

AC Adjustable-Speed Drives Product Focus Study

Sponsored by:



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Conducted by:



Reed Research Group

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Introduction

Research Objectives:

Research was undertaken to gain a better understanding of *Control Engineering* subscribers' applications and needs regarding AC Adjustable-Speed Drives. Specific areas under evaluation included:

- In-Plant vs. OEM Requirements
- Applications
- AC Adjustable-Speed Drive Types
- Selection Criteria
- AC Microdrives and Line Conditioning Devices
- Communication Networks
- Size Ratings of AC Drives
- Integrated Motor-Drives
- Customized vs. Off-the-Shelf Systems
- Purchases in the Last 12 Months
- Projected Need for AC Drives
- Magazines Received

Methodology:

On May 6, 2003, an email was sent to *Control Engineering* subscribers. In the email, respondents were asked to visit a web site that contained a survey regarding AC adjustable-speed drives. Respondents had the option of clicking on the embedded URL site or entering the web site address in their Internet browser.

As of May 12, 276 responses were received from those involved in the evaluation, specification, recommendation, installation, and/or purchase of flowmeters for in-plant or OEM (resale) requirements.

To review the survey instrument, please refer to the technical appendices of this report.

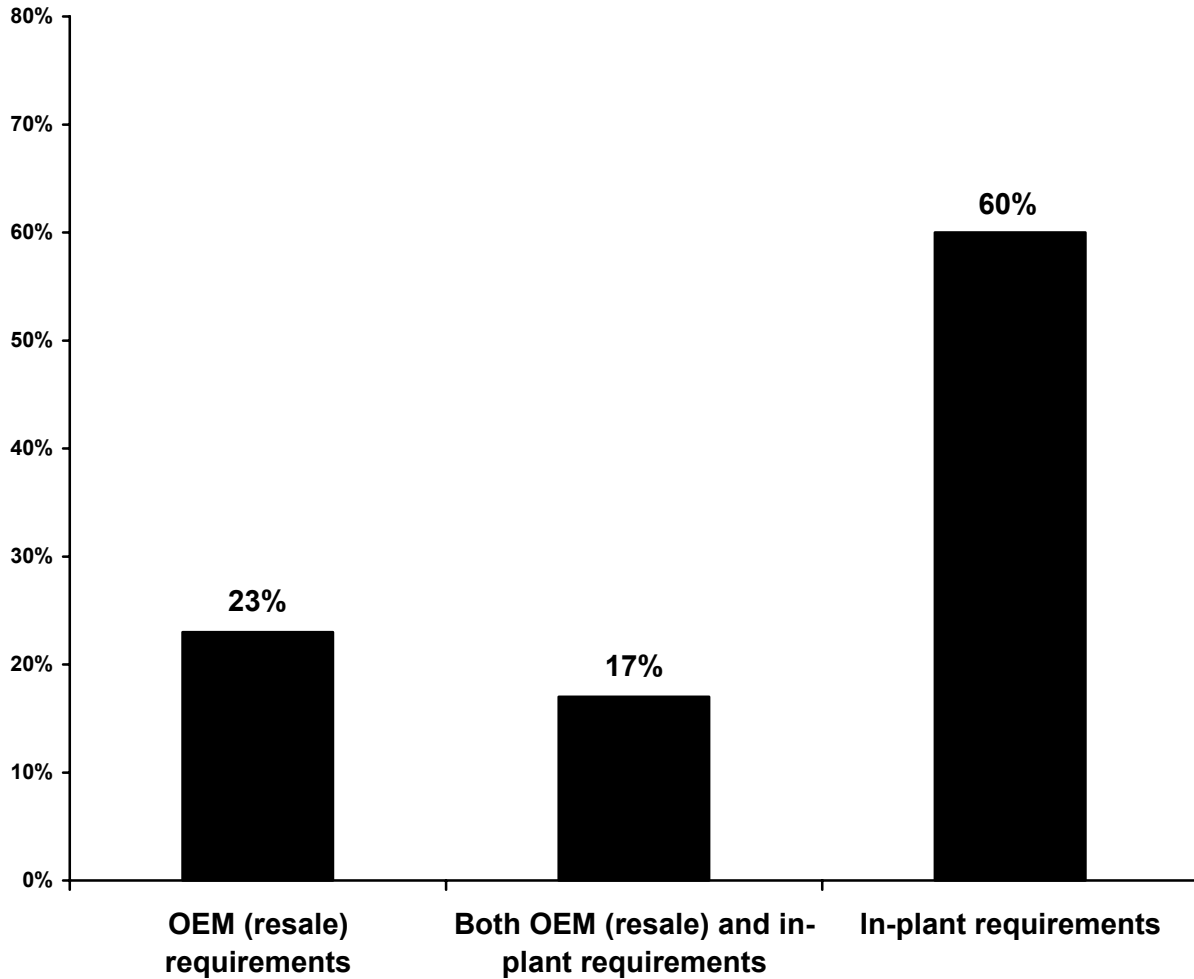
Executive Summary

- Among those specifying, recommending, and/or buying AC adjustable-speed drives, 77% do so for in-plant requirements and 40% do so for OEM requirements.
- Half of the respondents chose pumps, fans, and blowers as their primary application, making it the most common among those *Control Engineering* subscribers surveyed. Over two-fifths of respondents chose assembly, conveyer lines as their primary application.
- Volts/Hertz control (open loop) is the most common AC adjustable-speed drive type used by respondents.
- Seventy percent of respondents rate simple controls/setup as very important when selecting an AC adjustable-speed drive.
- Over one-third of respondents rate torque control as very important when selecting an AC adjustable speed drive.
- Over two-thirds of respondents use line conditioning devices and one-third of respondents use AC microdrives.
- Nearly all respondents have stand alone drives.
- 4-20 mA is currently the most commonly used communication network and will continue to be over the next year.
- Eighty-one percent of survey participants report 1 to 5 hp AC drives are used at their locations. The average number of such drives in use per location is 34. Results suggest all size ranges are widely used among those surveyed.
- Over one-fourth of respondents currently use an integrated motor-drive. Nine percent of total respondents do not currently use integrated motor-drives, but plan to use them in the next 12 months.
- On average, 86% of the AC drives respondents currently buy are off-the-shelf. The remainder is customized systems. Results suggest future purchases will be segmented along the same lines.
- Fifty-six percent of respondents purchased AC drives from Rockwell Automation in the past year; this being more than double the penetration of any other manufacturer.

- Fifty-two AC drives was the average number each respondent purchased in the past 12 months and the average AC drive spending per respondent in the past year was \$62,012.
- Forty-two percent of qualified respondents expect their need for AC drives will increase in the next 12 months, and 52% expect it to remain the same.
- Forty-six percent of *Control Engineering* subscribers responding do not receive *IAN*. Forty-eight percent do not receive *Control Design*.

