



The VFD Worksheet is part 2 of the application. Do not submit this file without submitting a completed Part1 Custom Application document file, which can be found at www.duke-energy.com.

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- Electric demand and/or energy reductions must be well documented with auditable calculations.
- Incomplete applications will not be reviewed; all fields are required.

Refer to the complete list of Instructions and Disclaimers, found in the Mercantile Self Custom Application Part 1 document.

Please enter your information and data into the cells that are shaded.
Cells in white are locked and cannot be written over.

Duke Energy Customer Contact Information (Match the information in Application Part 1):

Name	Chris Kearns
Company	GE Aircraft Engines

Equipment Vendor / Project Engineer Contact Information

Name	Brian Beckman
Company	Jacobs/CH2M

Location of Proposed VFD Project

Site Name	North Utility Plant (NUP)
Electric Account Number(s)	84500860013
Site Address	1 Neumann Way Cincinnati, Oh 45215

Before proceeding with the custom application, please verify that your project is not on the Self-Direct Prescriptive application.

The prescriptive rebate applications can be found at:

<http://www.duke-energy.com/ohio-large-business/smart-saver/mercantile-self-direct.asp>

Prescriptive rebate amounts are pre-approved.

Use one worksheet for each type of motor or fan that is being evaluated for a VFD

Driven Equipment Name **GE Core Drive 6KFP43250X9XXCB1**
Quantity **3**
Brake HP (BHP) at Full Load (see note 1) **250.0**
Nameplate HP **250.0**

Type **Pump**

App No.
Rev.

Current Equipment Operation without VFD - Input values for ONE driven equipment and its motor.

% of Full Load BHP of Driven Equipment	BHP of Driven Equipment @ Actual Load (BHP)	Motor output HP as % of Nameplate HP	Motor Efficiency @ Motor Output HP (%)	Motor Electrical Power Draw (kw)	Annual hours that motor runs (see note 2)	Monthly hours that each motor runs (see note 3)												Yearly Total (hr)
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
100 %	250.0	100%	95.4 %	195.49	8,760	744	672	744	720	744	720	744	744	720	744	720	744	8,760
%	0.0	0%	%	#DIV/0!														0
%	0.0	0%	%	#DIV/0!														0
%	0.0	0%	%	#DIV/0!														0
Not Running	0.0	0%	NA	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals					8,760	744	672	744	720	744	720	744	744	720	744	720	744	8,760

Proposed Equipment Operation with VFD - Input values for ONE driven equipment and its motor.

Efficiency of VFD **98 %**

% of Full Load BHP of Driven Equipment	BHP of Driven Equipment @ Actual Load (BHP)	Motor output HP as % of Nameplate	Motor Efficiency @ Motor Output HP (%)	Motor Electrical Power Draw (kw)	Annual hours that motor runs (see note 2)	Monthly hours that each motor runs (see note 3)												Yearly Total (hr)
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
100 %	250.0	100%	95.4 %	195.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90 %	225.0	90%	95.4 %	175.94	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80 %	200.0	80%	95.4 %	156.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70 %	175.0	70%	95.4 %	136.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60 %	150.0	60%	95.4 %	117.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50 %	125.0	50%	95.4 %	97.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40 %	100.0	40%	95.4 %	78.20	8760	744	672	744	720	744	720	744	744	720	744	720	744	8760
30 %	75.0	30%	95.4 %	58.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 %	50.0	20%	95.4 %	39.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 %	25.0	10%	95.4 %	19.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Not Running	0.0	0%	NA	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals					0	0	0	0	0	0	0	0	0	0	0	0	0	0

Detailed Project Description Attached? **Yes** (Required)

1 Brake HP (BHP) at Full Load

The "full load" operating condition is the condition at which the driven equipment operates for the base condition (i.e., without the VFD)

2 Annual hours that motor runs

If the % operating loads do not vary between months, then enter the total annual hours that the motor will run at full load, partial load and hours not operating.

3 Monthly hours that each motor runs

If the % operating loads vary between months (due to weather conditions or seasonal load), fill in the expected hours that the motor will run each month at full load, partial load and hours not operating.

App No.	0
Rev.	0

Operating Hours (see note 4)

24 x 7	Weekday		Saturday		Sunday		Weeks of Use In Year (see note 5)	Total Annual Hours of Use
	Start Hour	End Hour	Start Hour	End Hour	Start Hour	End Hour		
	12:00 AM	12:00 AM	12:00 AM	12:00 AM	12:00 AM	12:00 AM	52	8,760

Energy Savings

	Existing (no VFD)	Proposed (VFD)	Savings	Describe how energy numbers were calculated
Annual Electric Energy	5,137,548 kWh	2,264,460 kWh	2,873,088 kWh	This includes the savings for all three of the drives
Electric Demand (kilowatts)	586 kW	258 kW	328 kW	
Calculations attached	Yes	Yes		

Simple Payback

Average electric rate (\$/kWh) on the applicable accounts (see note 6)	\$0.06
Estimated annual electric savings	\$172,385
Other annual savings in addition to electric savings, such as operations, maintenance, other fuels	\$0.00
Incremental cost to implement the project (equipment & installation) (see note 7)	\$262,500.00
Copy of vendor proposal is attached (see note 8)	Yes
Simple Electric Payback in years (see note 9)	1.522751735
Total Payback in years	1.522751735

4 Operating Hours

Describe when the equipment is typically used. If the project is proposed for more than one site, provide any variations in operating hours between the sites on a separate sheet.

5 Weeks of Use in Year

If the equipment is not in use 52 weeks during the year (for example, during holiday or summer break), provide an explanation of when usage is not expected and why:

N/A - In use 52 weeks/yr

6 Average electric rate (\$/kWh)

If you do not know your average electric rate, use \$0.10/kWh.

7 Incremental cost to implement the project

Costs exclude self installation costs.

Retrofit projects, incremental cost is the total cost of the proposed project. New construction or where the existing equipment must be replaced anyway, then incremental cost is the premium of the proposed high efficiency project over baseline.

8 Copy of vendor invoice is attached

Vendor invoices detailing costs of the project are always required.

New construction projects or where the existing equipment must be replaced anyway, vendor proposal of baseline must also be attached.

9 Simple Electric Payback

If the simple payback on the project is less than 1 year, the rebate structure is affected.

Please check that the electric rate is accurate based on history.



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Please enter your information and data into the cells that are shaded.
Cells in white are locked and cannot be written over.

Duke Energy Customer Contact Information (Match the Information in Application Part 1):

Name	Chris Kearns
Company	GE Aircraft Engines

Equipment Vendor / Project Engineer Contact Information

Name	Brian Beckman
Company	Jacobs/CH2M

Location of Proposed VFD Project

Site Name	North Utility Plant (NUP)
Electric Account Number(s)	84500860013
Site Address	1 Neumann Way Cincinnati, Oh 45215

Before proceeding with the custom application, please verify that your project is not on the Self-Direct Prescriptive application.

The prescriptive rebate applications can be found at:

<http://www.duke-energy.com/ohio-large-business/smart-saver/mercantile-self-direct.asp>

Prescriptive rebate amounts are pre-approved.

Use one worksheet for each type of motor or fan that is being evaluated for a VFD

Driven Equipment Name **GE Core Drive 6KFP43150X9XXCB1**
Quantity **2**
Brake HP (BHP) at Full Load (see note 1) **150.0**
Nameplate HP **150.0**

Type **Pump**

App No.
Rev.

Current Equipment Operation without VFD - Input values for ONE driven equipment and its motor.

% of Full Load BHP of Driven Equipment	BHP of Driven Equipment @ Actual Load (BHP)	Motor output HP as % of Nameplate HP	Motor Efficiency @ Motor Output HP (%)	Motor Electrical Power Draw (kw)	Annual hours that motor runs (see note 2)	Monthly hours that each motor runs (see note 3)												Yearly Total (hr)
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
100 %	150.0	100%	95 %	117.79	8,760	744	672	744	720	744	720	744	744	720	744	720	744	8,760
%	0.0	0%	%	#DIV/0!														0
%	0.0	0%	%	#DIV/0!														0
%	0.0	0%	%	#DIV/0!														0
Not Running	0.0	0%	NA	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals					8,760	744	672	744	720	744	720	744	744	720	744	720	744	8,760

Proposed Equipment Operation with VFD - Input values for ONE driven equipment and its motor.

Efficiency of VFD **98 %**

% of Full Load BHP of Driven Equipment	BHP of Driven Equipment @ Actual Load (BHP)	Motor output HP as % of Nameplate	Motor Efficiency @ Motor Output HP (%)	Motor Electrical Power Draw (kw)	Annual hours that motor runs (see note 2)	Monthly hours that each motor runs (see note 3)												Yearly Total (hr)
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
100 %	150.0	100%	95 %	117.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90 %	135.0	90%	95 %	106.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80 %	120.0	80%	95 %	94.23	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70 %	105.0	70%	95 %	82.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60 %	90.0	60%	95 %	70.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50 %	75.0	50%	95 %	58.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40 %	60.0	40%	95 %	47.12	8760	744	672	744	720	744	720	744	744	720	744	720	744	8760
30 %	45.0	30%	95 %	35.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 %	30.0	20%	95 %	23.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 %	15.0	10%	95 %	11.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Not Running	0.0	0%	NA	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals					0	0	0	0	0	0	0	0	0	0	0	0	0	0

Detailed Project Description Attached? **Yes** (Required)

1 Brake HP (BHP) at Full Load

The "full load" operating condition is the condition at which the driven equipment operates for the base condition (i.e., without the VFD)

2 Annual hours that motor runs

If the % operating loads do not vary between months, then enter the total annual hours that the motor will run at full load, partial load and hours not operating.

3 Monthly hours that each motor runs

If the % operating loads vary between months (due to weather conditions or seasonal load), fill in the expected hours that the motor will run each month at full load, partial load and hours not operating.



App No.	0
Rev.	0

Operating Hours (see note 4)

24 x 7	Weekday		Saturday		Sunday		Weeks of Use In Year (see note 5)	Total Annual Hours of Use
	Start Hour	End Hour	Start Hour	End Hour	Start Hour	End Hour		
	12:00 AM	12:00 AM	12:00 AM	12:00 AM	12:00 AM	12:00 AM	52	8,760

Energy Savings

	Existing (no VFD)	Proposed (VFD)	Savings	Describe how energy numbers were calculated
Annual Electric Energy	2,063,663 kWh	909,596 kWh	1,154,067 kWh	Total for both drives
Electric Demand (kilowatts)	236 kW	104 kW	132 kW	
Calculations attached	Yes	Yes		

Simple Payback

Average electric rate (\$/kWh) on the applicable accounts (see note 6)	\$0.06
Estimated annual electric savings	\$69,244
Other annual savings in addition to electric savings, such as operations, maintenance, other fuels	\$0.00
Incremental cost to implement the project (equipment & installation) (see note 7)	\$105,000.00
Copy of vendor proposal is attached (see note 8)	Yes
Simple Electric Payback in years (see note 9)	1.516376527
Total Payback in years	1.516376527

4 Operating Hours

Describe when the equipment is typically used. If the project is proposed for more than one site, provide any variations in operating hours between the sites on a separate sheet.

5 Weeks of Use In Year

If the equipment is not in use 52 weeks during the year (for example, during holiday or summer break), provide an explanation of when usage is not expected and why:

N/A - In use 52 weeks/yr

6 Average electric rate (\$/kWh)

If you do not know your average electric rate, use \$0.10/kWh.

7 Incremental cost to implement the project

Costs exclude self installation costs.

Retrofit projects, incremental cost is the total cost of the proposed project. New construction or where the existing equipment must be replaced anyway, then incremental cost is the premium of the proposed high efficiency project over baseline.

8 Copy of vendor invoice is attached

Vendor invoices detailing costs of the project are always required.

New construction projects or where the existing equipment must be replaced anyway, vendor proposal of baseline must also be attached.

9 Simple Electric Payback

If the simple payback on the project is less than 1 year, the rebate structure is affected.

Please check that the electric rate is accurate based on history.



The General Worksheet is part 2 of the application. Do not submit this file without submitting a completed Part1 Custom Application document file, which can be found at www.duke-energy.com. This worksheet is for all projects that are not easily submitted through one of the other worksheets

Before you complete this application, please note the following important criteria:

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- Rebates already decided to proceed.
- Electric demand and/or energy reductions must be well documented with auditable calculations.
- Incomplete applications will not be reviewed; all fields are required.

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Please enter your information and data into the cells that are shaded.
Cells in white are locked and cannot be written over.

Duke Energy Customer Contact Information (Match the information in Application Part 1):

Name	Chris Kearns
Company	GE Aircraft Engines

Equipment Vendor / Project Engineer Contact Information

Name	Kelly Rogers
Company	Energy Management Solutions Inc.

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Prescriptive rebate amounts are pre-approved.



List of Sites (Required)

App No.	
Rev.	

Provide a list of sites addressed by this custom rebate application

[illegible]

1 Site ID

Can be a store number, building name or other way to identify the location. If there is only one site involved in this application, then a Site ID is not necessary.

2 Account Numbers

Must match the facility of the proposed project(s). If there are multiple meters at a site, only include the meters that pertain to the project(s).



For each project, answer the following questions (use one worksheet per project)

Project Name: **NUP Centralized Chillers**

App No.	0
Rev.	0

How would you classify this project? (Place an x in all boxes that apply.)

Lighting		Heating/Cooling	x	Air Compressor		Energy Management System	
VFD		Motors/Pumps		Process Equipment		Other, describe below:	

Brief Project Description

Describe the Baseline (see note 3) Equipment/System	Describe the Proposed High Efficiency Project
Multiple different RTU's on each building, providing individual cooling.	Using centralized chillers to cool the buildings, allowing for better part load energy savings and capacity control.

If Existing Equipment is the Baseline, how many years of useful life remain or how many years until scheduled replacement?

Detailed Project Description Attached? **Yes** (Required)

Operating Hours (see note 4)

24 x 7	Weekday		Saturday		Sunday		Weeks of Use In Year (see note 5)	Total Annual Hours of Use
	Start Hour	End Hour	Start Hour	End Hour	Start Hour	End Hour		
Yes								8,760

Energy Savings

	Baseline (see Note 3)	Proposed	Savings	Describe how energy numbers were calculated
Annual Electric Energy	5,045,455 kWh	#####	1,266,514 kWh	
Electric Demand	4,310 kW	3,258 kW	1,052 kW	
Calculations attached	Yes	Yes	(Required)	

Simple Payback

Average electric rate (\$/kWh) on the applicable accounts (see note 6)	\$0.07
Estimated annual electric savings	\$88,656
Other annual savings in addition to electric savings, such as operations, maintenance, other fuels	
Incremental cost to implement the project (equipment & installation) (see note 7)	\$722,355.00
Copy of vendor proposal is attached (see note 8)	No
Simple Electric Payback In years (see note 9)	8.147842932
Total Payback in years	8.147842932

1 Baseline

Retrofit projects: the existing equipment is the baseline.

New construction projects: the baseline is the standard option in today's market, taking into account any applicable organizational, local, state or federal codes or standards currently in effect.

4 Operating Hours

Describe when the equipment is typically used. If the project is proposed for more than one site, provide any variations in operating hours between the sites on a separate sheet.

5 Weeks of Use In Year

If the equipment is not in use 52 weeks during the year (for example, during holiday or summer break), provide an explanation of when usage is not expected and why:

52 Weeks

6 Average electric rate (\$/kWh)

If you do not know your average electric rate, use \$0.10/kWh.

7 Incremental cost to implement the project

Costs exclude self installation costs. Retrofit projects, incremental cost is the total cost of the proposed project. New construction or where the existing equipment must be replaced anyway, then incremental cost is the premium of the proposed high efficiency project over baseline.

8 Copy of vendor invoice is attached

Vendor invoices detailing costs of the project are always required.

New construction projects or where the existing equipment must be replaced anyway, vendor proposal of baseline must also be attached.

9 Simple Electric Payback

If the simple electric payback is less than 1 year, the rebate structure is affected. Double check average electric rate for correct payback.

451-AHU-1-3



AEGIS[®] SGR
BEARING PROTECTION RING
INSTALLED

Patented Technology

BALDOR • RELIANCE
SuperE Motor

CAT. NO.	EM3615T-G					
SPEC.	36M5245268G1					
HP	5					
VOLTS	230/460					
AMPS	13.4/6.7					
R.P.M.	1750					
FRAME	184T		HZ	60	PH	3
SER. F.	1.15	CODE	✓	DES. B	CLASS	H
NEMA NOM. EFF.	89.5	✓	P.F.	78	✓	
RATING	400 AMP-CONT					
USE DATA	TABLE AT 208/15T					
WARRANTY	1 YEAR					
MADE IN	USA					

451-AHU-1-2

BALDOR • RELIANCE SuperE Motor

CAT. NO.	EM2333T-G					
SPEC.	00J350Z01001					
HP	15					
VOLTS	230V					
AMPS	36.2/18.1					
R.P.M.	1785					
FRAME	254T		H2	50	PH	3
SER. F.	1.15	CODE	H	DES. A	CLASS	H
NEMA NOM. EFF.	92.4	%	P.F.	83	%	
RATING	40C AMB-CONT					
CC	010A	USABLE AT 208V		58	A	
BEARINGS	DE	6309		ODE	5208	
ENCL	TEFC	SN	Z180060121			

NEMA
Premium



RU

BALDOR ELECTRIC CO. PT. 1 SMITH AVE. MFG. IN U.S.A.
NP125K

451-AHU-2-4

MAX-GE™ PREMIUM EFFICIENCY INVERTER DUTY MOTOR **NEMA Premium**

HP/KW	15/11	15/11	TYPE	AEMHP
Hz	60	50	CAT. NO.	NP0154G
VOLTS	230/460	190/380	FRAME	254T
AMPS	34.8/17.3	43.2/21.6	ENCL.	TEFC
FLA	1765	1455	RATING	CONT.
CODE	G	H	INS.	F
	1.15	1.0	PHASE	3
MIN. EFF.	82.4	91.0	AMB	40°C
		89.5	WEIGHT	302 LBS
			FINISH	63092Z
			ODE BRG	93077Z
PWM VFD			CP	
DUTY	Hz	Hz		
CABLE IN		V NETWORK	AMP	
TECC® Westinghouse MOTOR COMPANY HOUSTON, TEXAS				

CHINA 30M3E3(W)

451-AHU-2-2

MAX-PE™ PREMIUM EFFICIENCY INVERTER DUTY MOTOR **NEMA Premium™**

HP/kW	25/18.5	25/18.5	TYPE	AEHHP
Hz	60	50	CAT. NO.	NV25G
VOLTS	230/460	190/380	FRAME	3241
AMPS	40.6/30.3	74.6/37.3	ENCL.	TEFC
R.P.M.	1170	970	RATING	CONT.
CODE	G	H	INS.	F
S.F.	1.15	1.0	TEMP. RISE	3
WINDING	930	910	TEMP. RISE	40°C
WEIGHT			WEIGHT	630
DESIGN			DE BRG	3241
DE BRG			DE BRG	3241
PWM VFD			Hz (CMTZ BASE)	
AMP			AMP	

TEC **TECHNICAL MOTOR CORP.** **TEX**

17-1332
17-1332
17-1332
17-1332

MADE IN CHINA
MOTOR

451-AHU-3-4

MAX-PE™ PREMIUM EFFICIENCY INVERTER DUTY MOTOR				NEMA Premium	
HP/KW	3/2.2	3/2.2	TYPE	AEHHP	
Hz	60	50	CAT. NO.	NP00343	
VOLTS	230/310	190/380	FRAME	182T	
AMPS	7.7/3.85	8.78/4.39	ENCL.	TEFC	
R.P.M.	1755	1430	RATING	CONT.	
CODE	K	L	INS.	F	
S.F.	1.15	1.0	PHASE	3	
NOM. EFF.	89.5	86.5	AMB.	40°C	
MIN. EFF.	87.5	84.0	WEIGHT	102 LBS	
DESIGN	B	B	DE BRG	6308ZZ	
SER. NO.	YAP315B584057		ODE BRG	6306ZZ	
PWM VFD	VT	CT	CP	S.F. 1.0	
DUTY	3-60 Hz	6-60 Hz	60-120 Hz	(60Hz BASE)	
USABLE ON	208	V NETWORK AT	8.52	AMF	
TECO® Westinghouse MOTOR COMPANY ROUND ROCK, TEXAS					

MADE IN CHINA
32045R-20M3E3(W)

451-AHU-3-2

7.5/5.5		7.5/5.5	AER	
230/460		190/380	FRAM	213T
17.34/8.67		21.2/10.6	END	TEFG
CODE			RATING	GONT
S.F.			PHASE	12
91.0		89.5		45°C
89.5		87.5		187/155
B		B		430/22
RBP4104151012				
3~60		6~60	60~90	
TECC® Westinghouse				

45
點火天

Super Motor



WEIGHT, 3680 LBS.

