order to be able to control for how long the function must be performed.

5. FRAMEWORK

This brand new series of high pressure machine has a compact framework design which simplifies access to all elements needing service and minimises maintenance operations. The compact design of this machine allows easy fork-lift truck transportation.

The frame includes no 2 separate drip trays to collect any leakage from the metering lines; tanks, filters, pumps and pressure relief valves. Everything possible is assembled above the drip trays.

6. MIXING HEAD TYPE Y2K

No 1 self cleaning, L type broomy-flow mixing head type ECOMIX Y2K



This head is equipped with a separation system on all the surfaces in contact with oil and PU (in order to avoid any contamination). In case of mains power failure the hydraulic system will only shut the mixing piston in order both to avoid erroneous working sequences and damages to the components lines.



- * The head is supply with:
- * Proximity (one for each plunger)
- * Nozzles
- * Oil electric distributor
- * **Horizontal positioning**
- * **No 1 standard boom, length about 1.9m**, to support the mixing head and allow a working radius of 120° and a vertical movement of 500mm. The supply of the standard boom positioned on board of machine includes the supply of relevant flexible connecting hoses

7. ASSEMBLING, COMMISSIONING AND TRAINING

No 1 technician for 5 working days (trip time included) days with the help of 2 mechanicals and 1 electrical from costumer.

All expenses for travel, board and lodging are at IMPIANTI OMS charge.

8. OPTIONAL INCLUDED IN THE MACHINE SUPPLY

- Automatic loading levels with minimum, loading and max level for each tank
- Automatic loading valve for loading from customer raw material storage
- Nr. 2 pneumatic piston pumps from drum
- Data collection on SD card

9. **OPTIONAL ITEMS FOR THE MACHINE**

Chiller group type "5", 15000 frig/h	Yes
IOV system complete of N.2 volumetric flow meter in order to control the real output and reading of the same on the machine control panel.	Yes
N.2 Magnetic Joints on both metering pumps (polyol and isocyanate)	Yes
Nr. 2 Additional Heat exchangers on the return line	Yes
Nr. 2 tanks with 250 lt. capacity instead of 100lt.	Yes