



Bensenville

**FloLo HVAC**

**ELECTRICAL**

- AC VARIABLE FREQUENCY DRIVES**  
ABB, BALDOR / RELIANCE
- A-C MOTORS**  
SIEMENS, BALDOR / RELIANCE, LEESON, BROOK CROMPTON, U.S. ELECTRIC, BODINE
- DC DRIVES**  
BALDOR / RELIANCE, SECO, ABB, KB ELECTRONICS, BODINE, FENNER, GRAHAM/DANFOSS
- D-C MOTORS**  
BALDOR / RELIANCE, BODINE, GRAHAM
- ELECTRICAL PARTS**  
BALDOR / RELIANCE, SIEMENS - FURNAS, WARNER, SIEMENS, HOYT, EDISON
- ELECTRONIC CONTROLS & SENSORS**  
DYNAPAR, VEEDER-ROOT, WARNER, EAGLE SIGNAL, MEG-ALERT, PROCESS CONTROL SYSTEMS, REFLEX
- ENCODERS (FEEDBACK DEVICES)**  
NORTHSTAR, DYNAPAR
- MEDIUM VOLTAGE MOTORS (2300/4000V)**  
SIEMENS, BALDOR / RELIANCE, U.S. ELECTRIC
- METRIC MOTORS**  
BROOK CROMPTON, BALDOR / RELIANCE, LEESON, SIEMENS
- MOTOR CONTROLS & MCCs**  
SIEMENS, MEG-ALERT
- SERVO / STEPPERS**  
SUPERIOR, BALDOR, FENNER/SERVO DYNAMICS
- TRANSFORMERS**  
OLSUN ELECTRIC, HEVI-DUTY

- MOTORS**  
A.O. SMITH, EMERSON
- MOTOR CONTROLS**  
SIEMENS (FURNAS) DEFINITE PURPOSE CONTACTORS, SIEMENS NEMA AND IEC RATED CONTACTORS & STARTERS
- DRIVE PRODUCTS**  
MASKA PULLEYS, FENNER POWERTWIST BELTING
- MISCELLANEOUS**  
LAU FAN BLADES, BLOWER WHEELS, BOOSTER PUMPS, CONTROL TRANSFORMERS, MOUNTED BEARINGS, BELTS, PULLEYS, EXHAUST FANS

- ADJUSTABLE SPEED DRIVES**  
REEVES, EURODRIVE
- BALL SCREWS / ACTUATORS**  
DANAHER MOTION
- CLUTCHES & BRAKES**  
WARNER, DODGE, NEXEN, FORMSPRAG, DELTRAN
- COUPLINGS**  
DODGE, DALTON, TB WOODS
- GEAR REDUCERS, GEARMOTORS & TORQUE ARMS**  
DODGE TIGEAR, DODGE QUANTIS, RELIANCE XL, GROVE GEAR, EURODRIVE
- MECHANICAL PARTS**  
REEVES, DODGE, NEXEN, WARNER, RELIANCE, MASTER
- MOUNTED BEARINGS**  
DODGE
- TENSION CONTROL**  
WARNER, NEXEN
- SHEAVES / BELTS**  
OPTI-BELT, DODGE,
- TORQUE LIMITERS**  
DODGE, DALTON

**OFTEN USED FORMULAS**

$IHP = .746 KW$       $IKW = 1.34 HP$

$HP = \frac{\text{Torque (lb.in.)} \times RPM}{63,025}$

$HP = \frac{\text{Torque (lb.ft.)} \times RPM}{5250}$

$HP = \frac{\text{Force (lbs)} \times FPM}{33,000}$

$TORQUE (lb.in.) = \frac{HP \times 63,025}{RPM}$

$TORQUE (lb.ft.) = \frac{HP \times 5,250}{RPM}$

$RPM = \frac{FPM}{.262 \times DIA}$

$FPM = DIA \times .262 \times RPM$

**MECHANICAL**

**RULES OF THUMB**

- An 1800 RPM motor develops 3 lb.ft. of torque per horsepower.
- A 1200 RPM motor develops 4.5 lb.ft. of torque per horsepower.
- A 3-phase motor draws 1.25 amps per HP at 460 volts and 2.5 amps per HP at 230 volts.
- A single phase motor draws 5 amps per HP at 230 volts and 10 amps per HP at 115 volts.

