



Intelligent Energy Control System (I.E.C.S)

The Natgraph Intelligent Energy Control System (I.E.C.S) is a new, unique and revolutionary control system that can be ordered as a power saving option on new Natgraph Air Force Dryers. This dramatically reduces the use of electrical power when drying by convection with heated air.

Tests conducted with a varied selection of Natgraphs customers, proved that in normal operation a conveyorised dryer will only be actually drying printed substrates for between 45 and 65% of its operational time. This information prompted Natgraph to develop a control system that will automatically switch the complete dryer into a stand-by state with minimal power usage, whilst maintaining a controlled internal environment ready to re-start production on-demand.

The I.E.C.S uses a substrate sensor, or signal from the print machine to automatically control the dryer's run-condition. When no substrate is detected for a pre-set period, (for example 90 seconds), the dryer is put into stand-by state, this activates the following power saving machine settings:

Stand-by State Process:

- Conveyor belt stops
- Thermal shutters close
- Motorised exhaust dampers close
- Recirculation fan slows down to minimum speed
- Infra-Red lamp power reduced to stand-by level
- Air heating elements set to minimum
- Cooler module switched off

The dryer will be held in this stand-by state until the next substrate is detected or an advance signal is received from the print machine. The insulated construction of the dryer ensures that there is minimal thermal loss of energy, with the exhaust damper fully closed as well as the fan operation reduced to the minimum, the dryer will hold its process temperature for long periods.

The power consumed in stand-by mode of a typical industrial specification Natgraph Air Force Dryer is only 15 – 20% of normal production energy usage. So the energy savings achieved by the I.E.C.S. is actually 40 - 45% of normal hourly power consumption, (dryer processing substrate for 50% of the working period) when compared to a standard Natgraph dryer and even more in the case of older Natgraph units or other makes of dryer.

The construction of the dryer ensures it can recover to its process settings swiftly, the control system automatically opens the thermal shutters and re-starts the belt to process the next printed substrates for drying once the next signal is received.

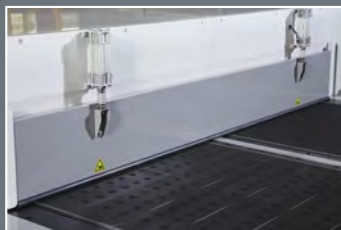
The following table shows power saving figures achieved in field trials in different industries, the return on investment period is approximately 1 – 2 years:

Industry	Ave. hourly kW use	kWh cost £*	Annual costs **	Time in production	I.E.C.S. reduction ***
Credit & Security Card	47.79	0.0975	£8,946	52%	£3,435
Textile Transfer	66.24	0.0975	£12,400	55%	£4,464
Membrane Switch & Graphic Overlay	54.33	0.0975	£10,171	48%	£4,231
Finishing (Latex scratch off)	46.74	0.0975	£8,750	66%	£2,380
Electronics	67.29	0.0975	£12,597	51%	£4,938

* Typical UK Tariff ** Calculated with a 40 hour week and 48 week year = 1,920 hours per year. ***Calculated with a 15% power use when in stand-by state.

I.E.C.S. Features

- Energy saving of 40 – 45% of 'normal' power consumption
- Fully automatic system, no operator input needed
- PLC screen indicates stand-by state/normal usage times
- System energized by substrate sensor or print machine signal
- Pneumatically operated, thermal shutters
- Motorized exhaust damper



Thermal Shutter



Motorised Damper



Twin belt option



PLC with light stand

Heat Exchangers

The Natgraph manufactured range of Heat Exchangers have been developed to lower the operating costs of drying screenprinted products by re-using the wasted energy normally extracted to atmosphere. These units have an aluminium (up to 250°C) or stainless steel (250°C+) core that transfers heat from the exhaust (contaminated) air to the intake (clean) air, that can then be taken back into the dryer to lower its operating costs.