In-Plant Vs. OEM (Resale) Requirements

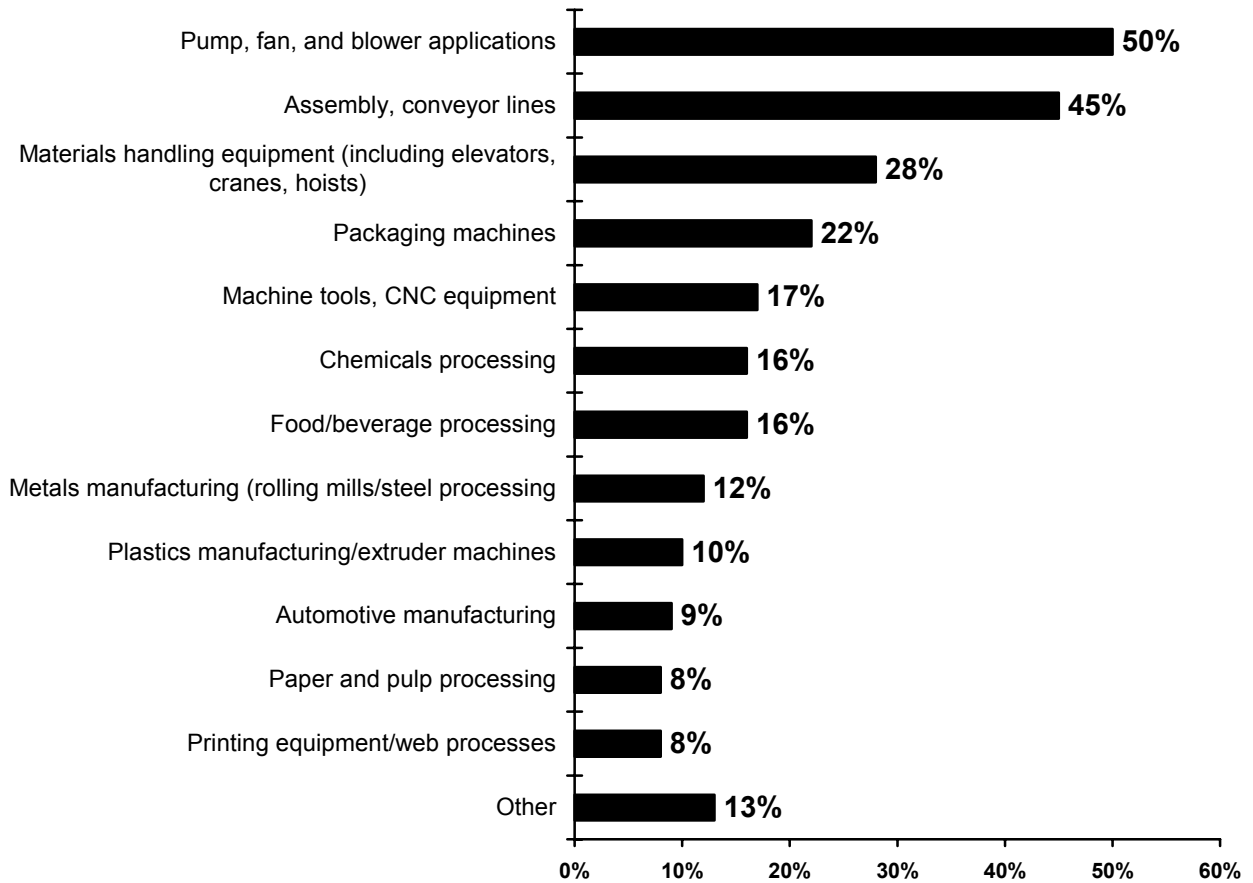
Among those specifying, recommending, and/or buying AC adjustable-speed drives, 77% do so for in-plant requirements and 40% do so for OEM requirements.



Q1. Are you involved in specifying, recommending, and/or buying AC Adjustable-Speed Drives?

Primary Applications

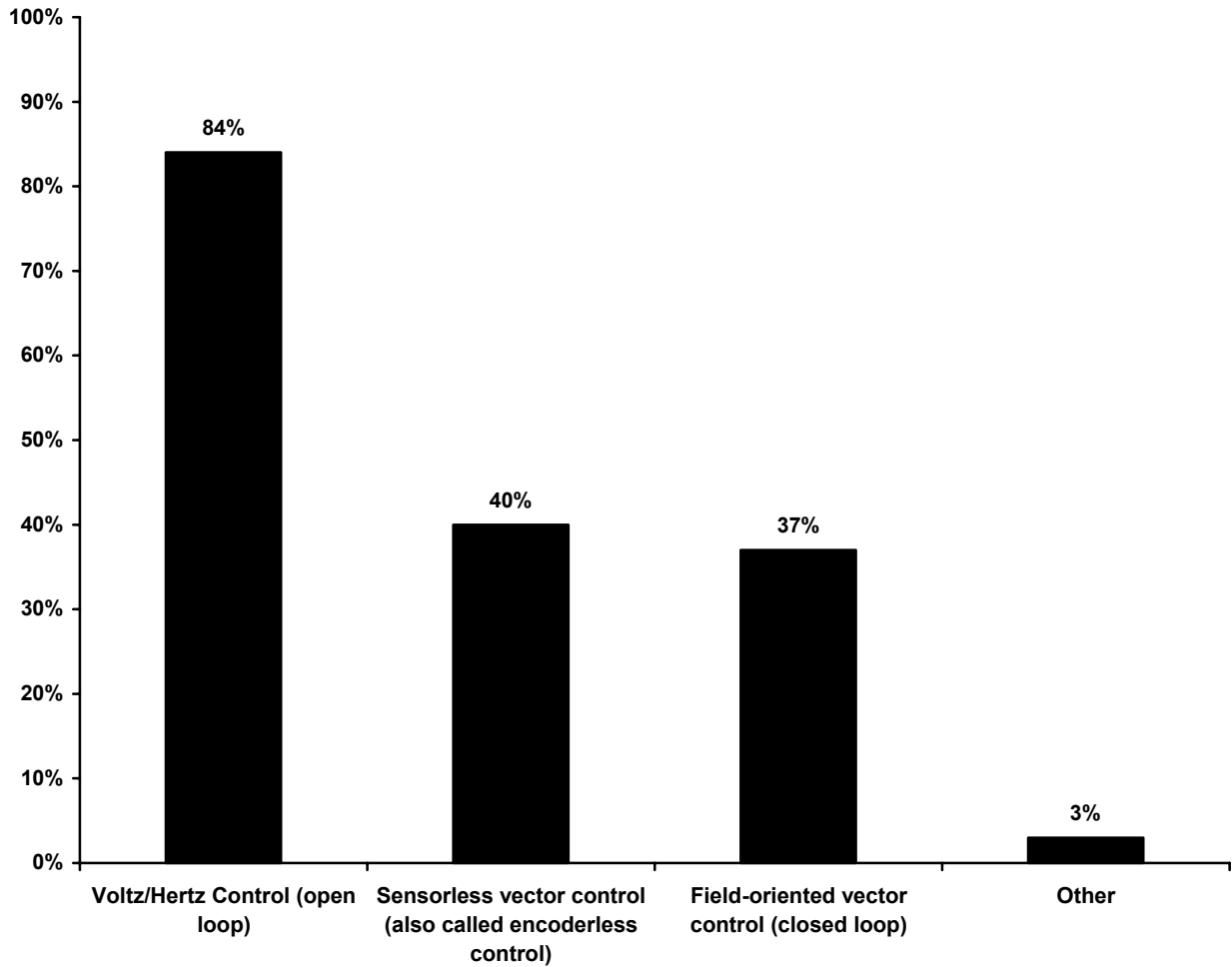
Half of the respondents chose pumps, fans, and blowers as their primary application, making it the most common among those *Control Engineering* subscribers surveyed. Over two-fifths of respondents chose assembly, conveyer lines as their primary application.



