Legal Department

American Electric Power
1 Riverside Plaza
Columbus, OH 43215-2373
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March 19, 2013

Chairman Todd Snitchler
Ohio Power Siting Board
Public Utilities Commission of Ohio
180 East Broad Street
Columbus, OH 43215-3793

Yazen Alami
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Re: **In the Matter of PEA Lima, LLC. and Ohio Power Company for Approval of a Special Arrangement Agreement with a Mercantile Customer**)))) **Case No. 13-0551-EL-EEC**

Dear Chairman Snitchler,

Attached please find the Joint Application of Ohio Power Company (OPCo) and mercantile customer PEA Lima, LLC for approval of a Special Arrangement of the commitment of energy efficiency/peak demand reduction (EE/PDR) resources toward compliance with the statutory benchmarks for 2013.

Amended Substitute Senate Bill 221 sets forth in R.C. 4928.66 EE/PDR benchmarks that electric distribution utilities shall be required to meet or exceed. The statute allows utilities to include EE/PDR resources committed by mercantile customers for integration into the utilities programs to be counted toward compliance with a utility's EE/PDR benchmarks. The statute also enables the Commission to approve special arrangements for mercantile customers that commit EE/PDR resources to be counted toward compliance with EE/PDR benchmarks.

The Commission's Order in Case No. 10-834-EL-EEC, established a streamlined process to expedite review of these special arrangements by developing a sample application process for parties to follow for consideration of such programs implemented during the prior three calendar years. Attached is OPCo's version of that application and accompanying affidavit. Any confidential information referenced in the Joint Application has been provided to the Commission Staff for filing in Commission Docket 10-1799-EL-EEC, under a request for protective treatment. OPCo respectfully requests that the Commission treat the two cases as associated dockets.

Cordially,

/s/ Yazen Alami
Yazen Alami

Attachments

Ohio | Public Utilities Commission

Application to Commit Energy Efficiency/Peak Demand Reduction Programs (Mercantile Customers Only)

Case No.: 13-0551-**EL-EEC**

Mercantile Customer: PEA LIMA LLC

Electric Utility: Ohio Power

Program Title or Description: AEP Ohio Business Incentives for Energy Efficiency: Self Direct Program

Rule 4901:1-39-05(F), Ohio Administrative Code (O.A.C.), permits a mercantile customer to file, either individually or jointly with an electric utility, an application to commit the customer's existing demand reduction, demand response, and energy efficiency programs for integration with the electric utility's programs. The following application form is to be used by mercantile customers, either individually or jointly with their electric utility, to apply for commitment of such programs in accordance with the Commission's pilot program established in Case No. 10-834-EL-POR

Completed applications requesting the cash rebate reasonable arrangement option (Option 1) in lieu of an exemption from the electric utility's energy efficiency and demand reduction (EEDR) rider will be automatically approved on the sixty-first calendar day after filing, unless the Commission, or an attorney examiner, suspends or denies the application prior to that time. Completed applications requesting the exemption from the EEDR rider (Option 2) will also qualify for the 60-day automatic approval so long as the exemption period does not exceed 24 months. Rider exemptions for periods of more than 24 months will be reviewed by the Commission Staff and are only approved up the issuance of a Commission order.

Complete a separate application for each customer program. Projects undertaken by a customer as a single program at a single location or at various locations within the same service territory should be submitted together as a single program filing, when possible. Check all boxes that are applicable to your program. For each box checked, be sure to complete all subparts of the question, and provide all requested additional information. Submittal of incomplete applications may result in a suspension of the automatic approval process or denial of the application.

Any confidential or trade secret information may be submitted to Staff on disc or via email at ee-pdr@puc.state.oh.us.

Section 1: Company Information

Name: PEA LIMA LLC

Principal address: 2485 Houx Parkway, Lima, Oh 45804

Address of facility for which this energy efficiency program applies: 1451 E Hanthorn Rd, Lima, Oh 45804-3935

Name and telephone number for responses to questions:

Dean Reder, Pea Lima Llc, (507) 234-5028

Electricity use by the customer (check the box(es) that apply):

☒ The customer uses more than seven hundred thousand kilowatt hours per year at our facility. (Please attach documentation.)

See Confidential and Proprietary Attachment 4 – Calculation of Rider Exemption and UCT which provides the facility consumption for the last three years, benchmark kWh, and the last 12 months usage.

☐ The customer is part of a national account involving multiple facilities in one or more states. (Please attach documentation.) When checked, see Attachment 6 – Supporting Documentation for a listing of the customer's name and service addresses of other accounts in the AEP Ohio service territory.

Section 2: Application Information

A) The customer is filing this application (choose which applies):

☐ Individually, on our own.

☒ Jointly with our electric utility.

B) Our electric utility is: Ohio Power Company

The application to participate in the electric utility energy efficiency program is "Confidential and Proprietary Attachment 3 – Self Direct Program Project Completed Application."

C) The customer is offering to commit (choose which applies):

☐ Energy savings from our energy efficiency program. (Complete Sections 3, 5, 6, and 7.)

☐ Capacity savings from the customer's demand response/demand reduction program. (Complete Sections 4, 5, 6, and 7.)

☒ Both the energy savings and the demand reduction from the customer's energy efficiency program. (Complete all sections of the Application.)

Section 3: Energy Efficiency Programs

A) The customer's energy efficiency program involves (choose whichever applies):

☐ Early replacement of fully functioning equipment with new equipment. (Provide the date on which the customer replaced fully functioning equipment, and the date on which the customer would have replaced such equipment if it had not been replaced early. Please include a brief explanation for how the customer determined this future replacement date (or, if not known, please explain why this is not known)).

☐ Installation of new equipment to replace equipment that needed to be replaced. The customer installed new equipment on the following date(s):

☒ Installation of new equipment for new construction or facility expansion. The customer installed new equipment on the following date(s): 12/31/2010

☐ Behavioral or operational improvement.

B) Energy savings achieved/to be achieved by your energy efficiency program:

1) If you checked the box indicating that your project involves the early replacement of fully functioning equipment replaced with new equipment, then calculate the annual savings [(kWh used by the original equipment) – (kWh used by new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: kWh

2) If you checked the box indicating that you installed new equipment to replace equipment that needed to be replaced, then calculate the annual savings [(kWh used by less efficient new equipment) – (kWh used by the higher efficiency new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: kWh

Please describe the less efficient new equipment that you rejected in favor of the more efficient new equipment.

3) If you checked the box indicating that your project involves equipment for new construction or facility expansion, then calculate the annual savings [(kWh used by less efficient new equipment) – (kWh used by higher

efficiency new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Unit Quantity (watts) = Existing (watts x units) – Installed (watts x units)

kWh Reduction (Annual Savings) = Unit Quantity x (Deemed kWh/Unit)

Annual savings: 137,310 kWh

See Confidential and Proprietary Attachment 5 – Self Direct Program Project Calculation for annual energy savings calculations and 10-1599-EL-EEC for the work papers that provide all methodologies, protocols, and practices used in this application for prescriptive measures, as needed.

Please describe the less efficient new equipment that you rejected in favor of the more efficient new equipment.

The less efficient new equipment is the minimum required by Ohio State code or Federal Standard whichever is more stringent. For those measures where no code applies the baseline equipment is assumed to be the least efficient equipment available in the marketplace or standard practice, whichever results in the most conservative annual savings. Any information available describing the less efficient new equipment option is provided in 10-1599-EL-EEC for the work papers that provide all methodologies, protocols, and practices used in this application for prescriptive measures.

4) If you checked the box indicating that the project involves behavioral or operational improvements, provide a description of how the annual savings were determined.

Section 4: Demand Reduction/Demand Response Programs

A) The customer's program involves (check the one that applies)::

☒ Coincident peak-demand savings from the customer's energy efficiency program.

☐ Actual peak-demand reduction. (Attach a description and documentation of the peak-demand reduction.)

☐ Potential peak-demand reduction (choose which applies):

- Choose one or more of the following that applies:

  ☐ The customer's peak-demand reduction program meets the requirements to be counted as a capacity resource under a tariff of a regional transmission organization (RTO) approved by the Federal Energy Regulatory Commission.

  ☐ The customer's peak-demand reduction program meets the requirements to be counted as a capacity resource under a program that is equivalent to an RTO program, which has been approved by the Public Utilities Commission of Ohio.

B) On what date did the customer initiate its demand reduction program?

The coincident peak-demand savings are permanent installations that reduce demand through energy efficiency and were installed on the date specified in Section 3 A above.

C) What is the peak demand reduction achieved or capable of being achieved (show calculations through which this was determined):

Unit Quantity (watts) = Existing (watts x units) – Installed (watts x units)

KW Demand Reduction = Unit Quantity (watts) x (Deemed KW/Unit (watts))

49.2 kW

See Confidential and Proprietary Attachment 5 – Self Direct Program Project Calculation for peak demand reduction calculation, and 10-1599-EL-EEC for the work papers that provide all methodologies, protocols, and practices used in this application for prescriptive measures, as needed.

Section 5: Request for Cash Rebate Reasonable Arrangement (Option 1) or Exemption from Rider (Option 2)

Under this section, check the box that applies and fill in all blanks relating to that choice.

Note: If Option 2 is selected, the application will not qualify for the 60-day automatic approval. All applications, however, will be considered on a timely basis by the Commission.

A) The customer is applying for:

☒ Option 1: A cash rebate reasonable arrangement.

OR

☐ Option 2: An exemption from the cost recovery mechanism implemented by the electric utility.

OR

☐ Commitment payment

B) The value of the option that the customer is seeking is:

Option 1: A cash rebate reasonable arrangement, which is the lesser of (show both amounts):

☒ A cash rebate of $ 8,010.00. (Rebate shall not exceed 50% project cost. Attach documentation showing the methodology used to determine the cash rebate value and calculations showing how this payment amount was determined.)

See Confidential and Proprietary Attachment 5 – Self Direct Program Project Calculation for incentive calculations for this mercantile program.

Option 2: An exemption from payment of the electric utility's energy efficiency/peak demand reduction rider.

☐ An exemption from payment of the electric utility's energy efficiency/peak demand reduction rider for ____ months (not to exceed 24 months). (Attach calculations showing how this time period was determined.)

OR

☐ A commitment payment valued at no more than $_____. (Attach documentation and calculations showing how this payment amount was determined.)

OR

☐ Ongoing exemption from payment of the electric utility's energy efficiency/peak demand reduction rider for an initial period of 24 months because this program is part of an ongoing efficiency program that is practiced by our organization. (Attach documentation that establishes your organization's ongoing efficiency program. In order to continue the exemption beyond the initial 24 month period your organization will need to provide a future application establishing additional energy savings and the continuance of the organization's energy efficiency program.)

Section 6: Cost Effectiveness

The program is cost effective because it has a benefit/cost ratio greater than 1 using the (choose which applies):

☐ Total Resource Cost (TRC) Test. The calculated TRC value is: _____ (Continue to Subsection 1, then skip Subsection 2)

☒ Utility Cost Test (UCT) . The calculated UCT value is: 6.3 (Skip to Subsection 2.)

Subsection 1: TRC Test Used (please fill in all blanks).

