



NEUTON[™]

CONTROLLED CHILLED BEAM
PUMP MODULE

WHERE AND HOW TO SELL



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WHY NEUTON™

NEUTON™ is a controlled chilled beam pump module that lowers project first cost, improves the operational performance of an active chilled beam system and provides active condensation control.

The system uses a high efficiency, variable speed pump that requires a fraction of the energy used by traditional pump loops.

NEUTON™ is designed to be a Plug-and-Play Control System which optimizes water temperature for each zone served with conventional chilled/hot water temperatures. As importantly, it provides an integrated control system with zone monitoring and feedback on par with state of the art VAV control systems familiar to engineers yet previously not available for active chilled beam systems.

HOW NEUTON™ WORKS

NEUTON™, using conventional chilled/hot water temperatures, runs in a cooling or heating mode.

In the cooling mode, the chilled water control valve slowly injects chilled water from the primary loop as recirculated secondary beam loop water is discharged through the check-valve into the primary chilled water return loop.

The hot water control valve is in the full bypass position and the corresponding check valve is closed.

Conventional chilled water temperatures (i.e. 42°F) can be utilized within a single primary loop to serve both the chilled beam zones and the dedicated outdoor air system.

In the heating mode, the hot water control valve slowly ejects a metered amount of recirculated secondary beam loop water while the corresponding check-valve allows for injection of water from the hot water supply loop.

The chilled water control valve is in the full bypass position and the corresponding check valve is closed.

Conventional hot water temperatures (i.e. 120°F) can be utilized within a single primary loop to serve both the chilled beam zones and the dedicated outdoor air system.

In both heating and cooling modes, the zone pump, beam water temperature sensor, control valves, associated electrical and controls are all monitored to keep the beam pipe temperature a few degrees above the measured dew point in the room via the supplied zone controller, eliminating the concern of condensation in cooling mode or stratification in heating mode.

FEATURES AND BENEFITS OF NEUTON™

- State-of-the art active condensation control system effectively eliminates chilled beam condensation.
- Reduce the cost of a chilled beam installation by 30% and more – NEUTON™ allows for smaller pipe diameters, fittings and feet of pipe.
- Cuts the amount of zone piping and fittings in half
- Allows beam zones to be served with conventional chilled/hot water temperatures – no more need for building-level secondary loops for the beams.
- Simplifies installation, controls and commissioning of a beam system
- Increases beam cooling and heating output – NEUTON™ allows all coils passes to be used for both cooling and heating
- Eliminate frustration and cost of customized controls development and installation
- Improved indoor air quality – excellent outdoor air delivery
- Cuts beam loop pump energy by up to 90% - high efficiency, variable speed pump uses a fraction of the energy used by traditional pump loops
- Improved response to occupied/unoccupied and low load conditions – novel control sequences vary water flow and/or temperature to the beams, as needed, to accommodate changes in zone load conditions
- Very high energy efficiency
- Very low primary airflow requirements
- Low noise levels
- Reduced filter maintenance – central location not room by room
- Ideal air distribution
- Ideal humidity control
- Eliminates condensate management problems

SELLING NEUTON™

It is important for SEMCO to be the basis of design for the system that the customer is designing to achieve the sale of any system. SEMCO can assist the engineer in the development of the schedule and the specification of the equipment.