Q2. What is your primary application for AC Adjustable-Speed Drives?

AC Adjustable-Speed Drive types

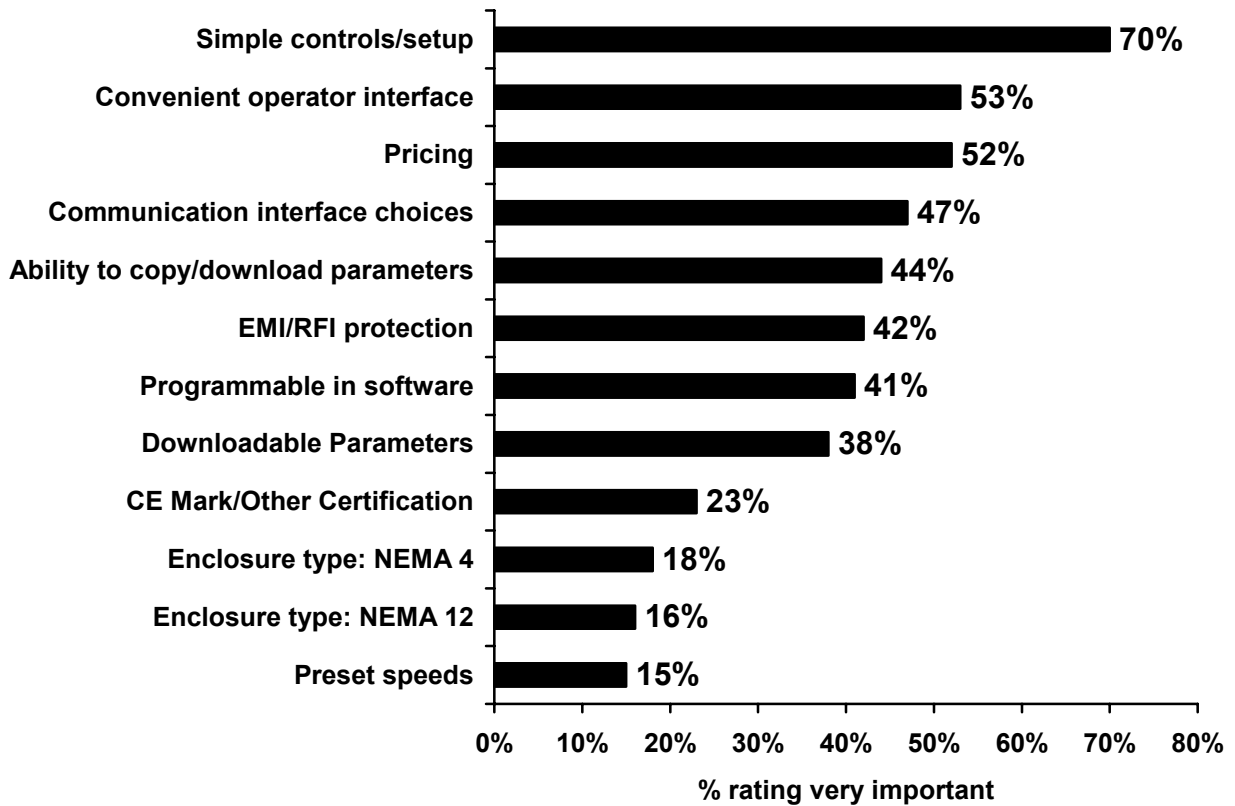
Volts/Hertz control (open loop) is the most common AC adjustable-speed drive type used by respondents.



Q3. Which of the following AC Drive types do you use?

Selection Criteria

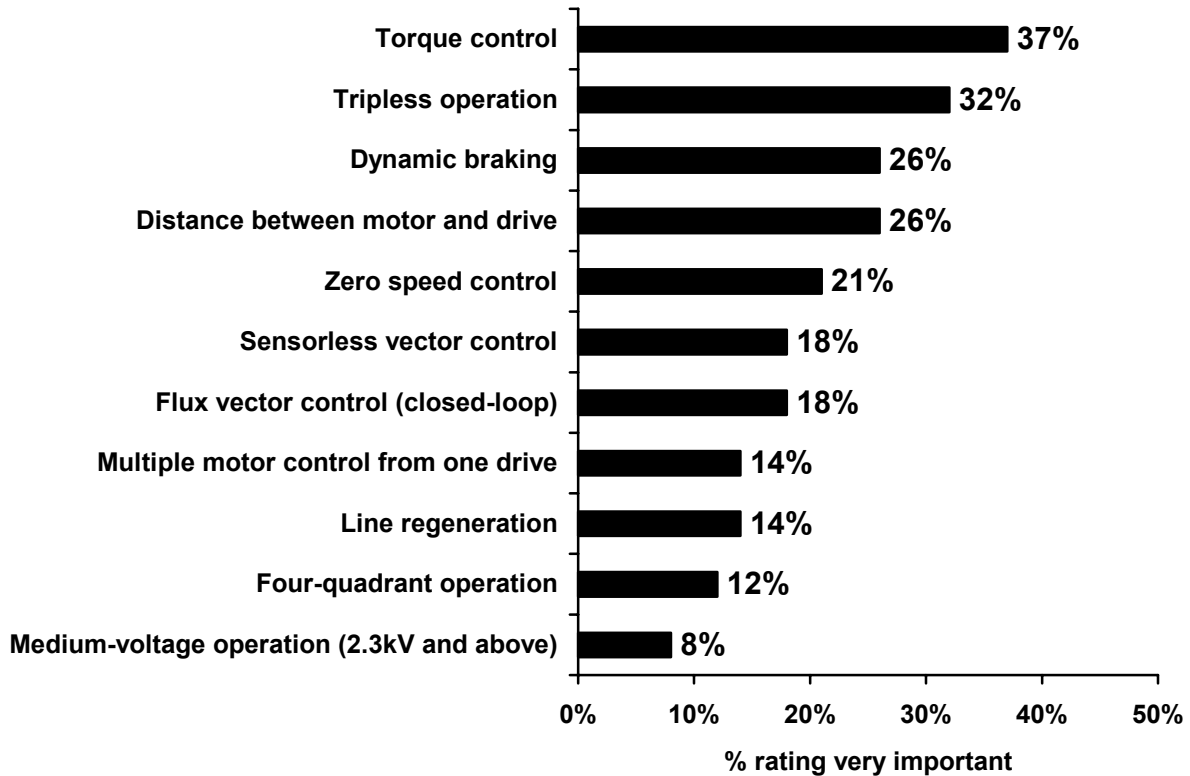
Seventy percent of respondents rate simple controls/setup as very important when selecting an AC adjustable speed drive.