The TRC value of the program is calculated by dividing the value of our avoided supply costs (generation capacity, energy, and any transmission or distribution) by the sum of our program overhead and installation costs and any incremental measure costs paid by either the customer or the electric utility.

The electric utility's avoided supply costs were _____.

Our program costs were _____.

The utility's incremental measure costs were _____.

Subsection 2: UCT Used (please fill in all blanks).

We calculated the UCT value of our program by dividing the value of our avoided supply costs (capacity and energy) by the costs to our electric utility (including administrative costs and incentives paid or rider exemption costs) to obtain our commitment.

Our avoided supply costs were $ 55,974.35

The utility's program costs were $ 823.86

The utility's incentive costs/rebate costs were $ 8,010.00.

Section 7: Additional Information

Please attach the following supporting documentation to this application:

- Narrative description of your program including, but not limited to, make, model, and year of any installed and replaced equipment.

  See Attachment 1 - Self Direct Project Overview and Commitment for a description of the project. See Attachment 6 – Supporting Documentation, for the specifications of the replacement equipment 10-1599-EL-EEC for the work papers that provide all methodologies, protocols, and practices used in this application for prescriptive measures, as needed. Due to the length of time since the equipment replacement, the make, model and year of the replaced equipment is not available.

- A copy of the formal declaration or agreement that commits your program to the electric utility, including:

  1) any confidentiality requirements associated with the agreement;

     See Attachment 2 – Self Direct Program Project Blank Application including Rules and Requirements. All confidentially requirements are pursuant to the Retrospective Projects/Rules and Requirements that are part of the signed application which is provided as Confidential and Proprietary Attachment 3 – Self Direct Program Project Completed Application.)

  2) a description of any consequences of noncompliance with the terms of the commitment;

     See Attachment 2 – Self Direct Program Project Blank Application including Rules and Requirements. All consequences of noncompliance are pursuant to the Retrospective Projects/Rules and Requirements that are part of the signed application which is provided as Confidential and Proprietary Attachment 3 – Self Direct Program Project Completed Application.

  3) a description of coordination requirements between the customer and the electric utility with regard to peak demand reduction;

     None required because the resources committed are permanent installations that reduce demand through increased efficiency during the Company's peak summer demand period generally defined as May through September and do not require specific coordination and communication to provide demand reduction capabilities to the Company.

4) permission by the customer to the electric utility and Commission staff and consultants to measure and verify energy savings and/or peak-demand reductions resulting from your program; and,

   See Attachment 2 – Self Direct Program Blank Application including Rules and Requirements granting such permission pursuant to the Retrospective Projects/Rules and Requirements that are part of the signed application which is provided as Confidential and Proprietary Attachment 3 – Self Direct Program Project Completed Application.

5) a commitment by you to provide an annual report on your energy savings and electric utility peak-demand reductions achieved.

   See Attachment 1 - Self Direct Project Overview and Commitment for the commitment to comply with any information and compliance reporting requirements imposed by rule or as part of the approval of this arrangement by the Public Utilities Commission of Ohio.

- A description of all methodologies, protocols, and practices used or proposed to be used in measuring and verifying program results. Additionally, identify and explain all deviations from any program measurement and verification guidelines that may be published by the Commission.

  The Company applies the same methodologies, protocols, and practices to Self Direct Program retrospective projects that are screened and submitted for approval as it does to prospective projects submitted through its Prescriptive and Custom Programs. The Commission has not published a technical reference manual for use by the Company so deviations can not be identified. The project submitted is a prescriptive project and energy savings are determined as described in Confidential and Proprietary Attachment 5 - Self Direct Program Project Calculation, and 10-1599-EL-EEC for the work papers that provide all methodologies, protocols, and practices used in this application for prescriptive measures, as needed.

Ohio | Public Utilities Commission

Application to Commit Energy Efficiency/Peak Demand Reduction Programs (Mercantile Customers Only)

Case No.: 13-0551-EL-EEC

State of Ohio :

Jou Ching Yong, Affiant, being duly sworn according to law, deposes and says that:

1. I am the duly authorized representative of:

   KEMA Services, Inc agent of Ohio Power

2. I have personally examined all the information contained in the foregoing application, including any exhibits and attachments. Based upon my examination and inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete.

Yu Jou Ching CEM, LEED AP BD+C
Signature of Affiant & Title

Sworn and subscribed before me this 13th day of March, 2013 Month/Year

Signature of official administering oath

Angie Doan, Notary
Print Name and Title

My commission expires on 1-13-2016

NOTARIAL SEAL STATE OF OHIO

Angie Doan
Notary Public, State of Ohio
My Commission Expires 01-13-2016

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Self Direct Project Overview & Commitment

The Public Utility Commission of Ohio (PUCO) will soon review your application for participation in AEP Ohio's Energy Efficiency/Peak Demand Response program. Based on your submitted project, please select by initialing one of the two options below, sign and fax to 877-607-0740.

Customer Name	**PEA LIMA LLC**	
Project Number	**AEP-12-07579**	
Customer Premise Address	**1451 E HANTHORN RD, LIMA, OH 45804-3935**	
Customer Mailing Address	**2485 Houx Parkway, Lima, OH 45804**	
Date Received	**8/14/2012**	
Project Installation Date	**12/31/2010**	
Annual kWh Reduction	**137,310**	
Total Project Cost	**$22,250.00**	
Unadjusted Energy Efficiency Credit (EEC) Calculation	**$10,680.00**	
Simple Payback (yrs)	**2.5**	
Utility Cost Test (UCT)	**6.3**	
		Please Choose One Option Below and Initial
Option 1 - Self Direct EEC: 75%	**$8,010.00**	☐ **Initial:**
Option 2 - EE/PDR Rider Exemption	**N/A Months (After PUCO Approval)**	☐ **Initial: N/A**

Note: *This is a one time selection. By selecting Option 1, the customer will receive payment in the amount stated above. Selection of Option 2: EE/PDR rider exemption, will result in the customer not being eligible to participate in any other energy efficiency programs offered by AEP Ohio during the period of exemption. In addition, the term of Option 2: EE/PDR rider exemption is subject to ongoing review for compliance and could be changed by the PUCO.*

If Option 1 has been selected, will the Energy Efficiency Funds selected help you move forward with other energy efficiency projects?

____YES ____NO

Project Overview:

The Self Direct (Prescriptive) project that the above has completed and applied is as follows.

Install VFD on various motors at the Tricanter Controls system. The motors include: (1) 1HP motor, (1) 2HP motor, (1) 20HP motor, (1) 10HP motor, (1) 20HP motor, and (1) 125HP motor

The documentation that was included with the application proved that the energy measures applied for were purchased and installed.

By signing this document, the Mercantile customer affirms its intention to commit and integrate the above listed energy efficiency resources into the utility's peak demand reduction, demand response, and energy efficiency programs. By signing, the Mercantile customer also agrees to serve as a joint applicant in any filings necessary to secure approval of this arrangement by the Public Utilities Commission of Ohio, and comply with any information and compliance reporting requirements imposed by rule or as part of that approval.

Ohio Power Company

By: Jon F. Will

Title: Manager

Date: 3/13/2013

PEA LIMA LLC

By: _____

Title: CFO

Date: 3-13-13

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Self-Direct Program Project Application

RETROFIT AND NEW CONSTRUCTION

Step 1: Check Project, Equipment, and Customer Eligibility

- ✓ Project must be a facility improvement that results in a permanent reduction in electrical energy usage (kWh).
- ✓ Measures applying for credits must have a minimum operating hours of 2,245 hours per year. Projects with annual energy (kWh) savings greater than the facility's annual energy (kWh) consumption will not be eligible.
- ✓ All installed equipment must meet or exceed the specifications given in the application and be installed in facilities served by AEP Ohio: Customer must have a valid AEP Ohio account number on an eligible AEP Ohio non-residential rate (see terms and conditions for list of eligible rates eligibility requirements).

Step 2: Submit Application

- ✓ Fill out the Customer Information form and the Worksheet for the measures that you installed. You may submit the application via mail, fax, or e-mail.

Submit your application to:
Email: gridsmartohio@kema.com

AEP Ohio Business Incentives for Energy Efficiency
2740 Airport Drive Suite 160
Columbus, OH 43219
Call: (877) 607-0739
Fax: (877) 607-0740

Visit our web site at gridsmartohio.com

- ✓ Submit a completed application prior to November 16, 2012 for any projects completed on or after January 1, 2009. Any applications received after the dealines may not be submitted to the PUCO by December 31st, 2012 and could jeopardize approval of any credit. Complete the checklist page and attach the documentation listed: customer information page, a signed Final Payment Agreement page, measure worksheet, scope of work (type, quantity, and wattage of old and new equipment), dated and itemized invoices for the purchase and installation of all equipment installed and specification sheets for all equipment installed showing that it meets the program specifications.

Step 3: Project Review

- ✓ The program team will review your Application. For some projects, an inspection will be part of the review, and you will be contacted to schedule it.
- ✓ After approval by AEP Ohio, the customer will be sent an Overview and Commitment form to sign for all self-direct projects. After the Overview and Commitment form is returned the project will be submitted to the Public Utilities Commission of Ohio (PUCO) for consideration. The PUCO will assign case number and review the project details that were prepared by AEP Ohio. The PUCO may request additional information, approve or reject the energy efficiency credits.

Step 4: Receive Energy Efficiency Credits

- ✓ The program team will issue the energy efficiency credits, within four to six weeks after PUCO project approval.
- ✓ In lieu of a one-time energy efficiency credit, you may elect to seek an exemption from the Energy Efficiency/Peak Demand Reduction (EE/PDR) Rider for the associated electric account(s) for a defined period of time as stated on this Application. For this exemption the Energy Efficiency Efficiency Credit amount (Option 1) is compared to the estimated value of the estimated EE/PDR obligation (Option 2), as calculated by AEP Ohio. The value of Option 2 will be approximately equal to the value of Option 1. If exemption is elected, the affective account is not eligible for other programs offered by AEP Ohio during the exemption period. Unless additional resources are committed, you will, after the specified number of months exempted, be again subject to the EE/PDR Rider. New Construction projects are not eligible to elect Option 2. Major Renovation projects that do not have a representative billing history for three years prior to the project installation are also not eligible to elect Option 2.
- ✓ If the energy efficiency credit is elected, you remain in the EE/PDR rider for the period of time that an exemption would have been in effect and may also participate in the AEP Ohio programs. However, during that period of time, you will not be allowed to elect the Option 2 exemption for any additional self-direct projects for the same account number.
- ✓ You are allowed and encouraged to consider using all or a portion of the energy credits, as received from AEP Ohio under this program, to help fund other energy efficiency and demand reduction projects you choose to initiate in the future. Future projects can also qualify for credits under the Prescriptive or Custom programs.

If you are viewing this document in Microsoft Excel, please note that each section of the application is accessible through the tabs at the bottom of the Excel window. Highlighted cells are for inputting information.