CHP-451-6

 **YORK****YMC²**

BY JOHNSON CONTROLS

YORK MAGNETIC
CENTRIFUGAL CHILLER**CH-451-13****OPERATIONAL DATA**

INSTALLATION/OPERATIONAL MANUAL: 160.84-OM1

WIRING DIAGRAM: 092-40643-000 thur-014

VOLTS: 460 PHASE: 3 HERTZ 60

RATED INPUT AMPS (Job FLA): 753

MIN. CIR. AMPACITY: 942

REFRIGERANT: 1710 lbs. 776 kgs. of R-134A

FACTORY CHARGED: X FIELD CHARGED: N/A

SYSTEM OPERATING WT: 35398 lbs. 16056 kgs.

SYSTEM DETAILS

SALES ORDER NO. 6N0601800301

SYSTEM YMC2-S3517ABS

COMPRESSOR M6C-331FAC

EVAPORATOR EC3914-371-CS1-2GMR

CONDENSER CB3914-260-BS1-2GMR

VSD MODEL NO. HYP1278XHC30B-46A

UNIT SERIAL NO. SHDM-612700

DESIGN WORKING PRESSURE

	EVAPORATOR PSIG [BARG]	CONDENSER PSIG [BARG]
REFRIGERANT	235[16.2]	235[16.2]
LIQUID	150[10.3]	150[10.3]

LUBRICATED
WITH

MOBIL POLYREX EM

NP2496L

CWP-451-3

BALDOR • RELIANCE

Super Motor

C010A

SPEC NO. MA44-7107-4238 CAT NO. 1201104406-000010 FRAME SIZE 449T

HP 250 VOLTS 460 PHASE 3 DESIGN B TYPEP

RPM 1189 AMPS 285 HZ 60 AMB 40 °C SF 1.15

DRIVE END BEARING 90BC03J30X DUTY CONT INSUL CLASS F

OPP. D.E. BEARING 90BC03J30X ENCLTEFC CODE G

SER NO. X1605M86827 POWER FACTOR 86 NEMA NOM EFFICIENCY 95.3

MAX CORR KVAR 68.2 GUARANTEED EFFICIENCY 95



US

Energy Verified

INV. DTY 10:1 VT. 1.0SF NEMA NOM/OSA QUOTED EFF AT 100% LOAD

MOTOR WEIGHT 3125 LBS.

Cooling Tower Fan Motor



DUTY	HP	RPM	AMPS	VOLTS	HZ
CONT	50	273	73	460	19.87
START	50	273	73	440	19.87
CAT NO.			SPEC NO. 733-4000-0031		
SER. NO. 33163220230			FRC FL3614Y		INSUL H
PH. 5	MAX. SAFE SPEED 117		AMB. 30 °C	MIN. AMB. -25 °C	
DESIGN NO. PH 633A		TYPE CTD		ENCL. TEAO	
S. F. 1.00			D. E. BRG 308008J50X		
ENCL. MOD.			D. O. E. BRG 1108008J50X		
MINIMUM AIRFLOW VELOCITY				765 FT. PER MINUTE	
51P88F00A203					

PATENT US 7,880,348, 02

BALDOR ELECTRIC CO. FT. SMITH, AR MFG. IN U.S.A.

PLANT 15

000613-006ABB

HWP-451-5

AWARNING

EYEBOLTS
LUGS IF PL
FOR LIFTING
COMPONE
THEY ARE

FAILURE T
INSTRUCT
IN INJURY

BALDOR • RELIANCE

Super Motor

1201154033-000010		SPEC. MP44G3907	
150	AMPS 160	VOLTS 460	DESIGN B
FRAME SIZE 345T	RPM 1785	W2 60	AMB 30° C SF 1.00
DRIVE END 908C03J30X	PH 3	DUTY CONT	INSUL. CLASS F
BEARING 908C03J30X	TYPE B	ENCL TEFC	CODE F
SER. NO. X1605M69216	POWER FACTOR 86	NEMA NOM. EFFICIENCY 93.8	
	MAX CORR 30.0	EFFICIENCY 95.0	
NEMA NOM/CSA QUOTED EFFICIENCY @ 100% LOAD			
INVERTER DUTY 10h1-V1		MAX. LOAD 1.85	
BALDOR ELECTRIC CO. FT. SMITH, AR. MFG. IN U.S.A.			

COMPONENT MOTOR

UL

E 54825
E 43451

Qty	Description & Tag
Please confirm pump rotation during submittal process.	
3	Tag: CHP-451-1,2,3 B&G Vertical Split Case Pump Series VSX-VSCS, Model 8 x 10 x 22A, BF, 400 HP, 1800 RPM, with 17.25" Impeller, Unitized EPR-Carbon/SIC (Standard) Seal, 250# ANSI Flange Drilling/Seal Adder for 300# PSI, Woods Duraflex Spacer, QDP, Nema Premium Efficient, 460/3/60 Motor, 3200 GPM, 290 FT TDH <i>TEFC</i>
2	Tag: HWP-451-1,2 B&G Vertical Split Case Pump Series VSX-VSCS, Model 4 x 6 x 17-1/2A, BF, 150 HP, 1800 RPM, with 16.5" Impeller, Unitized EPR-Carbon/SIC (Standard) Seal, 250# ANSI Flange Drilling/Seal Adder for 300# PSI, Woods Duraflex Spacer, QDP, Nema Premium Efficient, 460/3/60 Motor, 1200 GPM, 260 FT TDH <i>TEFC</i>
3	Tag: CWP-451-1,2,3 B&G Vertical Split Case Pump Series VSX-VSCS, Model 14 x 16 x 17-1/2A, BF, 250 HP, 1200 RPM, with 15.625" Impeller, Unitized EPR-Carbon/SIC (Standard) Seal, Woods Duraflex Spacer, QDP, Nema Premium Efficient, 460/3/60 Motor, 8100 GPM, 80 FT TDH <i>250</i> <i>6870 110</i> <i>TEFC</i>

SEE REVISED CWP SUBMITTAL FOR
CHANGE TO 250HP

☐ REVIEWED	☒ REVIEWED/CORRECTIONS NOTED
☐ REJECTED	☐ REVISE AND RESUBMIT

Corrections or comments made on the submittals during this review do not relieve Contractor from compliance with requirements of the Contract Documents. This review is for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Document. The Contractor remains responsible for determining the accuracy and completeness of other details such as dimensions and quantities; for substantiating instructions for installations; verifying materials, field measurements and related construction criteria; checking, coordinating, and performing Work in compliance with the Contract Documents.

KZF DESIGN Inc. *JAL* Date *3/8/16* *+3/28/16*

REVISE + SUBMIT CWP-45-1,2,3
ONLY.

Job Name: GE North Utility Plant
 Engineer: KZF Engineers
 Contractor: CH2M Hill

blackmore and glunt, Inc.



11435 Williamson Rd.

Cincinnati, OH 45241

PH: 513.489.5225

Prepared By: Kyle Browning

Date: 3/1/2016

JOB: GE Aviation North Utility Plant

REPRESENTATIVE: Blackmore & Glunt - Cincinnati

UNIT TAG: CHP-451-1,2,3

ENGINEER: KZF Design

CONTRACTOR:

ORDER NO.

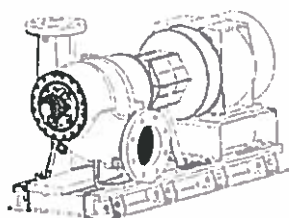
SUBMITTED BY: Kyle Browning

APPROVED BY:

DATE: 3/1/2018

DATE:

DATE:



Model VSCS 8x10x22A Double Suction Split Case Pump



SPECIFICATIONS

FLOW	3200 (GPM)	HEAD	290 (FT)
HP	400	RPM	1800
VOLTS	480		
CYCLE	80	PHASE	3
Baldor TEFC Rep Selected: (2015-7584), Inverter Duty, NEMA Premium Efficient, Special Option: Shaft Grounding Rings PREMIUM EFF Inverter Duty			
ENCLOSURE			
APPROX. WEIGHT	7834		
SPECIALS			

STANDARD MATERIALS OF CONSTRUCTION

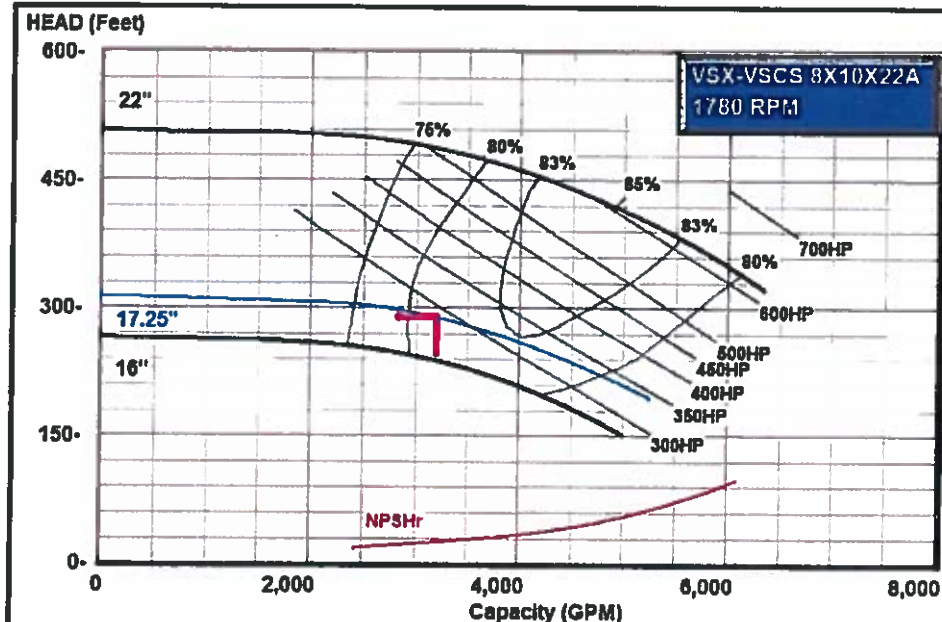
- ☒ Cast Iron Bronze Fitted
- ☒ Heavy Duty Maintenance Free Bearings
- ☒ Alignment Friendly Coupling
- ☒ Heavy Duty Groutless Baseplate
- ☒ ANSI/OSHA Coupling Guard
- ☒ ISO 1840-1:2003 Impeller Balance

OPTIONAL MATERIALS OF CONSTRUCTION

- ☐ Galvanized Drip Pan
- ☒ Spacer Coupling

TYPE OF SEAL AND WORKING PRESSURE

- ☐ Standard: 175 PSIG (12 BAR) max. working pressure, flat face flanges, 125# ANSI flange drilling, Unitized mechanical seal, EPB/Carbon/Silicon Carbide, 125 PSIG (8.5 BAR) max. suction pressure, 0 to 300°F (-18 to 149°C)
- ☒ Optional: 300 PSIG (20 BAR) max. working pressure, flat face flanges, 250# ANSI flange drilling, Unitized mechanical seal, EPB/Carbon/Silicon Carbide, 125 PSIG (8.5 BAR) max. suction pressure, 0 to 300°F (-18 to 149°C)
- ☐ Optional: 300 PSIG (20 BAR) max. working pressure, flat face flanges, 250# ANSI flange drilling, balanced mechanical seal, EPB/Graphite loaded Silicon Carbide on Graphite loaded Silicon Carbide, 300 PSIG (20 BAR) max. suction pressure, 0 to 300°F (-18 to 149°C)



Design Capacity = 3200.0 GPM
Design Head = 290.0 Feet

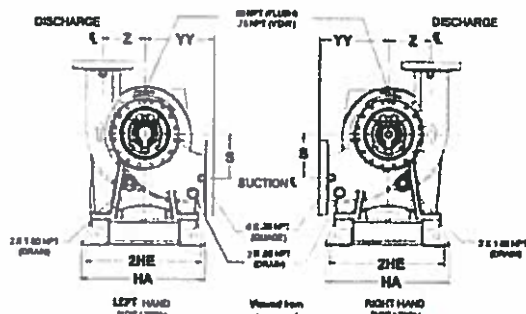
Suction Size = 10 "
Suct. Velocity = 13 fps
Discharge Size = 8 "
Disc. Velocity = 20.5 fps

Min. Imp. Dia. = 16 "
Max. Imp. Dia. = 22 "
Cut Dia. = 17.25 "

Max. Flow = 5252 GPM
B.E.P. Flow = 3657 GPM

Eff. @ Duty-Point = 82.32 %
Motor Size = 400 HP

B.H.P. @
Duty-Point = 284.62 BHP
Max. B.H.P. for
Imp. Cut = 341.46 BHP



FLANGE DIMENSIONS IN INCHES (MM)

	SIZE	THICKNESS	O.D.
Discharge	8"	1.81 (46)	14.75 (375)
Suction	10"	2.06 (52)	17 (432)

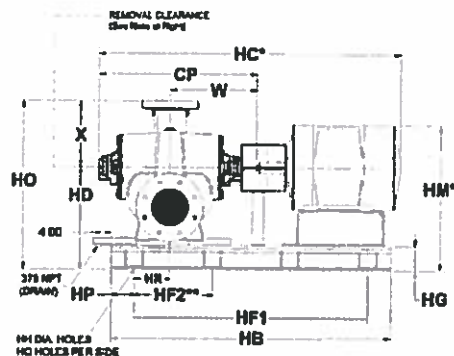
FLANGES ARE DRILLED 125# ANSI - STANDARD
250# ANSI - AVAILABLE

DIMENSIONS IN INCHES (MM)

S	X	YY	Z
13.75 (349)	23 (584)	23 (584)	13.75 (349)

Removal clearance from end
of bracket: 26 Inches (660 mm)

SPACER COUPLER



*Motor dimensions are approximate and vary by manufacturer and motor type.

**Distance to the next available hole.

MOTOR FRAME	DIMENSIONS - INCHES (mm) FOR PUMPS WITH SPACER COUPLER															
	CP	HA	HB	HC* MAX.	HD	2HE	HF ₁	HF ₂ **	HG	HH	HM* MAX.	HO	HP	HQ	HR	W
364T/TS	41.4 (1052)	41 (1041)	96 (2438)	86.859 (2206)	31.5 (800)	39.12 (994)	86 (2184)	17.2 (437)	7 (178)	1.13 (29)	41.45 (1053)	54.5 (1384)	5 (127)	6	14.75 (375)	23.21 (590)
365T/TS	41.4 (1052)	41 (1041)	96 (2438)	86.859 (2206)	31.5 (800)	39.12 (994)	86 (2184)	17.2 (437)	7 (178)	1.13 (29)	41.45 (1053)	54.5 (1384)	5 (127)	6	14.75 (375)	23.21 (590)
404T/TS	41.4 (1052)	41 (1041)	105 (2667)	88.46 (2272)	31.5 (800)	39.12 (994)	95 (2413)	19 (483)	7 (178)	1.13 (29)	41.97 (1068)	54.5 (1384)	5 (127)	6	14.75 (375)	23.21 (590)
405T/TS	41.4 (1052)	41 (1041)	105 (2667)	91.46 (2323)	31.5 (800)	39.12 (994)	95 (2413)	19 (483)	7 (178)	1.13 (29)	41.97 (1068)	54.5 (1384)	5 (127)	6	14.75 (375)	23.21 (590)
444T/TS	41.4 (1052)	41 (1041)	105 (2667)	96.926 (2462)	31.5 (800)	39.12 (994)	95 (2413)	19 (483)	7 (178)	1.13 (29)	47.02 (1194)	54.5 (1384)	5 (127)	6	14.75 (375)	23.21 (590)
445T/TS	41.4 (1052)	41 (1041)	105 (2667)	98.53 (2503)	31.5 (800)	39.12 (994)	95 (2413)	19 (483)	7 (178)	1.13 (29)	47.02 (1194)	54.5 (1384)	5 (127)	6	14.75 (375)	23.21 (590)
447T/TS	41.4 (1052)	41 (1041)	105 (2667)	105.01 (2667)	31.5 (800)	39.12 (994)	95 (2413)	19 (483)	7 (178)	1.13 (29)	45.38 (1153)	54.5 (1384)	5 (127)	6	14.75 (375)	23.21 (590)
➔ 449T/TS	41.4 (1052)	41 (1041)	105 (2667)	106.71 (2685)	31.5 (800)	39.12 (994)	95 (2413)	19 (483)	7 (178)	1.13 (29)	45.38 (1153)	54.5 (1384)	5 (127)	6	14.75 (375)	23.21 (590)
5008S/MS † ‡	41.4 (1052)	41 (1041)	105 (2667)	101.53 (2579)	31.5 (800)	39.12 (994)	95 (2413)	19 (483)	7 (178)	1.13 (29)	46 (1168)	54.5 (1384)	5 (127)	6	14.75 (375)	23.21 (590)
5010S/MS † ‡	41.4 (1052)	41 (1041)	108 (2743)	108.53 (2757)	33.88 (861)	38 (965)	98 (2489)	24.5 (622)	9.38 (238)	1.375 (35)	48.38 (1229)	56.88 (1445)	5 (127)	5	13 (330)	23.21 (590)
5807S † ‡	41.4 (1052)	41 (1041)	118 (2987)	111.65 (2838)	33.88 (861)	38 (965)	108 (2743)	27 (686)	9.38 (238)	1.375 (35)	49.44 (1256)	56.88 (1445)	5 (127)	5	13 (330)	23.21 (590)
5809S † ‡	41.4 (1052)	41 (1041)	118 (2997)	118.65 (3014)	33.88 (861)	38 (965)	108 (2743)	27 (686)	9.38 (238)	1.375 (35)	49.44 (1256)	56.88 (1445)	5 (127)	5	13 (330)	23.21 (590)
5811S † ‡	41.4 (1052)	41 (1041)	118 (2997)	126.65 (3217)	33.88 (861)	38 (965)	108 (2743)	27 (686)	9.38 (238)	1.375 (35)	49.44 (1256)	56.88 (1445)	5 (127)	5	13 (330)	23.21 (590)

Dimensions are subject to change. Not to be used for construction purposes unless certified.

Units may be built where foot/feet overhang the motor mounting platform. If overhang is unacceptable, consult factory for a custom submittal, quotation and/or lead time. A certified motor drawing will be required.

These dimensions are valid when using the Woods DuraFlex spacer coupling option. For dimensions on Faulk SteelFlex coupling options, consult factory for a special submittal drawing.

† For all customer supplied motors above 449 NEMA frame, a certified motor drawing must be supplied by the customer at the time of order entry.

‡ Submittal dimensions for motor frames above 449 NEMA are specific to ODP U.S. Electric Motors Only.

JOB: GE Aviation North Utility Plant

REPRESENTATIVE: Blackmore & Glunt - Cincinnati

UNIT TAG: HWP-451-1,2

ENGINEER: KZF Design

CONTRACTOR:

ORDER NO.

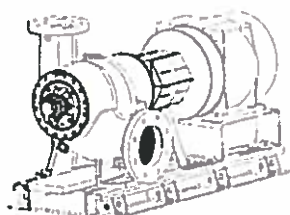
SUBMITTED BY: Kyle Browning

APPROVED BY:

DATE: 3/1/2016

DATE:

DATE:



Model VSCS

4x6x17 1/2 A

Double Suction Split Case Pump



SPECIFICATIONS

FLOW **1200 (GPM)** HEAD **260 (FT)**

HP **150** RPM **1800**

VOLTS **480**

CYCLE **60** PHASE **3**

Baldor TEFC Rep Selected:
(2015-7584), Inverter Duty, NEMA
Premium Efficient, Special Option:
Shaft Grounding Rings PREMIUM
EFF Inverter Duty

ENCLOSURE

APPROX. WEIGHT **1850**

SPECIALS

STANDARD MATERIALS OF CONSTRUCTION

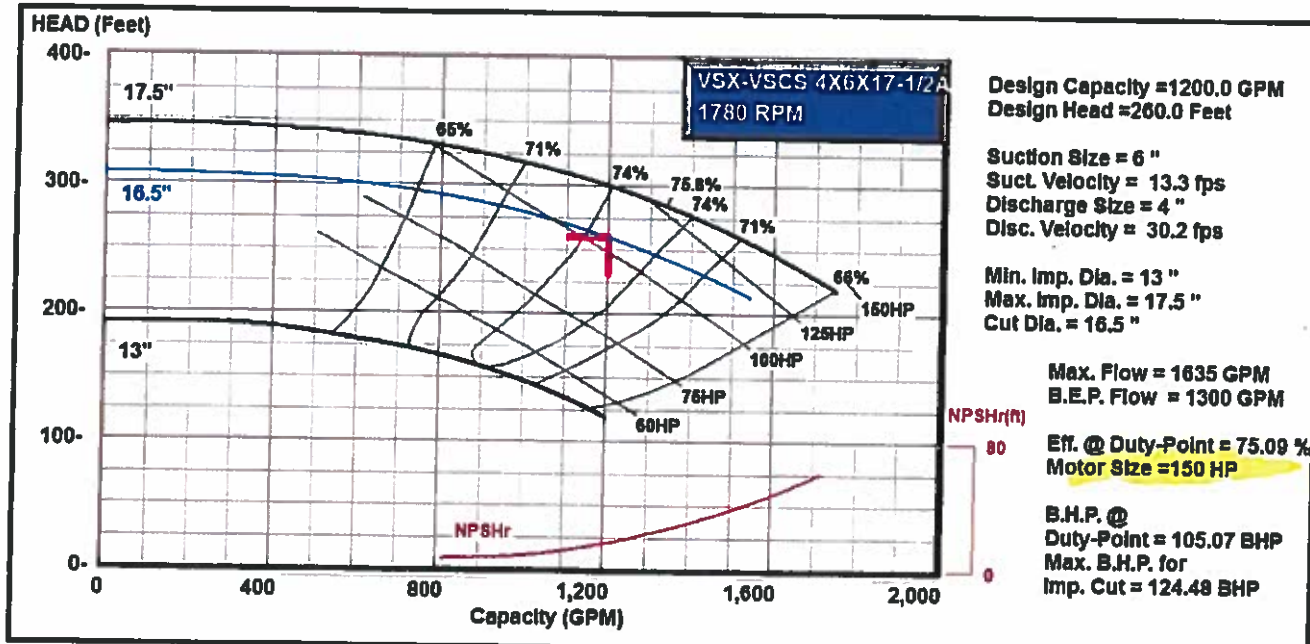
- ☒ Cast Iron Bronze Fitted
- ☒ Heavy Duty Maintenance Free Bearings
- ☒ Alignment Friendly Coupling
- ☒ Heavy Duty Groutless Baseplate
- ☒ ANSI/OSHA Coupling Guard
- ☒ ISO 1940-1:2003 Impeller Balance

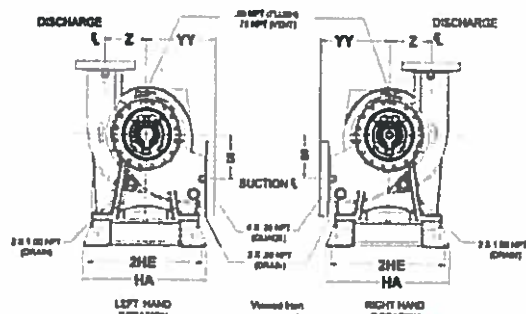
OPTIONAL MATERIALS OF CONSTRUCTION

- ☐ Galvanized Drip Pan
- ☒ Spacer Coupling

TYPE OF SEAL AND WORKING PRESSURE

- ☐ Standard: 175 PSIG (12 BAR) max. working pressure, flat face flanges, 125# ANSI flange drilling, Unitized mechanical seal, EPR/Carbon/Silicon Carbide, 175 PSIG (12 BAR) max. suction pressure, 0 to 300°F (-18 to 149°C)
- ☒ Optional: 300 PSIG (20 BAR) max. working pressure, flat face flanges, 250# ANSI flange drilling, Unitized mechanical seal, EPR/Carbon/Silicon Carbide, 200 PSIG (13.7 BAR) max. suction pressure, 0 to 300°F (-18 to 149°C)
- ☐ Optional: 300 PSIG (20 BAR) max. working pressure, flat face flanges, 250# ANSI flange drilling, balanced mechanical seal, EPR/Graphite loaded Silicon Carbide on Graphite loaded Silicon Carbide, 300 PSIG (20 BAR) max. suction pressure, 0 to 300°F (-18 to 149°C)





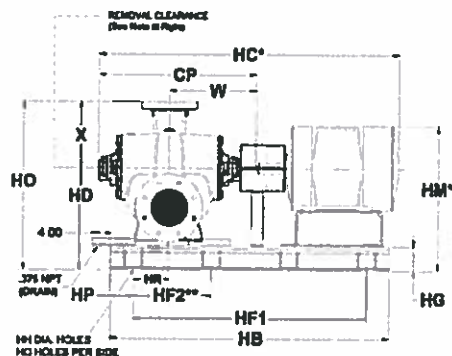
FLANGE DIMENSIONS IN INCHES (MM)			
	SIZE	THICKNESS	O.D.
Discharge	4"	1.50 (38)	10 (254)
Suction	6"	1.83 (41)	12.13 (308)

FLANGES ARE DRILLED 125# ANSI - STANDARD
250# ANSI - AVAILABLE

DIMENSIONS IN INCHES (MM)			
S	X	YY	Z
9.75 (248)	18 (457)	18 (457)	9.75 (248)

Removal clearance from end
of bracket: 23 Inches (584 mm)

SPACER COUPLER



*Motor dimensions are approximate and vary by manufacturer and motor type.

**Distance to the next available hole.

MOTOR FRAME	DIMENSIONS - INCHES (mm) FOR PUMPS WITH SPACER COUPLER															
	CP	HA	HB	HC* MAX.	HD	2HE	HF ₁	HF ₂ **	HG	HH	HM* MAX.	HO	HP	HQ	HR	W
254T	29.42 (747)	25.4 (645)	70 (1778)	62.69 (1592)	23.25 (591)	23.52 (597)	80 (1524)	15 (381)	5.25 (133)	0.88 (22)	31.07 (789)	41.25 (1048)	5 (127)	5	7.82 (194)	18.40 (417)
258T	29.42 (747)	25.4 (645)	70 (1778)	64.44 (1637)	23.25 (591)	23.52 (597)	80 (1524)	15 (381)	5.25 (133)	0.88 (22)	31.07 (789)	41.25 (1048)	5 (127)	5	7.82 (194)	18.40 (417)
284T/TS	29.42 (747)	25.4 (645)	70 (1778)	65.803 (1686)	23.25 (591)	23.52 (597)	80 (1524)	15 (381)	5.25 (133)	0.88 (22)	31.07 (789)	41.25 (1048)	5 (127)	5	7.82 (194)	18.40 (417)
288T/TS	29.42 (747)	25.4 (645)	70 (1778)	67.089 (1704)	23.25 (591)	23.52 (597)	80 (1524)	15 (381)	5.25 (133)	0.88 (22)	31.07 (789)	41.25 (1048)	5 (127)	5	7.82 (194)	18.40 (417)
324T/TS	29.42 (747)	25.4 (645)	70 (1778)	69.92 (1776)	23.25 (591)	23.52 (597)	80 (1524)	15 (381)	5.25 (133)	0.88 (22)	31.82 (808)	41.25 (1048)	5 (127)	5	7.82 (194)	18.40 (417)
328T/TS	29.42 (747)	25.4 (645)	70 (1778)	71.04 (1804)	23.25 (591)	23.52 (597)	80 (1524)	15 (381)	5.25 (133)	0.88 (22)	32.35 (822)	41.25 (1048)	5 (127)	5	7.82 (194)	18.40 (417)
364T/TS	29.42 (747)	25.4 (645)	80 (2032)	72.879 (1851)	23.25 (591)	23.52 (597)	72 (1829)	18 (457)	5.25 (133)	0.88 (22)	33.2 (843)	41.25 (1048)	4 (102)	5	8.63 (219)	16.40 (417)
365T/TS	29.42 (747)	25.4 (645)	80 (2032)	72.879 (1851)	23.25 (591)	23.52 (597)	72 (1829)	18 (457)	5.25 (133)	0.88 (22)	33.2 (843)	41.25 (1048)	4 (102)	5	8.63 (219)	16.40 (417)
404T/TS	29.42 (747)	25.4 (645)	80 (2032)	75.48 (1917)	23.25 (591)	23.52 (597)	72 (1829)	18 (457)	5.25 (133)	0.88 (22)	33.72 (856)	41.25 (1048)	4 (102)	5	8.63 (219)	16.40 (417)
405T/TS	29.42 (747)	25.4 (645)	80 (2032)	77.48 (1968)	23.25 (591)	23.52 (597)	72 (1829)	18 (457)	5.25 (133)	0.88 (22)	33.72 (856)	41.25 (1048)	4 (102)	5	8.63 (219)	16.40 (417)
444T/TS	29.42 (747)	25.4 (645)	80 (2032)	82.946 (2107)	23.25 (591)	23.52 (597)	72 (1829)	18 (457)	5.25 (133)	0.88 (22)	38.77 (985)	41.25 (1048)	4 (102)	5	8.63 (219)	16.40 (417)
⇒ 445T/TS	29.42 (747)	25.4 (645)	80 (2032)	84.55 (2148)	23.25 (591)	23.52 (597)	72 (1829)	18 (457)	5.25 (133)	0.88 (22)	38.77 (985)	41.25 (1048)	4 (102)	5	8.63 (219)	16.40 (417)

Dimensions are subject to change. Not to be used for construction purposes unless certified.

Units may be built where foot/feet overhang the motor mounting platform. If overhang is unacceptable, consult factory for a custom submittal, quotation and/or lead time. A certified motor drawing will be required.

These dimensions are valid when using the Woods DuraFlex spacer coupling option. For dimensions on Faulk SteelFlex coupling options, consult factory for a special submittal drawing.

Qty	Description & Tag
3	Tag: CWP-451-1,2,3 B&G Vertical Split Case Pump Series VSX-VSCS, Model 14 x 16 x 17-1/2A, BF, 250 HP, 1200 RPM, with 17" Impeller, Unitized EPR-Carbon/SIC (Standard) Seal, Woods Duraflex Spacer, Baldor, TEFC, Rep Selected: (2015-7584) , Inverter Duty, NEMA Premium Efficient, Special Option: Aegis SGR, Inverter Duty, 460/3/60 Motor, 6870 GPM, 110 FT TDH

☒ REVIEWED	☐ REVIEWED/CORRECTIONS NOTED
☐ REJECTED	☐ REVISE AND RESUBMIT
Corrections or comments made on the submittals during this review do not relieve Contractor from compliance with requirements of the Contract Documents. This review is for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Document. The Contractor remains responsible for determining the accuracy and completeness of other details such as dimensions and quantities; for substantiating instructions for installation; verifying materials, field measurements and related construction criteria; checking, coordinating, and performing Work in compliance with the Contract Documents.	
KZF DESIGN Inc. <i>FA</i>	Date <i>4/19/16</i>

Job Name: GE North Utility Plant
Engineer: KZF Engineers
Contractor: CH2M Hill

blackmore and glunt Inc.



11435 Williamson Rd.

Cincinnati, OH 45241

PH: 513.489.5225

Prepared By: Kyle Browning

Date: 3/31/2016

JOB: GE Aviation North Utility Plant

REPRESENTATIVE: Blackmore & Glunt - Cincinnati

UNIT TAG: CWP-451-1-3

ENGINEER: KZF Design

CONTRACTOR:

ORDER NO.

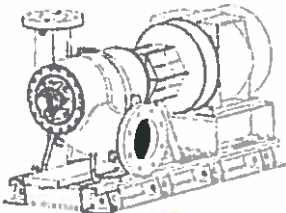
SUBMITTED BY: Kyle Browning

APPROVED BY:

DATE: 3/31/2016

DATE:

DATE:



Model VSCS 14x16x17 1/2 A Double Suction Split Case Pump



SPECIFICATIONS

FLOW	6870 (GPM)	HEAD	110 (FT)
HP	250	RPM	1200
VOLTS			480
CYCLE	60	PHASE	3
Baldor TEFC Rep Selected: (2015-7584), Inverter Duty, NEMA Premium Efficient, Special Option: Aegle SGR PREMIUM EFF Inverter Duty			
ENCLOSURE			
APPROX. WEIGHT	9821		
SPECIALS			

STANDARD MATERIALS OF CONSTRUCTION

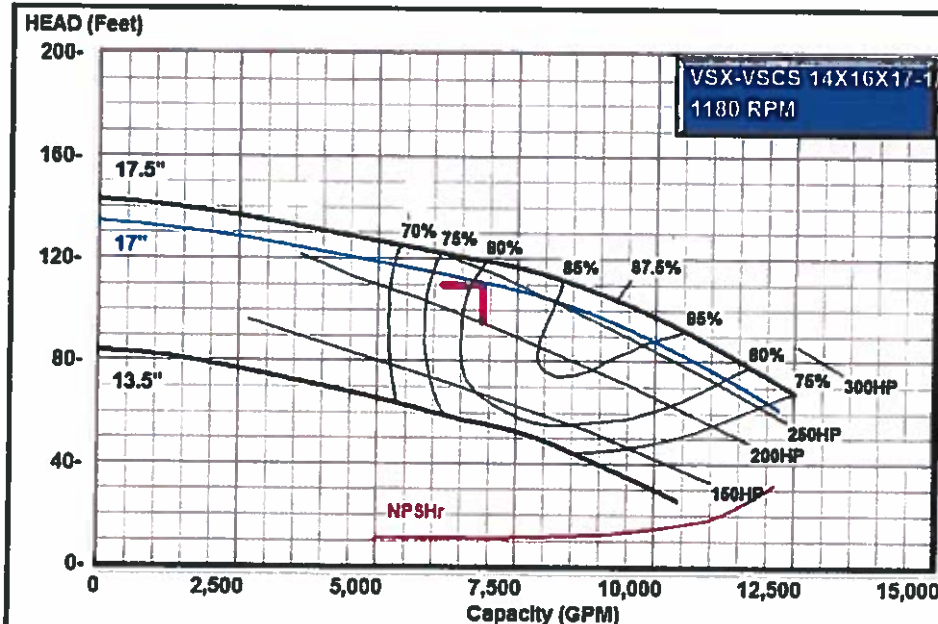
- ☒ Cast Iron Bronze Fitted
- ☒ Heavy Duty Maintenance Free Bearings
- ☒ Alignment Friendly Coupling
- ☒ Heavy Duty Groutless Baseplate
- ☒ ANSI/OSHA Coupling Guard
- ☒ ISO 1940-1:2003 Impeller Balance

OPTIONAL MATERIALS OF CONSTRUCTION

- ☐ Galvanized Drip Pan
- ☒ Spacer Coupling

TYPE OF SEAL AND WORKING PRESSURE

- ☒ Standard: 175 PSIG (12 BAR) max. working pressure, flat face flanges, 125# ANSI flange drilling, Unitized mechanical seal, EPD/Carbon/Silicon Carbide, 125 PSIG (8.5 BAR) max. suction pressure, 0 to 300°F (-18 to 149°C)
- ☐ Optional: 300 PSIG (20 BAR) max. working pressure, flat face flanges, 250# ANSI flange drilling, Unitized mechanical seal, EPD/Carbon/Silicon Carbide, 125 PSIG (8.5 BAR) max. suction pressure, 0 to 300°F (-18 to 149°C)
- ☐ Optional: 300 PSIG (20 BAR) max. working pressure, flat face flanges, 250# ANSI flange drilling, balanced mechanical seal, EPD/Graphite loaded Silicon Carbide on Graphite loaded Silicon Carbide, 300 PSIG (20 BAR) max. suction pressure, 0 to 300°F (-18 to 149°C)



Design Capacity = 6870.0 GPM
Design Head = 110.0 Feet

Suction Size = 16"
Suct. Velocity = 12.5 fps
Discharge Size = 14"
Disc. Velocity = 16 fps

Min. Imp. Dia. = 13.5"
Max. Imp. Dia. = 17.5"
Cut Dia. = 17"

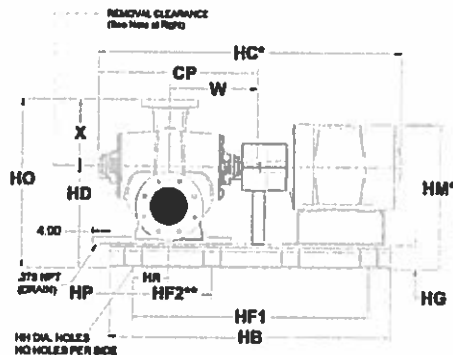
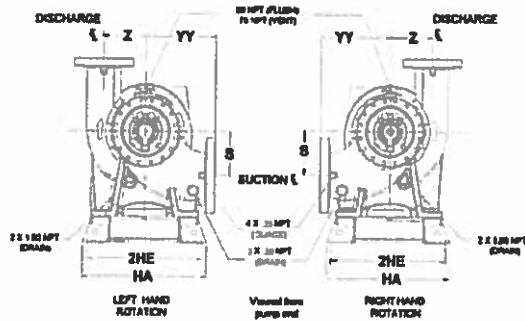
Max. Flow = 12226 GPM
B.E.P. Flow = 9445 GPM

Eff. @ Duty-Point = 81.13 %
Motor Size = 250 HP

B.H.P. @
Duty-Point = 236.39 BHP
Max. B.H.P. for
Imp. Cut = 260.84 BHP

Model VSCS 14x16x17½A Centrifugal Pump Submittal

B-865.15D



*Motor dimensions are approximate and vary by manufacturer and motor type.
 **Distance to the next available hole.

FLANGE DIMENSIONS IN INCHES (MM)			
	SIZE	THICKNESS	O.D.
Discharge	14"	2.38 (60)	22.38 (569)
Suction	18"	2.50 (64)	25.00 (635)

FLANGES ARE 125# ANSI - STANDARD
 250# ANSI - AVAILABLE

DIMENSIONS IN INCHES (MM)			
S	X	YY	Z
15.35 (390)	26.5 (673)	26.5 (673)	15.35 (390)

Removal clearance from end
 of bracket: 34 Inches (864 mm)

SPACER COUPLER

MOTOR FRAME	DIMENSIONS - INCHES (mm) FOR SPACER COUPLER															
	CP	HA	HB	HC*	HD	2HE	HF ₁	HF ₂ **	HG	HH	HM*	HO	HP	HQ	HR	W
404	50.25 (1276)	41 (1041)	108 (2743)	102.56 (2605)	36.5 (927)	39.12 (994)	98 (2489)	19.6 (498)	7 (178)	1.13 (29)	46.97 (1193)	63 (1600)	5 (127)	6 (152)	14.75 (375)	27.63 (702)
405	50.25 (1276)	41 (1041)	108 (2743)	104.58 (2658)	36.5 (927)	39.12 (994)	98 (2489)	19.8 (498)	7 (178)	1.13 (29)	46.97 (1193)	63 (1600)	5 (127)	6 (152)	14.75 (375)	27.63 (702)
444	50.25 (1276)	41 (1041)	108 (2743)	110.026 (2795)	36.5 (927)	39.12 (994)	98 (2489)	19.8 (498)	7 (178)	1.13 (29)	52.02 (1321)	63 (1600)	5 (127)	6 (152)	14.75 (375)	27.63 (702)
445	50.25 (1276)	41 (1041)	108 (2743)	111.63 (2835)	36.5 (927)	39.12 (994)	98 (2489)	19.8 (498)	7 (178)	1.13 (29)	52.02 (1321)	63 (1600)	5 (127)	6 (152)	14.75 (375)	27.63 (702)
447	50.25 (1276)	41 (1041)	108 (2743)	118.11 (3000)	38.88 (988)	38 (965)	98 (2489)	24.5 (622)	9.38 (238)	1.375 (35)	52.76 (1340)	65.38 (1661)	5 (127)	5 (127)	14.75 (375)	27.63 (702)
→ 449	50.25 (1276)	41 (1041)	108 (2743)	118.81 (3018)	38.88 (988)	38 (965)	98 (2489)	24.5 (622)	9.38 (238)	1.375 (35)	52.76 (1340)	65.38 (1661)	5 (127)	5 (127)	14.75 (375)	27.63 (702)
† ± 5008MS	50.25 (1276)	41 (1041)	124 (3150)	114.63 (2912)	38.88 (988)	38 (965)	114 (2896)	28.5 (724)	9.38 (238)	1.375 (35)	53.38 (1358)	65.38 (1661)	5 (127)	5 (127)	14.75 (375)	27.63 (702)
† ± 5010MS	50.25 (1276)	41 (1041)	124 (3150)	121.13 (3077)	38.88 (988)	38 (965)	114 (2896)	28.5 (724)	9.38 (238)	1.375 (35)	53.38 (1358)	65.38 (1661)	5 (127)	5 (127)	14.75 (375)	27.63 (702)
† ± 5012MS	50.25 (1276)	41 (1041)	124 (3150)	129.13 (3280)	38.88 (988)	38 (965)	114 (2896)	28.5 (724)	9.38 (238)	1.375 (35)	53.38 (1358)	65.38 (1661)	5 (127)	5 (127)	14.75 (375)	27.63 (702)
† ± 5807S	50.25 (1276)	41 (1041)	125.50 (3188)	124.75 (3169)	38.88 (988)	38 (965)	115.52 (2934)	28.875 (733)	9.38 (238)	1.375 (35)	54.44 (1383)	65.38 (1661)	5 (127)	5 (127)	14.75 (375)	27.63 (702)
† ± 5809S	50.25 (1276)	41 (1041)	125.50 (3188)	131.75 (3346)	38.88 (988)	38 (965)	115.52 (2934)	28.875 (733)	9.38 (238)	1.375 (35)	54.44 (1383)	65.38 (1661)	5 (127)	5 (127)	14.75 (375)	27.63 (702)
† ± 5811S	50.25 (1276)	41 (1041)	125.50 (3188)	139.75 (3550)	38.88 (988)	38 (965)	115.52 (2934)	28.875 (733)	9.38 (238)	1.375 (35)	54.44 (1383)	65.38 (1661)	5 (127)	5 (127)	14.75 (375)	27.63 (702)
† ± 5811M+	50.25 (1276)	41 (1041)	125.5 (3188)	151.69 (3853)	38.88 (988)	38 (965)	115.52 (2934)	28.8 (734)	9.38 (238)	1.375 (35)	107.01 (2718)	65.38 (1661)	5 (127)	5 (127)	14.75 (375)	27.63 (702)
† ± 5812M+	50.25 (1276)	41 (1041)	125.5 (3188)	156.69 (3980)	38.88 (988)	38 (965)	115.52 (2934)	28.8 (734)	9.38 (238)	1.375 (35)	107.01 (2718)	65.38 (1661)	5 (127)	5 (127)	14.75 (375)	27.63 (702)

Dimensions are subject to change. Not to be used for construction purposes unless certified.
 Units may be built where foot/feet overhang the motor mounting platform. If overhang is unacceptable, consult factory for a custom submittal, quotation and/or lead time. A certified motor drawing will be required.
 † For all customer supplied motors above 449 NEMA frame, a certified motor drawing must be supplied by the customer at the time of order entry.