Q4. How important are the following features when selecting an AC Adjustable-Speed Drive?

Performance Selection Criteria

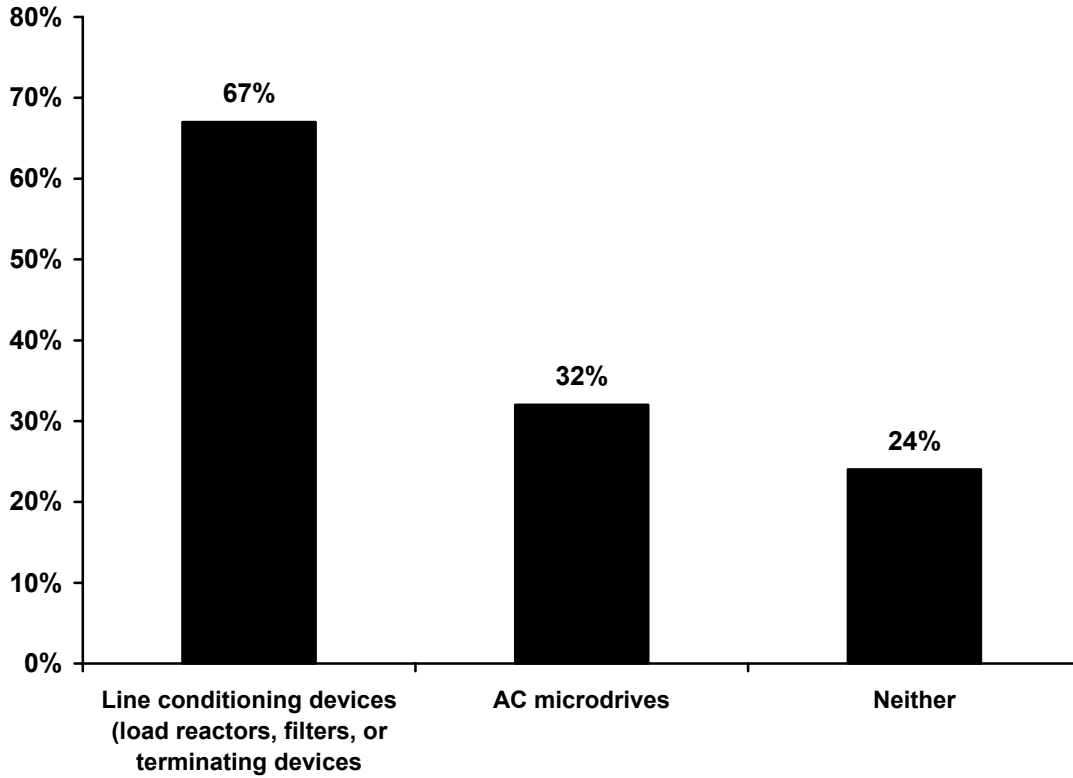
Over one-third of respondents rate torque control as very important when selecting an AC adjustable speed drive.



Q5. *How important are the following performance features when selecting an AC Adjustable-Speed Drive?*

AC Microdrives and Line Conditioning Devices

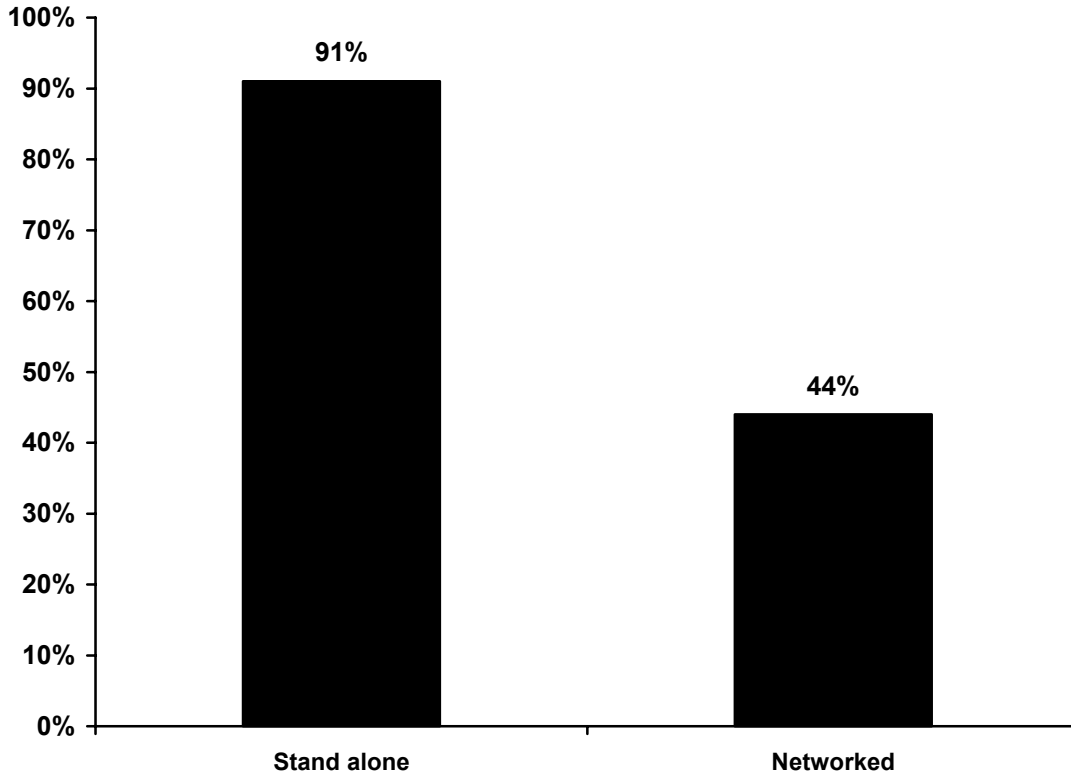
Over two-thirds of respondents use line conditioning devices and one-third of respondents use AC microdrives.