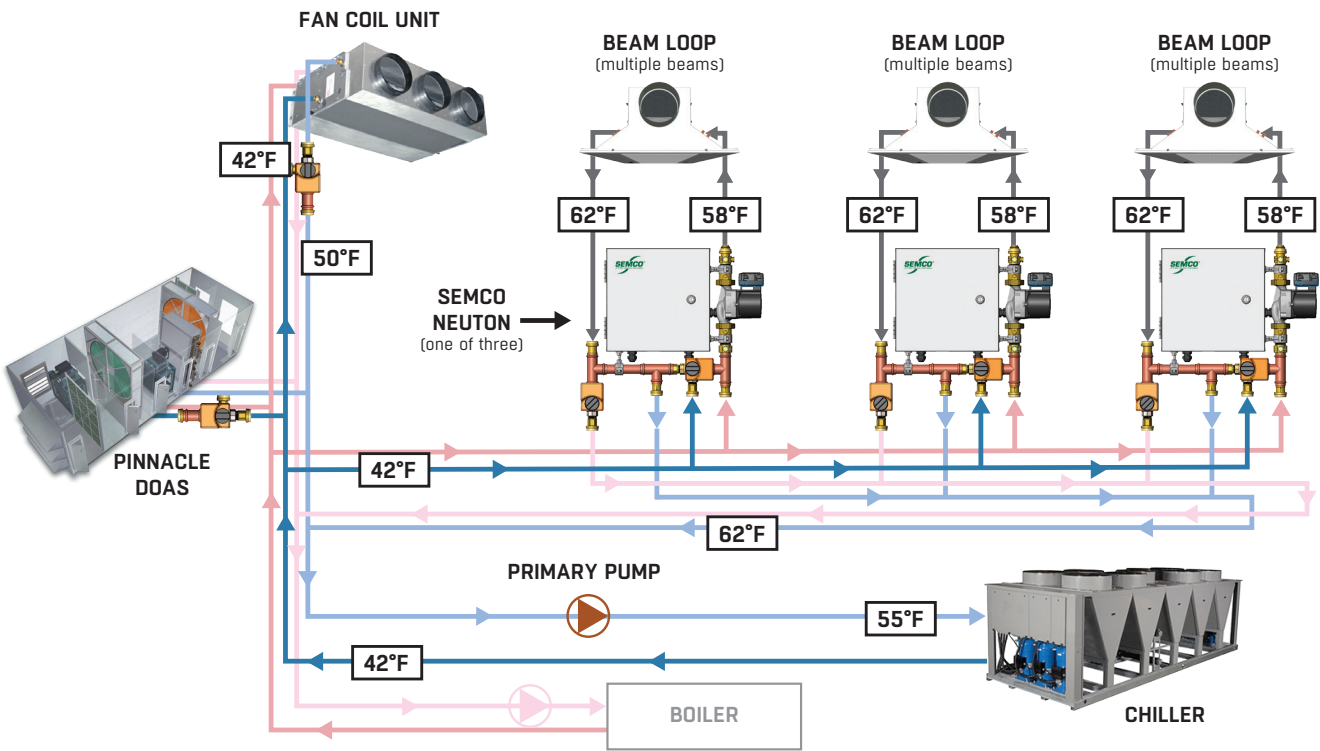
NEUTON™ is a patented product. As a result, there is often a concern regarding competitive bidding for proprietary products. Taco has a product marketed as LOFlo which utilizes two pumps in series to provided zone control for chilled beams. This product does not contain the integrated controls so this would have to be provided by the controls contractor at a great expense. This provides an alternate supplier that will likely have a much higher installed cost.

With our years of experience working directly with the engineer, we understand the project requirements better than an outsider. By working closely with the engineer, we won't become victims of "insider knowledge" if the

