

## IPCU (Integrated Pressure Control Unit)

- Continuous pressure measurement
- Furnace Pressure Control
- Reliable Design
- Ultra-low maintenance
- Hands-off operation
- Tailor-made fit

### A furnace pressure control which really works

**Integrated Pressure Control Unit | MPOT®- IPCU:** There's a classic phrase coined by Peter Drucker, "You can't manage what you don't measure." Nothing could be more true in the arena of profitable aluminum casting. If you operate reverb melters, are you continuously measuring the furnace's pressure? Some melters operate with a constant negative furnace pressure of 0.15" WC or worse. This is a huge amount of waste, in fuel, productivity, margin, and emissions... literally going up the stack. Others measure but struggle with a non-ideal control valve or mechanism. Our solution is simple:

Manage furnace pressure with one moving part! Bring your furnace into the 21st century with our IPCU, the simplest, lowest maintenance, most reliable pressure control unit on the market. Our revolutionary design uses a circular refractory sleeve to create a circumferential air blade, controlling the draft from the melter using our 360-degree air knife, by raising and lowering the sleeve as the furnace pressure changes. **NO DAMPER, period!** Note: The fixed bottom sleeve is engineered with a limiting orifice specific to a melter effluent volume. Our IPCU manages furnace pressure by modulating the upper sleeve up and down, depending on the measured pressure. Key here is the use of ambient air, not a damper, to manage the pressure in the melter. Air, not a refractory casting, holds back the furnace pressure. When furnace pressure drops below setpoint, our IPCU lowers the upper sleeve to maintain setpoint pressure. False air is the culprit behind negative pressure and destroys melt efficiency, wastes fuel, creates unnecessary CO<sub>2</sub>, and lowers productivity. Since ambient air suppresses the furnace's effluent, the refractory last years, not months.





Our IPCU includes a fixed limiting orifice lower section, a sliding upper sleeve, a fixed top hat with limiting orifice, all refractory lined, a 3-phase electrical motor, and a worm drive actuator. In addition, our IPCU comes with a local Manual/Auto control enclosure for maintenance and experimentation, located close to the unit. A negative pressure warrants lowering of the upper sleeve to a position that approaches a furnace pressure just above neutral, e.g., 0.01-0.05" WC. A well-sealed furnace is expected to have near neutral pressure, but as the furnace ages, voids in the refractory, charge doors, seals, etc., allow ambient air to ingress into the combustion zone, which results in throwing money up the flue with the additional fuel needed to combust the false air! Our IPCU is engineered, built like a tank, dependable, and may require maintenance after years, not months. Our worm drive gearing provides dependable movement of the upper sleeve. Our control algorithm manages the instantaneous dP signals from the furnace's pressure transducer, to allow smooth sleeve action, while dampening signal noise. Our system includes a Siemens Sitrans P pressure transducer, which measures and translates the signal to the desired output (" WC or mBar), a ceramic measurement probe, and has free contacts for additional IO, such as Door Open, E-Stop, etc. The pressure transducer is to be located in close proximity to the dP probe.



**Tailor Made fit:** Our team of senior engineers with decades of experience in aluminum refining commercialize solutions. Invite us to model your melter(s) and offer a solution, complete with a cost/benefit analysis. Our IPCU can be retrofitted on an existing melter or on a new melter, with air-fuel or oxy-fuel combustion. No furnace is too small or too large for our IPCU.

**Cost Savings:** Have you ever considered the true cost of false air in any of your melters? The table below estimates the economic impact negative furnace pressure can cost an aluminum refining operation: additional fuel, slower production, and creation of unnecessary CO<sub>2</sub>. Our IPCU is a tool you can use to move the needle on your year-end bottom line as well as carbon management. "If you are not watching your pennies, you may not have dollars to count at the end of the year."

Based on 12 mmBtu at \$7.50/mmBtu

Loss Production Value			Neg. Pres. Equiv. (% impact) (lbs/mth) (kg/mth) \$/mth
1" Gap	4" Gap	10" Gap	
1%	2%	10%	
-50,000	-100,000	-500,000	
-22'679	-45'359	-226'796	
-\$6,750	-\$13,500	\$67,500	

Loss Fuel Value			Neg. Pres. Equiv. (% loss) (scf/mth) (Nm <sup>3</sup> /h)* \$/mth Loss
1" Gap	4" Gap	10" Gap	
2%	4%	18%	
-175,104	-350,208	-1,575,936	
-281'041	-562'083	-2'529'377	
-\$1,313	-\$2,627	-\$11,820	

\*based on Nm<sup>3</sup>/h or scf per month

Benefit Potential with Furnace Pressure Control			Relative Air Ingress \$/ mth gained \$/ yr gained
Small	Medim	Large	
\$8,063	\$16,127	\$79,320	
\$96,759	\$193,519	\$951,843	



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