Q6. Do you use AC microdrives or line conditioning devices?

Stand Alone Versus Networked Drives

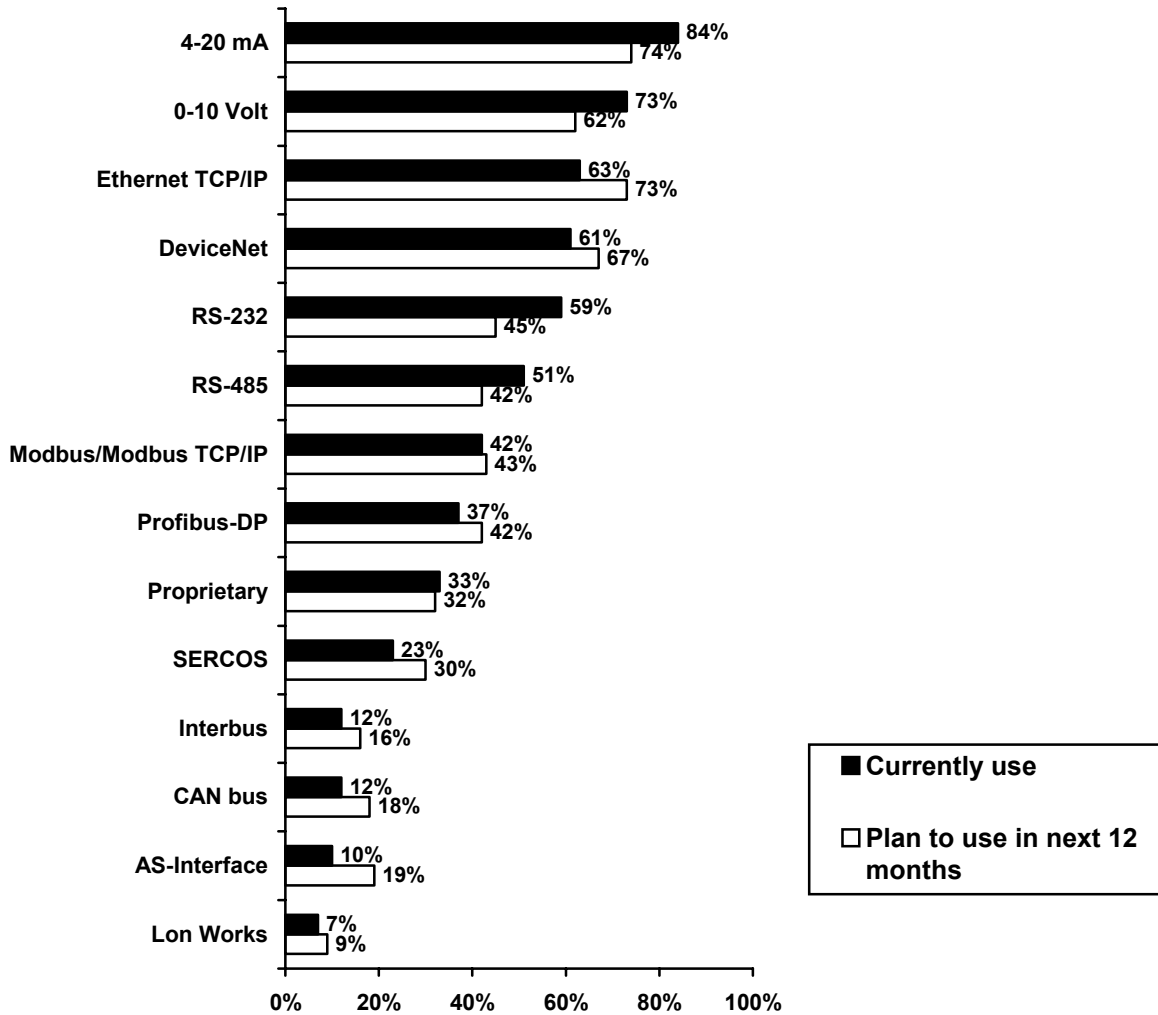
Nearly all respondents have stand alone drives.



Q7a. Are your drives stand-alone or networked?

Communication Networks

4-20 mA is currently the most commonly used communication network and will continue to be over the next year.



Q7b. For each communication protocol listed below, please indicate which of the following best reflects your current and future usage for your networked drives.

Size Rating Range and Quantity of AC Drives

Eighty-one percent of survey participants report 1 to 5 hp AC drives are used at their locations. The average number of such drives in use per location is 34. Results suggest all size ranges are widely used among those surveyed.

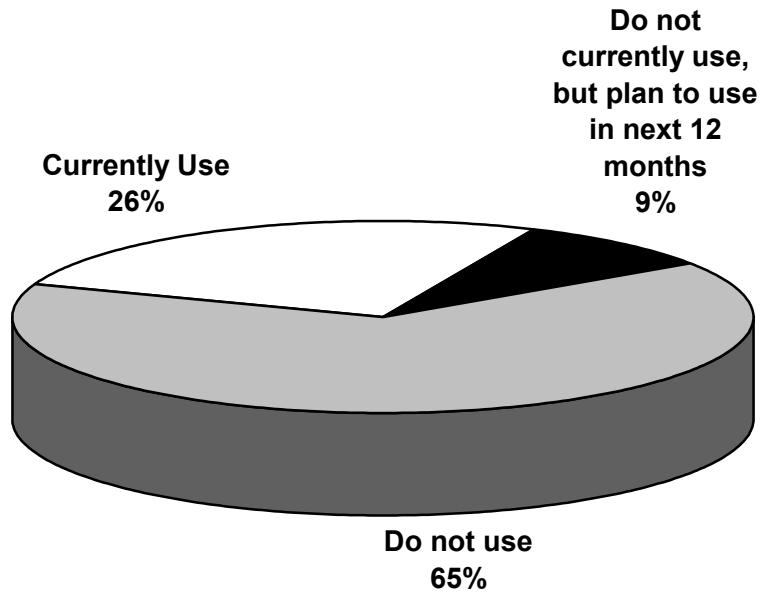
<i>Size Rating Range</i>	In Use <i>(% of Respondents)</i>	<i>Quantity of Drives in Use (Average)</i>
1 to 5 hp	81%	34
Up to 1 hp	55%	35
6 to 10 hp	53%	17
21 to 50 hp	51%	13
11 to 20 hp	44%	22
Over 50 hp	35%	12

Q.8A Which size rating ranges of AC drives are in use at your location?

B For each size rating range of AC drives in use, indicate the quantity in use at your location?