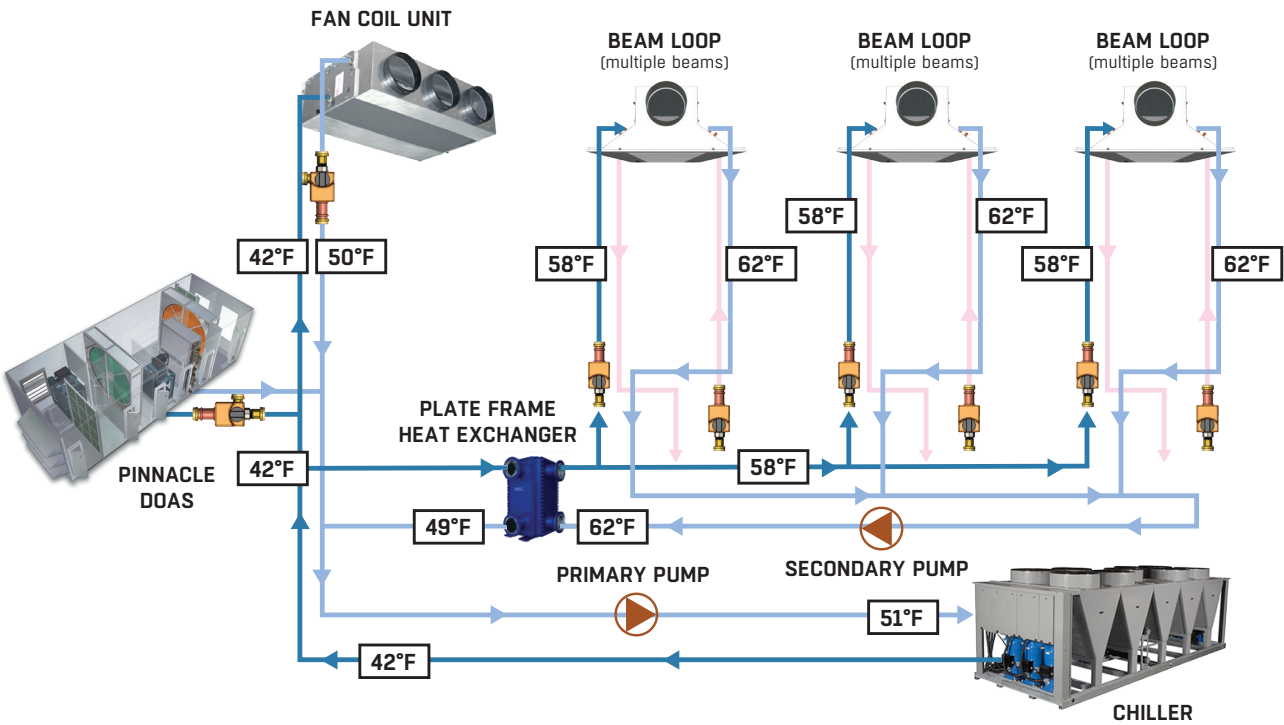
specification or schedule is not comprehensive.

By working directly with the engineer, we can provide features that are impossible or difficult for our competitors to match, for instance:

- 1) Selection and design of the system
- 2) Overall System design (3fficiency)
 - a. NEUTON™
 - b. Pinnacle
 - c. Chilled beams
- 3) Overall energy savings
- 4) Synergy of all key components to ensure that the proper ventilation, cooling/heating capacity and internal latent load are all provided to resulting in an effective active chilled beam project.



NEUTON™ 4-PIPE SYSTEM RUNNING IN COOLING MODE



TRADITIONAL SYSTEM IN COOLING MODE

THINGS TO CONSIDER DURING THE SALE

Traditional Beam Designs Require:	NEUTON™ Beam Designs Require:
Two primary loops are required for both cooling and heating to accommodate the DOAS and beams, requiring second chiller and boiler, plate frame heat exchangers or other modifications	A single primary loop with all devices is served by the same traditional chilled and hot water temperatures (beam water temperature set by NEUTON™).
Increased pipe size required for beam loop due to moderate chilled and hot water temperatures required by the beams	Primary pipe size (cost) remains small since no change to the chilled or hot water temperatures is required (same temperature to beam zones as DOAS).
Four pipe beam coils, with some coil passes allocated for cooling and others for heating	Two pipe beam coils, with all passes allocated for cooling and heating, results in more heating and cooling capacity (higher performance)
Piping at each zone needs to accommodate four piping runs – heating and cooling supply and return lines, valves and couplings	Only a single supply and return piping run in each zone since two pipe coils are used (half that required by conventional approach)
In each zone contractor needs to install two control valves, condensation sensors, run power to all devices then communicate with space thermostat or BAS signals	Contractor only needs to install the NEUTON™ and connect the smart sensor and power to the unit. All valves, DDC controller, electrical and software are factory installed and tested.
Design engineer needs to develop a custom control algorithm then communicate this to the BAS subcontractor then debug	No controls programming is needed. The optimized algorithms complete with BACnet® communications capabilities are standard with each NEUTON™.

NEUTON™ installation is a fraction of the installed cost associated with traditional chilled beam systems while providing advanced controls and substantial energy savings.