Drives

Section 15

**AF-60LP™ Micro Drive**

Product Description	15-2
Product Number System Diagram	15-2
Pricing, Dimensions and Weights	15-3
Options, Accessories, and Replacement Parts	15-4
Dynamic Braking Resistors	15-5
Standard Specifications	15-6
Dimensional Drawings	15-7
Basic Wiring Diagrams	15-9

AF-650GP™ General Purpose Drive

Product Description	15-10
Product Number System Diagram	15-10
Pricing	15-11
Options and Accessories	15-13
Dimensional Drawings	15-17
Basic Wiring Diagrams	15-22
Dimensions and Weights	15-23
Dynamic Braking Resistors	15-25
Standard Specifications	15-27
Replacement Parts	15-29

AF-600FP™ Fan and Pump Drive

Product Description	15-40
Product Number System Diagram	15-40
Pricing	15-41
Options and Accessories	15-43
Dimensional Drawings	15-47
Basic Wiring Diagrams	15-52
Dimensions and Weights	15-53
Standard Specifications	15-55
Replacement Parts	15-57

AF-600FP™ Enclosed Drive Panels

Product Description	15-68
Drive Panels Product Number System Diagram	15-69
Enclosed Drives Pricing	15-70
Enclosed Drives Options	15-76
Dimensional Drawings	15-77

AF-650GP™ Enclosed Drive Panels

Product Description	15-80
Drive Panels Product Number System Diagram	15-81
Enclosed Drives Pricing	15-82
Enclosed Drives Options	15-88
Dimensional Drawings	15-89

Warranty Coverage and Technical Support Coverage,

Pricing and Procedures	15-91
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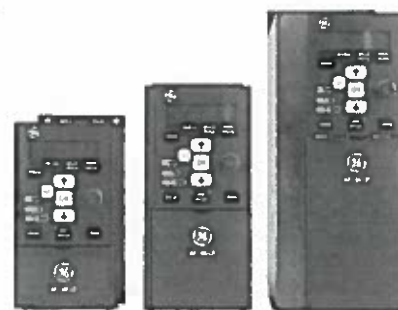
Drives

Section 15

Product Description

The AF-60LP™ Micro Drive is a compact but powerful and easy to use AC Variable Frequency Drive. The drive is available in its standard configuration that includes built-in Brake Chopper for 2HP and above, Single-Turn Potentiometer for speed reference, and LCD Keypad Display that can be remotely mounted. Models are available at 230V single-phase from 1/4 to 3HP, 230V three-phase from 1/3 to 5HP, and 460V three-phase from 1/2 to 10HP.

With standard features like Auto-Tuning, built-in RFI Filter, Process PI Controller, and Logic Controller make the AF-60LP™ Micro Drive ideal for OEM Machinery, Fan, Mixer, and Pump applications. It's Quick Menu, Side-By-Side Mounting, and optional DIN Rail Mounting also make it a time and space saver for any Drive user. It also has Modbus RTU Serial Communications as well as NEMA 1 Kits that allow it to be integrated into your Automation Systems or stand-alone installations.



Product Numbering System Diagram

(Product number for illustrative purposes only)

Description	6K	LP	2	3	F25	X	9	A1
GE Product Code								
Drive Type								
LP = AF-60LP™ Micro Drive								
Input Voltage								
2 = 208/230V, 50/60 Hz								
4 = 460V, 50/60 Hz								
Input Phase								
1 = 1-Phase								
3 = 3-Phase								
Revision								
A1 = 1st Revision								
A2 = Future								
Enclosure Type								
9 = IP20/Open								
Factory Installed Options								
X = Keypad								
HP Rating								
F25 = 1/4 HP								
001 = 1 HP								
010 = 10 HP								

Visit <http://www.geindustrial.com/drives> for additional product information including programming guides, drawings, programming software, an energy savings calculator, and much more.



Drives

AF-60LP™ Micro Drive

Pricing, Dimensions and Weights - Stock Units

Section 15

IP 20 - Protected Chassis - 230 Vac, 1-Phase, 50/60 Hz Input

HP	kW	Amps	Product No.	List Price GO-SLP	Unit Size	H x W x D (in)	Weight (lbs)	NEMA 1 Kit	Din Rail Mounting Kit
1/4	0.18	1.2	6KLP21F25X9A1	\$275.00	M1	6.13 x 2.76 x 6.06	2.43	NEMA1LP1	RMACLP1
1/2	0.37	2.2	6KLP21F50X9A1	\$280.00	M1	6.13 x 2.76 x 6.06	2.43	NEMA1LP1	RMACLP1
1	0.75	4.2	6KLP21001X9A1	\$305.00	M1	6.13 x 2.76 x 6.06	2.43	NEMA1LP1	RMACLP1
2	1.5	6.8	6KLP21002X9A1	\$360.00	M2	7.09 x 2.95 x 6.85	3.53	NEMA1LP2	RMACLP1
3	2.2	9.6	6KLP21003X9A1	\$490.00	M3	9.69 x 3.54 x 8.07	9.7	NEMA1LP3	N/A

IP 20 - Protected Chassis - 230 Vac, 3-Phase, 50/60 Hz Input

HP	kW	Amps	Product No.	List Price GO-SLP	Unit Size	H x W x D (in)	Weight (lbs)	NEMA 1 Kit	Din Rail Mounting Kit
1/3	0.25	1.5	6KLP23F33X9A1	\$260.00	M1	6.13 x 2.76 x 6.06	2.43	NEMA1LP1	RMACLP1
1/2	0.37	2.2	6KLP23F50X9A1	\$280.00	M1	6.13 x 2.76 x 6.06	2.43	NEMA1LP1	RMACLP1
1	0.75	4.2	6KLP23001X9A1	\$320.00	M1	6.13 x 2.76 x 6.06	2.43	NEMA1LP1	RMACLP1
2	1.5	6.8	6KLP23002X9A1	\$375.00	M2	7.09 x 2.95 x 6.85	3.53	NEMA1LP2	RMACLP1
3	2.2	9.6	6KLP23003X9A1	\$475.00	M3	9.69 x 3.54 x 8.07	9.7	NEMA1LP3	N/A
5	3.7	15.2	6KLP23005X9A1	\$600.00	M3	9.69 x 3.54 x 8.07	9.7	NEMA1LP3	N/A

IP 20 - Protected Chassis - 460 Vac, 3-Phase, 50/60 Hz Input

HP	kW	Amps	Product No.	List Price GO-SLP	Unit Size	H x W x D (in)	Weight (lbs)	NEMA 1 Kit	Din Rail Mounting Kit
1/2	0.37	1.2	6KLP43F50X9A1	\$430.00	M1	6.13 x 2.76 x 6.06	2.43	NEMA1LP1	RMACLP1
1	0.75	2.2	6KLP43001X9A1	\$450.00	M1	6.13 x 2.76 x 6.06	2.43	NEMA1LP1	RMACLP1
2	1.5	3.7	6KLP43002X9A1	\$515.00	M2	7.09 x 2.95 x 6.85	3.53	NEMA1LP2	RMACLP1
3	2.2	5.3	6KLP43003X9A1	\$565.00	M2	7.09 x 2.95 x 6.85	3.53	NEMA1LP2	RMACLP1
5	3.7	9	6KLP43005X9A1	\$750.00	M3	9.69 x 3.54 x 8.07	9.7	NEMA1LP3	N/A
7.5	5.5	12	6KLP43007X9A1	\$975.00	M3	9.69 x 3.54 x 8.07	9.7	NEMA1LP3	N/A
10	7.5	15.5	6KLP43010X9A1	\$1200.00	M3	9.69 x 3.54 x 8.07	9.7	NEMA1LP3	N/A
15	11	23	6KLP43015X9A1	\$1740.00	M4	11.5 x 4.92 x 9.49	13.2	NEMA1LP4	N/A
20	15	31	6KLP43020X9A1	\$2025.00	M4	11.5 x 4.92 x 9.49	13.2	NEMA1LP4	N/A
25	18.5	37	6KLP43025X9A1	\$2475.00	M5	13.19 x 6.5 x 9.76	20.9	NEMA1LP5	N/A
30	22	43	6KLP43030X9A1	\$2890.00	M5	13.19 x 6.5 x 9.76	20.9	NEMA1LP5	N/A

Brake Chopper is included with 2HP drives and above

Drive Efficiency and Watt Loss - 230 Vac, 1-Phase, 50/60 Hz Input

HP	kW	Amps	Product No.	Efficiency ¹	Watt Loss ¹
1/4	0.18	1.2	6KLP21F25X9A1	94.5	15.5
1/2	0.37	2.2	6KLP21F50X9A1	95.6	25.0
1	0.75	4.2	6KLP21001X9A1	96.0	44.0
2	1.5	6.8	6KLP21002X9A1	96.7	67.0
3	2.2	9.6	6KLP21003X9A1	97.1	85.1

Drive Efficiency and Watt Loss - 230 Vac, 3-Phase, 50/60 Hz Input

HP	kW	Amps	Product No.	Efficiency ¹	Watt Loss ¹
1/3	0.25	1.5	6KLP23F25X9A1	94.9	20.0
1/2	0.37	2.2	6KLP23F50X9A1	95.8	24.0
1	0.75	4.2	6KLP23001X9A1	96.3	39.5
2	1.5	6.8	6KLP23002X9A1	97.2	57.0
3	2.2	9.6	6KLP23003X9A1	97.4	77.1
5	3.7	15.2	6KLP23005X9A1	97.4	122.8

Drive Efficiency and Watt Loss - 460 Vac, 3-Phase, 50/60 Hz Input

HP	kW	Amps	Product No.	Efficiency ¹	Watt Loss ¹
1/2	0.37	1.2	6KLP43F50X9A1	95.5	25.5
1	0.75	2.2	6KLP43001X9A1	96.0	43.5
2	1.5	3.7	6KLP43002X9A1	97.2	56.5
3	2.2	5.3	6KLP43003X9A1	97.1	81.5
5	3.7	9	6KLP43005X9A1	98.0	133.5
7.5	5.5	12	6KLP43007X9A1	98.0	166.8
10	7.5	15.5	6KLP43010X9A1	98.0	217.5
15	11	23	6KLP43015X9A1	97.4	342
20	15	31	6KLP43020X9A1	97.4	454
25	18.5	37	6KLP43025X9A1	98.0	428
30	22	43	6KLP43030X9A1	97.9	520

¹At rated load conditions



Drives

AF-60LP™ Micro Drive

Options, Accessories and Replacement Parts

Section 15

Remote Mounting Kit for Keypad

Remote Mounting kit for mounting keypad on enclosure doors. Kit includes gasket, mounting brackets, and cable. Keypad is rated IP21.

Description	Product No.	List Price GO-SLP
Remote Mounting Kit for Keypad	RMKYPDACLP1	\$25.00



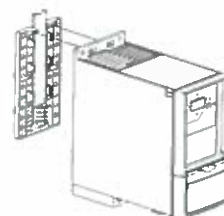
Remote Mounting Kit for Keypad

DIN Rail Mounting Kit for 1HP and below drives

This adapter can be used to mount AF-60LP™ Micro Drives at 1HP and below to 35mm DIN Rail.

Description	Product No.	List Price GO-SLP
DIN Rail Mounting Kit for unit size M1 and M2 ¹	RMACLP1	\$20.00

¹M2 drives manufactured after July 2009.



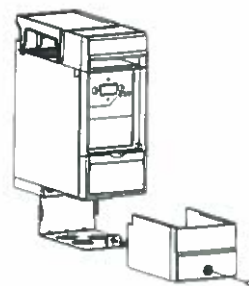
DIN Rail Mounting Kit for 1HP and below drives

NEMA 1 Kit

This kit can be mounted to the IP 20 protected AF-60LP™ Micro Drives to provide NEMA Type 1 protection.

Description	Product No.	List Price GO-SLP
NEMA 1 Kit for 1HP and below drives	NEMA1ACLP1	\$30.00
NEMA 1 Kit for 2HP at 230V/3HP at 460V and below drives	NEMA1ACLP2	\$35.00
NEMA 1 Kit for 3HP at 230V/5HP at 460V and above drives	NEMA1ACLP3	\$40.00
NEMA 1 Kit for 15HP and 20HP at 460V drives	NEMA1ACLP4 ²	\$45.00
NEMA 1 Kit for 25HP and 30HP at 460V drives	NEMA1ACLP5 ²	\$50.00

²Please note that these NEMA 1 Kits only include bottom cover.

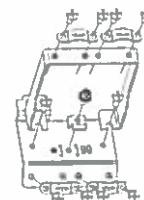


NEMA 1 Kit

De-Coupling Plate Kit

For EMC applications and strain relief for drive wiring.

Description	Product No.	List Price GO-SLP
De-Coupling Plate Kit for 2HP at 230V/3HP at 460V and below drives	DEPLTACLP1	\$15.00
De-Coupling Plate Kit for 3HP at 230V/5HP at 460V and above drives	DEPLTACLP2	\$15.00
De-Coupling Plate Kit for 15HP at 460V and above drives	DEPLTACLP3	\$20.00



De-Coupling Plate Kit

Replacement AF-60LP™ Keypad with Potentiometer

LCD Keypad with potentiometer for the AF-60LP™ Micro Drive. Keypad is removable under power and includes copycat feature to program multiple drives. Includes hand-off-auto keys for local control of drive and large parameter and operational data display. Menu key selects between drive status, quick menu, and main menu. LED indicators for Alarms, Warnings, and Power are also included on each keypad. Keypad dimensions are 3.35 H x 2.56 W x 1.1 D w/pot in inches.

Description	Product No.	List Price GO-SLP
Replacement AF-60LP™ Keypad with Potentiometer	KYPDACLP1	\$60.00



Replacement AF-60LP™ Keypad with Potentiometer



Drives

AF-60LP™ Micro Drive

Dynamic Braking Resistors

Section 15

Dynamic Braking allows for faster deceleration rates than could be achieved via a coast to stop. Dynamic braking consists of the internal drive brake chopper and separate add-on dynamic braking resistors.

Important application notes:

- The AF-60LP™ Micro Drive dynamic braking can be used for stopping a load with an inertia equal to or less than the applied motor's rotor inertia.
- High inertia or overhauling loads may cause extended deceleration times which could cause overheating and tripping of the drive.
- The dynamic braking is not a holding brake. It does not prevent a motor at rest from rotating.

Note: Refer to the drives' Operating Instruction for installation and connection details.

230 Vac

Nominal Applied Motor HP	Max. Braking Torque (%)	Brake Chopper	Recommended Dynamic Braking Resistor				Qty. Required	Total Ohms	Total kW	
			10% Duty Cycle		40% Duty Cycle				10% Duty Cycle	40% Duty Cycle
			Product Number	List Price GO-SLP	Product Number	List Price GO-SLP				
1/4	—	N/A	—	—	—	—	—	—	—	
1/2	—	N/A	—	—	—	—	—	—	—	
1	—	N/A	—	—	—	—	—	—	—	
2	150	Built-in	DB2104TBNC	\$400.00	DB2404TBNC	\$600.00	1	65	0.25	0.8
3	150	Built-in	DB2105TBNC	\$400.00	DB2405TBNC	\$600.00	1	50	0.285	1
5	150	Built-in	DB2106TBNC	\$450.00	DB2406TBNC	\$675.00	1	25	0.8	3

460 Vac

Nominal Applied Motor HP	Max. Braking Torque (%)	Brake Chopper	Recommended Dynamic Braking Resistor						Qty. Required	Total Ohms	Total kW	
			10% Duty Cycle		40% Duty Cycle		10% Duty Cycle	40% Duty Cycle				
			Product Number	List Price GO-SLP	Product Number	List Price GO-SLP						
1/2	—	N/A	—	—	—	—	—	—	—	—	—	
1	—	N/A	—	—	—	—	—	—	—	—	—	
2	150	Built-in	DB4103TBNC	\$525.00	DB4403TBNC	\$788.00	1	310	0.25	0.8		
3	150	Built-in	DB4104TBNC	\$525.00	DB4404TBNC	\$788.00	1	210	0.285	1.35		
5	150	Built-in	DB4105TBNC	\$600.00	DB4405TBNC	\$900.00	1	110	0.6	2.4		
7.5	150	Built-in	DB4106TBNC	\$850.00	DB4406TBNC	\$1275.00	1	80	0.85	3		
10	150	Built-in	DB4107TBNC	\$950.00	DB4407TBNC	\$1425.00	1	65	1	4.5		



Drives

AF-60LP™ Micro Drive

Standard Specifications

Section 15

Environmental Conditions

Enclosure	IP20 (NEMA 1 with optional NEMA 1 kit)
Installation Location	Do not install in locations where product could be exposed to dust, corrosive gas, inflammable gas, oil mist, vapor, water drops or direct sunlight. There must be no salt in the atmosphere. Condensation must not be caused by sudden changes in temperature. For use at altitudes of 3280 ft (1000M) or less without derating.
Ambient Temperature	-10° to +50°C
Ambient Humidity	5 to 95% RH (non-condensing)
Vibration	1 Gg
Storage Temperature	-25° to 65°C

Standards

Approvals	CE, UL, cUL, and C-Tick Suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical amperes for 230V and 460V WEEE and RoHS Compliant
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Input Power Supply

Rated Input AC Voltage	200-240 Vac, 1-phase, 50-60 Hz, +/- 10% V 200-240 Vac, 3-phase, 50-60 Hz, +/- 10% V 380-480 Vac, 3-phase, 50-60 Hz, +/- 10% V
Maximum Voltage Imbalance	3% of rated supply voltage
True Power Factor	> 0.4 nominal at rated load
Displacement Power Factor	> 0.98
Switching on input power supply	Maximum twice/minute
Environment according to EN60664-1	Overvoltage category III/pollution degree 2

Output

Rated Output Voltage	0-100% of supply voltage
Output Frequency	0-200 Hz (Adv Vector Control Plus Model) 0-400 Hz (Volts/Hertz Model)
Switching on output	Unlimited
Accel/Decel Times	0.05-3600 seconds
Overload Current Rating	150% of drive rated current for 1 minute

Control

Control Method	Sinusoidal PWM Control (V/Hz with torque vector control)
Switching Frequency Select	2, 4, 8, 12, 16 kHz
Operation Method	Keypad operation, Hand, Off, Auto Digital Input, Programmable for Start/Stop, Forward/Reverse, Jog Timer operation: Stop after predetermined time frame Link operation: RS-485 Modbus RTU
Frequency Reference Setting	Up or Down buttons on keypad or external reference
Analog Input	Built in Potentiometer 0-10 Vdc analog input 4-20ma analog input
Preset Speeds	8 presets via digital inputs
Link Operation	Drive RS-485 or Modbus RTU
Second Reference Setting	Switch from speed reference 1 to reference 2 via digital input
Trim Reference Setting	Available for speed reference offset via potentiometer, voltage input, or current input
Acceleration/Deceleration Time	0.05-3600 seconds (two acceleration and deceleration rates are selectable via digital inputs) Acceleration and deceleration patterns can be selected from linear or S-curve
DC Injection Braking	Starting frequency: 0.0-400 Hz Braking time: 0.0-60.0 seconds Braking level: 0-150% of rated current 0-400 Hz
Frequency Limit	0-400 Hz
Jump Frequency Control	Two jump (or skip) frequencies via parameter set to avoid mechanical vibration
Jogging Operation	Operation via On key or digital input (Fwd or Rev)
Auto-Restart After Power Failure	Restarts the drive without stopping after instantaneous power failure
Slip Compensation	Maintains motor at constant speed with load fluctuations
Energy Savings	Controls output voltage to minimize motor loss during constant speed operation
Start Mode Function	This functionality smoothly catches a spinning motor

Logic Controller (LC)

Logic Controller Events	Over 23 types of Programmable Events
Comparators	Array of 4 Comparators
Timers	Array of 3 Timers, adjustable from 0.0 to 3600 sec
Logic Rules	Array of 4 Boolean Logic Rules
Logic Controller States	Array of 20 Logic Controller Action States

Process Controller (PI)

Process CL Feedback Select	No function, analog input 1, analog input 2, pulse input, local bus reference
Process PI Control	Normal or Inverse
Process PI Anti Windup	Disabled or enabled
Process PI Start Speed	0.0-200 Hz
Process PI Proportional Gain	0.00-10.00
Process PI Integral Gain	0.10-9999 seconds
Process PI Feed Forward Factor	0-400%
On Reference Bandwidth	0-200%

Indication

LEDs	Green - drive is on Yellow - indicates a warning Red - indicates an alarm
Monitor Units Available	Frequency, current, voltage, power, horsepower, % load, speed, or time

Trip Codes

2	Live Zero Error
4	Line Phase Loss
7	DC Overvoltage
8	DC Undervoltage
9	Drive Overload
10	Motor Overtemperature
11	Motor Thermistor Overtemperature
12	Torque Limit
13	Overcurrent
14	Ground Fault
16	Short Circuit
17	Control Word Timeout
25	Brake Resistor Short-Circuited
27	Brake Chopper Short-Circuited
28	Brake Check
29	Power Board Overtemperature
30	Missing U Phase
31	Missing V Phase
32	Missing W Phase
38	Internal Fault
47	Control Voltage Fault
51	Auto Tune Check - Wrong Motor Parameters
52	Auto Tune Low Inom - Motor current is too low
59	Current Limit
63	Mechanical Brake Low
80	Drive restored to factory settings

Monitoring Parameters Available

Power	kW
Power	HP
Motor Voltage	V
Frequency	Hz
Motor Current	A
Frequency	%
Motor Thermal	%
DC Link Voltage	V
Drive Current	A
Drive Max Current	A
Logic Controller State	On/Off



Drives

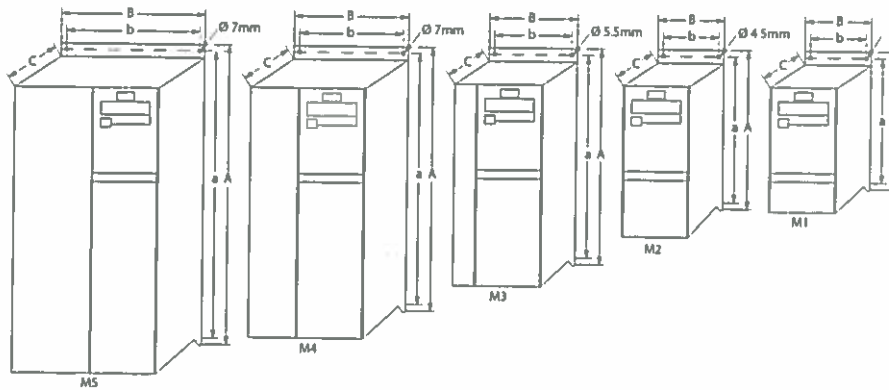
AF-60LP™ Micro Drive

Dimensional Drawings

Section 15

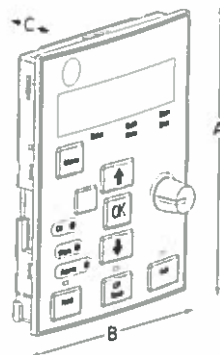
AF-60LP™ Micro Drive Dimensions

Unit Size	Ratings (HP)			Height (in./mm)		Width (in./mm)		Depth (in./mm)	Weight Lbs / Kg
	230 V, 1Ph	230V, 3Ph	460V, 3Ph	A	A (including decoupling plate)	a	B		
M1	0.25-1	0.33-1	0.5-1	5.9/150	8.1/205	5.5/140.4	2.8/70	2.16/55	5.8/148
M2	2	2	2-3	6.9/176	9.1/230	6.6/166.4	2.9/75	2.32/59	6.6/168
M3	3	3-5	3-10	9.41/239	11.6/294	8.9/226	3.54/90	2.72/69	7.6/194
M4	-	-	15-20	11.5/292	13.7/347.5	10.7/272.4	4.9/125	3.8/97	9.8/249
M5	-	-	25-30	13.2/335	15.3/387.5	12.4/315	6.5/165	5.5/140	10/256

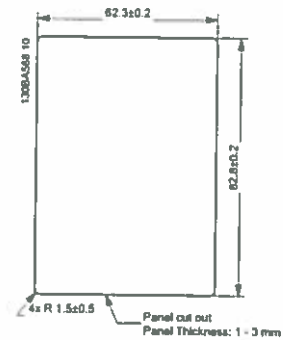


AF-60LP™ Micro Drive Keypad Dimensions

Height (in./mm)	Width (in./mm)	Depth (in./mm)	Weight Lbs / Kg
A	B	C	
3.35 / 85	2.56 / 65	1.1 / 28	0.18 / 0.08



AF-60LP™ Micro Drive Keypad



AF-60LP™ Micro Drive Keypad Cut Out

Note: Please allow 2" between drives with field installed IP21/NEMA 1 Kits. Also, please consult the relevant AF-6 Series drives Operating Instructions for recommended clearance above and below each drive rating.



Drives

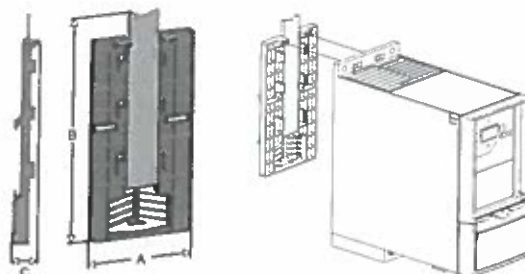
AF-60LP™ Micro Drive

Dimensional Drawings

Section 15

DIN Rail Mounting Kit for 1HP and below drives

Product Number	A (in/mm)	B (in/mm)	C (in/mm)
RMACLP1	2 36/60	5 08/129	0 53/13 5



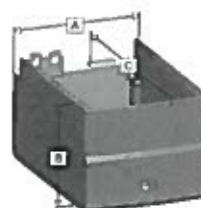
DIN Rail Mounting Kit for 1HP and below drives

NEMA 1 Field Installed Kit - Top

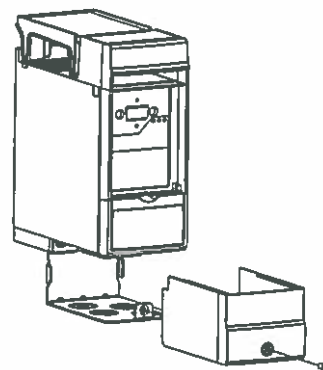
Product Number	A (in/mm)	B (in/mm)	C (in/mm)	D (in/mm)
NEMA1ACLP1	28 4/72	1 69/43	5 94/151	0 31/8
NEMA1ACLP2	3 03/77	1 69/43	6 77/172	0 31/8
NEMA1ACLP3	3 62/92	1 69/43	7 84/199	0 31/8



Top



Bottom



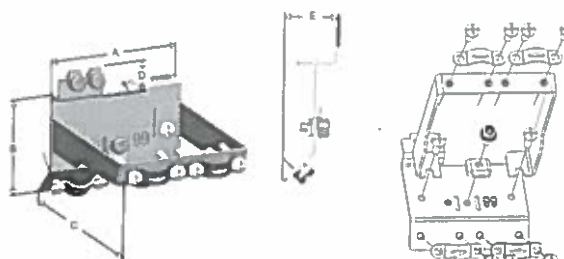
NEMA 1 Kit

NEMA 1 Field Installed Kit - Bottom

Product Number	A (in/mm)	B (in/mm)	C (in/mm)
NEMA1ACLP1	2 76/70	2 17/55	4 21/107
NEMA1ACLP2	2 95/75	2 17/55	4 49/114
NEMA1ACLP3	3 54/90	2 17/55	4 76/121

De-Coupling Plate Kit

Product Number	A (in/mm)	B (in/mm)	C (in/mm)	D (in/mm)	E (in/mm)
DEPLTACLP1	2 76/70	2 05/52	3 94/100	0 55/14	0 89/22 6
DEPLTACLP2	2 76/70	2 05/52	N/A	0 55/14	0 89/22 6



De-Coupling Plate Kit



Section 15

[illegible]

Pin	Symbol	Function
81		Com RS 485
86		PR RS 485
89		NR RS 485
12		+24 V OUT
18		Start
19		Reverse
20		GND
27		Reset
29		Jog
31		Preset bit 0
42		0/4 - 20 mA Output — A OUT
50		+10 V OUT
51		1K Ohm
55		GND
60		0/4 - 20 mA Input — A IN



Drives

AF-650GP™ General Purpose Drive

Section 15

Product Description

The AF-650GP™ General Purpose Drive is a powerful, flexible, and easy to use drive with many standard features. It is ideally suited for both Heavy Duty and Light Duty applications. Available ratings include: 208/230V from 1/2 to 50HP, 460V from 1/2 to 1200HP, 575V from 1/2 to 100HP and 575/690V from 15 to 1350HP.

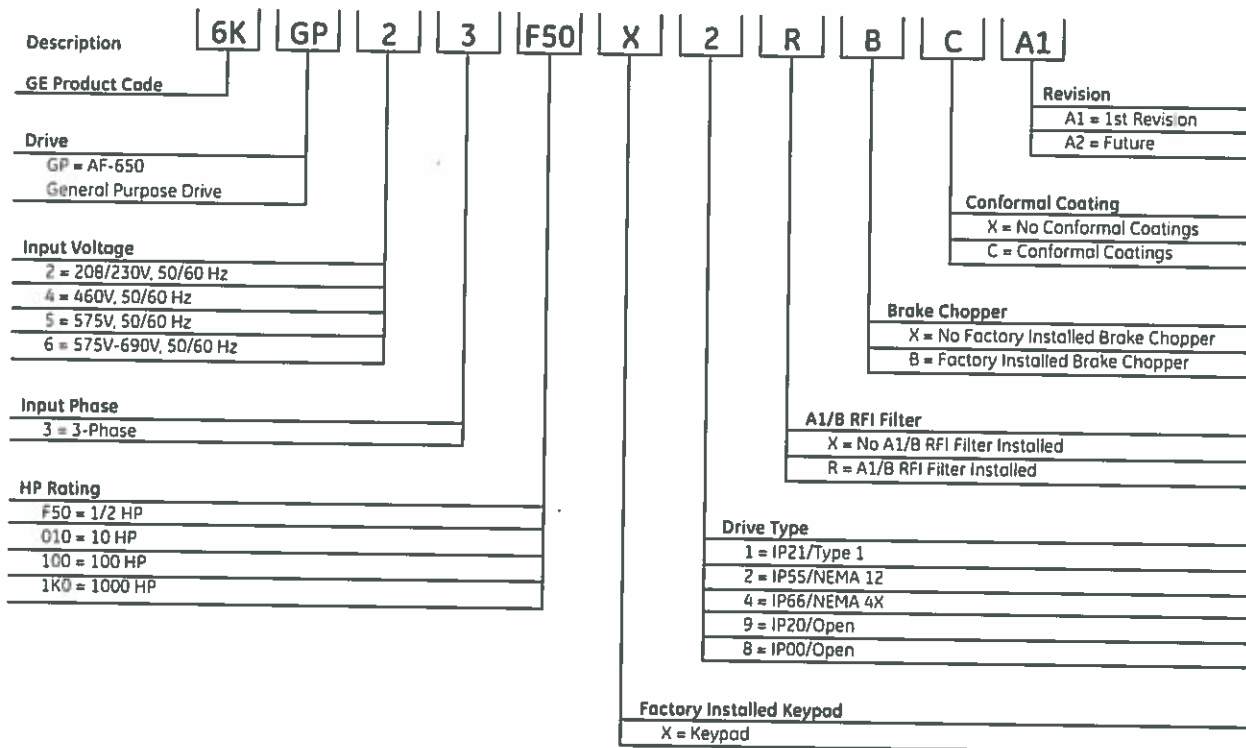
The drive is available in its standard configuration that includes an IP20 or IP00 Chassis, LCD Keypad that can be remote mounted, built-in DC Link Reactors, built-in Modbus RTU communications network, and RFI A2 filter. Standard features like Auto Tuning, process PID controller, energy savings mode and Logic Controller make the AF-650GP™ drive ideal for all your conveyor, extruder, machine tool or light duty variable torque applications. Its Quick Menu, Info Key (online manual), and full description keypad make it a time saver during start-up and commissioning.

Optional accessories include network communications modules for DeviceNet, Profibus DP, EtherNet IP, and soon to be available Modbus TCP/IP and Profinet RT. Drives are also available in IP54/55/NEMA 12, and IP66/NEMA 4X drive types. Optional IP21/NEMA 1 kits are available for all IP20 (100HP and below) Chassis units. Additionally, add on I/O modules, brake chopper, dynamic brake resistors, and conformal coated boards allow the drive to meet all your application needs.



Product Numbering System Diagram

(Product number for illustrative purposes only)



Visit <http://www.geindustrial.com/drives> for additional product information including programming guides, drawings, programming software, an energy savings calculator, and much more.



Drives

AF-650GP™ General Purpose Drive Pricing

Section 15

230V, 3-Phase, 50/60Hz Input

										List Price Adders, GO-SGP						
Heavy Duty Rating				Light Duty Rating				Standard Unit ¹ Includes:	Standard Unit Product No.	List Price GO-SGP	Drive Type (Digit 11)			Factory Installed Options (Digit 12) (Digit 13) (Digit 14)		
HP Rating	kW Rating	Rated Output Amps	Overload Amps (1 Min)	HP Rating	kW Rating	Rated Output Amps	Overload Amps (1 Min)				(9) IP20 Chassis	(2) IP55 NEMA 12	(4) IP66 NEMA 4X	(R) RFI filter A1/B	(B) Brake Chopper	(C) Conformal Coating
0.33	0.25	18	2.88	0.33	0.25	18	2.88	IP20 (9) Chassis RFI A2 Keypad	6KGP23F33X9X00A1	\$750.00	std	\$250.00	\$550.00	\$90.00	\$75.00	\$210.00
0.5	0.37	24	3.84	0.5	0.37	24	3.84		6KGP23F50X9X00A1	\$775.00	std	\$250.00	\$550.00	\$90.00	\$75.00	\$210.00
1	0.75	46	7.36	1	0.75	46	7.36		6KGP23001X9X00A1	\$875.00	std	\$250.00	\$550.00	\$120.00	\$75.00	\$210.00
2	1.5	75	12	2	1.5	75	12		6KGP23002X9X00A1	\$990.00	std	\$250.00	\$550.00	\$160.00	\$90.00	\$210.00
3	2.2	106	16.96	3	2.2	106	16.96		6KGP23003X9X00A1	\$1200.00	std	\$250.00	\$550.00	\$200.00	\$115.00	\$210.00
5	3.7	167	26.72	5	3.7	167	26.72		6KGP23005X9X00A1	\$1450.00	std	\$275.00	\$575.00	\$250.00	\$150.00	\$210.00
7.5	5.5	242	38.72	7.5/10	5.5/7.5	30.8	33.88		6KGP23007X9X00A1	\$1525.00	std	\$555.00	\$920.00	\$475.00	\$180.00	\$210.00
10	7.5	308	49.28	15	11	46.2	50.82		6KGP23010X9X00A1	\$1725.00	std	\$555.00	\$920.00	\$550.00	\$210.00	\$210.00
15	11	462	73.92	20	15	59.4	65.34		6KGP23015X9X00A1	\$2400.00	std	\$960.00	\$1600.00	\$715.00	\$285.00	\$210.00
20	15	594	89.1	25	18.5	74.8	82.28		6KGP23020X9X00A1	\$2900.00	std	\$960.00	\$1950.00	\$730.00	\$360.00	\$210.00
25	18.5	748	112.2	30	22	88	96.8		6KGP23025X9X00A1	\$3500.00	std	\$1100.00	\$2390.00	\$875.00	\$410.00	\$210.00
30	22	88	132	40	30	115	126.5		6KGP23030X9X00A1	\$4025.00	std	\$1100.00	\$2870.00	\$1200.00	\$530.00	\$210.00
40	30	115	172.5	50	37	143	157.3		6KGP23040X9X00A1	\$6450.00	std	\$1700.00	\$3270.00	\$1560.00	\$670.00	\$210.00
50	37	143	214.5	60	45	170	187		6KGP23050X9X00A1	\$7550.00	std	\$1700.00	\$3750.00	\$1750.00	\$825.00	\$210.00

¹IP21/NEMA 1 Kits are available as Field Installed Options for all 230V drives from 0.33 HP to 50 HP. See Page 15-13.

460V, 3-Phase, 50/60Hz Input

									List Price Adders, GO-SGP							
Heavy Duty Rating				Light Duty Rating				Standard Unit ² Includes:	Standard Unit Product No.	List Price GO-SGP	Drive Type (Digit 11)			Factory Installed Options (Digit 12) (Digit 13) (Digit 14)		
HP Rating	kW Rating	Rated Output Amps	Overload Amps (1 Min)	HP Rating	kW Rating	Rated Output Amps	Overload Amps (1 Min)				(9) IP20 Chassis	(2) IP55 NEMA 12	(4) IP66 NEMA 4X	(R) RFI filter A1/B	(B) Brake Chopper	(C) Conformal Coating
0.5	0.37	12	1.92	0.5	0.37	12	1.92	IP20 (9) Chassis RFI: A2 Keypad	6KGP43F50X9X00A1	\$995.00	std	\$250.00	\$550.00	\$90.00	\$75.00	\$210.00
1	0.75	21	3.36	1	0.75	21	3.36		6KGP43001X9X00A1	\$1025.00	std	\$250.00	\$550.00	\$120.00	\$75.00	\$210.00
2	1.5	34	5.44	2	1.5	34	5.44		6KGP43002X9X00A1	\$1095.00	std	\$250.00	\$550.00	\$160.00	\$100.00	\$210.00
3	2.2	48	7.68	3	2.2	48	7.68		6KGP43003X9X00A1	\$1275.00	std	\$250.00	\$550.00	\$200.00	\$125.00	\$210.00
5	4	82	13.12	5	4	82	13.12		6KGP43005X9X00A1	\$1500.00	std	\$250.00	\$550.00	\$245.00	\$150.00	\$210.00
7.5	5.5	11	17.6	7.5	5.5	11	17.6		6KGP43007X9X00A1	\$1800.00	std	\$275.00	\$575.00	\$290.00	\$180.00	\$210.00
10	7.5	14.5	23.2	10	7.5	14.5	23.2		6KGP43010X9X00A1	\$2160.00	std	\$275.00	\$575.00	\$335.00	\$210.00	\$210.00
15	11	21	33.6	15/20	11/15	27	29.7		6KGP43015X9X00A1	\$2700.00	std	\$555.00	\$920.00	\$465.00	\$285.00	\$210.00
20	15	27	43.2	25	18.5	34	37.4		6KGP43020X9X00A1	\$3275.00	std	\$555.00	\$920.00	\$545.00	\$360.00	\$210.00
25	18.5	34	54.4	30	22	40	44		6KGP43025X9X00A1	\$3950.00	std	\$960.00	\$1600.00	\$620.00	\$410.00	\$210.00
30	22	40	64	40	30	52	57.2		6KGP43030X9X00A1	\$4750.00	std	\$960.00	\$1600.00	\$710.00	\$460.00	\$210.00
40	30	52	91.5	50	37	65	71.5		6KGP43040X9X00A1	\$5900.00	std	\$960.00	\$1600.00	\$730.00	\$580.00	\$210.00
50	37	65	109.5	60	45	80	88		6KGP43050X9X00A1	\$7235.00	std	\$1100.00	\$1950.00	\$865.00	\$720.00	\$210.00
60	45	80	135	75	55	105	115.5		6KGP43060X9X00A1	\$8290.00	std	\$1100.00	\$1950.00	\$1170.00	\$860.00	\$210.00
75	55	105	159	100	75	130	143		6KGP43075X9X00A1	\$10100.00	std	\$1700.00	\$3270.00	\$1555.00	\$980.00	\$210.00
100	75	130	220.5	125	90	160	176		6KGP43100X9X00A1	\$13100.00	std	\$1700.00	\$3750.00	\$1735.00	\$1120.00	\$210.00

²IP21/NEMA 1 Kits are available as Field Installed Options for all 460V drives from 0.5 HP to 100 HP. See Page 15-13.