Integrated Motor-Drives

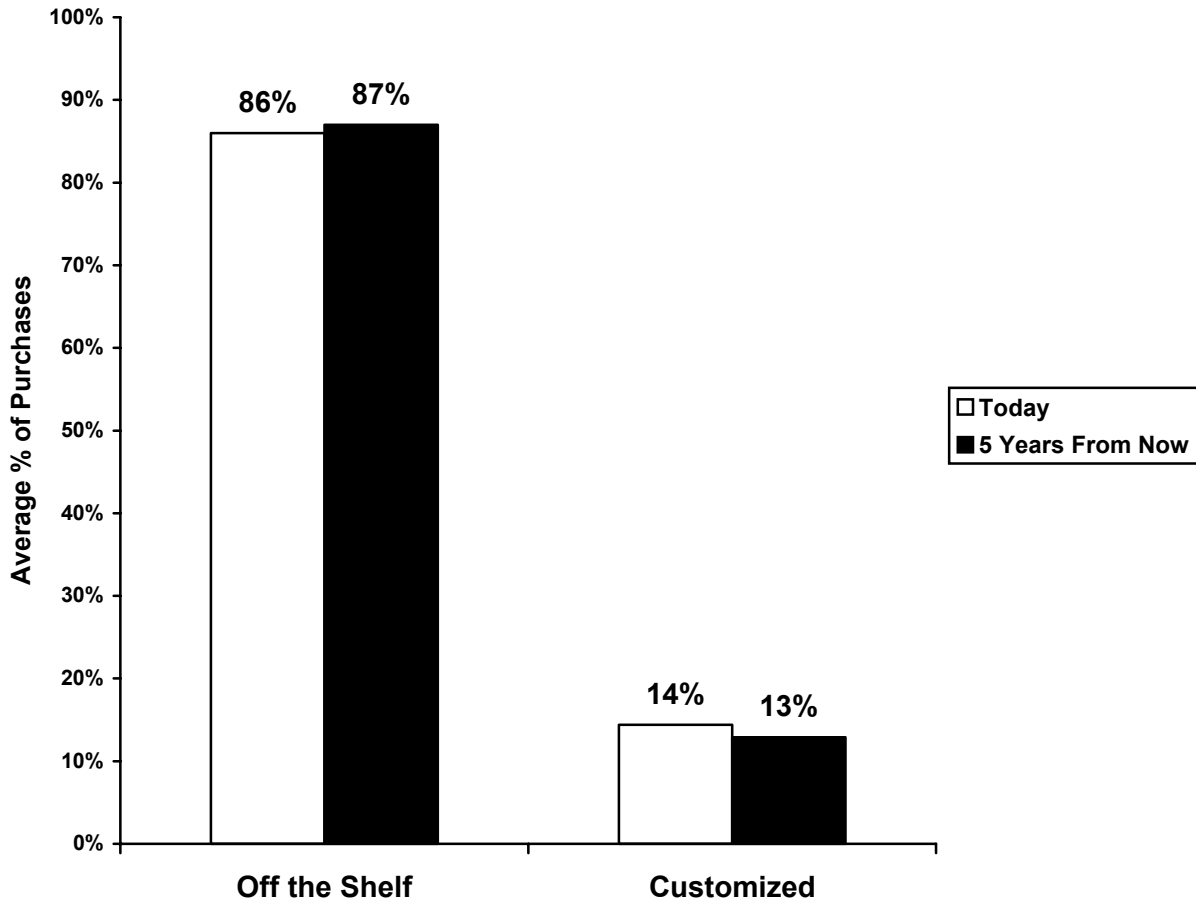
Over one-fourth of respondents currently use an integrated motor-drive. Nine percent of total respondents do not currently use integrated motor-drives, but plan to use them in the next 12 months.



Q9. Do you use an integrated motor-drive (i.e. an AC adjustable-speed drive and motor in one package)?

Customized vs. Off-the-Shelf Systems

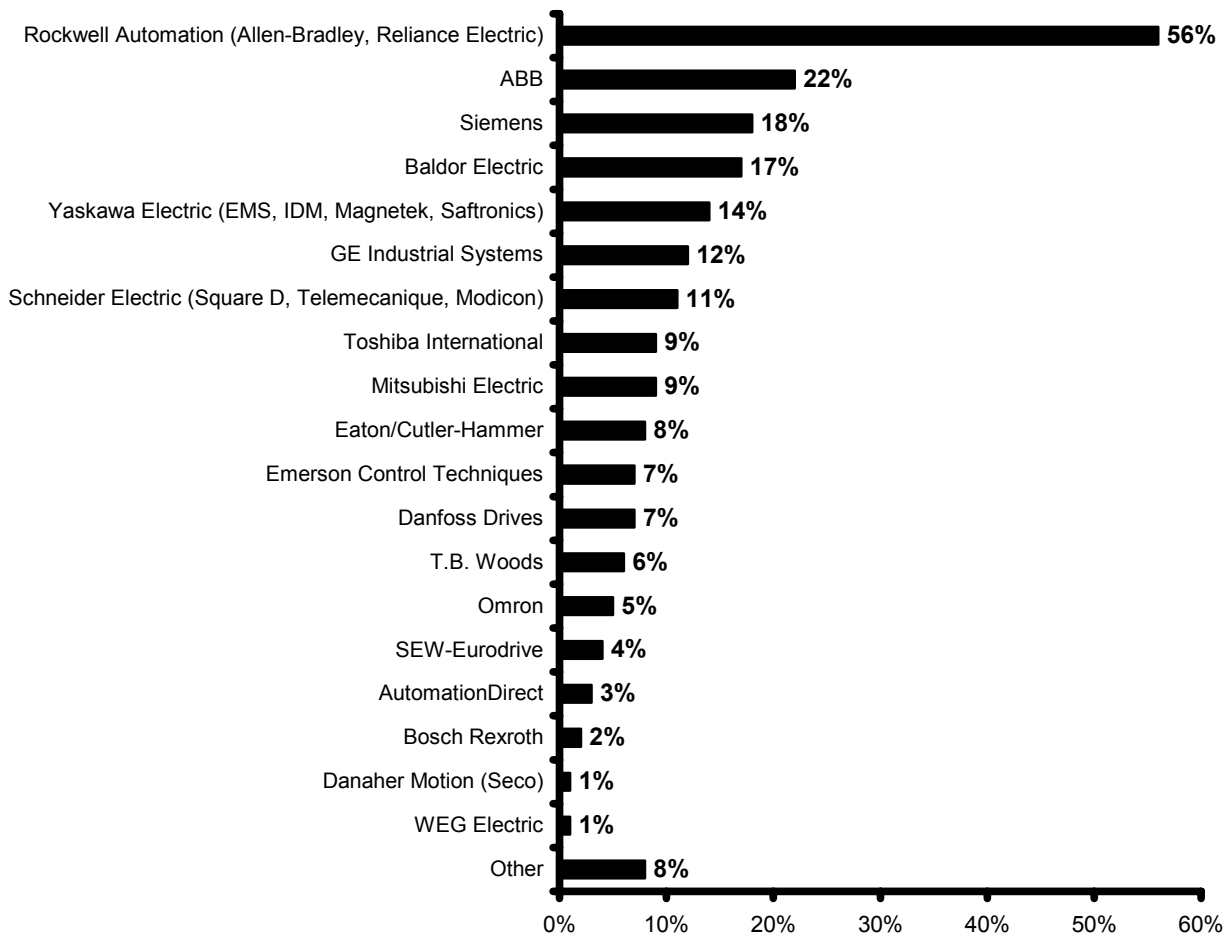
On average, 86% of the AC drives respondents currently buy are off-the-shelf. The remainder is customized systems. Results suggest future purchases will be segmented along the same lines.