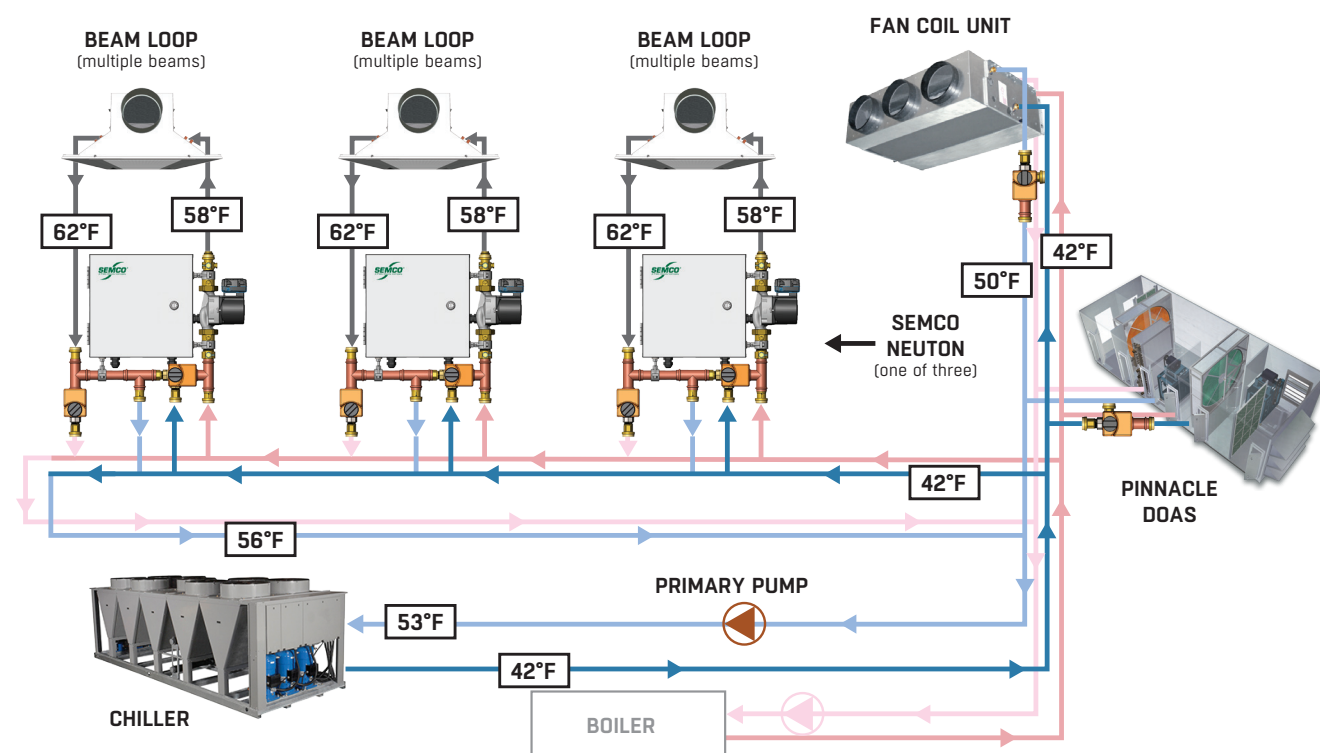
		Traditional (4 Pipe System)	NEUTON™ (4 pipe system)	NEUTON™ (2 pipe system)
Flow Required	Cooling Loop	112 GPM	35 GPM	67 GPM
	Heating Loop	31 GPM	6.5 GPM	14 GPM
Pump Power	Cooling Loop	1.1 HP	.2 HP	.6 HP
	Heating Loop	.2 HP	.04 HP	.06 HP
Pipe Diameter	Cooling Loop	3"	2"	2"
	Heating Loop	2"	1"	1.25"
Estimated Installation Cost	Cooling Loop	\$30,400	\$16,600	\$8,300
	Heating Loop	\$16,600	\$7,240	\$2,150
	Secondary Loop ⁽¹⁾ Hot and Cold	\$18,000	\$0	\$0
	Total Installation Cost	\$65,000	\$23,840	\$10,450

Note 1: Estimated cost associated with creating a separate secondary water loop to serve the chilled beams (cooling and heating). This would include plate frame heat exchanger, piping, valves and installation.