460V, 3-Phase, 50/60Hz Input

								List Price Adders, GO-SGP								
Heavy Duty Rating				Light Duty Rating				Standard Unit Includes:	Standard Unit Product No.	List Price GO-SGP	Drive Type (Digit 11)			Factory Installed Options (Digit 12) (Digit 13) (Digit 14)		
HP Rating	kW Rating	Rated Output Amps	Overload Amps (1 Min)	HP Rating	kW Rating	Rated Output Amps	Overload Amps (1 Min)				(8) IP00 Chassis	(1) IP21 NEMA 1	(2) IP54 NEMA 12	(R) RFI filter A1/B	(B) Brake Chopper	(C) Conformal Coating
125	90	160	240	150	110	190	209	IP00 (B) Chassis RFI A2 Keypad Coated	6KGP43125X8X00A1	\$15900.00	std	\$1250.00	\$3470.00	\$2120.00	\$1275.00	\$705.00
150	110	190	285	200	132	240	264		6KGP43150X8X00A1	\$17250.00	std	\$1250.00	\$3470.00	\$2565.00	\$1575.00	\$705.00
200	132	240	360	250	160	302	332.2		6KGP43200X8X00A1	\$20800.00	std	\$1250.00	\$3470.00	\$3140.00	\$1850.00	\$705.00
250	160	302	453	300	200	361	397.1		6KGP43250X8X00A1	\$22900.00	std	\$1250.00	\$3470.00	\$3750.00	\$2225.00	\$705.00
300	200	361	541.5	350	250	443	487.3		6KGP43300X8X00A1	\$27500.00	std	\$2600.00	\$6075.00	\$4475.00	\$2905.00	\$705.00
350	250	443	664.5	450	315	540	594		6KGP43350X8X00A1	\$32400.00	std	\$3500.00	\$6075.00	\$5420.00	\$3195.00	std
450	315	540	810	500	355	590	649		6KGP43450X8X00A1	\$37950.00	std	\$3500.00	\$6075.00	\$6390.00	\$4375.00	std
500	355	590	885	550	400	678	745.8		6KGP43500X8X00A1	\$54000.00	std	\$3500.00	\$6075.00	\$7260.00	\$4650.00	std
550	400	678	1017	600	450	730	803		6KGP43550X8X00A1	\$65000.00	std	\$3500.00	\$6075.00	\$7260.00	\$5180.00	std
600	450	730	1095	650	500	780	858		6KGP43600X1X0CA1	\$69500.00	N/A	std	\$6500.00	\$11655.00	\$7170.00	std
650	500	780	1170	750	560	890	979		6KGP43650X1X0CA1	\$82300.00	N/A	std	\$6500.00	\$13085.00	\$8050.00	std
750	560	890	1335	900	630	1050	1155		6KGP43750X1X0CA1	\$93800.00	N/A	std	\$6500.00	\$14890.00	\$9160.00	std
900	630	1050	1575	1000	710	1160	1276		6KGP43900X1X0CA1	\$109995.00	N/A	std	\$6500.00	\$17295.00	\$10640.00	std
1000	710	1160	1740	1200	800	1380	1518		6KGP431K0X1X0CA1	\$125500.00	N/A	std	\$7600.00	\$19735.00	\$12150.00	std
1200	800	1380	2070	1350	1000	1530	1683		6KGP431K2X1X0CA1	\$145835.00	N/A	std	\$8800.00	\$22930.00	\$14110.00	std



Drives

AF-650GP™ General Purpose Drive

Pricing

Section 15

575V, 3-Phase, 50/60Hz Input

																List Price Adders, GO-SGP							
Heavy Duty Rating								Light Duty Rating								Standard Unit ¹ Includes:	Standard Unit Product No.	List Price GO-SGP	Drive Type (Digit 11)		Factory Installed Options (Digit 12) (Digit 13) (Digit 14)		
HP Rating	kW Rating	Rated Output Amps	Overload Amps (1 Min)	Hp Rating	kW Rating	Rated Output Amps	Overload Amps (1 Min)	(9) IP20 Chassis	(2) IP55 NEMA 12	(4) IP66 NEMA 4X	(R) RFI filter A1/B	(B) Brake Chopper	(C) Conformal Coating										
Rating	Rating			Rating	Rating																		
1	0.75	18	288	1	0.75	18	288	IP20 (9) Chassis Keypad	6KGP53001X9000A1	\$1155.00	std	\$250.00	\$550.00	N/A	\$75.00	\$210.00							
2	1.5	27	432	2	1.5	27	432		6KGP53002X9000A1	\$1240.00	std	\$250.00	\$550.00	N/A	\$100.00	\$210.00							
3	2.2	39	624	3	2.2	39	624		6KGP53003X9000A1	\$1450.00	std	\$250.00	\$550.00	N/A	\$125.00	\$210.00							
5	4	61	976	5	4	61	976		6KGP53005X9000A1	\$1705.00	std	\$250.00	\$550.00	N/A	\$150.00	\$210.00							
7.5	5.5	9	144	7.5	5.5	9	144		6KGP53007X9000A1	\$2050.00	std	\$275.00	\$575.00	N/A	\$180.00	\$210.00							
10	7.5	11	176	10	7.5	11	176		6KGP53010X9000A1	\$2475.00	std	\$275.00	\$575.00	N/A	\$210.00	\$210.00							
15	11	18	288	15/20	11/15	22	24.2		6KGP53015X9000A1	\$3090.00	std	\$555.00	\$920.00	N/A	\$285.00	\$210.00							
20	15	22	352	25	18.5	27	29.7		6KGP53020X9000A1	\$3750.00	std	\$555.00	\$920.00	N/A	\$360.00	\$210.00							
25	18.5	27	432	30	22	34	37.4		6KGP53025X9000A1	\$4525.00	std	\$960.00	\$1600.00	N/A	\$410.00	\$210.00							
30	22	34	544	40	30	41	45.1		6KGP53030X9000A1	\$5445.00	std	\$960.00	\$1600.00	N/A	\$460.00	\$210.00							
40	30	41	656	50	37	52	57.2		6KGP53040X9000A1	\$6770.00	std	\$960.00	\$1600.00	N/A	\$580.00	\$210.00							
50	37	52	832	60	45	62	68.2		6KGP53050X9000A1	\$8300.00	std	\$1100.00	\$1950.00	N/A	\$720.00	\$210.00							
60	45	62	992	75	55	83	91.3	6KGP53060X9000A1	\$9520.00	std	\$1100.00	\$1950.00	N/A	\$860.00	\$210.00								
75	55	83	1328	100	75	100	110	6KGP53075X9000A1	\$11600.00	std	\$1700.00	\$3270.00	N/A	\$980.00	\$210.00								
100	75	100	160	125	90	131	144.1	6KGP53100X9000A1	\$15050.00	std	\$1700.00	\$3750.00	N/A	\$1120.00	\$210.00								

¹IP21/NEMA 1 Kits are available as Field Installed Options for all 575V drives from 1 HP to 100 HP. See Page 15-13.

575/690V², 3-Phase, 50/60Hz Input

												List Price Adders, GO-SGP											
Heavy Duty Rating				Light Duty Rating				Standard Unit Includes:	Standard Unit Product No.	List Price GO-SGP	Drive Type (Digit 11)			Factory Installed Options (Digit 12) (Digit 13) (Digit 14)									
HP ² Rating	kW Rating	Rated Output Amps	Overload Amps (1 Min)	HP ² Rating	kW Rating	Rated Output Amps	Overload Amps (1 Min)				(1) IP21 NEMA 1	(2) IP55 NEMA 12	(4) IP66 NEMA 4X	(R) RFI filter A1/B	(B) Brake Chopper	(C) Conformal Coating							
15	11	13	208	20	15	18	20	IP21/NEMA 1 (1) RFI A2 Keypad	6KGP63015X1000A1	\$2875.00	std	\$640.00	\$1060.00	\$535.00	\$330.00	\$240.00							
20	15	18	288	25	18.5	22	24		6KGP63020X1000A1	\$3500.00	std	\$800.00	\$1340.00	\$625.00	\$415.00	\$240.00							
25	18.5	22	352	30	22	27	30		6KGP63025X1000A1	\$4140.00	std	\$950.00	\$1580.00	\$710.00	\$470.00	\$240.00							
30	22	27	432	40	30	34	37		6KGP63030X1000A1	\$4825.00	std	\$1105.00	\$1840.00	\$820.00	\$530.00	\$240.00							
40	30	34	51	50	37	41	45		6KGP63040X1000A1	\$5635.00	std	\$1170.00	\$2240.00	\$840.00	\$670.00	\$240.00							
50	37	41	61.5	60	45	52	56		6KGP63050X1000A1	\$6825.00	std	\$1430.00	\$2750.00	\$995.00	\$825.00	\$240.00							
60	45	52	76.5	75	55	62	68		6KGP63060X1000A1	\$7880.00	std	\$1720.00	\$3300.00	\$1350.00	\$990.00	\$240.00							
75	55	62	93	100	75	83	91		6KGP63075X1000A1	\$9780.00	std	\$1960.00	\$3760.00	\$1790.00	\$1125.00	\$240.00							
100	75	83	124.5	125	90	100	110		6KGP63100X1000A1	\$12175.00	std	\$2245.00	\$4315.00	\$1995.00	\$1290.00	\$240.00							

²690V horsepower ratings. Please consult AF-650GP™ Manuals for 575V ratings.

575/690V², 3-Phase, 50/60Hz Input

Heavy Duty Rating								Light Duty Rating				List Price Adders, GO-SGP										
HP ² Rating	kW Rating	Rated Output Amps	Overload Amps (1 Min)	HP ² Rating	kW Rating	Rated Output Amps	Overload Amps (1 Min)	Standard Unit Includes:	Standard Unit Product No.	List Price GO-SGP	(8) IP00 Chassis	(1) IP21 NEMA 1	(2) IP54 NEMA 12	(R) RFI filter A1/B	(B) Brake Chopper	(C) Conformal Coating						
125	90	108	162	150	110	131	194	IP00 (8) Chassis RFI A2 Keypad Conformal Coated	6KGP63125X8000A1	\$15270.00	std	\$1190.00	\$3990.00	N/A	\$1810.00	std						
150	110	131	196.5	200	132	155	171		6KGP63150X8000A1	\$17610.00	std	\$1190.00	\$3990.00	N/A	\$1810.00	std						
200	132	155	232.5	250	160	192	211		6KGP63200X8000A1	\$21650.00	std	\$1190.00	\$3990.00	N/A	\$2125.00	std						
250	160	192	288	300	200	242	266		6KGP63250X8000A1	\$25325.00	std	\$1190.00	\$3990.00	N/A	\$2560.00	std						
300	200	242	363	350	250	290	319		6KGP63300X8000A1	\$27695.00	std	\$3525.00	\$6990.00	N/A	\$3340.00	std						
350	250	290	435	400	315	344	378		6KGP63350X8000A1	\$31360.00	std	\$3525.00	\$6990.00	N/A	\$3675.00	std						
400	315	344	516	500	400	400	440		6KGP63400X8000A1	\$36875.00	std	\$3525.00	\$6990.00	N/A	\$5030.00	std						
500	350	380	570	600	450	450	495		6KGP63500X8000A1	\$51565.00	std	\$3525.00	\$6990.00	N/A	\$4920.00	std						
550	400	410	615	650	500	500	550		6KGP63550X8000A1	\$71500.00	std	\$7500.00	\$11170.00	N/A		std						
650	500	500	750	750	560	570	627		6KGP63650X8000A1	\$90530.00	std	\$7500.00	\$11170.00	N/A		std						
750	560	570	855	800	630	630	693	6KGP63750X8000A1	\$95550.00	std	\$7500.00	\$11170.00	N/A		std							
900	630	630	945	1000	710	730	803	IP21/NEMA 1 (1) RFI A2 Keypad Conformal Coated	6KGP63900X1000A1	\$120965.00	std	std	\$11170.00	N/A	consult factory	std						
1000	710	730	1095	1200	800	850	935		6KGP63100X1000A1	\$138070.00	N/A	std	\$11170.00	N/A		std						
1150	800	850	1275	1300	900	945	1040		6KGP63110X1000A1	\$160400.00	N/A	std	\$11170.00	N/A		std						
1250	900	945	1417.5	1400	1000	1060	1166		6KGP63120X1000A1	\$181535.00	N/A	std	\$11170.00	N/A		std						
1350	1000	1060	1590	1600	1200	1260	1386		6KGP63130X1000A1	\$200500.00	N/A	std	\$11170.00	N/A		std						

²690V horsepower ratings. Please consult AF-650GP™ Manuals for 575V ratings.



Drives

AF-650GP™ General Purpose Drive Field Installed IP21/NEMA 1 Add-On Option Kits

Section 15

IP21/NEMA 1 Add-On Option Kits

Voltage	HP Rating	kW Rating	IP21/NEMA 1 Kit Product No.	List Price GO-5AC	Fits AF-650GP™ IP20 Drive Product No.
230	0.33	0.25	NEMA1ACA2	\$110.00	6KGP23F25X9XXXA1
	0.5	0.37	NEMA1ACA2	\$110.00	6KGP23F50X9XXXA1
	1	0.75	NEMA1ACA2	\$110.00	6KGP23001X9XXXA1
	2	1.5	NEMA1ACA2	\$110.00	6KGP23002X9XXXA1
	3	2.2	NEMA1ACA2	\$110.00	6KGP23003X9XXXA1
	5	3.7	NEMA1ACA3	\$115.00	6KGP23005X9XXXA1
	7.5	5.5	NEMA1ACB3	\$140.00	6KGP23007X9XXXA1
	10	7.5	NEMA1ACB3	\$140.00	6KGP23010X9XXXA1
	15	11	NEMA1ACB4	\$150.00	6KGP23015X9XXXA1
	20	15	NEMA1ACB4	\$150.00	6KGP23020X9XXXA1
	25	18.5	NEMA1ACC3	\$160.00	6KGP23025X9XXXA1
	30	22	NEMA1ACC3	\$160.00	6KGP23030X9XXXA1
	40	30	NEMA1ACC4	\$175.00	6KGP23040X9XXXA1
	50	37	NEMA1ACC4	\$175.00	6KGP23050X9XXXA1
	0.5	0.37	NEMA1ACA2	\$110.00	6KGP43F50X9XXXA1
	1	0.75	NEMA1ACA2	\$110.00	6KGP43001X9XXXA1
	2	1.5	NEMA1ACA2	\$110.00	6KGP43002X9XXXA1
	3	2.2	NEMA1ACA2	\$110.00	6KGP43003X9XXXA1
	5	3.7	NEMA1ACA2	\$110.00	6KGP43005X9XXXA1
	7.5	5.5	NEMA1ACA3	\$115.00	6KGP43007X9XXXA1
460	10	7.5	NEMA1ACA3	\$115.00	6KGP43010X9XXXA1
	15	11	NEMA1ACB3	\$140.00	6KGP43015X9XXXA1
	20	15	NEMA1ACB3	\$140.00	6KGP43020X9XXXA1
	25	18.5	NEMA1ACB4	\$150.00	6KGP43025X9XXXA1
	30	22	NEMA1ACB4	\$150.00	6KGP43030X9XXXA1
	40	30	NEMA1ACB4	\$150.00	6KGP43040X9XXXA1
	50	37	NEMA1ACC3	\$160.00	6KGP43050X9XXXA1
	60	45	NEMA1ACC3	\$160.00	6KGP43060X9XXXA1
	75	55	NEMA1ACC4	\$175.00	6KGP43075X9XXXA1
	100	75	NEMA1ACC4	\$175.00	6KGP43100X9XXXA1
575	1	0.75	NEMA1ACA3	\$115.00	6KGP53001X9XXXA1
	2	1.5	NEMA1ACA3	\$115.00	6KGP53002X9XXXA1
	3	2.2	NEMA1ACA3	\$115.00	6KGP53003X9XXXA1
	5	3.7	NEMA1ACA3	\$115.00	6KGP53005X9XXXA1
	7.5	5.5	NEMA1ACA3	\$115.00	6KGP53007X9XXXA1
	10	7.5	NEMA1ACA3	\$115.00	6KGP53010X9XXXA1
	15	11	NEMA1ACB3	\$140.00	6KGP53015X9XXXA1
	20	15	NEMA1ACB3	\$140.00	6KGP53020X9XXXA1
	25	18.5	NEMA1ACB4	\$150.00	6KGP53025X9XXXA1
	30	22	NEMA1ACB4	\$150.00	6KGP53030X9XXXA1
	40	30	NEMA1ACB4	\$150.00	6KGP53040X9XXXA1
	50	37	NEMA1ACC3	\$160.00	6KGP53050X9XXXA1
	60	45	NEMA1ACC3	\$160.00	6KGP53060X9XXXA1
	75	55	NEMA1ACC4	\$175.00	6KGP53075X9XXXA1
	100	75	NEMA1ACC4	\$175.00	6KGP53100X9XXXA1
	125	90	NEMA1ACC4	\$175.00	6KGP53125X9XXXA1



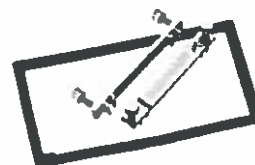
Drives

AF-650GP™ General Purpose Drive Options and Accessories

Remote Mounting Kit for graphical LCD Keypad

Remote Mounting Kit for mounting graphical LCD Keypad on enclosure door. Kit includes gasket, mounting brackets, and cable. Keypad is rated IP65.

Description	Product Number	List Price GO-SAC
Remote Mounting Kit for graphical LCD Keypad	RMKYPDAC	\$95.00
Remote Mounting Kit without cable	OPCRMKNC	\$85.00



Remote Mounting Kit

Profibus DP Communications Module

Profibus DP internal drive mounted module for use on AF-650GP™ and AF-600FP™ drives. Supports Profibus DP V1 communications networks.

Description	Product Number	List Price GO-SAC
Profibus DP Communications Module	OPCPDP	\$725.00

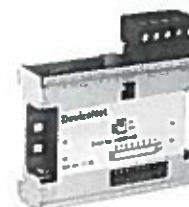


Profibus DP Communications Module

DeviceNet Communications Module

DeviceNet internal drive mounted module for use on AF-650GP™ and AF-600FP™ drives. ODVA certified device.

Description	Product Number	List Price GO-SAC
DeviceNet Communications Module	OPCDEV	\$600.00



DeviceNet Communications Module

Ethernet IP Communications Module¹

Ethernet IP internal drive mounted module for use on AF-650GP™ and AF-600FP™ drives. ODVA certified device. Features 2-Port built-in switch. Also includes webserver and email notification.

Description	Product Number	List Price GO-SAC
Ethernet/IP Communications Module	OPCEIP	\$700.00

¹Requires I/O and network slots and cannot be used with any other network or I/O modules.

Modbus TCP Communications Module

Modbus TCP internal drive mounted module for use on AF-650GP™ and AF-600FP™ drives.

Description	Product Number	List Price GO-SAC
Modbus TCP Communications Module	OPCMBTCP	\$700.00



General Purpose I/O Module

ProfiNet RT Communications Module

ProfiNet RT internal drive mounted module for use on AF-650GP™ and AF-600FP™ drives.

Description	Product Number	List Price GO-SAC
ProfiNet RT Communications Module	OPCPRRT	\$700.00

General Purpose I/O Module

General Purpose I/O internal drive mounted module for use on AF-650GP™ and AF-600FP™ drives. Module includes:

- 3) 24V Digital Inputs
- 2) PNP/NPN Digital Outputs
- 2) 0-10V Analog Inputs
- 1) 0/4-20mA Analog Output

Description	Product Number	List Price GO-SAC
General Purpose I/O Module	OPCGPIO	\$475.00



Drives

AF-650GP™ General Purpose Drive

Options and Accessories

Section 15

Encoder Module

Encoder internal drive mounted module for use on the AF-650GP™ drive. Module supports all 5V incremental encoders. Also supports Hyperface SinCos encoders.

Description	Product Number	List Price GO-SAC
Encoder Input Module	OPCENC	\$400.00



Encoder Module

Resolver Module

Resolver internal drive mounted module for use on the AF-650GP™ drive. Module supports 4-8Vrms, 2.5kHz - 15kHz, 50mA resolvers. Resolution is 10bit at 4Vrms.

Description	Product Number	List Price GO-SAC
Resolver Input Module	OPCRE5	\$400.00



Resolver Module

Relay Output Module

Relay Output internal drive mounted module for use on the AF-650GP™ and AF-600FP™ drives. Module adds (3) Form C relay outputs to the drive. Relays are rated at 2A at 240V resistive load.

Description	Product Number	List Price GO-SAC
Relay Output Module	OPCRLY	\$475.00



Relay Output Module

24V DC External Supply Module

24V DC External Supply internal drive mounted module for use on the AF-650GP™ and AF-600FP™ drives. This module accepts an external 24V DC supply which is used to keep the control board of the drive and other option modules powered in the event of a Line side power outage. Can be used with Communications and I/O Modules.

Description	Product Number	List Price GO-SAC
24V DC External Supply Module	OPC24VPS	\$240.00



24V DC External Supply Module

Safe PLC I/O Module

Safe PLC I/O internal drive mounted module for use on the AF-650GP™ drive. This module provides a safety input based on a single pole 24V DC input.

Description	Product Number	List Price GO-SAC
Safe PLC I/O Module	OPCSAFE	\$450.00



Safe PLC I/O Module

Screw Terminal Accessory

Screw Terminal Accessory is available for field installation on AF-650GP™ and AF-600FP™ drives. These screw terminals can replace the cage clamp terminals which ship with each drive. This set of three terminals are for the digital inputs, analog I/O, and RS485 connection.

Description	Product Number	List Price GO-SAC
Screw Terminal Accessory	OPCTERM	\$25.00



Drives

AF-650GP™ General Purpose Drive Options and Accessories

Section 15

Pedestal Kit

Pedestal Kit allows Unit Size 41 and 42 drives (NEMA 1 and 12, 150HP to 350/400HP at 460V/575V AF-600 FP and 125HP to 300/400HP at 460/690V AF-650 GP) to be floor mounted.

Description	Product Number	List Price GO-SAC
Pedestal Kit	OPC4XPED	\$875.00

USB Kit

This kit allows for the USB programming terminal to be brought out to the front cover of the drive. Works with all drive types.

