



# PROTON PROTHERMIC™ HIGH FREQUENCY WIRE INDUCTION PREHEATERS



## INTRODUCTION:

proTHERMIC™, the Trade Mark from PROTON for a comprehensive range of High Frequency Induction Wire Preheaters featuring the latest advances in the field of High Frequency Solid State Technology.

## WIRE PREHEATING:

For almost all wire extrusion processes, wire preheating is an essential operation, to achieve elimination of wire moisture, to avoid cold wire shrinkage of the insulation, to stop plastic cracking due to cold wire bending, to improve the stripping characteristics, to avoid spark faults, etc...

For chemical or physical foaming extrusion, wire preheating assures a constant coaxial capacitance of the Insulation.

## OPERATIONAL PRINCIPLE:

proTHERMIC™ High Frequency Induction Preheaters are powered by an internal Solid State PWM High Frequency Inverter that converts the three phase mains input to a single phase load.

Power is transferred to the wire via a transformer integrated into the Preheater case through which the wire passes; in effect the wire becomes a shorted secondary transformer turn causing power to be dissipated in it.

proTHERMIC™ Preheaters are controlled by the NEXIS™ Controller which, in addition to controlling the voltage and current to obtain the desired wire temperature also chooses the optimum frequency for the wire size being processed and so maximises the power transfer efficiency.

The NEXIS™ Controller is Menu driven and provides a very simple and ergonomic man-machine interface.

PLC communications are provided, including profibus.

## BENEFITS:

- High Frequency Induction Heating
- Advanced Control Technology
- High energy efficiency
- Consistent Conductor Temperature
- Precision Pulley and Bearing Assembly
- Hardened Pulley Surface for Long Life
- Wire Break Detection facility
- Fully Menu driven Operation
- State of the Art Digital Communications
- Safety door (with electrical interlock fitted for EU Countries)



# DESCRIPTION PROTHERMIC™ INDUCTION PREHEATERS



## CONSTRUCTION:

All proTHERMIC™ Preheaters are of robust construction finished in a powder coat paint . High quality materials are used including extensive use of stainless steel to eliminate power losses within the machine frame.

## LOW LOSS, LOW FRICTION PULLEYS:

Fitted with low-loss, low-friction pulleys. Due to the low mass of the shorting rim, the thermal losses at low speeds are minimised. Bearings and hubs are greased for life and do not require any maintenance.

## STANDARD SAFETY DOOR:

To avoid operator contact with rotating pulleys, a transparent safety door, with key-lock, is fitted as standard. For the European Union, an electrical operated door lock is fitted ,this is a requirement from the latest Machine Directive to Comply with EN 60204, EN 55081 and IEC 801

## SOLID STATE HIGH FREQUENCY POWER UNIT:

The unique three to single phase Solid State Inverter is specifically designed for this application. The advantage is that the induction frequency is optimised at all times and that the wire is evenly heated. The Inverter is using a switching scheme that eliminates power loss and electrical interference, also, line inductors are used to equalise phase input currents, improve form factor and to avoid distortion of the mains supply. The three-phase supply does not require a neutral line.

## PROTON NEXIS™ CONTROLLER:

All Models share the same user friendly, menu-driven, NEXIS™ controller. A graphical TFT display clearly shows the parameters such as conductor material and preheat temperature that need to be set by the operator and also many diagnostic functions.

Furthermore the controller contains a product library.

When calculating the heating power, the NEXIS™ Controller takes into consideration the conductor material characteristics, resistance change with rising temperature, load power factor, pulley losses and the line speed to maximise the preheating temperature

## INTEGRATION INTO PLC CONTROLLED EXTRUSION LINES:

All Models provide the same Interface for integrating the Preheater into conventional line control systems.

Optionally, they can be fitted with profiBUS Communication

## CE CONFORMITY:

All Models are designed to the latest CE Requirements and EMC Directive.





**PREHEATER MODELS PH160 , PH300 and PH450**



**Model PH300-20-400RC  
High Speed Ceramic Pulley Preheater**



## SPECIFICATIONS : PH160 , PH300 and PH450 Standard Models

Model	PH160-12-400	PH160-20-400	PH300-12-400	PH300-20-400	PH300-25-400	PH450-20-400	PH450-25-400
Pulley Size	2 x 160 mm	2 x 160 mm	2 x 300 mm	2 x 300 mm	2 x 300 mm	2 x 450 mm	2 x 450 mm
Max. Power	12 KVA	20 KVA	12 KVA	20 KVA	25 KVA	20 KVA	25 KVA
Wire size solid	0.2 – 1.8 mm	0.2 – 1.8 mm	0.5 – 3.5 mm	0.5 – 3.5 mm	0.5 – 3.5 mm	1 – 5 mm	1 – 5 mm
Stranded	up to 4 mm <sup>2</sup>	up to 4 mm <sup>2</sup>	up to 10 mm <sup>2</sup>	up to 10 mm <sup>2</sup>	up to 10 mm <sup>2</sup>	up to 25 mm <sup>2</sup>	up to 25 mm <sup>2</sup>
W/D/H (in mm)	380x550 x1500	380x550x1500	620x504x1575	620x504x1575	620x504x1575	1236x567x1500	1236x567x1500
Weight	260 Kilo	280 Kilo	330 Kilo	350 Kilo	350 Kilo	480 Kilo	480 Kilo

### PREHEATER PERFORMANCE:

Conductor size, conductor material (resistivity), preheating temperature and speed are all interrelated. Therefore the speed/temperature that can be achieved for any given wire size depends on the available power output of the Preheater (12, 20 or 25 KVA).

We provide detailed performance graphs for each Preheater, please contact us.

To make your Preheater evaluation, please provide us with:

- Conductor material and conductor type (Cu, Al, etc.../solid, stranded, flexible)
- Minimum and maximum wire size in mm or mm<sup>2</sup>
- Required extrusion speed with minimum and maximum wire size.
- Typical required preheating temperature

### COMMON SPECIFICATIONS: ALL MODELS:

Wire Types:	Copper, Aluminium, Copperclad, Steel and Alloys
Induction Frequency:	max. 1.5 KHz
Maximum Temperature:	250°C
Wire Line Height:	980 - 1020mm
Mains Supply:	3 x 380 – 460Vac (without Neutral), 50/60Hz
Environmental Protection:	IP53
Environmental Temperature:	5 – 45°C
Controller:	<b>NEXIS™</b> Universal Controller with 120 x 85 mm Backlit TFT Screen and Membrane Navigation pad fully Menu Driven Operation, incl. product library



### STANDARD INTERFACING FOR PLC: ALL MODELS

RS232 communication:	Full Serial Data Communication
Analogue Input:	Preset Temperature: 0 – 10Vdc = 0 – 250 °C
Electrical lock Safety door:	+ 24Vdc Input to release Lock (fitted standard to EU market models only)
Start Input:	Contact or logic input
Stop Input:	Contact or logic input
Run Output:	Contact Closure
Emergency Switch:	Output = Relay Contact / Input = 24 Vdc
Bus Systems standard:	CANBUS
Bus System <u>option</u> :	profibus

[www.protonproducts.com](http://www.protonproducts.com)

#### HEAD OFFICE

**Proton Products International Ltd.**  
10 Aylesbury End, Beaconsfield,  
Buckinghamshire, HP9 1LW,  
ENGLAND

[info@protonproducts.com](mailto:info@protonproducts.com)

#### EUROPE

**Proton Products Europe N.V.**  
Nieuwbaan 81  
B-1785 Merchtem, BELGIUM.  
Tel +32 (0) 52 466 311  
Fax: +32 (0) 52 466 313

[europe.sales@protonproducts.com](mailto:europe.sales@protonproducts.com)

#### ASIA

**Proton Products Chengdu Ltd**  
126 East 2nd section, 1st Ring Rd.  
Chengdu, 610051, P.R. CHINA.  
Tel +86 288 439 3112,  
Fax +86 288 437 0880

[sales@protonproducts.com](mailto:sales@protonproducts.com)