NEUTON™ Chilled Beam Designs Require: 2 Pipe Approach

The Two Pipe approach includes all of the advantages associated with the NEUTON™ 4 pipe approach plus:

- Primary distribution pipe lengths that are approximately half of the traditional approach since the chilled/hot water is pulled from then injected back into the same distribution pipe (the variable chilled/hot water temperatures that result can be accommodated by the NEUTON™)
- Approximately 65% of the installed cost associated with traditional chilled beam systems while providing advanced controls and substantial energy savings



NEUTON™ CHILLED BEAM PIPING LAYOUT: 2 PIPE APPROACH

NEUTON™ Serving Multiple Zones: Individual Offices

- One NEUTON™ can be utilized to serve multiple individual offices with similar load profiles
- One NEUTON™ is used to create a separate zone loop to feed multiple small zones (offices)
- Smart zone sensor installed in office with greatest latent load or, if all zones are equal, the return air plenum
- Each zone contains a thermostat and conventional two way valve (on off)
- At least one office must use a 3 way valve with the proper Cv such that when all valves are closed, approximately 25% of the of the design flow is returned back to the NEUTON™

WHAT WE NEED TO KNOW TO HELP SPECIFY NEUTON™

- | | |
|-------------------------------------|---|
| 1) Application | 5) Total number of separate zones |
| 2) Hot water supply condition | 6) Zone sensible and latent loads in spaces |
| 3) Cold water supply condition | 7) Estimate of internal piping losses associated with zone piping |
| 4) Preferred Communication Protocol | |

KEY MARKETS FOR NEUTON™ AND WHY THEY NEED NEUTON™

- 1) LEED Chilled Beam Projects where the highest energy efficiency is desired – When designed in conjunction with the entire system from the HVAC unit, fans, etc, the overall design can be optimized to create substantial savings.
- 2) Schools, offices, laboratories, etc. – These applications are the largest users of Chilled Beams. Especially during new construction, NEUTON™ can help reduce first costs of the system and also provide long term energy savings.
- 3) Renovations. NEUTON™ allows existing distribution piping accommodating traditional hot and cold water temperatures to be reused.
- 4) Projects where installing active chilled beams at the lowest cost is desired

COMMISSIONING

It is always required that we sell a commissioning trip, but if possible it is highly beneficial to sell a start-up as well. Start-up involves unit checkout: Do all sensors report correctly? Have shipped loose sensors been installed correctly? Can the controller correctly modulate all peripheral equipment (valves, duct pressure, etc.)? Often, at the time of start-up the building or physical plant is not quite ready so it is impossible to test the unit. Normally the owner and commissioning agent are not present so a return trip is needed.

The commissioning trip is a good time to meet the owner and facility manager, explain how NEUTON™ works and provide information about maintenance. Sales presence along with our service tech can be beneficial for all. Sales representatives cannot perform this task alone.

Be sure that before commissioning trip takes place, the customer should submit in writing a report to SEMCO indicating that everything is ready for commissioning.

AFTER SALE SUPPORT

To ensure that the client is satisfied it is crucial to provide after sale support. By doing so, we increase the likelihood of having a satisfied customer who will do business with us time and time again.

Contact the customer within 45 days of commissioning to address any questions or concerns and to elicit feedback from the customer.

Confirm that the customer has the NEUTON™ Owner's Manual and any other necessary documentation, understands the maintenance requirements, and knows how to contact the SEMCO service team should the need arise.

SEMCO SERVICE DEPARTMENT:

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EXCELLENCE IN SOLUTIONS

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FläktGroup SEMCO delivers smart and energy efficient Air Distribution and Air Quality solutions to support every application area. We offer our customers innovative technologies, high quality and outstanding performance supported by more than fifty years of accumulated industry experience. The widest product range in the market, and strong market presence in 65 countries worldwide, guarantee that we are always by your side, ready to deliver Excellence in Solutions.

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