Description	Product Number	List Price GO-SAC
For all drives up to Unit Size 5X	OPCUSB	\$75.00
For all Unit Size 6X drives	OPCUSB6X	\$225.00

Power Shields

These shields are used to cover the drive power terminals on NEMA 1 and NEMA 12 drive types.

Description	Product Number	List Price GO-SAC
For Unit Size 41 and 42 drives	OPCCOVER4142	\$520.00
For Unit Size 51 drives	OPCCOVER51	\$1305.00

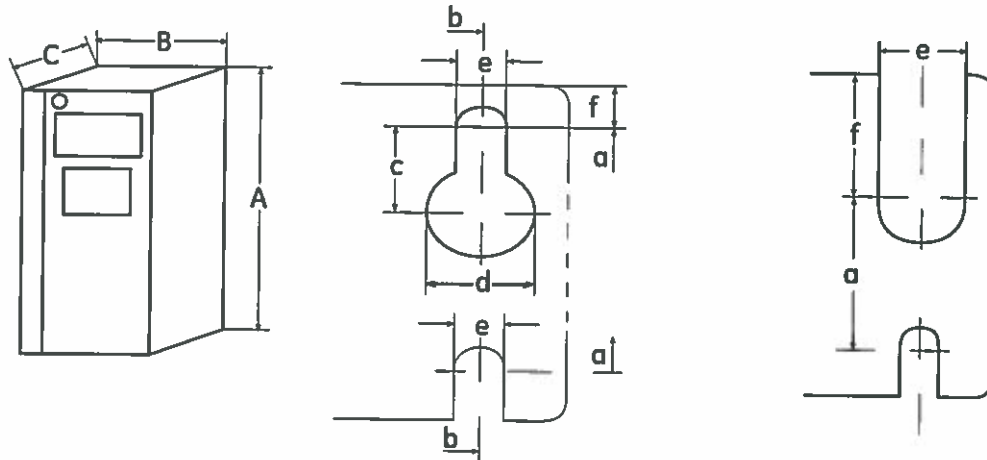


Drives

AF-650GP™ General Purpose Drive

Dimensional Drawings

Section 15



Mechanical Dimensions, 1X Unit Sizes

Unit Size	Dimensions	12	13	15
Drive Type		IP20 Open Chassis	IP20 Open Chassis	NEMA 12/NEMA 4
Voltage				
240V		0.33 to 3HP	5HP	0.33 to 5HP
460V		0.5 to 5HP	7.5 to 10HP	0.5 to 10HP
575V			1 to 10HP	1 to 10HP
Height				
Height of backplate	A	10.55 in	10.55 in	16.54 in
Height with de-coupling plate	A	14.72 in	14.72 in	—
Distance between mounting holes	a	10.12 in	10.12 in	15.83 in
Width				
Width of backplate	B	3.54 in	5.12 in	9.53 in
Distance between mounting holes	b	2.76 in	4.33 in	8.46 in
Depth				
Depth without I/O and/or Network Option	C	8.07 in	8.07 in	7.68 in
Depth with I/O and/or Network Option	C	8.67 in	8.67 in	7.68 in
Screw Holes				
	c	0.315 in	0.315 in	0.325 in
	d	0.433 in	0.433 in	0.472 in
	e	0.216 in	0.216 in	0.256 in
	f	0.354 in	0.354 in	0.354 in
Weight		10.8 lbs	14.5 lbs	29.7/31.2 lbs

Mechanical Dimensions, 2X Unit Sizes

Unit Size	Dimensions	21	22	23	24
Drive Type		NEMA 12/NEMA 4	NEMA 12/NEMA 4	IP20 Open Chassis	IP20 Open Chassis
Voltage					
240V		7.5 to 10HP	15HP	7.5 to 10HP	15 to 20HP
460V		15 to 20HP	25 to 30HP	15 to 20HP	25 to 40HP
575V		15 to 20HP	25 to 30HP	15 to 20HP	25 to 40HP
Height					
Height of backplate	A	18.9 in	25.6 in	15.7 in	20.5 in
Height with de-coupling plate	A	—	—	16.54 in	23.43 in
Distance between mounting holes	a	17.9 in	24.6 in	14.96 in	19.5 in
Width					
Width of backplate	B	9.53 in	9.53 in	6.5 in	9.06 in
Distance between mounting holes	b	8.27 in	8.27 in	5.5 in	7.87 in
Depth					
Depth without I/O and/or Network Option	C	10.24 in	10.24 in	9.81 in	9.53 in
Depth with I/O and/or Network Option	C	10.24 in	10.24 in	10.31 in	9.53 in
Screw Holes					
	c	0.472 in	0.472 in	0.315 in	—
	d	0.748 in	0.748 in	0.472 in	—
	e	0.354 in	0.354 in	0.268 in	0.335 in
	f	0.354 in	0.354 in	0.31 in	0.59 in
Weight		50.6 lbs	59.5 lbs	26.4 lbs	51.7 lbs



Drives

AF-650GP™ General Purpose Drive

Dimensional Drawings

Section 15

Mechanical Dimensions, 3X Unit Sizes

Unit Size	Dimensions	31	32	33	34
Drive Type		NEMA 12/NEMA 4	NEMA 12/NEMA 4	IP20 Open Chassis	IP20 Open Chassis
Voltage					
240V		20 to 30HP	40 to 50HP	25 to 30HP	40 to 50HP
460V		40 to 60HP	75 to 100HP	50 to 60HP	75 to 100HP
575V		40 to 60HP	75 to 100HP	50 to 60HP	75 to 100HP
Height					
Height of backplate	A	26.78 in	30.31 in	21.65 in	25.98 in
Height with de-coupling plate	A	—	—	24.8 in	31.5 in
Distance between mounting holes	a	25.51 in	29.1 in	20.51 in	24.84 in
Width					
Width of backplate	B	12.13 in	14.57 in	12.13 in	14.57 in
Distance between mounting holes	b	10.71 in	13.15 in	10.63 in	12.99 in
Depth					
Depth without I/O and/or Network Option	C	12.2 in	13.19 in	13.12 in	13.12 in
Depth with I/O and/or Network Option	C	12.2 in	13.19 in	13.12 in	13.12 in
Screw Holes					
	c	0.492 in	0.492 in	—	—
	d	0.748 in	0.748 in	—	—
	e	0.354 in	0.354 in	0.335 in	0.335 in
	f	0.386 in	0.386 in	0.67 in	0.67 in
Weight		99 lbs	143 lbs	77 lbs	110 lbs

Mechanical Dimensions IP20 Open Chassis Drives with Field Installed IP21/NEMA 1 Kits¹

Unit Size	32	33	33	34	33	34
Drive Type	IP20 Open Chassis with IP21/NEMA 1 Kit	IP20 Open Chassis with IP21/NEMA 1 Kit	IP20 Open Chassis with IP21/NEMA 1 Kit	IP20 Open Chassis with IP21/NEMA 1 Kit	IP20 Open Chassis with IP21/NEMA 1 Kit	IP20 Open Chassis with IP21/NEMA 1 Kit
Voltage						
240V	0.33 to 3HP	5HP	7.5 to 10HP	15 to 20HP	25 to 30HP	40 to 50HP
460V	0.5 to 5HP	7.5 to 10HP	15 to 20HP	25 to 40HP	50 to 60HP	75 to 100HP
575V		1 to 10HP	15 to 20HP	25 to 40HP	50 to 60HP	75 to 100HP
Height						
Height with Kit	14.76 in	14.76 in	18.7 in	26.4 in	29.7 in	37.4 in
Width						
Width of backplate	3.71 in	5.12 in	6.5 in	9.1 in	12.1 in	14.6 in
Distance between mounting holes	2.76 in	4.33 in	5.5 in	7.9 in	10.6 in	13.0 in
Depth						
Depth without I/O and/or Network Option	8.07 in	8.07 in	9.81 in	9.53 in	13.3 in	13.3 in
Depth with I/O and/or Network Option	8.67 in	8.67 in	10.31 in	9.53 in	13.3 in	13.3 in

¹Please consult IP21/NEMA 1 Kit Instructions for further mounting details and dimensions.

Note: Please allow 2" between drives with field installed IP21/NEMA 1 Kits. Also, please consult the relevant AF-6 Series drives Operating Instructions for recommended clearance above and below each drive rating.

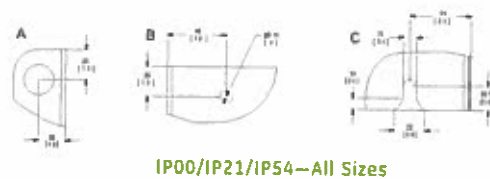
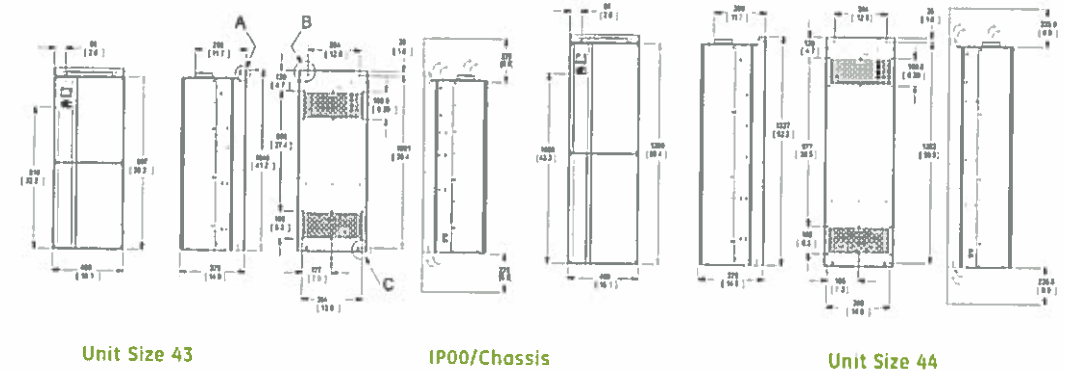
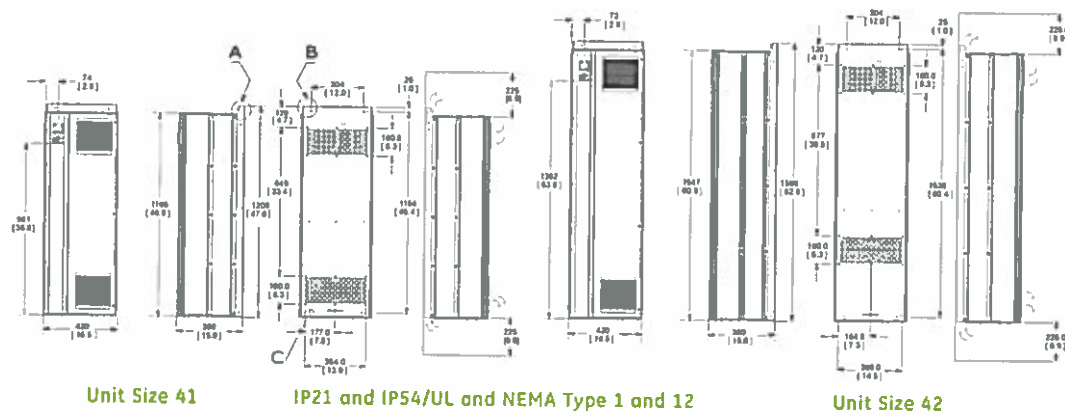


Drives

AF-650GP™ General Purpose Drive

Dimensional Drawings

Section 15



Unit Size	41	42	43	44
Drive Type	NEMA 1/NEMA 12	NEMA 1/NEMA 12	IP00 Open Chassis	IP00 Open Chassis
Voltage				
480V	125 to 150HP	200 to 300HP	125 to 150HP	200 to 300HP
690V	125 to 200HP	250 to 400HP	125 to 200HP	250 to 400HP
Shipping Dimensions				
Height	25.6 in	25.6 in	25.6 in	25.6 in
Width	68.11 in	68.11 in	48.03 in	58.66 in
Depth	22.44 in	22.44 in	22.44 in	22.44 in
Drive Dimensions				
Height	47.6 in	62.56 in	41.18 in	52.24 in
Width	16.54 in	16.54 in	16.06 in	16.06 in
Depth	14.96 in	14.96 in	14.76 in	14.76 in
Weight	228.8 lbs	332.2 lbs	200.2 lbs	303.6 lbs



Drives

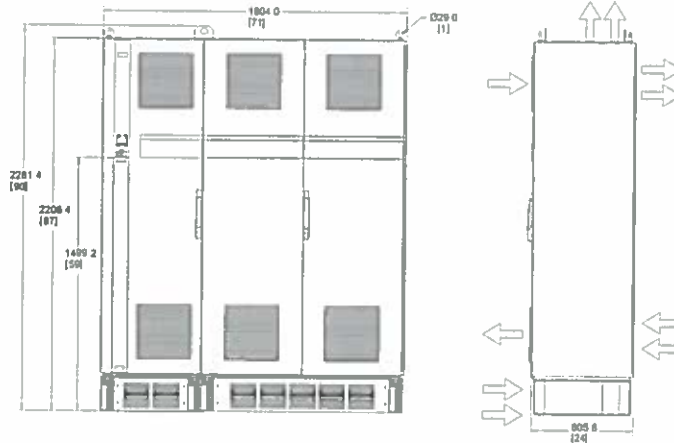
AF-650GP™ General Purpose Drive

Dimensional Drawings

Section 15

Unit Size 62 Dimensions

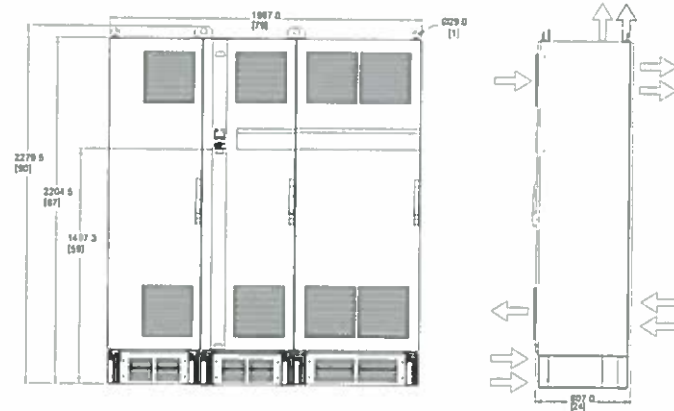
Drive Type	NEMA 1/NEMA 12
Voltage	
460V	1000 to 1200HP
690V	1250 to 1350HP
Shipping Dimensions	
Height	91.5 in
Width	77.2 in
Depth	36.5 in
Drive Dimensions	
Height	90 in
Width	71 in
Depth	24 in
Weight	2782 lbs



Unit Size 62

Unit Size 63 Dimensions

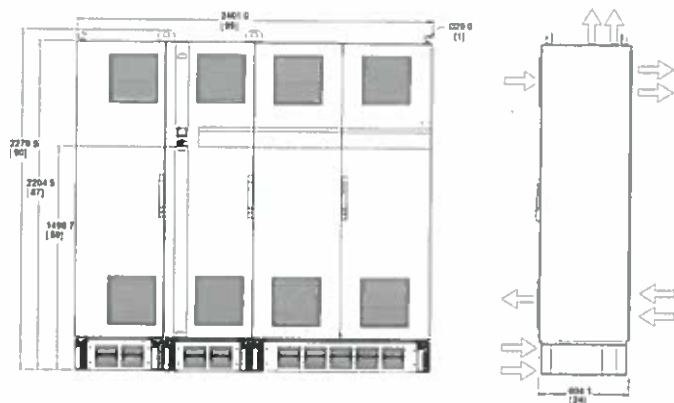
Drive Type	NEMA 1/NEMA 12
Voltage	
460V	600 to 900HP
690V	900 to 1150HP
Shipping Dimensions	
Height	91.5 in
Width	85 in
Depth	36.5 in
Drive Dimensions	
Height	90 in
Width	79 in
Depth	24 in
Weight	2864 lbs



Unit Size 63

Unit Size 64 Dimensions

Drive Type	NEMA 1/NEMA 12
Voltage	
460V	1000 to 1200HP
690V	1250 to 1350HP
Shipping Dimensions	
Height	91.5 in
Width	100.1 in
Depth	36.5 in
Drive Dimensions	
Height	90 in
Width	94.5 in
Depth	24 in
Weight	3397 lbs



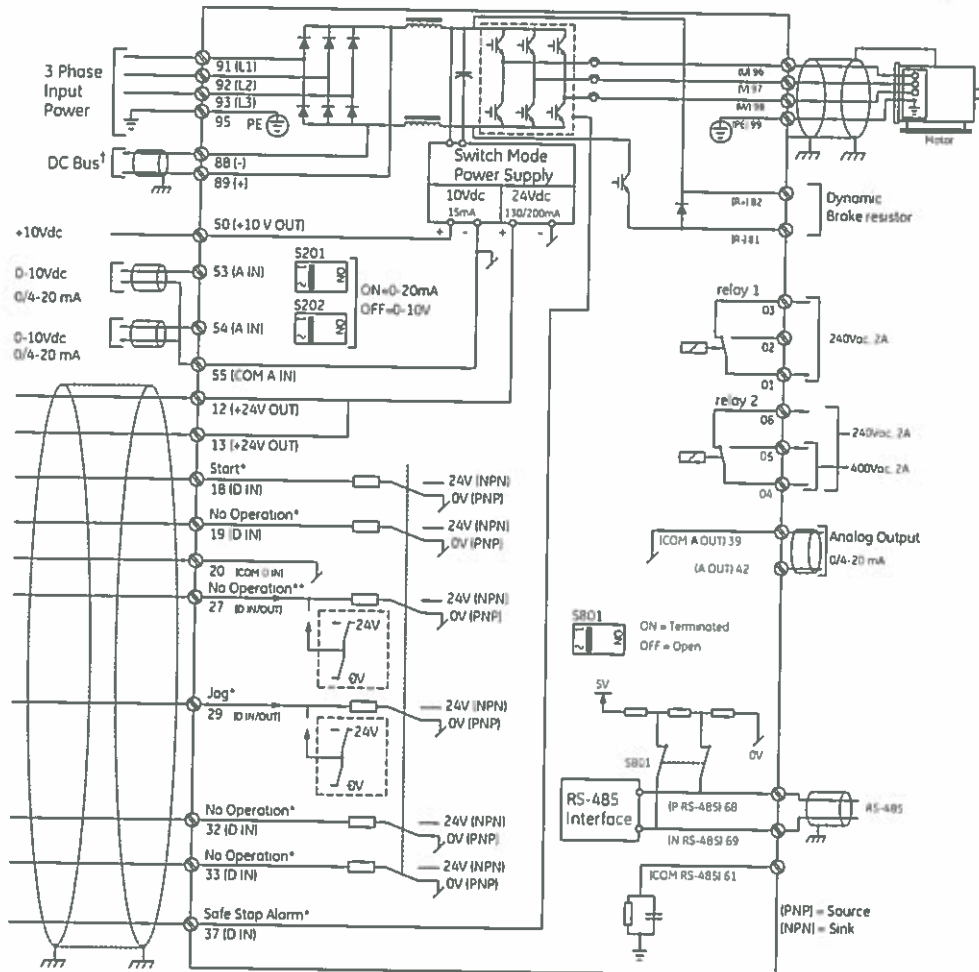
Unit Size 64



Drives

AF-650GP™ General Purpose Drive Basic Wiring Diagrams

Section 15



* Indicates default setting; see Parameter Group E-## to re-program.

** Indicates default setting for version 1.10 drives or higher. Prior versions are set to Coast Inverse, indicating that terminal #27 must be Logic "High" to enable the drive to run. See Parameter E-03 Terminal 27 Digital Input to re-program.

† These terminals are only available with optional factory installed brake chopper.



Drives

Section 15

AF-650GP™ General Purpose Drive Heavy Duty Efficiency, Watt Loss, Unit Size, Dimensions and Weights

230 Vac

HP Rating	Output Current	Efficiency			Watt Loss [W]	GE Unit Size	Drive Type	Height (in)	Width (in)	Depth (in)	Weight (lbs)
		at 5 kHz (%)	at 4 kHz (%)	at 3 kHz (%)							
0.33	1.8	94			21	12	IP20 Chassis	14.7	3.5	8.7	10.8
0.5	2.4	94			29	12	IP20 Chassis	14.7	3.5	8.7	10.8
1	4.6	95			54	12	IP20 Chassis	14.7	3.5	8.7	10.8
2	7.5	96			82	12	IP20 Chassis	14.7	3.5	8.7	10.8
3	10.6	96			115	12	IP20 Chassis	14.7	3.5	8.7	10.8
5	16.7	96			185	13	IP20 Chassis	14.7	5.1	8.7	14.55
7.5	24.2		96.4		239	23	IP20 Chassis	16.5	6.5	10.31	26.5
10	30.8		95.9		371	23	IP20 Chassis	16.5	6.5	10.31	26.5
15	46.2		96.4		463	24	IP20 Chassis	23.43	9.06	9.53	51.8
20	59.4		96		621	24	IP20 Chassis	23.43	9.06	9.53	51.8
25	74.8			97	740	33	IP20 Chassis	24.8	12.13	13.15	77.2
30	88			97	876	33	IP20 Chassis	24.8	12.13	13.15	77.2
40	115			97	1143	34	IP20 Chassis	31.5	14.57	13.15	110.2
50	143			97	1400	34	IP20 Chassis	31.5	14.57	13.15	110.2

460 Vac

HP Rating	Output Current	Efficiency				Watt Loss [W]	GE Unit Size	Drive Type	Height (in)	Width (in)	Depth (in)	Weight (lbs)
		at 5 kHz (%)	at 4 kHz (%)	at 3 kHz (%)	at 2 kHz (%)							
0.5	1.2	93				35	12	IP20 Chassis	14.7	3.5	8.7	10.8
1	2.1	96				46	12	IP20 Chassis	14.7	3.5	8.7	10.8
2	3.4	97				62	12	IP20 Chassis	14.7	3.5	8.7	10.8
3	4.8	97				88	12	IP20 Chassis	14.7	3.5	8.7	10.8
5	8.2	97				124	12	IP20 Chassis	14.7	3.5	8.7	10.8
7.5	11	97				187	13	IP20 Chassis	14.7	5.1	8.7	14.55
10	14.5	97				255	13	IP20 Chassis	14.7	5.1	8.7	14.55
15	21		98			291	23	IP20 Chassis	16.5	6.5	10.31	26.5
20	27		98			379	23	IP20 Chassis	16.5	6.5	10.31	26.5
25	34		98			444	24	IP20 Chassis	23.43	9.06	9.53	51.8
30	40		98			547	24	IP20 Chassis	23.43	9.06	9.53	51.8
40	52			98		570	24	IP20 Chassis	23.43	9.06	9.53	51.8
50	65			98		697	33	IP20 Chassis	24.8	12.13	13.15	77.2
60	80			98		891	33	IP20 Chassis	24.8	12.13	13.15	77.2
75	105			98		1022	34	IP20 Chassis	31.5	14.57	13.15	110.2
100	130			99		1232	34	IP20 Chassis	31.5	14.57	13.15	110.2
125	160			98		2641	43	IP00 Chassis	39.3	16.1	14.7	200.6
150	190			98		2995	43	IP00 Chassis	39.3	16.1	14.7	200.6
200	240			98		3425	44	IP00 Chassis	50.3	16.1	14.7	304.2
250	302			98		3910	44	IP00 Chassis	50.3	16.1	14.7	304.2
300	361			98		4625	44	IP00 Chassis	50.3	16.1	14.7	304.2
350	443				98	5165	52	IP00 Chassis	59	23	19.5	611
450	540				98	6960	52	IP00 Chassis	59	23	19.5	611
500	590				98	7691	52	IP00 Chassis	59	23	19.5	611
550	678				98	8636	52	IP00 Chassis	59	23	19.5	611
600	730				98	9492	61	IP21/NEMA 1	86.8	55.1	23.9	2214
650	780				98	10631	61	IP21/NEMA 1	86.8	55.1	23.9	2214
750	890				98	11263	61	IP21/NEMA 1	86.8	55.1	23.9	2214
900	1050				98	13172	61	IP21/NEMA 1	86.8	55.1	23.9	2214
1000	1160				98	14967	62	IP21/NEMA1	86.8	71	23.9	2748
1200	1380				98	16392	62	IP21/NEMA1	86.8	71	23.9	2748



Drives

Section 15

AF-650GP™ General Purpose Drive

Heavy Duty Efficiency, Watt Loss, Unit Size, Dimensions and Weights

575 Vac

HP Rating	Output Current	Efficiency			Watt Loss (W)	GE Unit Size	Drive Type	Height (in)	Width (in)	Depth (in)	Weight (lbs)
		at 5 kHz (%)	at 3 kHz (%)	at 2 kHz (%)							
1	1.7	97			35	13	IP20 Chassis	14.7	5.1	8.7	14.55
2	2.7	97			65	13	IP20 Chassis	14.7	5.1	8.7	14.55
3	3.9	97			92	13	IP20 Chassis	14.7	5.1	8.7	14.55
5	6.1	97			145	13	IP20 Chassis	14.7	5.1	8.7	14.55
7.5	9	97			195	13	IP20 Chassis	14.7	5.1	8.7	14.55
10	11	97			261	13	IP20 Chassis	14.7	5.1	8.7	14.55
15	18		98		225	23	IP20 Chassis	16.5	6.5	10.31	26.5
20	22		98		285	23	IP20 Chassis	16.5	6.5	10.31	26.5
25	27		98		329	24	IP20 Chassis	23.43	9.06	9.53	51.8
30	34		98		700	24	IP20 Chassis	23.43	9.06	9.53	51.8
40	41		98		700	24	IP20 Chassis	23.43	9.06	9.53	51.8
50	52			98	850	33	IP20 Chassis	24.8	12.13	13.15	77.2
60	62			98	1100	33	IP20 Chassis	24.8	12.13	13.15	77.2
75	83			98	1400	34	IP20 Chassis	31.5	14.57	13.15	110.2
100	100			98	1500	34	IP20 Chassis	31.5	14.57	13.15	110.2

575-690 Vac

HP Rating	Output Current	Efficiency			Watt Loss (W)	GE Unit Size	Drive Type	Height (in)	Width (in)	Depth (in)	Weight (lbs)
		at 3 kHz (%)	at 2 kHz (%)	at 1.5 kHz (%)							
15	13	98			228	22	IP21/NEMA 1	25.6	9.5	10.3	59.5
20	18	98			285	22	IP21/NEMA 1	25.6	9.5	10.3	59.5
25	22	98			335	22	IP21/NEMA 1	25.6	9.5	10.3	59.5
30	27	98			375	22	IP21/NEMA 1	25.6	9.5	10.3	59.5
40	34	98			480	32	IP21/NEMA 1	30.3	14.6	13.2	143.3
50	41	98			592	32	IP21/NEMA 1	30.3	14.6	13.2	143.3
60	51	98			720	32	IP21/NEMA 1	30.3	14.6	13.2	143.3
75	62	98			880	32	IP21/NEMA 1	30.3	14.6	13.2	143.3
100	83	98			1800	32	IP21/NEMA 1	30.3	14.6	13.2	143.3
125	108		98		2264	43	IP00 Chassis	39.3	16.1	14.7	180.8
150	131		98		2664	43	IP00 Chassis	39.3	16.1	14.7	180.8
200	155		98		2953	43	IP00 Chassis	39.3	16.1	14.7	200.6
250	192		98		3451	44	IP00 Chassis	50.3	16.1	14.7	246.9
300	242		98		4275	44	IP00 Chassis	50.3	16.1	14.7	271.2
350	290		98		4875	44	IP00 Chassis	50.3	16.1	14.7	304.2
400	344			98	5185	44	IP00 Chassis	50.3	16.1	14.7	332.9
500	380			98	5385	52	IP00 Chassis	59	23	19.5	487.2
600	410			98	5818	52	IP00 Chassis	59	23	19.5	487.2
650	500			98	7671	52	IP00 Chassis	59	23	19.5	520.3
750	570			98	8715	52	IP00 Chassis	59	23	19.5	610.7
900	630	98			9674	61	IP21/NEMA 1	86.8	55.1	23.9	2213.4
1000	730	98			10965	61	IP21/NEMA 1	86.8	55.1	23.9	2213.4
1150	850	98			12890	61	IP21/NEMA 1	86.8	55.1	23.9	2213.4
1250	945	98			14457	62	IP21/NEMA 1	86.8	71	23.9	2746.9
1350	1060	98			15899	62	IP21/NEMA 1	86.8	71	23.9	2746.9



Drives

AF-650GP™ General Purpose Drive

Dynamic Braking Resistors

Section 15

Please note that the AF-650 General Purpose drives must be ordered with the Brake Chopper factory option in order to use the Dynamic Braking Resistors.

230 Vac

Nominal Applied Motor HP	Nominal Applied Motor kW	Max. Braking Torque (%)	Repetitive Braking Torque Duty - 10%						Repetitive Braking Torque Duty - 40%						Case Style Resistors						
			Cont. Max					List Price GO-SAC	Cont. Max					List Price GO-SAC	Cont. Max					List Price GO-SAC	
			Qty.	(kW)	Ohms	Breaking Time(s)	Product Number		Qty.	(kW)	Ohms	Breaking Time(s)	Product Number		Qty.	(kW)	Ohms	Breaking Time(s)	Duty Cycle (%)		Product Number
0.33	0.25	160	1	0.095	425	12	DB2101TBNC	\$300.00	1	0.43	425	120	DB2401TBNC	\$450.00	1	0.1	430	48	40	DB2601FP	\$270.00
0.5	0.37	160	1	0.25	310	12	DB2102TBNC	\$300.00	1	0.80	310	120	DB2402TBNC	\$450.00	1	0.2	310	66	55	DB2602FP	\$270.00
1	0.75	160	1	0.065	145	12	DB2103TBNC	\$300.00	1	0.26	145	120	DB2403TBNC	\$450.00	1	0.2	150	32	27	DB2603FP	\$270.00
2	1.5	160	1	0.25	65	12	DB2104TBNC	\$400.00	1	0.80	65	120	DB2404TBNC	\$600.00	1	0.2	72	17	14	DB2604FP	\$360.00
3	2.2	160	1	0.285	50	12	DB2105TBNC	\$400.00	1	1.00	50	120	DB2405TBNC	\$600.00	2	0.2	50	12	10	DB2605FP	\$360.00
5	3.7	160	1	0.8	25	12	DB2106TBNC	\$450.00	1	3.00	25	120	DB2406TBNC	\$675.00	2	0.2	60	13	11	DB2606FP	\$405.00
7.5	5.5	158	1	1	20	12	DB2107TBNC	\$530.00	1	-	-	-	-	-	2	-	-	-	-	-	-
10	7.5	153	1	2	15	12	DB2108TBNC	\$650.00	1	-	-	-	-	-	2	-	-	-	-	-	-
15	11	154	1	2.8	10	12	DB2109TBNC	\$1200.00	1	-	-	-	-	-	-	-	-	-	-	-	-
20	15	150	1	4	7	12	DB2110TBNC	\$1310.00	1	-	-	-	-	-	-	-	-	-	-	-	-
25	18.5	150	1	4.8	6	12	DB2111TBNC	\$1485.00	1	-	-	-	-	-	-	-	-	-	-	-	-
30	22	150	1	6	4.7	30	DB2112TBNC	\$1635.00	1	-	-	-	-	-	-	-	-	-	-	-	-
40	30	150	1	8	3.3	30	DB2113TBNC	\$1663.00	1	-	-	-	-	-	-	-	-	-	-	-	-
50	37	150	1	10	2.7	30	DB2114TBNC	\$2204.00	1	-	-	-	-	-	-	-	-	-	-	-	-

460 Vac

Nominal Applied Motor HP	Nominal Applied Motor kW	Max. Braking Torque (%)	Repetitive Braking Torque Duty - 10%					Repetitive Braking Torque Duty - 40%					Case Style Resistors								
			Qty.	Cont. Max Breaking (kW)	Ohms	Time(s)	Product Number	List Price GO-SAC	Qty.	Cont. Max Breaking (kW)	Ohms	Time(s)	Product Number	List Price GO-SAC	Qty.	Cont. Max Breaking (kW)	Ohms	Time(s)	Duty Cycle (%)	Product Number	List Price GO-SAC
0.5	0.37	160	1	0.065	620	12	DB4101TBNC	\$450.00	1	0.26	620	120	DB4401TBNC	\$675.00	1	100	830	36	30	DB4601FP	\$405.00
1	0.75	160	1	0.065	620	12	DB4102TBNC	\$450.00	1	0.26	620	120	DB4402TBNC	\$675.00	1	200	620	32	27	DB4602FP	\$405.00
2	1.5	160	1	0.25	310	12	DB4103TBNC	\$525.00	1	0.80	310	120	DB4403TBNC	\$788.00	1	200	310	17	14	DB4603FP	\$473.00
3	2.2	160	1	0.29	210	12	DB4104TBNC	\$525.00	1	1.35	210	120	DB4404TBNC	\$788.00	1	200	210	12	10	DB4604FP	\$473.00
5	4	160	1	0.60	110	12	DB4105TBNC	\$600.00	1	2	110	120	DB4405TBNC	\$900.00	2	200	240	12	10	DB4605FP	\$540.00
7.5	5.5	160	1	0.85	80	12	DB4106TBNC	\$850.00	1	3	80	120	DB4406TBNC	\$1275.00	2	200	160	10	8	DB4606FP	\$765.00
10	7.5	160	1	1	65	12	DB4107TBNC	\$950.00	1	5	65	120	DB4407TBNC	\$1425.00	2	200	130	7	6	DB4607FP	\$855.00
15	11	160	1	2	40	12	DB4108TBNC	\$1050.00	1	5	40	120	DB4408TBNC	\$1575.00	2	240	80	6	5	DB4608FP	\$945.00
20	15	160	1	3	30	12	DB4109TBNC	\$1100.00	1	9	30	120	DB4409TBNC	\$1650.00	2	240	72	5	4	DB4609FP	\$990.00
25	18.5	160	1	4	25	12	DB4110TBNC	\$1200.00	1	13	25	120	DB4410TBNC	\$1800.00	-	-	-	-	-	-	-
30	22	160	1	4	20	12	DB4111TBNC	\$1300.00	1	13	20	120	DB4411TBNC	\$1950.00	-	-	-	-	-	-	-
40	30	150	1	5	15	12	DB4112TBNC	\$1750.00	1	16	15	120	DB4412TBNC	\$2625.00	-	-	-	-	-	-	-
50	37	150	1	6	12	12	DB4113TBNC	\$1900.00	1	19	12	120	DB4413TBNC	\$2850.00	-	-	-	-	-	-	-
60	45	150	1	15	9.8	12	DB4114TBNC	\$2150.00	1	38	9.8	120	DB4414TBNC	\$3225.00	-	-	-	-	-	-	-
75	55	150	1	13	7.3	12	DB4115TBNC	\$2355.00	1	38	7.3	120	DB4415TBNC	\$3533.00	-	-	-	-	-	-	-
100	75	150	1	15	4.7	12	DB4116TBNC	\$3800.00	1	45	4.7	120	DB4416TBNC	\$5700.00	-	-	-	-	-	-	-
125	90	150	1	22	3.8	30	DB4117TBNC	\$4300.00	2	75	3.8	600	DB4417TBNC	\$6450.00	-	-	-	-	-	-	-
150	110	150	1	27	3.2	30	DB4118TBNC	\$6450.00	2	90	3.2	600	DB4418TBNC	\$9675.00	-	-	-	-	-	-	-
200	132	150	1	32	2.6	30	DB4119TBNC	\$7600.00	2	112	2.6	600	DB4419TBNC	\$11175.00	-	-	-	-	-	-	-
250	160	150	1	39	2.1	30	DB4120TBNC	\$8600.00	2	135	2.1	600-	DB4420TBNC	\$12675.00	-	-	-	-	-	-	-
300	200	150	2	56	3.3	30	DB4121TBNC	\$9420.00	-	-	-	-	-	-	-	-	-	-	-	-	
350	250	150	2	72	2.6	30	DB4122TBNC	\$14050.00	-	-	-	-	-	-	-	-	-	-	-	-	
450	355	150	2	100	2.1	30	DB4123TBNC	\$16200.00	-	-	-	-	-	-	-	-	-	-	-	-	
550	400	150	4	144	1.3	30	DB4124TBNC	\$17000.00	-	-	-	-	-	-	-	-	-	-	-	-	
600	450	150	4	144	1.3	30	DB4125TBNC	\$18500.00	-	-	-	-	-	-	-	-	-	-	-	-	
650	500	150	4	144	1.3	30	DB4126TBNC	\$20000.00	-	-	-	-	-	-	-	-	-	-	-	-	
750	560	150	4	144	1.3	30	DB4127TBNC	\$21500.00	-	-	-	-	-	-	-	-	-	-	-	-	
900	630	150	4	144	1.3	30	DB4128TBNC	\$23000.00	-	-	-	-	-	-	-	-	-	-	-	-	
1000	710	150	4	144	1.3	30	DB4129TBNC	\$24500.00	-	-	-	-	-	-	-	-	-	-	-	-	
1200	800	150	4	144	1.3	30	DB4130TBNC	\$26000.00	-	-	-	-	-	-	-	-	-	-	-	-	

Consult Factory

Consult Factory



Drives

AF-650GP™ General Purpose Drive Dynamic Braking Resistors

Section 15

575 Vac

Nominal Applied Motor HP	Nominal Applied Motor kW	Max. Braking Torque (%)	Repetitive Braking Torque Duty - 10%						Repetitive Braking Torque Duty - 40%					
			Cont. Max Breaking Time(s)						Cont. Max Breaking Time(s)					
			Qty.	(kW)	Ohms	Product Number	List Price GO-SAC		Qty.	(kW)	Ohms	Product Number	List Price GO-SAC	
1	0.75	160	1	0.065	620	12	DB5101TBNC	\$450.00	1	0.26	620	120	DB5401TBNC	\$675.00
2	1.5	160	1	0.10	425	12	DB5102TBNC	\$450.00	1	1.00	425	120	DB5402TBNC	\$675.00
3	2.2	160	1	0.25	310	12	DB5103TBNC	\$525.00	1	1.60	310	120	DB5403TBNC	\$788.00
5	4	160	1	0.43	150	12	DB5104TBNC	\$525.00	1	4	150	120	DB5404TBNC	\$788.00
7.5	5.5	160	1	0.60	110	12	DB5105TBNC	\$600.00	1	5	110	120	DB5405TBNC	\$900.00
10	7.5	160	1	1	80	12	DB5106TBNC	\$850.00	1	6	80	120	DB5406TBNC	\$1275.00
15	11	160	1	2	40	12	DB5107TBNC	\$950.00	1	11	40	120	DB5407TBNC	\$1425.00
20	15	160	1	2	40	12	DB5108TBNC	\$1050.00	1	11	40	120	DB5408TBNC	\$1575.00
25	18.5	160	1	3	30	12	DB5109TBNC	\$1100.00	1	18	30	120	DB5409TBNC	\$1650.00
30	22	160	1	4	25	12	DB5110TBNC	\$1200.00	1	23	25	120	DB5410TBNC	\$1800.00
40	30	150	1	4	20	12	DB5111TBNC	\$1300.00	1	25	20	120	DB5411TBNC	\$1950.00
50	37	150	1	5	15	12	DB5112TBNC	\$1750.00	1	32	15	120	DB5412TBNC	\$2625.00
60	45	150	1	6	12	12	DB5113TBNC	\$1900.00	1	40	12	120	DB5413TBNC	\$2850.00
75	55	150	1	15	9.8	12	DB5114TBNC	\$2150.00	1	62	9.8	120	DB5414TBNC	\$3225.00
100	75	150	1	13	7.3	12	DB5115TBNC	\$2355.00	1	72	7.3	120	DB5415TBNC	\$3533.00

690 Vac

Nominal Applied Motor HP	Nominal Applied Motor kW	Max. Braking Torque (%)	Repetitive Braking Torque Duty - 10%						Repetitive Braking Torque Duty - 40%					
			Cont. Max Breaking Time(s)						Cont. Max Breaking Time(s)					
			Qty.	(kW)	Ohms	Product Number	List Price GO-SAC		Qty.	(kW)	Ohms	Product Number	List Price GO-SAC	
125	90	160	1	126	9.8	60	DB6101TBNC	\$6010.00	1	77	9.8	120	DB6401TBNC	\$6010.00
150	110	160	1	153	7.3	60	DB6102TBNC	\$6800.00	1	93	7.3	120	DB6402TBNC	\$6800.00
200	132	160	1	185	4.7	60	DB6103TBNC	\$7910.00	1	113	4.7	120	DB6403TBNC	\$7910.00
250	160	160	1	224	4.7	60	DB6104TBNC	\$9925.00	1	137	4.7	120	DB6404TBNC	\$9925.00
300	200	160	2	147	3.8	60	DB6105TBNC	\$11425.00	2	90	3.8	120	DB6405TBNC	\$11425.00
350	250	160	2	173	2.6	60	DB6106TBNC	\$12925.00	2	105	2.6	120	DB6406TBNC	\$12925.00
400	315	160	2	212	2.6	60	DB6107TBNC	\$14425.00	2	130	2.6	120	DB6407TBNC	\$14425.00
500	355	160	-	-	-	-	-	-	-	-	-	-	-	-
550	355	160	-	-	-	-	-	-	-	-	-	-	-	-
650	500	160	-	-	-	-	-	-	-	-	-	-	-	-
750	560	150	-	-	-	-	-	-	-	-	-	-	-	-
900	630	150	-	-	-	-	-	-	-	-	-	-	-	-
1000	710	150	-	-	-	-	-	-	-	-	-	-	-	-
1150	800	150	-	-	-	-	-	-	-	-	-	-	-	-
1250	900	150	-	-	-	-	-	-	-	-	-	-	-	-
1350	1000	150	-	-	-	-	-	-	-	-	-	-	-	-