**OHM'S LAW**

- Ohms = Volts/Amperes ( $R=E/I$ )
- Amperes = Volts/Ohms ( $I = E/R$ )
- Volts = Amperes x Ohms ( $E = IR$ )
- Watts = Volts x Amperes ( $W = EI$ )

**ALTERNATING CURRENT**

To Find	Single Phase	Three Phase
Amperes When HP is known	$\frac{HP \times 746}{E \times \text{Eff} \times \text{pf}}$	$\frac{HP \times 746}{1.73 \times E \times \text{Eff} \times \text{pf}}$
Amperes When KW is known	$\frac{KW \times 1000}{E \times \text{pf}}$	$\frac{KW \times 1000}{1.73 \times E \times \text{pf}}$
Amperes When KVA is known	$\frac{KVA \times 1000}{E}$	$\frac{KVA \times 1000}{1.73 \times E}$
Kilowatts	$\frac{I \times E \times \text{pf}}{1000}$	$\frac{1.73 \times I \times E \times \text{pf}}{1000}$
KVA	$\frac{I \times E}{1000}$	$\frac{1.73 \times I \times E}{1000}$
Output Horsepower	$\frac{I \times E \times \text{Eff} \times \text{pf}}{746}$	$\frac{1.73 \times I \times E \times \text{Eff} \times \text{pf}}{746}$

I = Amperes, E = Volts, Eff = Efficiency, pf = Power Factor  
KVA = Kilovolt-amperes, KW = Kilowatts

**Industrial Motion Control Solutions**

1061 East Green Street P.O. Box 586 1401 Delany Road 3000 Commercial 510 Stevenson	Bensenville IL 60106-0586 Gurnee IL 60031-1292 Northbrook IL 60062 South Elgin IL 60177-1135	(630) 595-1010 (847) 249-0880 (847) 559-9844 (847) 695-4734	FAX (630) 595-1327 FAX (847) 249-8230 FAX (847) 559-9847 FAX (847) 695-4792
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**FLOLO HVAC SALES LOCATIONS**

1061 East Green Street 3000 Commercial 510 Stevenson	Bensenville IL 60106-0586 Northbrook IL 60062 South Elgin IL 60177-1135	(630) 595-1010 (847) 559-9844 (847) 695-4799	FAX (630) 595-1327 FAX (847) 559-9847 FAX (847) 695-4792
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# FLOLO Total Services



## Electrical Repair



- Standard & Premium Efficient motors
- Servo motors
- Brushless motors
- Redesign of AC and DC motors
- DC motors & generators
- Wound rotor motors
- High frequency alternators
- Magnetic chucks
- Dry type transformers
- Specialty coils
- Low & Medium voltage circuit breakers & switchgear



## Mechanical Repair

- Vertical pump motors.
- Mechanical variable speed drives.
- Gear reducers - right angle and parallel.
- Pumps - waste water, vertical turbine, split case, etc.
- Fans and blowers
- Vibration analysis



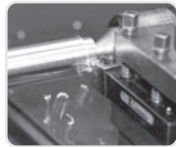
## Testing

- Complete vibration testing and analysis
- Dynamometer testing - Fractional to 300HP full load.
- Dynamometer testing of low speed equipment to 3000 lb/ft.
- Dynamic balancing
- DC hypotential testing
- Surge comparison testing
- Core loss testing



## Machine Shop

- Turning, milling, drilling and grinding
- Horizontal boring mill.
- Metallizing
- Selective plating
- MIG and TIG welding
- Babbiting



## Electrical & Mechanical Field Service

- Troubleshooting and repair of AC & DC Variable Speed Drives
  - Machine Controls service and repair
- Inspection, service and repair of Power Distribution Panels
  - Service and repair of Electro-Mechanical equipment including large AC & DC motors, pumps, blowers and related machinery



## Flolo Electrical Contracting & Installation

- Main Electrical Service
- AC & DC Variable Speed Drives - Installation & Start-Up
- Power distribution systems
- Power Lines for Machinery
- Power Surveys
- General Industrial Wiring
- Industrial Drive Systems
- Machine Controls
- Lighting Systems



## PREDICTIVE MAINTENANCE

State-of-the-art equipment, enables our Predictive Maintenance group to predict machinery failures before they occur.

### VIBRATION ANALYSIS —

Allows us to detect the cause of vibration:

- Imbalance
- Misalignment
- Defective bearings
- Motor fault

Predictive Maintenance helps us pinpoint specific problem areas that require service, eliminating the need for unnecessary and expensive overhauls based on time intervals.

### ELECTRICAL TESTING —

Without disconnecting your motor we take a series of readings at the motor control that provides a complete picture of the operating condition of your motor or transformer.

- Detect an unbalanced condition that can burn out motor windings.
- Detect an unbalanced condition that may indicate poor connections.
- Detect poor connections or incorrect windings.
- Measure resistance between phases.
- Indicate the proper angle between current and voltage or frequency.
- Measure the phase balance of windings.
- Measure, through the use of a Megger, the insulation values of the windings.
- A thermal scan of the motor and controls which can show localized overheating and poor connections.

# FLOLO Total Services

## ELECTRONIC BOARD REPAIR *Factory Trained Qualified Technicians — State-of-the-Art Equipment*

- \* No Evaluation Fee
- \* **RUSH BREAKDOWN** Repair Available
- \* Quality Repair
- \* Competitive Pricing
- \* Fast Turn Around
- \* Customer Satisfaction

### TEST • REPAIR • EXCHANGE • REMANUFACTURE MOST MAJOR INDUSTRIAL DRIVES AND CONTROLS

- A-C Variable Frequency Drives
- D-C Drives
- Counters
- Encoders
- Industrial Printed Circuit Boards
- Servo Drives
- PLCs
- Soft-start controls
- Temperature controls
- Power supplies
- Eddy Current controls
- Magnetic controls
- Dancer controls
- and . . .
- Other Custom Control Systems



### AUTHORIZED SERVICE CENTER FOR START-UP OF ABB DRIVES WARRANTY REPAIR CENTER FOR BALDOR DRIVES AUTHORIZED SERVICE CENTER FOR CLEVELAND MOTION CONTROLS

#### A PARTIAL LIST OF PRODUCTS WE REPAIR:

ABB DRIVES	FINCOR	REFLEX
ALLEN - BRADLEY	GENERAL ELECTRIC	RELANCE
BALDOR	GOULD	ROBICON
BODINE	GRAHAM	SABINA
BOSTON	K-B	SECO
BURTON	LEESON	SIEMENS
CLEVELAND CONTROLS	LENZE	SQUARE D
CUTLER - HAMMER	LOUIS ALLIS	SSD DRIVES
DANFOSS	MAGNETEK	T.B. WOODS
DART	MINARIK	TOSHIBA
DAYTON	MITSUBISHI	VEEARC
EMERSON	NORDIC	AND
EXTRON	PARAMETRICS	MANY MORE...
FENNER	POWERTEC	

# FLOLO Engineered Systems

CUSTOM CONTROL PANELS DESIGNED AND BUILT  
WITH UNSURPASSED QUALITY WORKMANSHIP



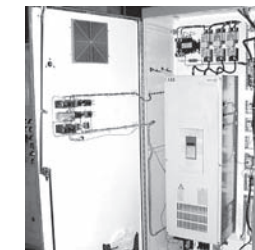
### Why Choose Flolo?

#### COMMITMENT

The Flolo team has one objective — to provide the best engineered package available. That means an efficient, precisely engineered solution to our customer's problem.

#### ACCOUNTABILITY

Flolo becomes a part of your team, accepting certain responsibilities for the final system. You have our total commitment for a successful project.



#### BEST PRACTICES

Our customers have the right to expect:

- Quality products with great service at a fair price
- Knowledgeable people
- Courteous and respectful people
- Accuracy in quoting and billing
- Realistic deliveries
- Prompt resolution of unforeseen difficulties

#### RECOGNIZED LEADER IN:

- Coordinated drive systems
- Servo and stepper applications
- Programmable Logic Controllers
- Motion controllers
- Human Machine Interface
- Design and development of control software



#### PROJECT METHODOLOGY

Our Project management skills come from following a process in which all of our project managers have been trained. Its four stages are:

- 1) Planning
- 2) Quotation
- 3) Implementation
- 4) Installation - Startup - Support

#### CERTIFICATION

The Flolo Systems Group is CSA Certified and UL Listed for classifications UL508A, UL698A and UL698B.

**Authorized Rockwell Automation / Allen-Bradley System Integrator**