

2019 Variable Frequency Drive New Equipment & Construction

Instructions for completing the NE&C VARIABLE FREQUENCY DRIVE Incentive Worksheet

General Notes:

1. A vendor proposal is required for an Incentive. The Variable Frequency Drive (VFD) Installation Information, page 3 may also be required.
2. VFDs offer a method of significantly reducing the energy consumed by fans, centrifugal pumps, and other motor-driven machinery operated under varying loads. For VFD applications not covered here, use the Custom Incentive Application.
3. Systems must have varying load operations such as variable flow, temperature or pressure regulation. Fan and pump operations that would otherwise be regulated by on/off cycling are not eligible for VFD incentives. Systems with constant speed and variable load operations (such as conveyors) are not eligible for VFD incentives.
4. Check with your specific utility for any harmonics or power quality requirements.
5. If power factor correction capacitors are present, they could be adversely affected by the VFD. The customer's design engineer should address this issue.
6. Invoices are required for payment of Incentives.
7. The Incentive, in conjunction with all other sources of funding, cannot exceed the total project cost.

Eligibility Requirements:

1. Eligibility requirements can be found in the "Application Code" box in the back side of the Incentive form.
2. Fans / pumps motors must operate a minimum of 2,000 hours a year.
3. Applicants must demonstrate significant load diversity that will result in savings through motor speed variation
4. The VFD speed must be automatically controlled by differential pressure, flow, temperature or other method.
5. The Incentive offer is not valid unless signed and dated by the Utility Representative. The Customer accepts the Utilities Incentive offer and agrees to the Terms and Conditions of the Utility by signing in the pre-approval offer block.

2019 Variable Frequency Drive New Equipment & Construction VFD Installation Information Form

Check with your utility representative to determine if the attached VFD Installation Information Form needs to be completed and submitted.

Pre-Installation:

1. Review the Incentive eligibility requirements.
2. Review the proposed equipment specifications to confirm it meets the minimum efficiency requirements.
3. Provide to the utility representative the manufacturer's equipment specifications and confirm that it meets the minimum efficiency requirements:
 - a. Motor HP (size) horsepower
 - b. Fan or Pump ID identification (example: AC-2, air handler #2, chilled water pump #1)
 - c. Area Served - location (example: Atrium, Lobby, Cafeteria, 2nd floor offices)
 - d. Fan or Pump Application Code (Table 1 on the VFD worksheet)
 - e. Verify the fan is not a forward curve with inlet vanes type.
 - f. Annual Hours of Operation

If controlled HP falls between two listed HP values, interpolate to determine the maximum Incentive. Show your calculations.

| NE&C VFD INCENTIVE WORKSHEET | | | | | | | | |
|------------------------------|------------------|----------------------------------|-------------------------|--|--|---|--|--|
| Item | Motor HP | Fan or Pump ID | Area Served | Application Code ¹ | Control Parameters ² | Motor Efficiency | Annual Hours of Operation | Incentive ⁴ (\$) |
| <i>Ex.</i> | 10 | AC-2 | Atrium | SFA | DT | 91% | 5,400 | \$1,000 |
| | Motor name plate | Equipment identification or name | Location of pump or fan | Refer to table 1 on the Incentive Form | Refer to table 2 on the Incentive Form | Refer to Motor Manufacture's specifications | State Annual Hours (\geq 2,000 hours / year) | Refer to table 4 on the Incentive Form |

Post-Installation:

Utility Representative must verify that:

1. The equipment including the VFD, motor and line reactors has been installed and is operable.
2. The VFD equipment matches the Incentive application information. If the equipment has changed from what was approved for the initial Incentive offer, the substituted equipment/material specifications must be submitted and reviewed by the utility to verify compliance with technical requirements and approved before an Incentive is considered.
3. Verify that the prior control is disabled
 - a. inlet or outlet dampers are fully open or removed
 - b. inlet or outlet valves are fully open or removed, bypass loop valved off or removed
4. Observe operation of drive, motor, and driven equipment
5. If possible, observe variation in drive speed with changing operating conditions
6. The invoice or proof of payment has been submitted
7. The Utility Representative & Customer have signed & dated the post installation inspection block on the Incentive form.

2019 Variable Frequency Drive New Equipment & Construction VFD Installation Information Form

Equipment Information

Item ID reference number found in the Incentive worksheet table: _____
 Fan or Pump ID(s) _____ (Example: FW-1, Feedwater Pump #1; CW-1, Condenser Water Pump #1)
 VFD Application: _____ (Use list of applications from page one, or describe other)
 Building Type: _____ (Office, Hotel/Motel, Healthcare, Elementary/High School, College/University, Warehouse, Restaurant, Manufacturing, Other?)
 Type of area(s) served by fan(s) or pump(s): _____
 Equipment served by the fan (s) or pump (s): _____
 If fan, note type: _____ (centrifugal, forward curve, backward curve, axial, etc)
 Fan or Pump Nominal HP _____ (if multiple motors, list individual HP's) Nameplate motor efficiency(s) _____
 Fan or Pump Manufacturer: _____ Model: _____
 Full Load Design Conditions: Flow _____ (CFM, GPM) Pressure _____ (inches static, feet of water, PSI, other?)
 Existing Controls: _____ (discharge damper, inlet guide vanes, outlet control valve, bypass valve, etc.)
 Existing setpoint: _____ (inches static, feet of water, PSI, other ?)

Operating Hours

The fan or pump operates the following hours: (Example: 0600 to 1800)

| | |
|--------------------------|--------------------------|
| <u>Summer</u> | <u>Winter</u> |
| Weekdays _____ to _____ | Weekdays _____ to _____ |
| Saturdays _____ to _____ | Saturdays _____ to _____ |
| Sundays _____ to _____ | Sundays _____ to _____ |

Number of shifts per weekday: _____ Number of shifts per weekend day: _____

Motor Load

Option 1: (retrofit): Measured input power under full load: _____ kW, (true RMS power) _____ Power Factor _____

Option 2: (retrofit): Measured current and voltage under full load: _____ Amps _____ Volts

Load calculation = _____ volts X _____ amps X _____ PF = _____ kW

Option 3: (retrofit or new): Estimated Fan or Pump Load: _____ %, Estimated Power _____ kW

If estimating load, provide description, assumptions and formula used to calculate power: _____

Proposed Operations

The proposed VFD will be automatically controlled to maintain the following setpoints:

Flow _____ (CFM, GPM, other?) Pressure _____ (inches static, feet of water, PSI, other?)

Other ? (describe): _____

Estimated VFD speed in future operations

| % Load | Summer | | Winter | |
|---------------|-------------|-------------|-------------|-------------|
| | Week-day | Week-end | Week-day | Week-end |
| 90% to 100% | | | | |
| 80% to 90% | | | | |
| 60% to 80% | | | | |
| 20% to 60% | | | | |
| Off | | | | |
| Totals | 100% | 100% | 100% | 100% |