

Utility Systems Technologies (UST) has recently installed the first of the next generation Current Balancer Units (CBU) for a 125HP pump application in southern Texas.

The Current Balancer is designed for 3-phase motor applications where the power source is supplying unbalanced current, causing excessive motor heating, and potentially premature motor failure. Using its high speed electronic tap switching design technology, UST has developed this product to precisely adjust the voltage which in turn will balance each of the three phase currents to less than 3%. “A 1% phase-to-phase unbalance with incoming voltage will create a 6-10% current unbalance” says Dr. Robert Degeneff, President of Utility Systems Technologies. “The CBU monitors phase-to-phase voltage and automatically makes adjustments to insure balanced voltage and current exists on the motor circuit, and therefore promotes longer motor life, lower energy consumption, and operation within the motor manufacturer's recommended specification”. Ideal applications for this product include submersible pumps typically used by municipalities supplying water in rural areas. UST will manufacture this product in sizes from 5kVA to 250kVA or larger if needed. Standard enclosure will be a NEMA-3R, suitable for outdoor installations.

UST is a manufacturer of electronic voltage regulators and power quality devices that are designed to improve and condition power quality for industrial & critical applications where reliable power quality is essential. The company's products are marketed and sold throughout the world into several industries such as automotive, medical, oil & gas, food & beverage, and power generation. Other applications include government facilities, defense applications, and renewable energy. As a veteran owned business, UST has established a global presence with product in over 30 countries serving international markets from it's manufacturing facility located in in Watervliet, New York.



# Current Balancer



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# UST Current Balancing Unit (CBU)

UST Model #:

Application				
Power Rating/Size (kVA)	Up to 250kVA (larger sizes available upon request)			
Phase - Frequency (Hz)	3 phase	60Hz or 50Hz		
Voltage (L-L)	480V (typical), any industry standard 3-phase voltage available.			
Connections	Input: Wye (3W+N+G) or Delta (3W+G). Output: Delta (3W+G)			
Cable Entry	Side, Rear lower			
Regulation/Operating Characteristics				
Input Voltage Range	Nominal +/-10% with 5% or less phase to phase voltage unbalance			
Output Current Balance	3% phase to phase, or less (Typical) for the specified input voltage range			
Current Balance vs. Load	Current balancing is the same across the load and power factor range			
Overload / Inrush Capability	1000% - 1 second, 500% - 5 seconds, 200% - 1 min. ; 1000% fault clearing			
Minimum Load	Current balance requires minimum 10% load. Unit will run any load from 0% to 100% rated.			
Load Power Factor	No minimum or part load or load power factor limitations, compatible with all load types			
Tap Switching	No load current interruption or waveform distortion on switching at any load or power factor			
Zero Crossing Sensitivity	Tap switching not dependent on determining load current zero crossing			
Harmonic Distortion	No distortion added at any load or power factor			
Balance Correction Time	Less than 5 seconds typical (manual adjustment provided)			
Efficiency	99% typical			
Operating Frequency	±3% of nominal frequency			
Noise Suppression/Load Protection				
Surge Suppression	Included, complies with ANSI/IEEE C62.41, UL 1449			
Failsafe Electronic Bypass	Auto-actuation on high temperature, over-current, component failure with no loss of load			
Construction				
Technology	Electronically-controlled tap switching series transformer design			
Switching Semiconductors	Non-full power semiconductors – individual SCRs are not required to carry full unit current			
Controls	Microprocessor-based control			
Cooling	NEMA-3R (outdoor) with thermostatically controlled fan/s.			
Transformer	Copper wound, meets ANSI specs			
Enclosure	NEMA 3R, Outdoor (std. Enclosure 36"W x 22"D x 57" H, up to 125kVA, larger sizes available)			
Backlit LCD Display	Displays tap position and correction by phase			
Power Monitor / Meter	Available as option for voltage & current display			
Environmental Requirements				
Temperature - Humidity	Ambient 32 to 104°F (0 to 40°C) – Relative humidity 0-95% non-condensing			
Audible Sound Level	Meets or exceeds NEMA standards			
Operating Altitude	0 to 10,000 ft (3000m)			
Weights & Dimensions	Weight	Height ( inches)	Width ( inches)	Depth ( inches)



05/01/13

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# Minimize 3-Phase Submersible Motor Replacements

## **Power Problems**

The expense and downtime required to replace a submersible motor are issues most well owners would truly like to avoid. Unfortunately, many submersible motor applications are in remote locations where unbalanced power significantly reduces the life of these motors. These power problems create unbalanced current, a leading cause of premature submersible motor failures.

The major contributor to unbalanced current is unequal incoming phase-to-phase voltage. A 1% phase-to-phase unbalance in the incoming voltage creates a 6 to 10% current unbalance. This current unbalance causes severe overheating of the motor windings which significantly shortens motor life. Operating at 10°C above the motor winding design temperature shortens the motor life expectancy by 50%, and 20°C shortens that life by 75%.

## **Extending Submersible Motor Life**

Historically, the only way to deal with high current unbalance was not to run the motor or to run the motor, knowing that it will overheat, vibrate and its life will be measurably reduced. However, in many applications, not running a pump (motor) is simply an unacceptable alternative.

Now, there is a way to run a submersible motor and protect it from the harmful overheating and vibration caused by current unbalance: the Current Balancing Unit (CBU) from UST. The CBU automatically and continuously provides balanced current to keep motors operating within the OEMs recommendations.

## **Continuous Protection**

The CBU monitors the phase-to-phase currents to the motor and automatically adjusts them in less than 1 second to minimize current unbalance to 3% or less.

It accommodates wide fluctuations in nominal incoming voltages, so that even if the voltage

from the utility is shifting up or down, the current stays balanced.

Since the CBU is installed on the incoming line, it works with any type of motor, motor starter, controller or other protective devices. The CBU has no minimum load, overload or power factor limitations and comes in all standard sizes for submersible motors.

## **Easy Installation and Rugged Design**

With an all solid state design, the CBU has no moving parts to wear out and no scheduled maintenance. All balancing functions of the CBU calibrate and operate automatically. Operation is so simple there are no controls to adjust or instruments to read.

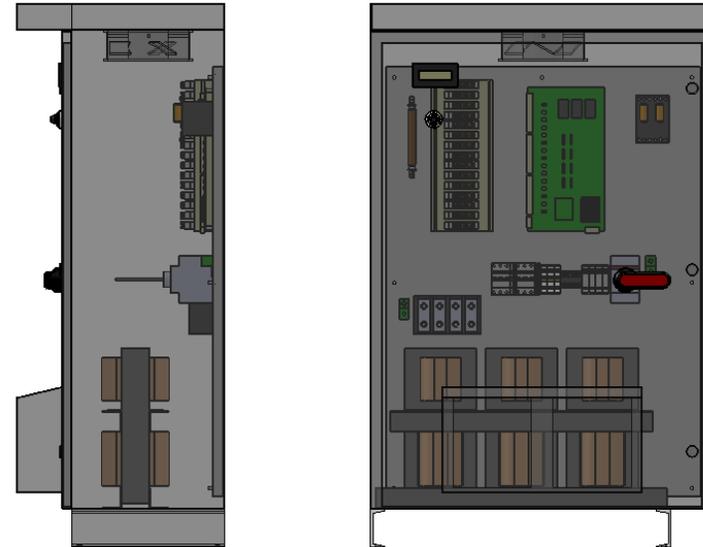
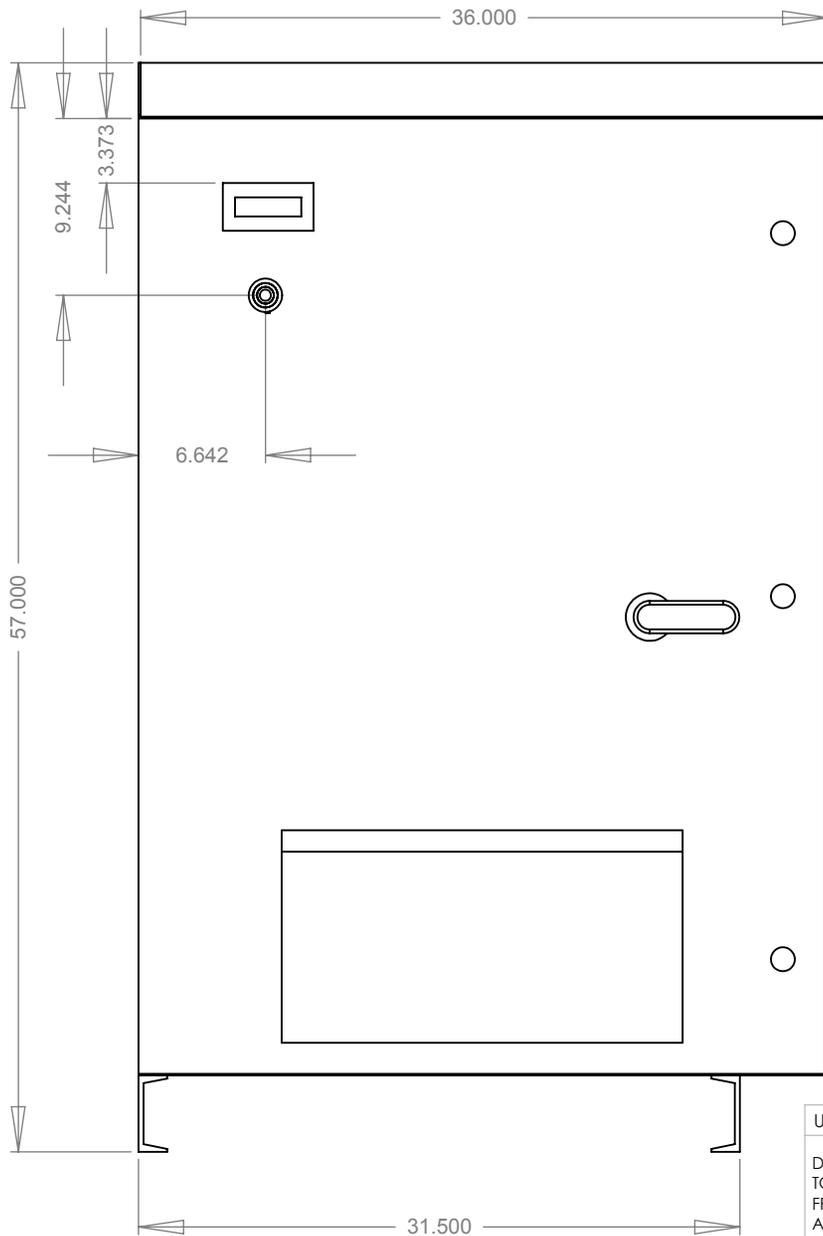
Sizing the CBU is also simple requiring just the motor horsepower and voltage.

And, installation is only a matter of wiring the CBU in line with the submersible motor. There is no measuring, switch setting, adjustment, programming or assembly; just drop it in place, wire it up and it is ready to go.

## **Save Money and Improve Efficiency**

Extending the life of a submersible motor by minimizing current unbalance, the CBU can save tens of thousands of dollars for each replacement avoided. For critical applications, the CBU can also provide peace of mind that a motor is protected from unexpected overheating failures.

With a 99% efficiency, the CBU is easy on the energy bill, and because balanced current improves motor efficiency – the CBU can even save energy, depending on the particular application.

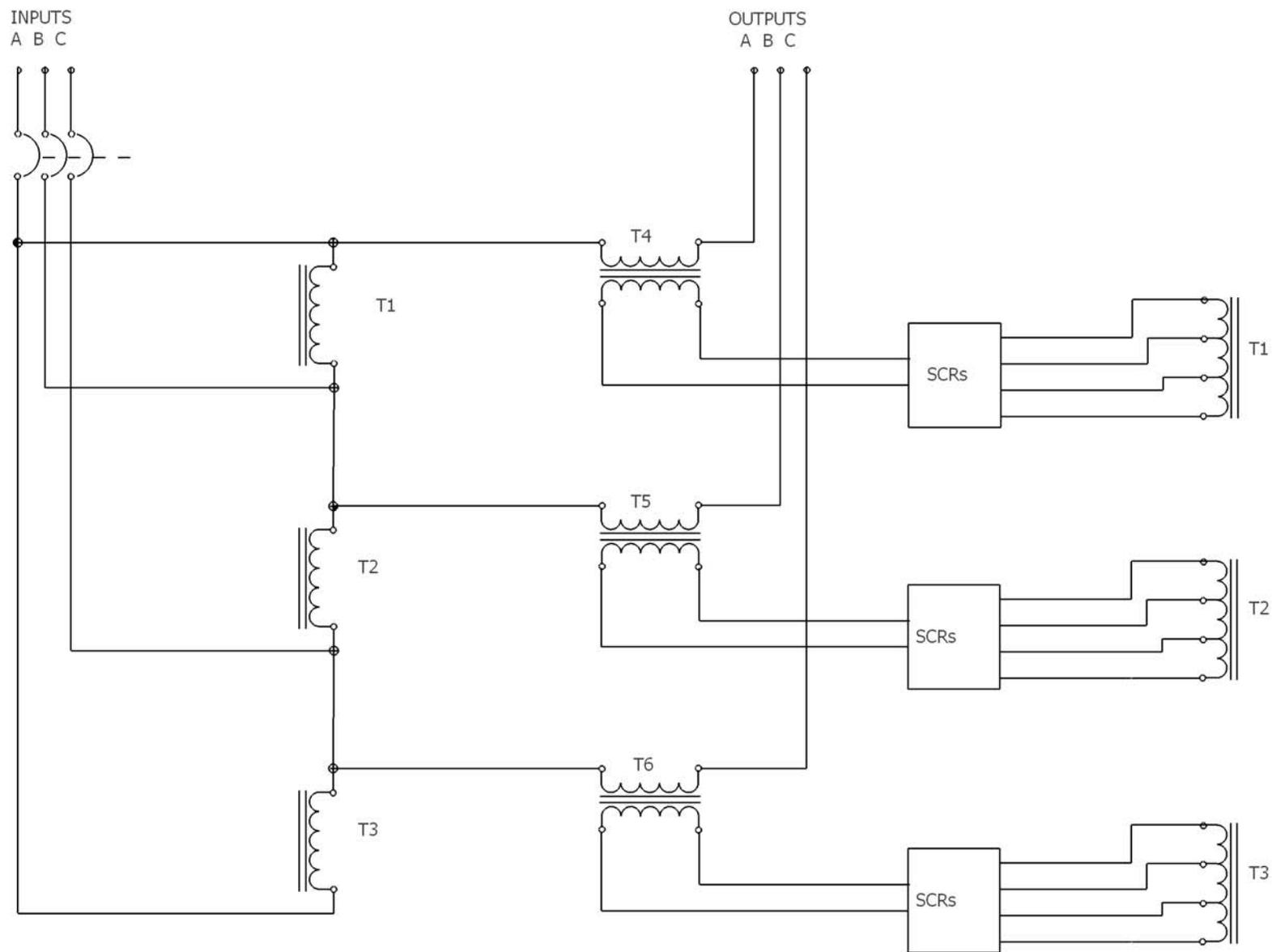


Overall Dimensions: 57"H x 36"W x 22"D

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DIMENSIONS ARE IN INCHES		DRAWN			
TOLERANCES:		CHECKED		TITLE:	
FRACTIONAL ±		ENG APPR.		Current Balancer	
ANGULAR: MACH ± BEND ±		MFG APPR.		Enclosure Layout	
TWO PLACE DECIMAL ±		Q.A.		SIZE	DWG. NO.
THREE PLACE DECIMAL ±		COMMENTS:		<b>A</b>	ERS20130314-5
INTERPRET GEOMETRIC TOLERANCING PER:				SCALE: 1:20	SHEET 1 OF 1
MATERIAL					
FINISH					
DO NOT SCALE DRAWING					



UST CURRENT BALANCER SCHEMATIC DIAGRAM		
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