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Self-Direct Program
Project Application

APPLICATION CHECKLIST

APPLICATION

Required Attachments

- ☐ Customer/Contractor Information (Completed and Signed)
- ☐ Completed Forms for Energy Efficiency Credits Requested AND Signed Final Payment Agreement Page
- ☐ Itemized Invoices
- ☐ Equipment Specifications
- ☐ Scope of Work
- ☐ W-9 (LLC, Individual, Partnership, Property Management Companies)

Worksheets

- ☐ Lighting
- ☐ HVAC
- ☐ Refrigeration
- ☐ Motors and VFD
- ☐ Custom

Application Date: _____

Completion Date: _____

Project Cost: _____

**Incomplete applications will delay processing and energy efficiency credits.*

Please complete and submit forms for above checked boxes.

Please fill out if this is a revised submittal

ORIGINAL SUBMITTAL DATE: _____

APPLICATION NUMBER (IF KNOWN): _____

AEP Ohio Business Incentives Program for Energy Efficiency
2740 Airport Drive Suite 160
Columbus, OH 43219

Phone: (877) 607-0739
Fax: (877) 607-0740
gridsmartohio@kema.com
www.gridsmartohio.com

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Self-Direct Program Project Application

TERMS AND CONDITIONS

AEP Ohio is offering prescriptive and custom incentives under the AEP Ohio Business Incentives for Energy Efficiency program to offer the implementation of past cost-effective energy efficiency improvements for non-residential (commercial and industrial) customers. AEP Ohio provides energy efficiency credits (EEC) for the purchase and installation of qualifying cost effective equipment in the customer's facility under the Terms and Conditions provided in this application and subject to regulatory approvals. Energy Efficiency credits will only be provided in the form of a check or an Energy Efficiency/Peak Demand Reduction (EE/PDR) Rider exemption under this program.

Please note that funds are limited and subject to availability.

All applications are subject to review and approval by AEP Ohio, its contractor(s)/agent(s), and the Public Utility Commission of Ohio (PUCO) prior to any EEC payments or exemptions from the EE/PDR rider in this program. Funds are limited and subject to availability.

Program Effective Dates
AEP Ohio Business Incentives for Energy Efficiency program EEC are offered until approved funds are exhausted or November 16th of each program year, whichever comes first. The effective dates of the current program year and application submittal requirements are as follows:

- Self-direct projects are projects completed since 1/1/2009. Self direct projects are eligible to apply for EEC with this application. Future projects that are not yet completed should apply on the Prescriptive/Custom application.
- All 2012 AEP Ohio Business Incentives for Energy Efficiency program Applications should be received no later than November 16, 2012. Any applications received after the deadlines may not be submitted to the PUCO by December 31st, 2012 and could jeopardize approval of any incentive. AEP Ohio reserves the right to extend or shorten this timeline.
- Subsequent program year budgets and plans will be made available towards the end of the existing program year. AEP Ohio currently has filed with the PUCO to offer this program through the 2014 program year.

Program and Project Eligibility
The Self-Direct Program applies to customer facilities served by AEP Ohio's retail electric rates who meet the minimum energy usage requirements of 700,000 kWh per year or who are part of a national account involving multiple facilities in one or more states.
The AEP Ohio Business Incentives for Energy Efficiency program offers both prescriptive credits for some of the more common energy efficiency measures and custom credits for those eligible improvements not included on the list of prescriptive measures. Program credits are available under the AEP Ohio Business Incentives for Energy Efficiency program to include non-residential accounts served on AEP Ohio's regulated retail rates. Qualifying projects must be installed in a facility in AEP Ohio's electric service territory in Ohio. These credits are available to all non-residential customers who pay into the Energy Efficiency and Peak Demand Response (EE/PDR) rider and receive their electricity over AEP Ohio wires, regardless which retail electric supplier the customer has chosen to purchase power. A customer may neither apply for nor receive incentives for the same product, equipment or service from more than one utility.

Custom projects must involve measures, which result in a reduction in electric energy usage due to an improvement in system efficiency. Projects that result in reduced energy consumption without an improvement in system efficiency are not eligible for a custom credit. The project simple payback prior to the incentive payment generally should fall between 1 to 7 years, or pass cost effectiveness test(s) determined by AEP Ohio to qualify for an incentive. Incentives are calculated based on first-year energy savings and peak demand reduction. Peak demand reduction is defined as the reduction in average load over the Performance Hours by the replacement of existing electrical equipment with more efficient electrical equipment. Peak Performance Hours is defined as the time between June 1st and August 31st on weekday, non-holidays, between the hours 3:00 PM and 6:00 PM Eastern Time.

Projects involving measures covered by the prescriptive credit portion of the program are not eligible for a custom credit. However, the applicant has the option to apply for a custom incentive for whole building integrated projects or systems, even if they include prescriptive measures. The prescriptive elements may be capped at the deemed savings and/or incentive level.

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Self-Direct Program Project Application

TERMS AND CONDITIONS

Project requirements under the AEP Ohio Business Incentives for Energy Efficiency program include the following:

- Projects must involve a new facility improvement that results in a permanent reduction in electrical energy usage (kWh).
- Projects that are NOT eligible for a credit include the following:
  - Fuel switching (e.g. electric to gas or gas to electric)
  - Changes in operational and/or maintenance practices or simple control modifications not involving capital costs
  - Removal or termination of existing processes, facilities, and/or operations.
  - On-site electricity generation
  - Projects involving gas-driven equipment in place of or to replace electric equipment (such as a chiller)
  - Projects focused primarily on power factor improvement
  - Projects that involve peak-shifting (and not kWh savings)
  - Renewables (Please visit www.gridsmartohio.com for Renewables Program)
  - Are required by state or federal law, building or other codes, or are standard industry practice
  - Are easily reverted/removed or are installed entirely for reasons other than improving energy efficiency
  - Include other conditions to be determined by AEP Ohio
  - Renewables (Please visit www.gridsmartohio.com for Renewables Program)
- Any measures installed at a facility must produce verifiable and persistent energy reduction and must be sustainable and provide 100% of the energy benefits as stated in the Application for a period of at least five (5) years or for the life of the product, whichever is less. If the Customer ceases to be a delivery service customer of AEP Ohio or removes the equipment or systems at any time during the 5-year period or the life of the product, the Customer may be required to return a prorated amount of incentive funds to AEP Ohio.
- Customer cannot apply for incentives for future projects and elect after the fact to apply for credits under this program.
- Confidential information contained in any documents associated with this application will be protected from public filings. However, this information may be disclosed to the Public Utilities Commission of Ohio for further review and approval.
- Used or rebuilt equipment is generally NOT eligible for an incentive.
- All installed equipment must meet state, federal, and local codes and requirements.
- Costs associated with internal labor are not eligible.
- Projects must be installed on the AEP Ohio electric account in Ohio served by an eligible electric rate type listed on the application.
- Equipment must be purchased, installed, and operating (or capable of operating in the case of seasonal uses) prior to submitting a final application for an incentive.
- AEP Ohio will issue incentive payments in the form of checks, not utility bill credits.
- The incentive is paid as a one-time, one-program offer and cannot be combined with incentive payments from other AEP Ohio programs. The customer may be eligible to participate in other programs offered by AEP Ohio, as long as no project receives more than one incentive.

PROGRAM ENERGY EFFICIENCY CREDITS	
Energy efficiency cerdit levels for one-year energy savings	See tables for prescriptive credits. Custom credits $0.08/kWh X 75%
Minimum/Maximum simple payback before energy efficiency credit applied	Must pass cost effectiveness test(s) (determined by AEP Ohio). Generally between 1-7 years.
Maximum payout	75% of 50% of the total cost (additional measure caps may apply)
Energy efficiency credit levels for projects completed since 1/1/2009	calculated amount on the Prescriptive or Custom worksheets attached and subject to funding limits
Credit Limit	See Incentive Limits and Tiering section
Credit Calculation Order	Measure credit caps are applied first. Project cost credit limits are applied second. Credit tiering is applied third. And 75% factor applied to credit last.

AEP OHIO
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Self-Direct Program
Project Application

TERMS AND CONDITIONS

Energy Efficiency Credit Limits

For both the Prescriptive and Custom measures in this application, the total energy efficiency credits shall be 75% the lesser of: 1) The calculated credit as approved by AEP Ohio, or 2) 50% of Total Project Cost (not including internal labor cost). In calculating the savings and energy efficiency credits for Custom measures, please contact AEP Ohio Business Incentives for Energy Efficiency Program office to determine appropriate baseline for savings.

Incentive Limits and Tiering

- The limit for each self-direct project is $225,000.
- The limit for each business entity (corporation, LLC, partnership, etc) is based on their tariff, indicated below.

TARIFF	LIMIT PER BUSINESS ENTITY
General Service Tariffs 1, 2, 3 & 4	$900,000 per year

- A business entity with facilities in both categories can qualify for both limits. All facilities served in one category for a business entity are combined to determine the limit.
- The total credit paid for any self direct application cannot exceed 50% of the total project cost (not including internal labor). In addition to the above project cost limit, credit payment rates vary when a customer's calculated credit exceeds the tiers listed below:
- **Tier 1** $0 - $100,000 = 100% of eligible calculated credit value
- **Tier 2** $100,001 - $300,000 = 50% of eligible calculated credit value
- **Tier 3** $300,001 - $500,000 = 25% of eligible calculated credit value
- **Tier 4** $500,001 - Beyond = 10% of eligible calculated credit value

Application

Application should be submitted by November 16, 2012 for any projects completed or or after Jan 1, 2009 or later. Any applications received after the deadlines may not be submitted to the PUCO by November 16, 2012 and could jeopardize approval of any incentive. Project documentation, such as copies of dated invoices for the purchase and installation of the measure and/or product specification sheets, is required. AEP Ohio reserves the right to request additional backup information, supporting detail, calculations, manufacturer specification sheets or any other information to any credit payment.

The location or business name on the invoice must be consistent with the application information. Applications shall all required documentation should be received by November 16, 2012 to be applicable for the 2012 program year.

A signed application with documentation verifying installation of the project including, but not limited to, equipment, invoices, approvals, and other related information must be submitted to AEP Ohio prior to application approval.

The project invoice should provide sufficient detail to separate the project cost from the cost of other services such as repairs and building code compliance. AEP Ohio reserves the right to request additional supporting documentation as deemed necessary to ensure measure eligibility and verify that the expected energy savings will occur. Confidential information contained in any documents associated with this application will be protected from public filings. However, this information could include: equipment purchase dates, installation dates, proof that the equipment is operational, manufacturer specifications, warranty information, and proof of customer co-payment.

The customer understands and agrees that all other terms and conditions, as specified in the application, including all attachments and exhibits attached to this application, serves as a contract for the customer's commitment of energy resources to AEP Ohio, shall apply.

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TERMS AND CONDITIONS

Application Review Process

AEP Ohio will review Applications for eligibility and completeness. Completed applications will be reviewed in the order received. Funds are reserved for the project when AEP Ohio receives a complete application and determines that the project meets the program eligibility requirements. Applicants who submit incomplete applications will be notified of deficiencies upon review of the application, and may lose their place in line in the review process until all requested information is received. Applications must be completed and all information received by the deadlines defined above to begin processing. Applicants are encouraged to call the program hotline if they have any questions about documentation requirements.