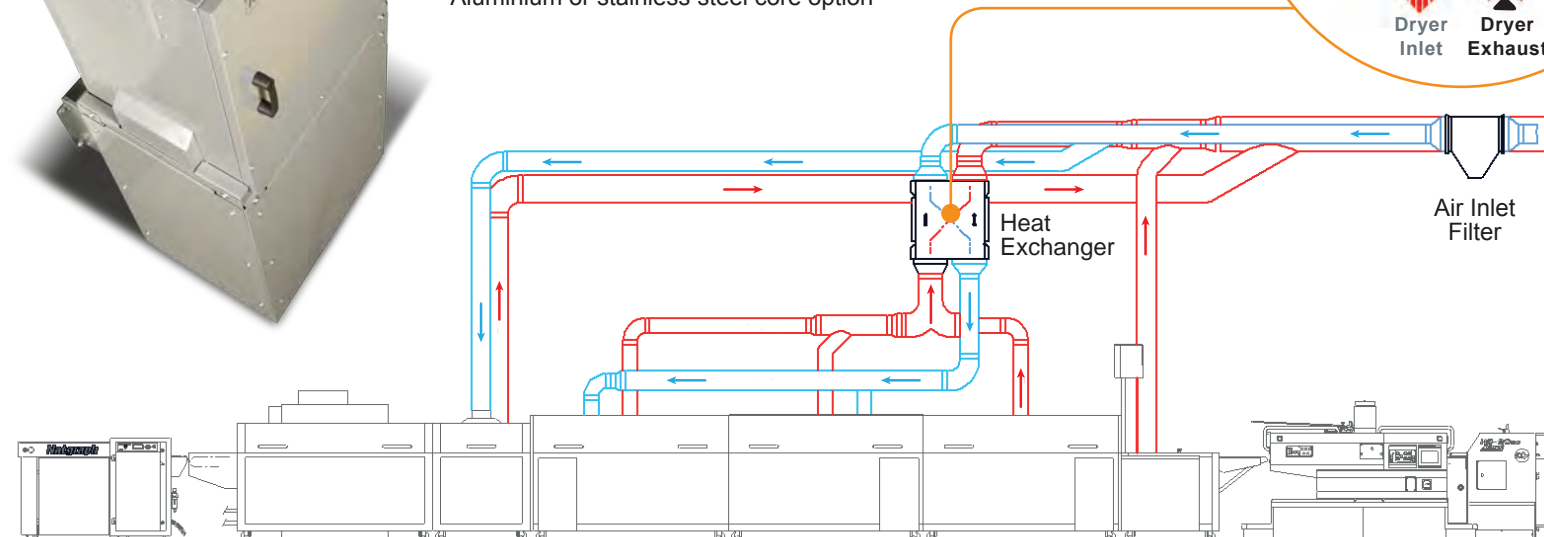
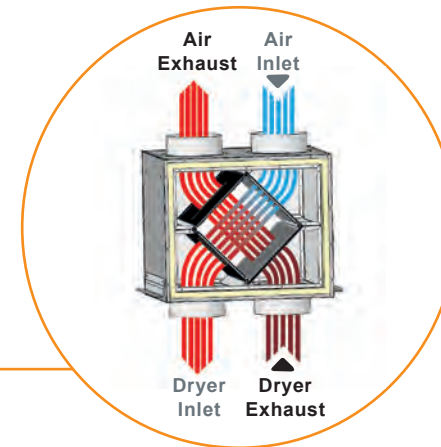
Each and every Natgraph Air Force Dryer in which hazardous solvents are processed complies with the EN 1539:2009 European Safety Standard and so is designed to continually extract a minimum percentage of the recirculated air to atmosphere, this is to ensure that the solvent concentration within the dryer cannot rise above the allowed LEL (Lower Explosive Limit). Therefore approximately 75% of the running cost of a forced air dryer is wasted energy in the form of heat, extracted from the dryer.

The energy recovery level of a Natgraph Heat Exchanger can be as high as 60% from these normally wasted, hot exhaust gases and so by the correct installation of these units (available in three sizes depending upon the dryer specification), the operating costs of a Natgraph Air Force Dryer can typically be reduced by up to 25%.

Available in 3 versions, as a free-standing unit (connected directly behind the dryer), stand mounted (above the dryer), or in-ducting mounted, these units are fully insulated with a large access door which allows the core to be withdrawn for cleaning or replacement if needed.

Heat Exchanger Features:

- Recovery of up to 60% of normally wasted energy
- Fully insulated enclosure
- Full sized access door for core removal
- Available in 3 sizes, (depending upon air volumes)
- Free-standing, stand mounted, or in-ducting versions
- Aluminium or stainless steel core option



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brochures at:
www.natgraph.co.uk

t +44 (0) 115 97 95 800
f +44 (0) 115 97 95 700
e info@natgraph.co.uk

Natgraph Ltd,
Dabell Avenue,
Blenheim Industrial Estate,
Nottingham, NG6 8WA, UK