Q.10 *What percentage of AC drives you purchase are customized systems, compared to “Off the Shelf”?*

Manufacturers Purchased From

Fifty-six percent of respondents purchased AC drives from Rockwell Automation in the past year; this being more than double the penetration of any other manufacturer.



N = 209

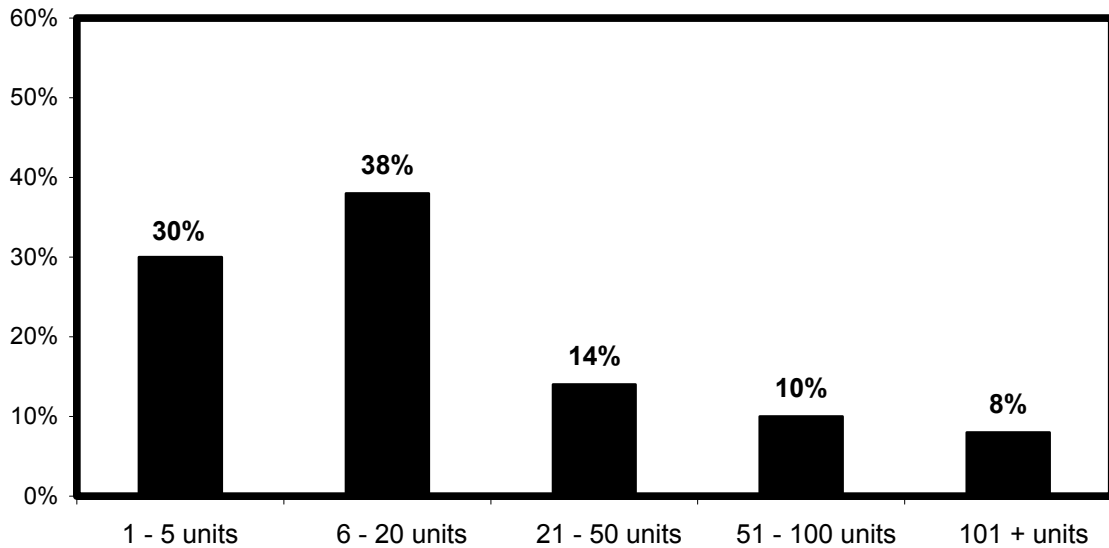
Q.11 Which manufacturers have you purchased AC drives from in the past 12 months?

Unit Purchases

Fifty-two AC drives was the average number each respondent purchased in the past 12 months.

Average = 52 units

Total = 6946 units



N = 134

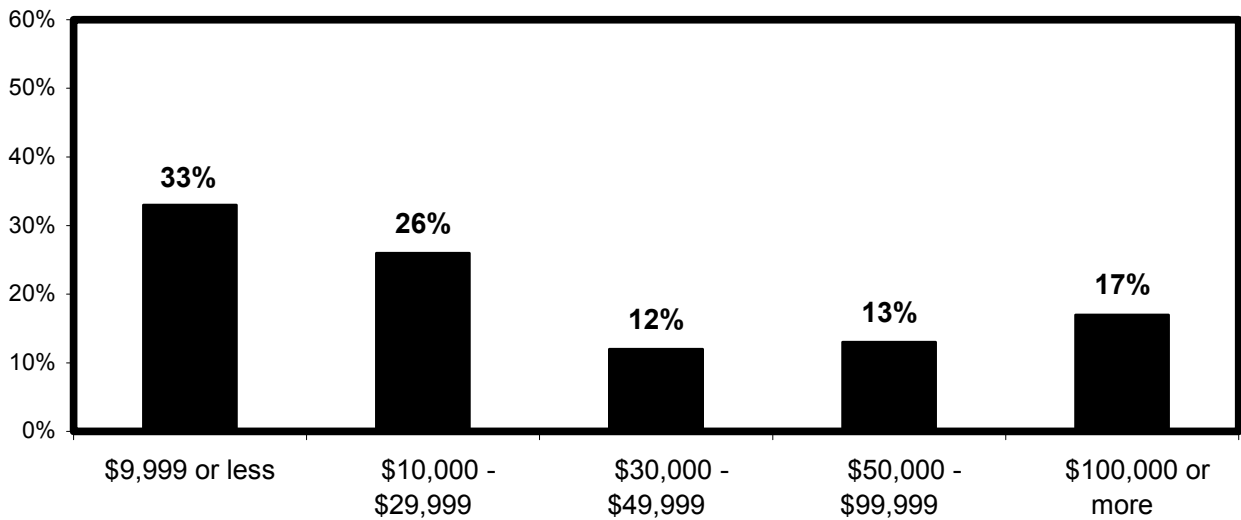
Q11. Which manufacturers have you purchased AC Drives from in the past 12 months? Please also indicate the number of units.

Dollar Purchases

The average AC drive spending per respondent in the past year was \$62,012.

Average = \$62,012

Total = \$8,309,562

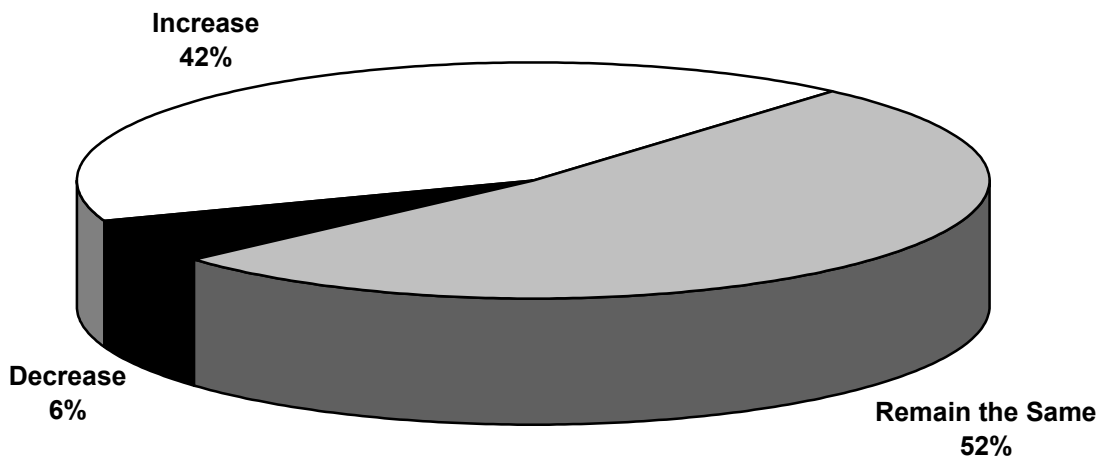


N = 134

Q11. Which manufacturers have you purchased AC Drives from in the past 12 months? Please also indicate the total dollars of those purchases.

Outlook for AC Drive Need

Forty-two percent of qualified respondents expect their need for AC drives will increase in the next 12 months, and 52% expect it to remain the same.

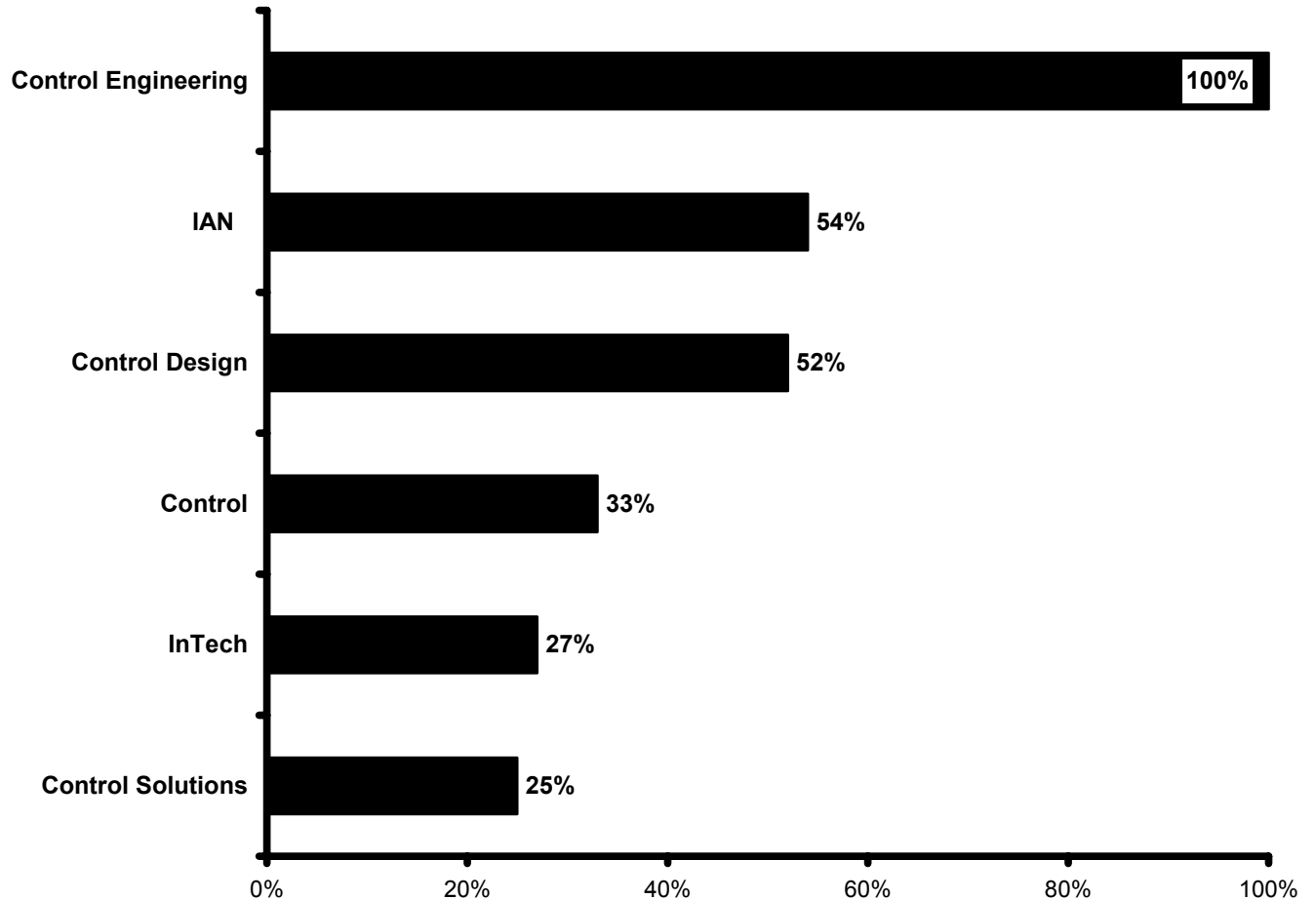


N=134

Q12. How do you expect your need for AC Drives to change in the next 12 months?

Magazines Received

Forty-six percent of *Control Engineering* subscribers responding do not receive *IAN*.
Forty-eight percent do not receive *Control Design*.



Q13. In addition to *Control Engineering*, what other trade publications do you receive personally addressed to you?

Technical Appendices:

- Respondent demographics
- Survey

Industry Segment

Manufacturing

Industrial, commercial, agricultural, and other machinery	12%
Food, beverage	8%
Fabricated Metals	7%
Plastics, rubber	4%
Pulp, paper	4%
Pharmaceutical	4%
Motor vehicles and components	4%
Chemical	3%
Instrumentation, measurement, control systems, and related devices	3%
Engine, turbine, mechanical, and electrical power transmission equipment	3%
Petroleum, refining	1%
Aircraft, aerospace	1%
Primary metals	1%
Electronic components	1%
Computers, communication equipment	1%
Other electronic products and equipment	1%
Other transportation equipment manufacturing	1%
Other manufacturing and processes	10%

Non-manufacturing

System engineering, integration, and architectural services	17%
Utilities	3%
Government, military	3%
Construction services	2%
Mining	1%
Information, data processing, and software services	1%
Other non-manufacturing	4%

**Additionally, both transportation services and scientific and research services received one vote each, which translated as less than one percent of total respondents.*

Q14. Which one of the following best describes the primary end product or service performed at this location?

Job Function

Control and/or instrument engineering	25%
Operations and/or maintenance	15%
Other engineering, including product, software, plant, electrical and/or electronic	14%
Systems design engineering including applied R&D	13%
Systems integrators and/or consultants	11%
General or corporate management	8%
Production engineering, process or manufacturing	8%
Product design engineering including applied R&D	4%
Evaluation, quality control, standards, reliability, test engineering	1%

Q15. Which best describes your job function?