Inspections

AEP Ohio reserves the right to inspect all projects to verify compliance with the program rules and verify the accuracy of project documentation. This may include installation inspections, verification of detailed lighting layout descriptions, metering, data collection, interviews, and utility bill or monitoring data analyses. The customers are required to allow access to project documents and the facility where the measures were installed for a period of five years after receipt of incentive payment by AEP Ohio. Customer understands and agrees that Program installations may also be subject to inspections by the PUCO or their designee, and photographs of installation may be required.

Tax Liability

Credits are taxable and, if more than $600, will be reported to the IRS unless the customer is exempt. AEP Ohio is not responsible for any taxes that may be imposed on your business as a result of your receipt of payment. W-9 (for LLC, Individual, Partnership, Property Management Companies) must be provided along with all applications.

Requirements for Custom Project Electricity Savings Calculation

The annual electricity savings must be calculated for custom projects using industry-accepted engineering algorithms or simulation models. The applicant may estimate the annual electricity usage of both the existing and proposed equipment based on the current operation of the facility. A listing of the pre-existing information requirements is provided at the end of the custom application section. If the previous equipment was at the end of its useful life, the applicant must use, as the baseline, the equipment that would meet the applicable federal and local energy codes unless an "as found" baseline is being used by the applicant. If the applicant is using an "as found" baseline, additional specific information on the pre-existing information must be provided.

The applicant must be able to clearly describe the method used to calculate the savings. The applicant must provide all assumptions used in the calculations and document the sources for these assumptions. If no savings analysis is provided by the customer/contractors, AEP Ohio reserves the right to utilize their approved methodology and analysis to determine energy savings.

The method and assumptions used by the applicant to calculate the annual savings will be reviewed by AEP Ohio. AEP Ohio is solely responsible for the final determination of the annual energy savings and peak demand reduction to be used in calculating the credit amount. AEP Ohio also reserves the right to require specific measurement and verification activities including monitoring the retrofit to determining the credit. Verification of the preexisting consumption may also be required.

AEP Ohio may need to conduct inspections of projects to verify equipment and operating conditions. For custom and "as found" projects, the applicant is required to provide information in order to allow AEP Ohio ti verify the baseline usage of the pre-existing equipment. Customers are encouraged to submit projects that warrant special treatnebt (i.e., non-typical projects) to be considered on a case-by-case basis by AEP Ohio.

Disclaimer

AEP Ohio does not guarantee the energy savings and does not make any warranties associated with the measures eligible for credits under this program. AEP Ohio has no obligations regarding and does not endorse or guarantee any claims, promises, work, or equipment made, performed, or furnished by any contractors or equipment vendors that sell or install any energy efficiency measures. AEP Ohio is not responsible for the proper disposal/recycling of any waste generated as a result of this project. AEP Ohio is not liable for any damage caused by the operation or malfunction of the installed equipment.

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Self-Direct Program Project Application

Important: Please read the terms and conditions before signing and submitting this application.
You must complete all information and provide required additional documentation to avoid processing delays.

CUSTOMER INFORMATION

Business Type *(select one)*

- LARGE OFFICE ☐
- SMALL OFFICE ☐
- SCHOOL ☐
- SMALL RETAIL/SERVICE ☐
- LARGE RETAIL/SERVICE ☐
- HOTEL/MOTEL ☐
- MEDICAL - Hospital ☐
- MEDICAL - Nursing Home ☐
- ASSEMBLY/MEETING PLACE ☐
- RESTAURANT ☐
- GROCERY ☐
- CONDITIONED WAREHOUSE ☐
- UNCONDITIONED WAREHOUSE ☐
- INDUSTRIAL/MANUFACTURING ☐
- COLLEGE/UNIVERSITY ☐
- GOVERNMENT/MUNICIPAL ☐
- OTHER/MISCELLANEOUS ☐ _____

Tax Status *(from W9)*

- CORPORATION (Inc., PC, Etc.) ☐
- Government Agency ☐
- Individual ☐
- Partnership ☐
- Exempt ☐
- OTHER (may receive 1099) _____

Operating Hours

- Low Hours (<8h /day) ☐
- One shift (8h /day) ☐
- Two shifts (16h/day) ☐
- Three shifts (24h/day) ☐
- Building Operating Hours _____
- Equipment Operating Hours _____

How Did You Hear?

- AEP Account Representative ☐ _____
- Contractor ☐ _____
- Distributor ☐ _____
- Website ☐
- Other ☐ _____

Operating Days

- Seven days/week ☐ _____
- Five days/week ☐ _____

Square Footage

- Affected Area S.F. _____

NAME OF APPLICANT'S BUSINESS		PROJECT NAME (IF APPLICABLE)		
NAME AS IT APPEARS ON UTILITY BILL	AEP OHIO ACCT #*	APPLICANT TAXPAYER ID # (SSN/FEDERAL ID)		
MAILING ADDRESS		CITY	STATE	ZIP
INSTALLATION ADDRESS		CITY	STATE	ZIP

CUSTOMER CONTACT

Please provide all contacts we may need to process for this project. The business contact should be the project decision maker, the technical contact, etc

NAME OF CONTACT PERSON - *Preferred Contact for Documentation*			TITLE OF CONTACT
CONTACT PHONE #	EXT.	CONTACT FAX #	CONTACT EMAIL ADDRESS

SOLUTION PROVIDER/CONTRACTOR INFORMATION**

NAME OF CONTRACTING COMPANY				
NAME OF CONTACT PERSON			TITLE OF CONTACT PERSON	
CONTACT PHONE #	EXT.	CONTACT FAX #	CONTACT EMAIL ADDRESS	
MAILING ADDRESS			CITY	STATE / ZIP

If there are questions about the application who should we contact? **Customer** ☐ **Contractor** ☐

As an eligible customer, I verify the information is correct and request consideration for participation under this program.

CUSTOMER SIGNATURE (AEP OHIO CUSTOMER)	PRINT NAME
TOTAL INCENTIVE REQUESTED***	DATE
ESTIMATED COMPLETION DATE	ESTIMATED PROJECT COST

* AEP Ohio Account Number where measure is installed

** Solution Provider/Contractor - Party involved in the application submittal (i.e. specs, scope of work, etc.)

*** Credit cannot exceed 50 percent of the total project cost or other caps described in the Terms and Conditions.

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Self-Direct Program
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SELF-DIRECT APPLICATION AGREEMENT

I understand that the location or business name on the invoice must be consistent with the application information. Final Applications and all required supporting documentation should be received by **November 16, 2012 for projects completed on or after January 1, 2009. Any applications received after the deadlines may not be submitted to the PUCO by December 31st, 2012 and could jeoparidize approval of any incentive by the PUCO.**

I agree to verification by the utility or their representatives of both sales transactions and equipment installation.

I understand that these credits are available to all non-residential customers who pay into the Energy Efficiency and Demand Response (EE/PDR) rider and receive their electricity over AEP Ohio wires regardless from which retail electric supplier the customer has chosen to purchase power.

I certify that the information on this application is true and correct, and that the Taxpayer ID Number, tax status, and W-9 are the applicant's.

I agree that if: I remove the related product(s) identified in my application before a period of 5 years or the end of the product life, whichever is less, I shall refund a prorated amount of energy efficiency credits to AEP Ohio based on the actual period of time in which the related product(s) were installed and operating. This is necessary to assure that the project's related energy benefits will be achieved.

I understand that the program may be modified or terminated without prior notice.

AEP Ohio reserves the right to refuse payment and participation if the customer or contractor violates Program rules and requirements. AEP Ohio is not liable for energy efficiency credits promised to customers as a result of misrepresentation of the Program.

Customer and customer's contractor shall be responsible to comply with any applicable codes or ordinances.

All submissions become the property of AEP Ohio. It is recommended for you to keep to a copy for your records.

I understand that this project must involve a facility improvement that results in improved energy efficiency. I also understand that all materials removed, including lamps and PCB ballasts, must be permanently taken out of service and disposed of in accordance with local codes and ordinances. I understand it is my responsibility to be aware of any applicable codes or ordinances. Information about hazardous waste disposal can be found at: http://www.epa.gov/epawaste/hazard/index.htm

I understand that the Application and all required documentation should be received by the AEP Ohio Business Incentives for Energy Efficiency program by November 16, 2012 for any projects completed on or after January 1, 2009. Any applications received after the deadlines may not be submitted to the PUCO by December 31, 2012 and could jeopardize approval of any credit by the PUCO. All equipment must be fully operational.

AEP Ohio will pay 75% of the lesser of: 1) The calculated credit as approved by AEP Ohio subject to funding limits or 2) 50% of the project cost (subject to application caps). I understand that AEP Ohio or their representatives have the right to ask for additional information at any time AEP Ohio's Business Incentives Program for Energy Efficiency will make the final determination of energy efficiency credit levels for this project.

The program has a limited budget. Applications will be processed within the budget limits. Applications and all supporting documentation required should be received by November 16, 2012 to be eligible for funding under the current program period.

AEP OHIO
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Self-Direct Program
Project Application

SELF-DIRECT APPLICATION AGREEMENT

Customer understands and agrees that all other terms and conditions, as specified in the application, including all attachments and exhibits attached to this application which will serve as a contract for the Customer's Commitment of energy and demand resources to AEP Ohio shall apply.

I understand that AEP Ohio does not guarantee the energy savings and does not make any warranties associated with the measure eligible for energy efficiency credits under this program, and, further, that AEP Ohio has no obligations regarding any claims, promises, work, or equipment made, performed, or furnished by any contractors or equipment vendors that sell or install any energy efficiency measures and does not endorse or guarantee same.

Energy efficiency credits will be based upon the final application and program terms and conditions, as well as the availability of funds.

Any and all energy savings generated by the project described in this application are hereby committed to AEP Ohio in oder to count against its respective companies' benchmark requirements in S.B.221.

ENERGY EFFICIENCY CREDITS REQUESTED

I have read and understand the program requirements and measure specifications, and Terms and Conditions set forth in this application and agree to abide by those requirements. Furthermore, I concur that I must meet all eligibility criteria in order to be paid under this program.

ALL EQUIPMENT MUST BE INSTALLED AND OPERATIONAL. A CUSTOMER SIGNATURE IS REQUIRED FOR PAYMENT. SIGNED APPLICATIONS RECEIVED BY FAX OR EMAIL WILL BE TREATED THE SAME AS ORIGINAL APPLICATIONS RECEIVED BY MAIL. All submissions become the property of AEP Ohio. Keep a copy for your records.

TOTAL PROJECT COST	TOTAL ENERGY EFFICIENCY CREDITS REQUESTED*

CUSTOMER SIGNATURE (AEP OHIO CUSTOMER)		
PRINT NAME	DATE	ACTUAL COMPLETION DATE

**AEP Ohio will pay the lesser of 1) The calculated credit as approved by AEP Ohio 2) 50% of the total project cost of the project.*

TRICANTER CONTROLS 1 of 6

Customer: Guardian Energy
Location: Lima, OH
Date: 6/22/2012

RECOMMENDATION: VFD and Controls - Install a variable frequency drive and controls on the motors of the Tricanter System. These controls will work together to reduce the overall combined load of the Tricanter.

Motor Size:	1.00	HP				VFD Efficiency:	98%
Number of Motors:	1						
Total Motor Size:	1.00	HP	Motor Efficiency:	85.5%		Hours of Operation:	8,760
Motor Type:	3	New Premium Eff.	Electric Demand Rate:	$ -	kW	Existing Load Factor:	75%
Existing Control:	5	Pump: None	Electricity Rate:	$ 0.0600	kWh		
Load Profile:	2						

		Percent of Full Input Power								
System Rated Flow	Operating Time	Existing	Proposed VFD	Full-Load Power kW	Avg Existing Input Power	Proposed Motor Input Power	kW Power Savings	Hours Per Year	kWh/Yr. Energy Savings	kW Saved
0%	0%	0%	0%	0.9	0.0	0.0	0.0	0	0	
20%	0%	100%	6%	0.9	0.7	0.0	0.6	0	0	
25%	0%	100%	7%	0.9	0.7	0.0	0.6	0	0	
30%	0%	100%	8%	0.9	0.7	0.1	0.6	0	0	
35%	30%	100%	10%	0.9	0.7	0.1	0.6	2,628	1,543	1
40%	40%	100%	12%	0.9	0.7	0.1	0.6	3,504	2,012	1
45%	30%	100%	14%	0.9	0.7	0.1	0.6	2,628	1,468	1
50%	0%	100%	17%	0.9	0.7	0.1	0.5	0	0	
55%	0%	100%	20%	0.9	0.7	0.1	0.5	0	0	
60%	0%	100%	24%	0.9	0.7	0.2	0.5	0	0	
65%	0%	100%	29%	0.9	0.7	0.2	0.5	0	0	
70%	0%	100%	35%	0.9	0.7	0.2	0.4	0	0	
75%	0%	100%	42%	0.9	0.7	0.3	0.4	0	0	
80%	0%	100%	50%	0.9	0.7	0.3	0.3	0	0	
85%	0%	100%	59%	0.9	0.7	0.4	0.3	0	0	
90%	0%	100%	71%	0.9	0.7	0.5	0.2	0	0	
95%	0%	100%	85%	0.9	0.7	0.6	0.1	0	0	
100%	0%	100%	101%	0.9	0.7	0.7	(0.0)	0	0	
	100%									

Existing Energy Usage:	5,732
Proposed Energy Usage:	709

ECONOMIC EVALUATION:

Estimated Installed Drive Cost	$ 750	
kWh Saved	5,024	
Proposed Rebate Rate	$ 0.080	/kWh
kW Saved	0.6	
Savings $	$ 301	
Rebate	$ 301	
Proposed Payback Without Rebate	2.49	
Proposed Payback With Rebate	1.5	Years

Rebate Rate

$ 0.08	Per kWh
$ 100.00	Per kW

TRICANTER CONTROLS 2 of 6

Customer: Guardian Energy
Location: Lima, OH
Date: 6/22/2012

RECOMMENDATION: VFD and Controls - Install a variable frequency drive and controls on the motors of the Tricanter System. These controls will work together to reduce the overall combined load of the Tricanter.

Motor Size:	2.00	HP				VFD Efficiency:	98%
Number of Motors:	1		Motor Efficiency:	86.5%		Hours of Operation:	8,760
Total Motor Size:	2.00	HP	Electric Demand Rate:	$ -	kW	Existing Load Factor:	75%
Motor Type:	3	New Premium Eff.	Electricity Rate:	$ 0.0600	kWh		
Existing Control:	5	Pump: None					
Load Profile:	2						

System Rated Flow	Operating Time	Percent of Full Input Power: Existing	Percent of Full Input Power: Proposed VFD	Full-Load Power kW	Avg Existing Input Power	Proposed Motor Input Power	kW Power Savings	Hours Per Year	kWh/Yr. Energy Savings	kW Saved
0%	0%	0%	0%	1.7	0.0	0.0	0.0	0	0	
20%	0%	100%	6%	1.7	1.3	0.1	1.2	0	0	
25%	30%	100%	7%	1.7	1.3	0.1	1.2	2,628	3,155	1
30%	40%	100%	8%	1.7	1.3	0.1	1.2	3,504	4,144	1
35%	30%	100%	10%	1.7	1.3	0.1	1.2	2,628	3,051	1
40%	0%	100%	12%	1.7	1.3	0.2	1.1	0	0	
45%	0%	100%	14%	1.7	1.3	0.2	1.1	0	0	
50%	0%	100%	17%	1.7	1.3	0.2	1.1	0	0	
55%	0%	100%	20%	1.7	1.3	0.3	1.0	0	0	
60%	0%	100%	24%	1.7	1.3	0.3	1.0	0	0	
65%	0%	100%	29%	1.7	1.3	0.4	0.9	0	0	
70%	0%	100%	35%	1.7	1.3	0.5	0.8	0	0	
75%	0%	100%	42%	1.7	1.3	0.5	0.7	0	0	
80%	0%	100%	50%	1.7	1.3	0.7	0.6	0	0	
85%	0%	100%	59%	1.7	1.3	0.8	0.5	0	0	
90%	0%	100%	71%	1.7	1.3	0.9	0.4	0	0	
95%	0%	100%	85%	1.7	1.3	1.1	0.2	0	0	
100%	0%	100%	101%	1.7	1.3	1.3	(0.0)	0	0	
	100%									

Existing Energy Usage:	11,332
Proposed Energy Usage:	982

ECONOMIC EVALUATION:

Estimated Installed Drive Cost	$ 1,500	
kWh Saved	10,350	
Proposed Rebate Rate	$ 0.080	/kWh
kW Saved	1.2	
Savings $	$ 621	
Rebate	$ 621	
Proposed Payback Without Rebate	2.42	
Proposed Payback With Rebate	1.4	Years

Rebate Rate

$ 0.08	Per kWh
$ 100.00	Per kW

TRICANTER CONTROLS 3 of 6

Customer: Guardian Energy
Location: Lima, OH
Date: 6/22/2012

RECOMMENDATION: VFD and Controls - Install a variable frequency drive and controls on the motors of the Tricanter System. These controls will work together to reduce the overall combined load of the Tricanter.

Motor Size:	20.00	HP				VFD Efficiency:	98%
Number of Motors:	1						
Total Motor Size:	20.00	HP	Motor Efficiency:	93.0%		Hours of Operation:	8,760
Motor Type:	3	New Premium Eff.	Electric Demand Rate:	$ -	kW		
Existing Control:	5	Pump: None	Electricity Rate:	$ 0.0600	kWh	Existing Load Factor:	75%
Load Profile:	2						

System Rated Flow	Operating Time	Percent of Full Input Power: Existing	Percent of Full Input Power: Proposed VFD	Full-Load Power kW	Avg Existing Input Power	Proposed Motor Input Power	kW Power Savings	Hours Per Year	kWh/Yr. Energy Savings	kW Saved
0%	0%	0%	0%	16.0	0.0	0.0	0.0	0	0	
20%	0%	100%	6%	16.0	12.0	0.7	11.3	0	0	
25%	0%	100%	7%	16.0	12.0	0.9	11.2	0	0	
30%	0%	100%	8%	16.0	12.0	1.0	11.0	0	0	
35%	0%	100%	10%	16.0	12.0	1.2	10.8	0	0	
40%	30%	100%	12%	16.0	12.0	1.5	10.6	2,628	27,748	11
45%	40%	100%	14%	16.0	12.0	1.8	10.3	3,504	35,995	10
50%	30%	100%	17%	16.0	12.0	2.1	9.9	2,628	26,098	10
55%	0%	100%	20%	16.0	12.0	2.5	9.5	0	0	
60%	0%	100%	24%	16.0	12.0	3.0	9.0	0	0	
65%	0%	100%	29%	16.0	12.0	3.6	8.5	0	0	
70%	0%	100%	35%	16.0	12.0	4.3	7.8	0	0	
75%	0%	100%	42%	16.0	12.0	5.1	6.9	0	0	
80%	0%	100%	50%	16.0	12.0	6.1	5.9	0	0	
85%	0%	100%	59%	16.0	12.0	7.3	4.7	0	0	
90%	0%	100%	71%	16.0	12.0	8.7	3.3	0	0	
95%	0%	100%	85%	16.0	12.0	10.4	1.6	0	0	
100%	0%	100%	101%	16.0	12.0	12.4	(0.4)	0	0	
	100%									

Existing Energy Usage:	105,403
Proposed Energy Usage:	15,562

ECONOMIC EVALUATION:

Estimated Installed Drive Cost	$ 15,000	
kWh Saved	89,841	
Proposed Rebate Rate	$ 0.080	/kWh
kW Saved	9.9	
Savings $	$ 5,390	
Rebate	$ 5,390	
Proposed Payback Without Rebate	2.78	
Proposed Payback With Rebate	1.8	Years

Rebate Rate

$ 0.08	Per kWh
$ 100.00	Per kW

TRICANTER CONTROLS 4 of 6

Customer: Guardian Energy
Location: Lima, OH
Date: 6/22/2012

RECOMMENDATION: VFD and Controls - Install a variable frequency drive and controls on the motors of the Tricanter System. These controls will work together to reduce the overall combined load of the Tricanter.

Motor Size:	10.00	HP				VFD Efficiency:	98%
Number of Motors:	1						
Total Motor Size:	10.00	HP	Motor Efficiency:	91.7%		Hours of Operation:	8,760
Motor Type:	3	New Premium Eff.	Electric Demand Rate:	$ -	kW	Existing Load Factor:	75%
Existing Control:	5	Pump: None	Electricity Rate:	$ 0.0600	kWh		
Load Profile:	2						

		Percent of Full Input Power								
System Rated Flow	Operating Time	Existing	Proposed VFD	Full-Load Power kW	Avg Existing Input Power	Proposed Motor Input Power	kW Power Savings	Hours Per Year	kWh/Yr. Energy Savings	kW Saved
0%	0%	0%	0%	8.1	0.0	0.0	0.0	0	0	
20%	0%	100%	6%	8.1	6.1	0.4	5.7	0	0	
25%	0%	100%	7%	8.1	6.1	0.4	5.7	0	0	
30%	0%	100%	8%	8.1	6.1	0.5	5.6	0	0	
35%	0%	100%	10%	8.1	6.1	0.6	5.5	0	0	
40%	0%	100%	12%	8.1	6.1	0.7	5.4	0	0	
45%	25%	100%	14%	8.1	6.1	0.9	5.2	2,190	11,408	5
50%	30%	100%	17%	8.1	6.1	1.1	5.0	2,628	13,234	5
55%	35%	100%	20%	8.1	6.1	1.3	4.8	3,066	14,805	5
60%	10%	100%	24%	8.1	6.1	1.5	4.6	876	4,013	5
65%	0%	100%	29%	8.1	6.1	1.8	4.3	0	0	
70%	0%	100%	35%	8.1	6.1	2.2	3.9	0	0	
75%	0%	100%	42%	8.1	6.1	2.6	3.5	0	0	
80%	0%	100%	50%	8.1	6.1	3.1	3.0	0	0	
85%	0%	100%	59%	8.1	6.1	3.7	2.4	0	0	
90%	0%	100%	71%	8.1	6.1	4.4	1.7	0	0	
95%	0%	100%	85%	8.1	6.1	5.3	0.8	0	0	
100%	0%	100%	101%	8.1	6.1	6.3	(0.2)	0	0	
	100%									

Existing Energy Usage:	53,448
Proposed Energy Usage:	9,989

ECONOMIC EVALUATION:

Estimated Installed Drive Cost	$ 7,500	
kWh Saved	43,459	
Proposed Rebate Rate	$ 0.080	/kWh
kW Saved	4.6	
Savings $	$ 2,608	
Rebate	$ 2,608	
Proposed Payback Without Rebate	2.88	
Proposed Payback With Rebate	1.9	Years

Rebate Rate

$ 0.08	Per kWh
$ 100.00	Per kW

TRICANTER CONTROLS 5 of 6

Customer: Guardian Energy
Location: Lima, OH
Date: 6/22/2012

RECOMMENDATION: VFD and Controls - Install a variable frequency drive and controls on the motors of the Tricanter System. These controls will work together to reduce the overall combined load of the Tricanter.

Motor Size:	20.00	HP				VFD Efficiency:	98%
Number of Motors:	1		Motor Efficiency:	93.0%		Hours of Operation:	8,760
Total Motor Size:	20.00	HP	Electric Demand Rate:	$ -	kW	Existing Load Factor:	75%
Motor Type:	3	New Premium Eff.	Electricity Rate:	$ 0.0600	kWh		
Existing Control:	5	Pump: None					
Load Profile:	2						

System Rated Flow	Operating Time	Percent of Full Input Power: Existing	Percent of Full Input Power: Proposed VFD	Full-Load Power kW	Avg Existing Input Power	Proposed Motor Input Power	kW Power Savings	Hours Per Year	kWh/Yr. Energy Savings	kW Saved
0%	0%	0%	0%	16.0	0.0	0.0	0.0	0	0	
20%	0%	100%	6%	16.0	12.0	0.7	11.3	0	0	
25%	0%	100%	7%	16.0	12.0	0.9	11.2	0	0	
30%	0%	100%	8%	16.0	12.0	1.0	11.0	0	0	
35%	0%	100%	10%	16.0	12.0	1.2	10.8	0	0	
40%	0%	100%	12%	16.0	12.0	1.5	10.6	0	0	
45%	30%	100%	14%	16.0	12.0	1.8	10.3	2,628	26,996	10
50%	40%	100%	17%	16.0	12.0	2.1	9.9	3,504	34,797	10
55%	30%	100%	20%	16.0	12.0	2.5	9.5	2,628	25,025	10
60%	0%	100%	24%	16.0	12.0	3.0	9.0	0	0	
65%	0%	100%	29%	16.0	12.0	3.6	8.5	0	0	
70%	0%	100%	35%	16.0	12.0	4.3	7.8	0	0	
75%	0%	100%	42%	16.0	12.0	5.1	6.9	0	0	
80%	0%	100%	50%	16.0	12.0	6.1	5.9	0	0	
85%	0%	100%	59%	16.0	12.0	7.3	4.7	0	0	
90%	0%	100%	71%	16.0	12.0	8.7	3.3	0	0	
95%	0%	100%	85%	16.0	12.0	10.4	1.6	0	0	
100%	0%	100%	101%	16.0	12.0	12.4	(0.4)	0	0	
	100%									

Existing Energy Usage:	105,403
Proposed Energy Usage:	18,585

ECONOMIC EVALUATION:

Estimated Installed Drive Cost	$ 15,000	
kWh Saved	86,817	
Proposed Rebate Rate	$ 0.080	/kWh
kW Saved	9.5	
Savings $	$ 5,209	
Rebate	$ 5,209	
Proposed Payback Without Rebate	2.88	
Proposed Payback With Rebate	1.9	Years

Rebate Rate

$ 0.08	Per kWh
$ 100.00	Per kW

TRICANTER CONTROLS 6 of 6

Customer: Guardian Energy
Location: Lima, OH
Date: 6/22/2012

RECOMMENDATION: VFD and Controls - Install a variable frequency drive and controls on the motors of the Tricanter System. These controls will work together to reduce the overall combined load of the Tricanter.

Motor Size:	125.00	HP				VFD Efficiency:	98%
Number of Motors:	1						
Total Motor Size:	125.00	HP	Motor Efficiency:	95.4%		Hours of Operation:	8,760
Motor Type:	3	New Premium Eff.	Electric Demand Rate:	$ -	kW		
Existing Control:	5	Pump: None	Electricity Rate:	$ 0.0600	kWh	Existing Load Factor:	95%
Load Profile:	2						

System Rated Flow	Operating Time	Percent of Full Input Power: Existing	Percent of Full Input Power: Proposed VFD	Full-Load Power kW	Avg Existing Input Power	Proposed Motor Input Power	kW Power Savings	Hours Per Year	kWh/Yr. Energy Savings	kW Saved
0%	0%	0%	0%	97.7	0.0	0.0	0.0	0	0	
20%	0%	100%	6%	97.7	92.9	5.6	87.3	0	0	
25%	0%	100%	7%	97.7	92.9	6.7	86.2	0	0	
30%	0%	100%	8%	97.7	92.9	8.0	84.9	0	0	
35%	0%	100%	10%	97.7	92.9	9.5	83.3	0	0	
40%	0%	100%	12%	97.7	92.9	11.4	81.5	0	0	
45%	0%	100%	14%	97.7	92.9	13.6	79.3	0	0	
50%	0%	100%	17%	97.7	92.9	16.2	76.6	0	0	
55%	0%	100%	20%	97.7	92.9	19.4	73.5	0	0	
60%	0%	100%	24%	97.7	92.9	23.1	69.7	0	0	
65%	0%	100%	29%	97.7	92.9	27.6	65.2	0	0	
70%	0%	100%	35%	97.7	92.9	33.0	59.9	0	0	
75%	15%	100%	42%	97.7	92.9	39.4	53.5	1,314	70,237	53
80%	20%	100%	50%	97.7	92.9	47.1	45.8	1,752	80,236	46
85%	30%	100%	59%	97.7	92.9	56.2	36.7	2,628	96,327	37
90%	20%	100%	71%	97.7	92.9	67.1	25.7	1,752	45,087	26
95%	15%	100%	85%	97.7	92.9	80.2	12.7	1,314	16,680	13
100%	0%	100%	101%	97.7	92.9	95.7	(2.9)	0	0	
	100%									

Existing Energy Usage:	813,445
Proposed Energy Usage:	504,878

ECONOMIC EVALUATION:

Estimated Installed Drive Cost	$ 80,000	
kWh Saved	308,567	
Proposed Rebate Rate	$ 0.080	/kWh
kW Saved	-	
Savings $	$ 18,514	
Rebate	$ 18,514	
Proposed Payback Without Rebate	4.32	
Proposed Payback With Rebate	3.3	Years

Rebate Rate

$ 0.08	Per kWh
$ 100.00	Per kW

AEP OH Analysis: 125HP Pump Savings Calculation							
System Rated Flow	% Operating Time	Operating Hours	Existing % of Input Power	VFD % of Input Power	Avg. Existing Input Power (kW)	Avg. Proposed Input Power (kW)	kWh Savings
0	0	-	1	0	83.084	0.000	-
20	0	-	1	0	83.084	0.000	-
25	0	-	1	0	83.084	0.000	-
30	0	-	1	0	83.084	0.000	-
35	0	-	1	0	83.084	0.000	-
40	0	-	1	0.41	83.084	34.065	-
45	0	-	1	0.46	83.084	38.219	-
50	0	-	1	0.51	83.084	42.373	-
55	0	-	1	0.56	83.084	46.527	-
60	0	-	1	0.61	83.084	50.681	-
65	0	-	1	0.66	83.084	54.836	-
70	0	-	1	0.71	83.084	58.990	-
75	0.15	1,314	1	0.76	83.084	63.144	26,201.49
80	0.2	1,752	1	0.82	83.084	68.129	26,201.49
85	0.3	2,628	1	0.87	83.084	72.283	28,384.95
90	0.2	1,752	1	0.93	83.084	77.268	10,189.47
95	0.15	1,314	1	0.98	83.084	81.423	2,183.46
100	0	-	1	1.05	83.084	87.239	-
					83.084	43.06540444	93,160.86

LISTEN. THINK. SOLVE.®

PRODUCT PROFILE

PowerFlex® 700 AC Drive

Powerful Performance. Flexible Control.

Whether your application requires simple speed control, demanding torque control, or a variety of horse power ratings, the PowerFlex® 700 AC drive offers the most outstanding performance found in a general purpose drive.

The PowerFlex 700 AC drive is available from .37 to 500 kW/0.5 to 700 HP and is easier to use than any other drive in its class while offering the world-class performance that you have come to expect from the PowerFlex family.

Excellent Performance

- Three control modes in one drive: Vector Control with Force™ Technology, Sensorless Vector and V/Hz control.
- Outstanding open or closed loop speed regulation for applications ranging from fans and pumps to precise control of winders.
- Excellent torque production and tight torque regulation for the most demanding applications like extruders and web processes.
- Fast update times of torque inputs are suitable for high performance applications.

Saves Space

- Innovative bookshelf design of frames 0-6 means drives that are up to 68% smaller than other global drives.
- Bookshelf design optimizes panel space by allowing Zero Stacking™ or side-by-side mounting of the drives. In many cases, twice as many drives can be packaged in the same panel space as competitive products.
- Save panel space and wiring time with internal brake transistors, integral EMC filters, and integral common mode chokes (Frame 0-6), as well as communication and feedback options.

PowerFlex 700 AC Drive (0.37 to 500 kW; 0.5 to 700 HP)

Easy-to-Use Control

- Full-featured LCD Human Interface Module (HIM) with multi-line and multi-lingual display simplifies programming.
- S.M.A.R.T Start and Detailed Assisted Start-up routines in the LCD HIM allow for easy configuring and tuning of the drive.
- Pull-apart control terminal blocks allow for easy wiring and quick disconnect!
- Frames 0-6 control board and I/O are mounted in a cassette, that also houses the encoder option, mounted alongside the drive for easy access.
- Frames 7-10 have the same control board as frames 0-6 installed directly into drive.
- Optimized global voltage settings designed to worldwide standards allow quick set-up anywhere in the world.
- Excellent PC software tools, such as DriveExplorer™, DriveTools™ SP and RSLogix 5000™ make configuring, programming, monitoring and troubleshooting even easier.

Premier Integration with PowerFlex Drives

For simplified drive start-up and reduced development time, the AC family of Allen-Bradley PowerFlex drives can be configured with RSLogix 5000 software. This single software approach simplifies parameter and tag programming while still allowing stand-alone drive software tool use on the factory floor.

PowerFlex 700 Vector Control – Series B

The Vector Control Cassette includes three control modes (Vector Control with Force™ Technology, Sensorless Vector and V/Hz) which will easily meet most application needs.

