

THE HISTORY AND ADVANCEMENTS OF YASKAWA

FROM THE BEGINNING TO THE PRESENT STATE

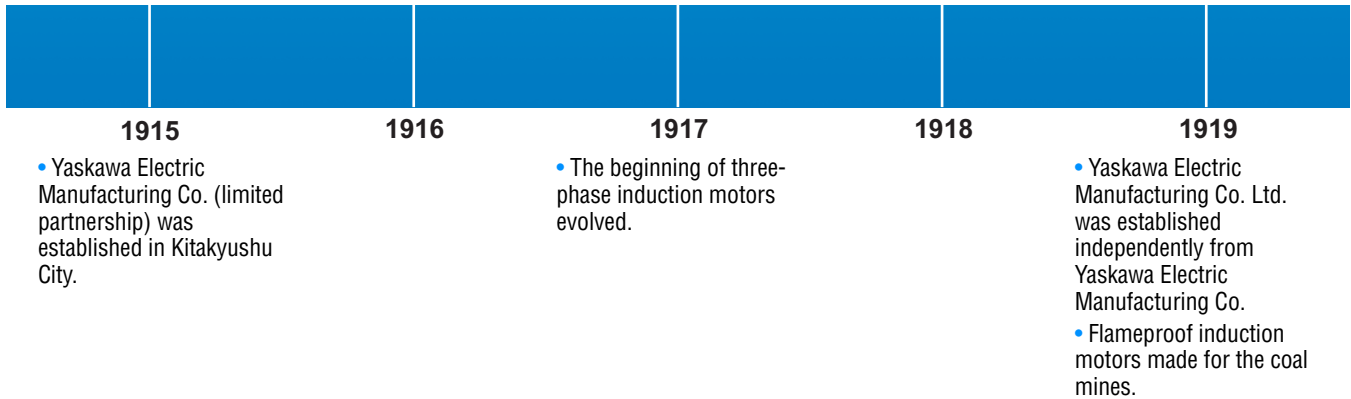
From the time that Yaskawa Electric Corporation first made its inaugural appearance back in 1915 until the time that it made its presence in the United States as Yaskawa Electric America in 1967, there have been a great deal of changes and advancements that have occurred along the way. With the above in mind, this paper will attempt to trace Yaskawa from the beginning until the present state by taking a look at their achievements along the way. It will not only examine the progression within the technology used, but also the invention of the actual products themselves.

What is interesting about Yaskawa, is not only the key role that they played in taking things to the next level, but also the fact that many of the times they were the first to do so. Yaskawa has been known over the years for their first to achieve mentality, as many of the times have they set the standards for which others follow their lead.

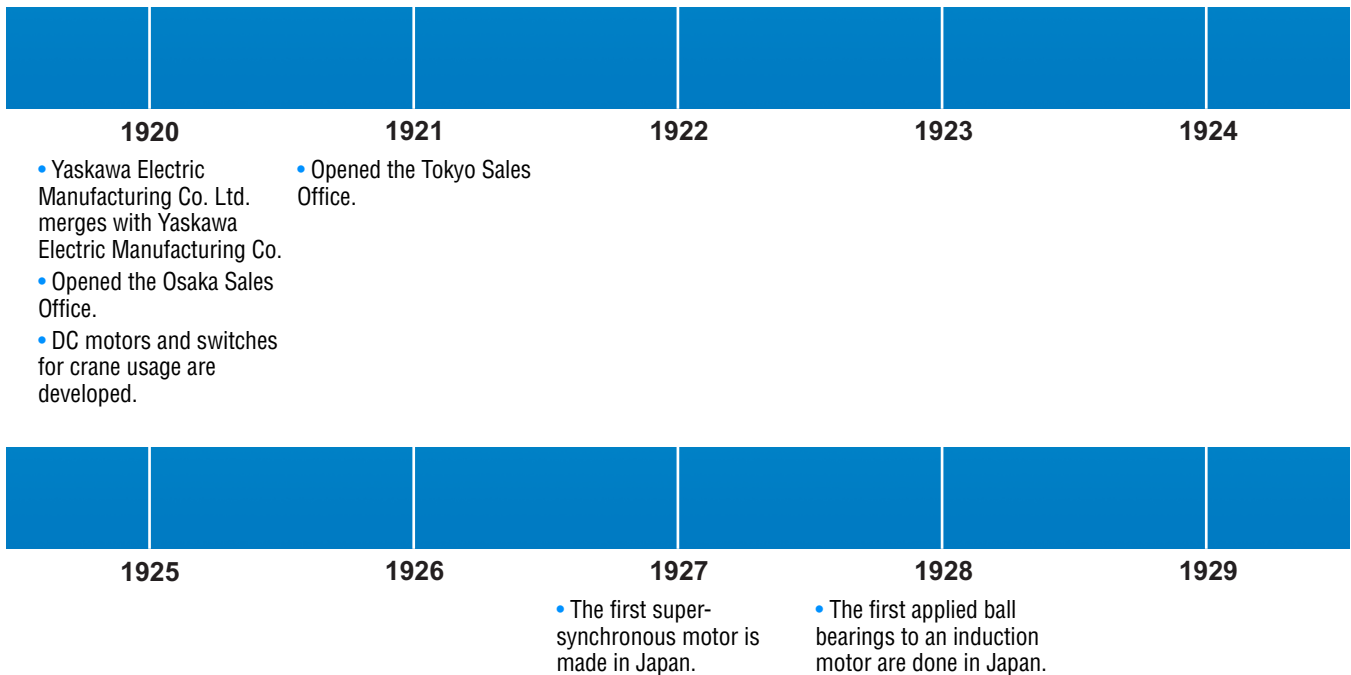
1900-1920s Overview

It all began in the initial stages back in the early 1900s, when the importance of motors was just starting to take the stage. Although they were quite basic in their make-up and performance, the motors accomplished the goal that they set out to attain. This is where Yaskawa came into the picture with their first introduction of the three-phase induction motor.

1910s:



1920s:



Other 1900-1920s Happenings:

- Liquid resistors

1930-1940s Overview

This is when the focus really started to become serious about building quality and productive motors and controllers. Changes were beginning to take place, forcing new developments with the needs of both motors and controllers in efforts of keeping up with the demands.

1930s:



1930

- Flameproof switches are made for the coal mines.

1931

- First applied silver alloy to contact tips of magnetic contactors are performed in Japan.

1932

- Reorganized product line specializing in electric motors and controls.

1933

- Ward-Leonard systems were produced for planers.

1934



1935

- Opened the Research Laboratory.
- Created automatic charging systems for blast furnaces.
- Centralized control system for coal washeries and belt conveyors used for coal transport in inclined shafts.

1936

1937

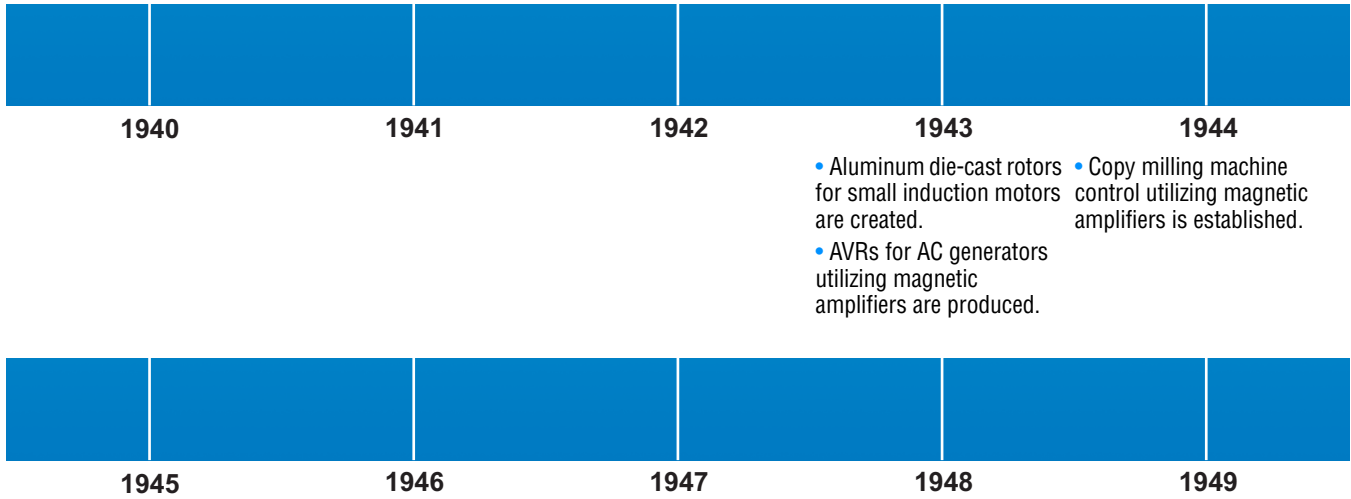
1938

- Adopted conveyor systems for assembly of small motors and small switches.

1939



1940s:

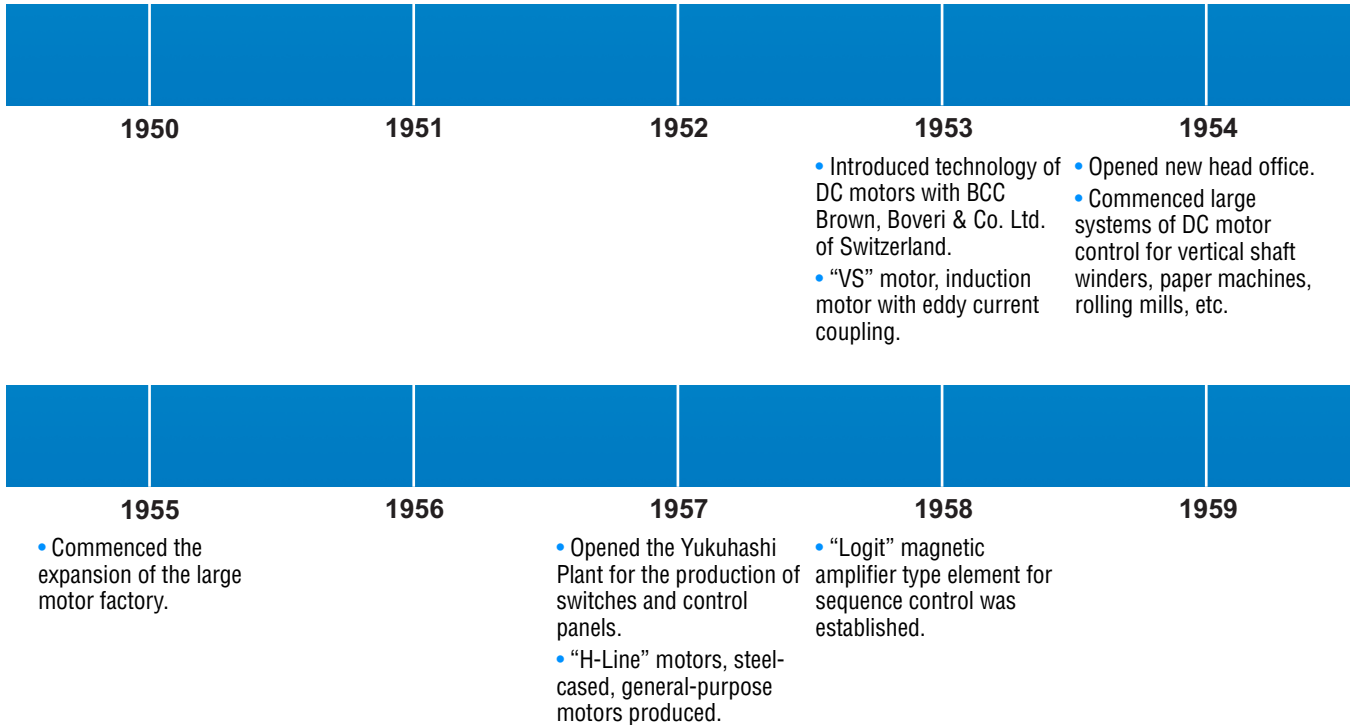


Other 1930-1940s Happenings:

- Clapper-type, low-voltage magnetic load breakers
- Electric copy lathes
- Speed control equipment for cement kilns

1950s Overview

By the 1950s, the concentration was set on building certain motors responsible for handling the various applications. More is known about the capabilities of the motor and what they can accomplish, so the tasks that they are out to obtain have become more specialized.



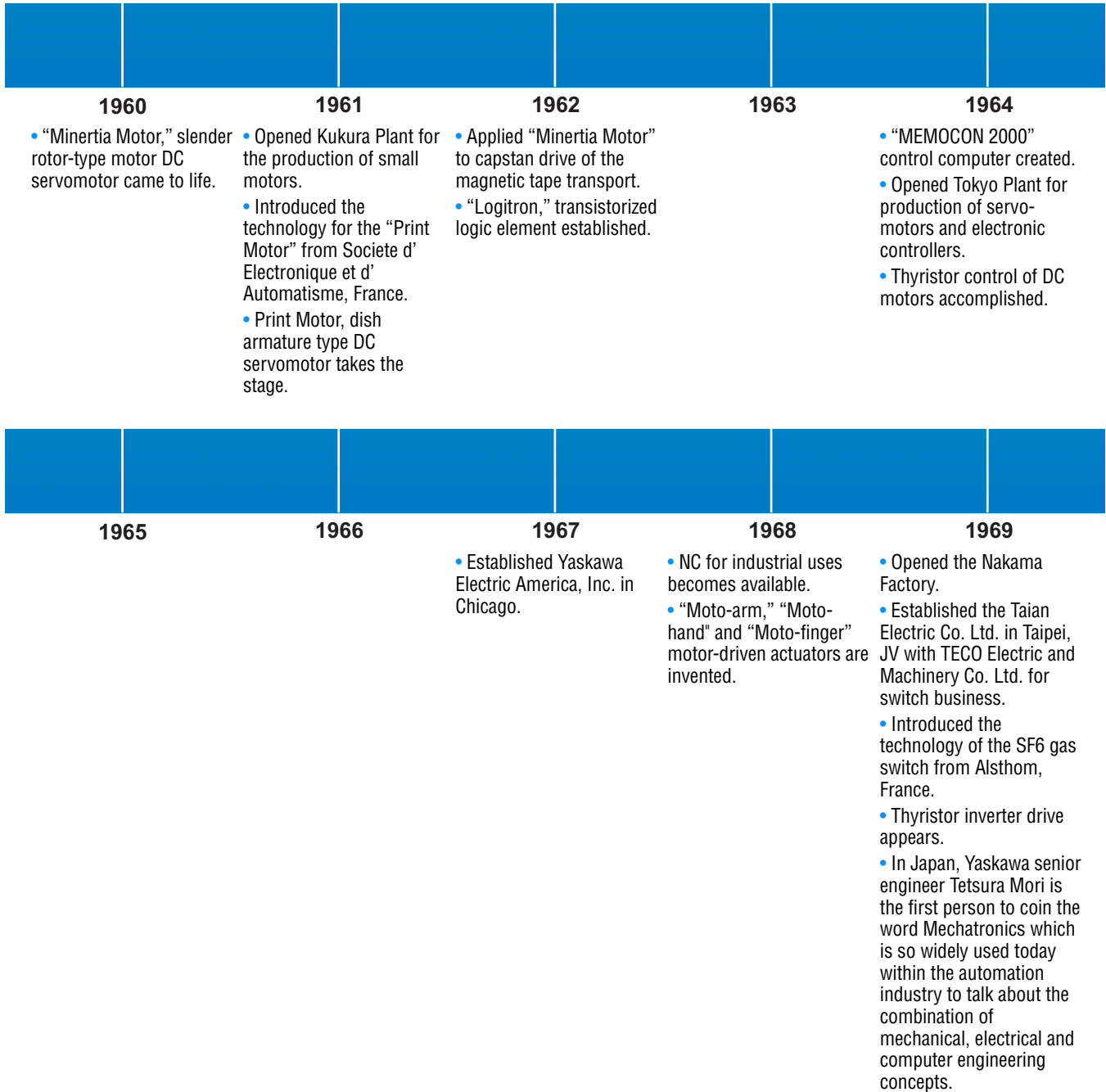
Other 1950s Happenings:

- Sectional drive electrical products for papermaking machines
- Magnetic timers
- Remove monitoring systems for water supply

1960s Overview

Things have now shifted into taking a look at the field of industrial electronics. This is also the timeframe that Mechatronics was introduced, meaning the combination of mechanics, electronics and control to work together in efforts of accomplishing the same goal.

1960s:



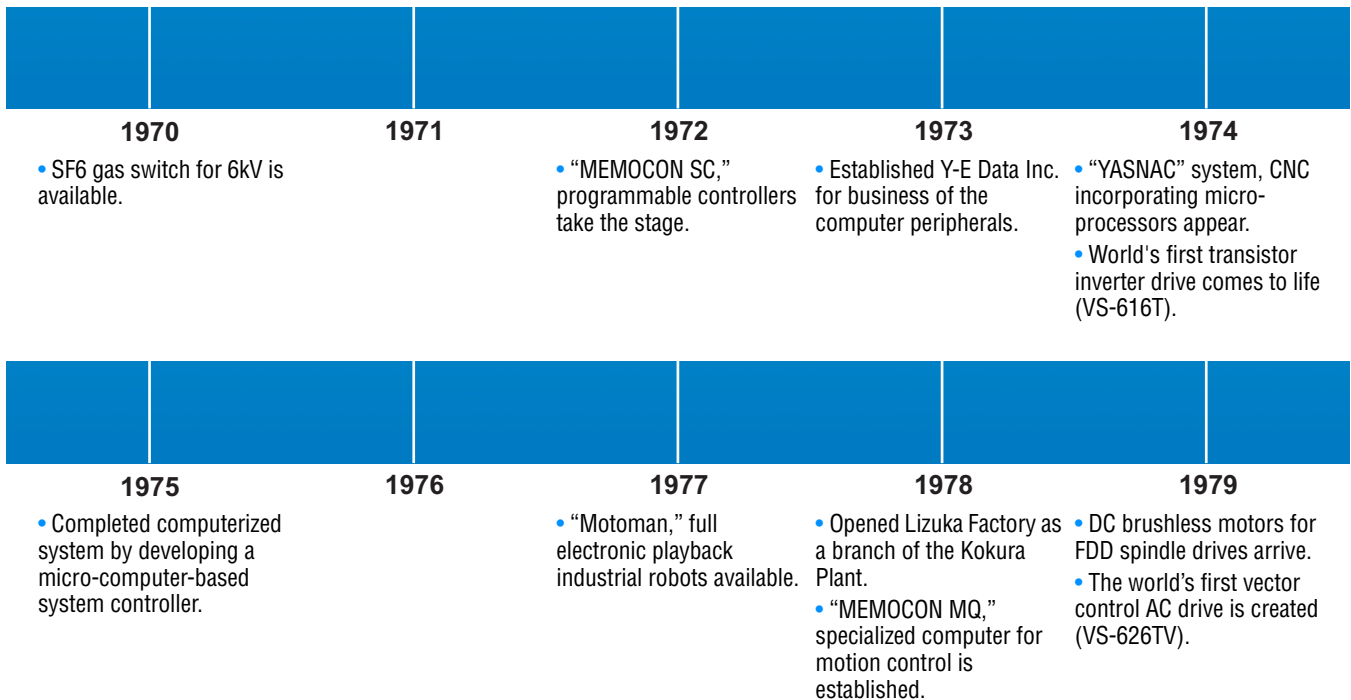


Other 1960s Happenings:

- 12,000kW electric products for blooming mill
- Introduction of Mechatronics
- Clapper-type, high-voltage air magnetic contactors
- Cup motors
- Hard-wired CNCs
- Electrical products using MEMOCON controllers for automatic charging apparatus for blast furnaces

1970s Overview

Rolling into this period of time, things have really started to focus on the world of industrial automation. The world is beginning to go through a transition stretch, where things are starting to become more complex and involved. The bar has been raised as the needs, wants and demands have become greater, forcing the technology to become better to keep up with the pace.



Other 1970s Happenings:

- CAM-driven type sequence programmers
- Sewage treatment control systems
- YASNAC B Series
- Bestact reed switches

1980s Overview

The 1980s weren't just concerned about industrial automation, but rather factory automation. There is a sense of how can we produce more for less. Companies not only want quality products that are productive and reliable, but also cost-effective.

1980 <ul style="list-style-type: none">• Established Yaskawa Electric Europe GmbH in Dusseldorf.	1981 <ul style="list-style-type: none">• Introduced TQC.• High-frequency motor series introduced.	1982 <ul style="list-style-type: none">• Opened Technical Development Center in Tokyo Plant area.• Collaborated with Machine Intelligence Corp. USA, for working on the vision system.• AC servomotors hit the stage.• Vision systems appear.• Intelligent Color CRT displays for plant system control.	1983 <ul style="list-style-type: none">• Licensed Gould Inc., USA, to manufacture AC spindle motors and controllers.	1984 <ul style="list-style-type: none">• Received the prestigious Deming Application Award for excellence.• ACGC (Advanced Color Graphics Computer) developed for user-programmable CNC.
1985 <ul style="list-style-type: none">• Optical data highway for plant system control established.• FDS Flexible configuration method for drive systems through applications of standardized software.• The world's first digital control drive is produced (VS-616H II).	1986 <ul style="list-style-type: none">• Opened Technical Development Center in Kukora Plant area.• Established Y-E Drive Co. Ltd. for business of H-Line motors and single-phase motors.• The vacuum robot was invented.	1987 <ul style="list-style-type: none">• Real-time A1 "Bus-Link" created.	1988 <ul style="list-style-type: none">• Yaskawa is the first to develop the insulated gate bipolar transistor (IGBT) low-noise inverter (VS-618G II LN).	1989

Other 1980s Happenings:

- AC inverter drive product for continuous casting systems
- MEMCON-GI Series
- Submersible SF6 gas load break switches
- YASNAC I Series CNC
- Patented on-the-fly winding change drive

1990s Overview

By the 1990s, factory automation has combined with Mechatronics to make things easier and better. It could be summarized as finding a way to work smarter and not harder by combining several different thought processes and technologies. It's all about reaching new heights by being innovative and trying to out-duel the competition with bigger and better products and services.

1990	1991	1992	1993	1994
<ul style="list-style-type: none">• Opened new Motoman Center in Kitakyushu, Japan.• NC production begins in Northbrook, IL.• G3 Series inverter drives are available.	<ul style="list-style-type: none">• Change company name from Yaskawa Electric Manufacturing to Yaskawa Electric Corp.• Sigma Series servo systems come to life.	<ul style="list-style-type: none">• Inverter production begins in Northbrook, IL, the first in the US.• Installed 10,000th YASNAC unit in the US.• Laser World Robot comes to life.	<ul style="list-style-type: none">• Established Yaskawa Electric UK Ltd. manufacturing facility in the United Kingdom.• Yaskawa reached the plateau of manufacturing its first One-Million Drives (VS-616 G3).	<ul style="list-style-type: none">• Opened new North American manufacturing facility in Buffalo Grove, IL.• YEA acquires full ownership of Motoman Inc.• First time that ASIPM is used in small AC drives (VS mini-C).
1995	1996	1997	1998	1999
<ul style="list-style-type: none">• Opened new Motoman Inc. manufacturing facility in Troy, Ohio.• G5 and P5 Series inverter drives appear, the world's first vector control general-purpose inverter (VS-616 G5).• G5 HHP AC Drive is developed.	<ul style="list-style-type: none">• Motoman SK Series Robot arrives.• Yaskawa opens production facility in Shanghai, China for the Chinese and Indian markets.		<ul style="list-style-type: none">• Opened YEA headquarters in Waukegan, IL.• Production of the One-Millionth servomotor occurs.• Production of the 100,000th inverter takes place in the US.• Sigma II Series servo system begins.• Motion Suite Series machine controllers start.	



Other 1990s Happenings:

- Specialized AC linear motors
- Clean robots
- Vacuum transfer system
- Parallel computer/controllers
- SMC-2000 and HR MCs
- Industry-leading multiple robot control
- MECHATROLINK high-speed, digital communication
- M5 and MC5 spindle drives
- Open architect technology
- Medium voltage SF6 fault current limiting device
- Special-purpose semiconductor actuators
- V7 and J7 microdrive inverters
- MotionWorks+ programming software

2000s Overview

At this stage in the game, it's a free for all as everyone is looking out for themselves and trying to get a leg up by being the first to come up with something new and more advanced. The focus has landed on performance solutions, what can you do or offer to the customer. Providing compatibility and new features and benefits has become very important. This is considered a very pivotal stage in the game, as it is setting the standards for tomorrow's future.

2000	2001	2002	2003	2004
<ul style="list-style-type: none">• Sigma II indexer application modules are developed.• Linear Sigma Series servomotors take the stage.• Varispeed G7 adjustable frequency drive - World's first three-level control, general-purpose inverter architecture.	<ul style="list-style-type: none">• Legend digital torque amplifier with SMC-3010 Legend-MC arrives.• YEA begins direct sales of AC inverter drive production.	<ul style="list-style-type: none">• E7 AC drive for building automation is produced.• Yaskawa has now shipped Five Million AC drives (Varispeed F7).	<ul style="list-style-type: none">• F7 general-purpose AC drive is developed.• P7 AC drive for pumps and fans is established.• Linear Sigma Trac is made available.• SGMCS direct drive servomotors are added.	<ul style="list-style-type: none">• SMC-4000 multi-axis Ethernet motion controller comes to life.• Four-Million AC servos shipped worldwide.• MP2300 multi-axis machine controller is produced.
2005	2006	2007	2008	2009
<ul style="list-style-type: none">• E7 18-pulse drive system (25-500HP) appears.• The new iQpump is developed.	<ul style="list-style-type: none">• Five-Million servomotors have been shipped worldwide.• The world's first Matrix Converter (Varispeed AC7) is achieved by Yaskawa, as they receive the Frost and Sullivan Excellence Award for the accomplishment.• The V1000 microdrive is offered by Yaskawa.	<ul style="list-style-type: none">• The MP2300Siec motion controller and the Sigma-5 servo products are launched.• Yaskawa becomes the first and only company to have shipped 10-Million drives (V1000).• Yaskawa opens a new landmark factory in Yukuhashi, Japan, which expands output by 50% by operating 24/7/365.• Yaskawa becomes involved with the global programming software of ICE 61131-3. They did so with their version of MotionWorks IEC software, which runs with the MP2300Siec motion controller.• Yaskawa Engineered Systems Group (YESG) opens a new facility in Plain City, Ohio.	<ul style="list-style-type: none">• The J1000 microdrive becomes available.• In less than a year's time, Yaskawa increases their drives production by One-Million to over 11-Million total.• Yaskawa ranked #5 overall across the country for top companies providing outstanding quality products and superior customer service according to Quality Magazine's Quality Leadership 100 survey.• Yaskawa wins Frost and Sullivan Award for Customer Value Leadership for their excellence within the microdrive market.	<ul style="list-style-type: none">• In March of this year, Yaskawa moves from their New Berlin location into a newly designed Oak Creek facility to enhance the growth of their value-add business. This location will be the home of manufacturing, development, as well as sales and marketing.



Other 2000s Happenings:

- DriveWizard software
- Ethernet communications
- E7B and E7L bypass assemblies
- IPM motors
- DriveWorks EZ
- MECHATROLINK II communication
- YTerm software
- MP2000 series controllers
- