

PART 1 – GENERAL

- 1.1 All PWM AC Variable Frequency Centrifugal Chiller Drives shall be equipped with AutoTranslineator harmonic mitigation equipment to prevent power system problems resulting from high levels of harmonic distortion.**
- .1 The AutoTranslineator and all of its components shall be manufactured and tested in accordance with the latest applicable standards of UL, CSA and NEMA.
 - .2 Demonstration of compatibility between the AutoTranslineator and the Centrifugal Chiller VFD must be available upon request.
 - .3 The AutoTranslineator shall be warranted to be free of defects in materials and workmanship for a period of 3 years from the date of shipment.
 - .4 Factory Performance Testing: Manufacturer must be capable of factory testing for AutoTranslineator performance and energy efficiency under actual variable frequency drive loads. A detailed description of the program and a sample test report must be provided at time of quotation.
 - .5 Subject to compliance with all of the contract documents and specifications, the acceptable product and manufacturer is: ATL™ AUHF, represented by ADM Engineering Ltd. (416) 259-0585, Toll Free: (877) 236-8337

PART 2 - PRODUCT

2.1 Key Requirements:

- .1 The AutoTranslineator shall treat all of the characteristic low frequency harmonics generated by a 3-phase, diode bridge rectifier load (5th, 7th, 11th, 13th, etc.).
- .2 The characteristic harmonics shall be suppressed without the need for individual tuning or the requirement to phase shift against other harmonic sources.
- .3 Harmonic mitigation shall be by passive inductor/capacitor network. Active electronic components shall not be used.
- .4 Power factor shall be .98 lagging to .95 leading in operating range from full to half load.
- .5 To ensure compatibility with engine generators, the AutoTranslineator must never introduce a capacitive reactive power (KVAR), which is greater than 15% of its kVA rating.
- .6 The AutoTranslineator shall not resonate with system impedances or attract harmonic currents from other harmonic sources.
- .7 The AutoTranslineator in combination with the Centrifugal Chiller Variable Frequency Drive shall meet all requirements as outlined in the 1992 edition of IEEE std 519 for individual and total harmonic voltage and current distortion. The Point of Common Coupling (PCC) for all voltage and current harmonic calculations and measurements shall be the input terminals to the harmonic mitigation equipment.
- .8 Total Harmonic Voltage Distortion (THVD) shall meet the requirements of Table 10.2 of IEEE std 519 by not exceeding 5% and by limiting the individual harmonic voltage distortion to less than 3%. These limits shall apply while operating on either utility supply or generator supply when applicable. The AutoTranslineator vendor shall not be responsible for pre-existing voltage distortion caused by other harmonic sources.
- .9 Total Demand Distortion (TDD) of the current at the input terminals of the AutoTranslineator shall not exceed the limits as defined in Table 10.3 of IEEE std 519. For I_{sc}/I_L ratio < 20, TDD must be less than 5%. For all other I_{sc}/I_L ratios, the TDD must not exceed 8% even when Table 10.3 allows for more relaxed limits.
- .10 The full load efficiency of the AutoTranslineator / Centrifugal Chiller VFD combination shall be greater than 95%. The AutoTranslineator itself shall have efficiency no less than 98%.

2.2 Basic Requirements:

- .1 All wiring shall be copper.
- .2 Insulation class: 220°C system. Temperature rise: 130°C
- .3 Anti-vibration pads shall be used between the reactor or transformer core and the enclosure.
- .4 Ventilated, sprinkler proof NEMA-3R enclosure.
- .5 The AutoTranslineator must be capable of stepping voltage up or down as required by the installation

2.3 Options:

- .1 Submit for approval before shipment certified production test results with serial numbers for harmonic mitigation performance and energy efficiency under actual variable frequency drive loading.

PART 3 - EXECUTION

3.1 Installation

- .1 The AutoTranslineator shall be handled, stored and installed in accordance with the manufacturer's recommended installation practices as found in the installation, operation, and maintenance manual. Installation shall comply with all applicable codes.

3.2 Acceptance

- .1 [OPTION] Harmonic compliance shall be verified with onsite field measurements of both the voltage and current harmonic distortion at the input terminals of the harmonic mitigating equipment with and without the equipment operating. A recording type Fluke 41 or equivalent harmonics analyzer displaying individual and total harmonic currents and voltages must be utilized.