Control Features:

- Accurate torque regulation
- Precise speed control (open or closed loop)
- Encoder feedback / pulse input (optional)
- DC Bus regulation
- Slip compensation or droop control
- Advanced flying start (instantaneous)
- Process PI loop
- Six digital & two high speed analog inputs
- Three digital and two analog outputs
- PTC Input
- Dedicated enable (selectable)
- Programming flexibility (parameter links)
- Inertia Ride-Through
- Fast Braking (fast stopping w/o brake resistors)
- Dynamic user sets
- Security options
- Assisted start-up and application specific set-up menus

force™ TECHNOLOGY

1 Encoder Interface
This Vector Control option provides an interface for a 5/12-volt pulse encoder.

2 Internal Common Mode Cores*
No additional external cores are required to keep common mode noise from disrupting sensitive electronics. Eliminating external core installation saves labor costs and panel space.

3 Wiring
Clearly marked, conveniently placed terminal blocks provide direct access for power and control wiring. Control blocks are "pull apart" for added convenience.

4 Integral Dynamic Brake*
Standard chopper transistor and available drive-mounted (or separate mounting) braking resistor provide cost-effective dynamic brake options.

5 Internal EMC Filter*
Meets environmental standards without requiring additional panel space.

6 Multi-Color LED's
Status indications are visible with all covers installed to simplify diagnostics.

7 Human Interface Module
A flexible LCD Human Interface Module provides exceptional information display and programming ease in a multi-lingual format.

8 Internal Communications
Allows the user to integrate the drive into the manufacturing process. Status indicators for all internal communication options are visible on the cover for easy setup and monitoring of drive communications.

* Applies to PowerFlex 700 frames 0-6.



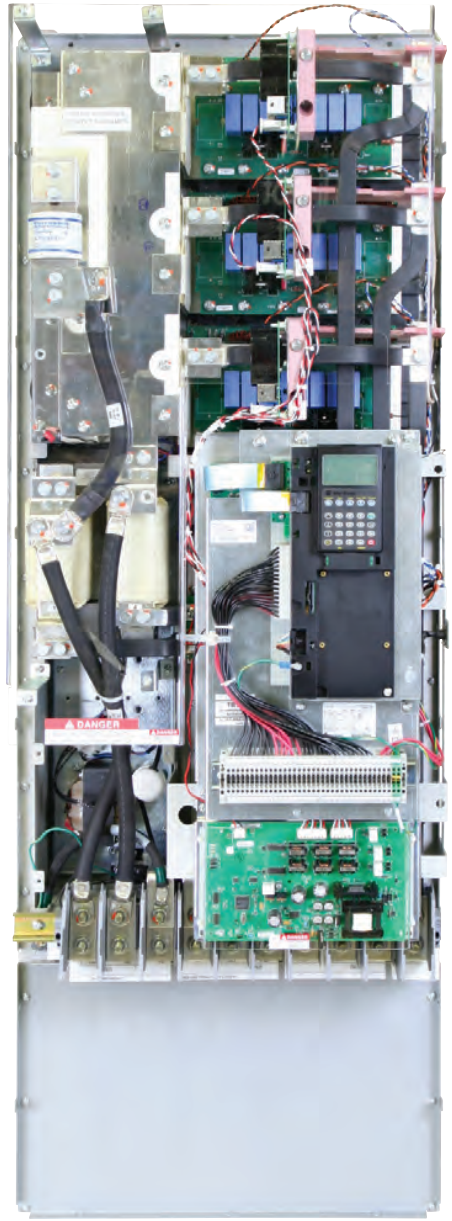
Flexible Packaging Options

- Along with IP20/UL Type 1 (NEMA 1) package options, the PowerFlex 700 drive is also available in IP54/UL Type 12 (NEMA 12) Flange mount and Stand-alone packages (75-200HP).
- IP00/NEMA Open 250-700HP can be mounted with heat-sink out the back and packaged to meet IP54/UL Type 12.
- IP20 drive package configuration for Frames 8-10 comes in MCC-style enclosures.
- The Configured Drives Program simplifies installation and start-up of the PowerFlex 700 AC drive by allowing users to order drive packages that combine operator interface, control, communications and power options in pre-configured assemblies. Offering a number of commonly requested pre-engineered options, as well as more complex packages, Standard Packaged Drives provide a wide range of motor control options.

Communications

The Allen-Bradley® PowerFlex family of drives utilizes Rockwell Automation's NetLinx Open Network Architecture. This provides the common set of features and services for DeviceNet™, ControlNet™ and EtherNet/IP™ networks resulting in lower total cost of ownership. Users can easily manage information from shop floor to top floor and seamlessly integrate their complete system as they control, configure and collect data.

- PowerFlex drives offer internal communication options helping the user to cost-effectively assemble highly integrated applications. Options include: DeviceNet, ControlNet, Universal Remote I/O, and other open communications including Profibus™ and Interbus-S.
- Status indicators for all internal communications options are visible on the cover for easy set-up and monitoring of drive communications.



PowerFlex 700 Frame 7

Human Interface Modules

The LCD Human Interface Module (HIM) supports full multi-lingual text for grouping, parameter descriptions, programming, troubleshooting and start-up in a 7-line by 21-character display. It also offers keypad options in a variety of combinations that can include digital speed control, programming keys, control keys and a full numeric keypad.


Programmer Keypad


Full-Numeric Keypad


NEMA Type 4X

Wireless Interface Module




Outstanding Vector Control

Do you have a demanding application? Many applications that previously required encoder feedback can be run open loop with performance results exceeding your application's requirements. Allen-Bradley's patented Force Technology delivers accurate and reliable torque regulation and speed control regardless of whether the motor is hot or cold.

Low Noise

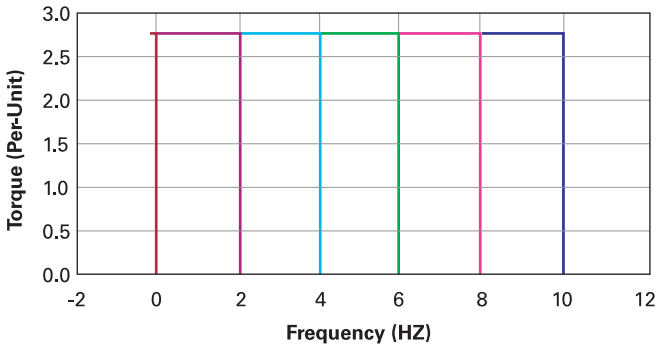
You no longer have to worry about noise or standards compliance. The world-class PowerFlex 700 AC drive (frames 0-6) is designed to meet CE certification and stringent EMC standards without added filtering. Not only does this save you valuable panel space, but it also eliminates any of your concerns regarding compliance.

Additionally, PowerFlex 700 drives have internal common mode cores on the output leads. This helps reduce common mode noise that can be problematic to other components in your system.

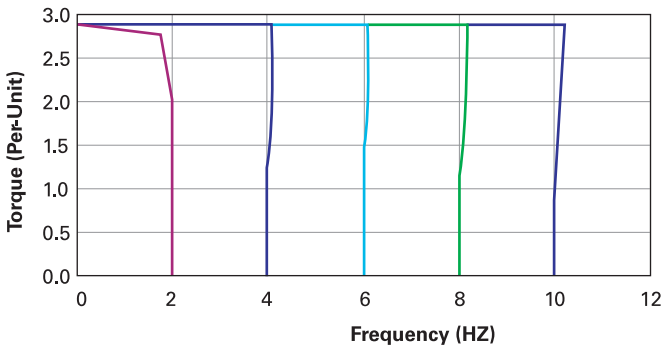
Motor Friendly

Are voltage spikes caused by transistors switching into long motor cables damaging your motor? The PowerFlex 700 drive is the industry leader in protecting your motor from damage due to reflected wave phenomenon. Over the past decade, Rockwell Automation has pioneered the investigation and resolution of this reflected wave phenomenon. This has resulted in proprietary and patented reflected wave reduction algorithms and hardware solutions - both internal to the drive as well as external. No other manufacturer has done more to protect your induction motors from premature failures.

PowerFlex 700 Drive with Vector Control and Encoder



PowerFlex 700 Drive with Vector Control - Encoderless



Integrated Software

For simplified AC drive start-up and reduced development time, we've integrated Allen-Bradley PowerFlex drive configuration with RSLogix5000® software. This single-software approach simplifies parameter and tag programming while still allowing stand-alone drive software tool use on the factory floor.

DriveTools™ SP Software Suite

A powerful PC based software suite, for programming, configuring, and troubleshooting.

- DriveExecutive™ – for online/offline configuration and management of drives and drive peripherals.
- DriveObserver™ – for real-time trending of drive information.

DriveExplorer™ Software

Allen-Bradley DriveExplorer software is an easy-to-use, cost effective online programming tool designed for Microsoft® Windows™ 95/98, Windows NT™ (4.0 or greater) and Windows CE (2.0 or 2.11) operating systems. It provides the user with the means to monitor and configure PowerFlex drive and communication adapter parameters.

Assured Network Connectivity

PowerFlex 700 drives and options are put through an extensive suite of tests to assure compatibility with other Allen-Bradley products from PLCs to PanelViews™. Rockwell Automation offers a wide breadth of communication options along with outstanding network reliability unmatched in the industry.

Application Features

The PowerFlex 700 drives include several features to solve the toughest applications. These include Position Indexing/Speed Profiling, TorqProve™, Oil Pump and Adjustable Voltage Control.

TorqProve™ for Lifting Application:

- Torque Proving (includes Flux Up and Last Torque measurement)
- Brake Proving (includes mode to slowly lower load if brake slips or fails)*
- Float Capability*
- Micro Positioning
- Load-based speed limits (allows fast unloaded speeds)
- End and Deceleration Limit Switch inputs
- Fast Stop
- Encoder and Encoderless operation
- Speed Deviation Fault, Output Phase Loss Fault, Encoder Loss Fault
- Assisted Start-up for easy commissioning
- Designed to comply with CMAA Specification #70

* Available with encoder only – see manual for encoderless restrictions.

Position Indexing / Speed Profiling:

Uses a 16 step array to provide:

- Point-to-point positioning – either absolute or incremental moves (referenced to home position)
- Velocity profiling based on encoder counts, digital inputs, time or parameter levels
- Homing capability
- Blend moves

Applications:

The advanced features of the PowerFlex 700 drive, make it ideal for the following applications:

- Fans & pumps
- Mixers
- Conveyors & palletizers
- Demanding extruders
- Web handling / Tension control
- Lifts / Hoists
- Centrifuges
- Vibration welding
- Induction heating
- Power supplies
- Linear motors
- Pump jacks and PC pumps
- Stamping presses
- Bottling lines
- Test stands

200V/240V

Output Power		200 Volt Class Output Current, Amps			240 Volt Class Output Current, Amps			Frame Size
kW ND (HD)	HP ND (HD)	Cont. ND (HD)	1 min. ND (HD)	3 sec. ND (HD)	Cont. ND (HD)	1 min. ND (HD)	3 sec. ND (HD)	
0.37 (0.25)	0.5 (0.33)	2.5	2.8	3.8	2.2	2.4	3.3	0
0.75 (0.55)	1 (0.75)	4.8	5.6	7.0	4.2	4.8	6.4	0
1.5 (.75)	2 (1.5)	7.8	10.4	13.8	6.8	9.0	12.0	1
2.2 (1.5)	3 (2)	11	12.1	17.0	9.6	10.6	14.4	1
4 (2.2)	5 (3)	17.5	19.3	26.3	15.3	16.8	23.0	1
5.5 (4)	7.5 (5)	25.3	27.8	38.0	22.0	24.2	33.0	1
7.5 (5.5)	10 (7.5)	32.2	38.0	50.6	28.0	33.0	44.0	2
11 (7.5)	15 (10)	48.3	53.1	72.5	42.0	46.2	63.0	3
15 (11)	20 (15)	56.0	64.0	86.0	52.0	63.0	80.0	3
18.5 (15)	25 (20)	78.2	86.0	117.3	70.0	78.0	105.0	4
22 (18.5)	30 (25)	92.0	117.3	156.4	80.0	105.0	136.0	4
30 (22)	40 (30)	120 (92)	132 (138)	175 (175)	104 (80)	115 (120)	175 (160)	5
37 (30)	50 (40)	130 (104)	143 (156)	175 (175)	104 (130)	143 (156)	175 (175)	5
45 (37)	60 (50)	177 (150)	195 (225)	266 (300)	154 (130)	169 (195)	231 (260)	6
55 (45)	75 (60)	221 (177)	243 (266)	308 (308)	192 (154)	211 (231)	288 (308)	6
75 (55)	100 (75)	260 (205)	286 (305)	390 (410)	260 (205)	286 (305)	390 (410)	6

400V/480V

Output Power		400 Volt Class Output Current, Amps			480 Volt Class Output Current, Amps			Frame Size
kW ND (HD)	HP ND (HD)	Cont. ND (HD)	1 min. ND (HD)	3 sec. ND (HD)	Cont. ND (HD)	1 min. ND (HD)	3 sec. ND (HD)	
0.37 (0.25)	0.5 (0.33)	1.3	1.4	1.9	1.1	1.2	1.6	0
0.75 (0.55)	1 (0.75)	2.1	2.4	3.2	2.1	2.4	3.2	0
1.5 (.75)	2 (1.5)	3.5	4.5	6.0	3.4	4.5	6.0	0
2.2 (1.5)	3 (2)	5.0	5.5	7.5	5.0	5.5	7.5	0
4 (2.2)	5 (3)	8.7	9.9	13.2	8.0	8.8	12.0	0
5.5 (4)	7.5 (5)	11.5	13.0	17.4	11.0	12.1	16.5	0
7.5 (5.5)	10 (7.5)	15.4	17.2	23.1	14.0	16.5	22.0	1
11 (7.5)	15 (10)	22.0	24.2	33.0	22.0	24.2	33.0	1
15 (11)	20 (15)	30.0	33.0	45.0	27.0	33.0	44.0	2
18.5 (15)	25 (20)	37.0	45.0	60.0	34.0	40.5	54.0	2
22 (18.5)	30 (25)	43.0	55.5	74.0	40.0	51.0	68.0	3
30 (22)	40 (30)	56.0	64.5	86.0	52.0	60.0	80.0	3
37 (30)	50 (40)	72.0	84.0	112.0	65.0	78.0	104.0	3
45 (37)	60 (50)	85 (72)	94 (108)	128 (144)	77 (65)	85 (98)	116 (130)	4
55 (45)	75 (60)	105 (85)	116 (128)	154 (170)	96 (77)	106 (116)	144 (154)	5
55 (45)	100 (75)	125 (96)	138 (144)	163 (168)	125 (96)	138 (144)	163 (168)	5
75 (55)	–	140 (105)	154 (157)	190 (190)	–	–	–	
90 (75)	125 (100)	170 (140)	187 (210)	255 (280)	156 (125)	172 (188)	233 (250)	6
110 (90)	150 (125)	205 (170)	220 (255)	300 (340)	180 (156)	198 (234)	270 (312)	6
132 (110)	200 (150)	260 (205)	286 (308)	390 (410)	248 (180)	273 (270)	372 (360)	6
160 (150)	250 (200)	292 (263)	322 (395)	438 (526)	292 (263)	322 (395)	438 (526)	7
180 (180)	250 (250)	325 (325)	358 (488)	488 (650)	325 (325)	358 (488)	488 (650)	7
200 (180)	300 (250)	365 (325)	402 (488)	548 (650)	365 (325)	402 (488)	548 (650)	8
240 (200)	350 (300)	415 (365)	457 (548)	623 (730)	415 (365)	457 (548)	623 (730)	8
280 (240)	400 (350)	481 (415)	530 (623)	722 (830)	481 (415)	530 (623)	722 (830)	8
300 (280)	450 (400)	535 (481)	589 (722)	803 (962)	535 (481)	589 (722)	803 (962)	8
350 (300)	500 (450)	600 (535)	666 (803)	908 (1070)	600 (535)	666 (803)	908 (1070)	8
400 (350)	600 (500)	730 (600)	803 (900)	1095 (1200)	730 (600)	803 (900)	1095 (1200)	9
500 (400)	700 (600)	875 (700)	963 (1050)	1313 (1400)	875 (700)	963 (1050)	1313 (1400)	10

600V/690V

Output Power		600 Volt Class Output Current, Amps			690 Volt Class Output Current, Amps			Frame Size
kW ND (HD)	HP ND (HD)	Cont. ND (HD)	1 min. ND (HD)	3 sec. ND (HD)	Cont. ND (HD)	1 min. ND (HD)	3 sec. ND (HD)	
0.75 (0.55)	1 (0.75)	1.7	2.0	2.6	N/A	–	–	0
1.5 (.75)	2 (1.5)	2.7	3.6	4.8	N/A	–	–	0
2.2 (1.5)	3 (2)	3.9	4.3	5.9	N/A	–	–	0
4 (2.2)	5 (3)	6.1	6.7	9.2	N/A	–	–	0
5.5 (4)	7.5 (5)	9.0	9.9	13.5	N /A	–	–	0
7.5 (5.5)	10 (7.5)	11	13.5	18	N /A	–	–	1
11 (7.5)	15 (10)	17	18.7	25.5	N /A	–	–	1
15 (11)	20 (15)	22	25.5	34	N /A	–	–	2
18.5 (15)	25 (20)	27	33	44	N/A	–	–	2
22 (18.5)	30 (25)	32	40.5	54	N /A	–	–	3
30 (22)	40 (30)	41	48	64	N/A	–	–	3
37 (30)	50 (40)	52	61.5	82	N /A	–	–	3
45 (37)	60 (50)	62	78	104	N/A	–	–	4
45 (37)	–	–	–	–	52 (46)	57 (69)	78 (92)	5
55 (45)	–	–	–	–	60 (52)	66 (78)	90 (104)	5
75 (55)	75 (60)	77 (63)	85 (94)	116 (126)	82 (60)	90 (90)	120 (123)	5
90 (75)	100 (75)	99 (77)	109 (116)	126 (138)	98 (82)	108 (123)	127 (140)	5
110 (90)	125 (100)	125 (99)	138 (149)	188 (198)	119 (98)	131 (147)	179 (196)	6
132 (110)	150 (125)	144 (125)	158 (188)	216 (250)	142 (119)	156 (179)	213 (238)	6

NEMA 1 Dimensions mm (in)

Frame Size		Dimensions Height mm (in.)	Width mm (in.)	Depth mm (in.)
0		336 (13.23)	110 (4.33)	200 (7.87)
1		336 (13.23)	135 (5.31)	200 (7.87)
2		342.5 (13.48)	222 (8.74)	200 (7.87)
3		517.5 (20.37)	222 (8.74)	200 (7.87)
4		758.9 (29.88)	219.8 (8.65)	201.6 (7.94)
5		644.5 (25.37)[1]	308.9 (12.16)	275.4 (10.84)
6		850 (33.46)[2]	403.9 (15.90)	275.5 (10.85)
7		1498.6 (59.00)	514.4 (20.25)	406.9 (16.02)
8	300-400 HP	2374 (93.5)	75.7 (29.83)	889 (35)
8	450-500 HP	2374 (93.5)	75.7 (29.83)	1016 (40)
9		2374 (93.5)	75.7 (29.83)	1016 (40)
10		2374 (93.5)	1267.7 (49.91)	889 (35)

Notes:

1 When using the supplied junction box (100 HP drives Only), add an additional 45.1 mm (1.78 in.) to this dimension.

2 When using the supplied junction box, add an additional 126.3 mm (4.97 in.) to this dimension

NEMA Type Open/IP00/Flange Mount and Stand alone NEMA 12/IP54

Frame Size		Height mm (in.)	Width mm (in.)	Depth mm (in.)
5	Standalone	1574.8 (62.0)	609.6 (24.0)	450.7 (17.75)
5	Flange Mount	1061.0 (41.77)	500.0 (19.69)	400.6 (15.77)
6	Standalone	1828.8 (72.0)	711.3 (28.0)	487.8 (19.20)
6	Flange Mount	1100.0 (43.3)	584.0 (23.0)	426.3 (16.8)
7	IP00*	1498.6 (59.00)	514.4 (20.25)	406.9 (16.02)
8	IP00* (300-400 HP)	2275.8 (89.60)	757.7 (29.83)	599.2 (23.59)
8	IP00* (450-500 HP)	2275.8 (89.60)	757.7 (29.83)	726.2 (28.59)
9	IP00*	2275.8 (89.60)	757.7 (29.83)	781.8 (30.78)
10	IP00*	2275.8 (89.6)	1267.7 (49.91)	889 (35)

* "Heatsink-out-the back", heatsink is rated IP54/NEMA 12

Standards

- CSA/cUL
- UL *
- C-Tick, IEC 61800-3
- ATEX
- NFPA 70 *
- NEMA ICS 3.1
- CMAA Specifications #70
- IEC 146
- SEMIF47
- RINA
- CE (Frame 0-6)
  EMC: EN61800-3
  Low Voltage: EN50178
- ABS

* Apply to frames 7-10

Input Specifications

3-Phase Voltage:	200-240V ± 10%, 380-480V ± 10%, 500-690V + 10%/-5%
Frequency:	47 to 63 Hz
Logic Control Ride Through:	0.5 seconds

Output Specifications

Voltage:	Adjustable from 0V to rated motor voltage
Frequency Range:	0-420Hz
Instantaneous Over Current Trip:	220-300% based on drive rating

Enclosure and Ambient Operating Temperatures

Frame 0-6

IP20/Open Type:	0° - 50° C (32° - 122° F)
IP20/UL Type 1:	0° - 40° C (32° - 104° F)
IP54/UL Type 12:	0° - 40° C (32° - 122° F)

Frame 7-10

IP20/NEMA 1, IP00/NEMA Open:	0° - 40° C (32° - 104° F) (heatsink) 0° - 65° C (drive)

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Summary: Application of PEA Lima, LCC and Ohio Power Company for approval of a special arrangement agreement with a mercantile customer
electronically filed by Mr. Yazen Alami on behalf of Ohio Power Company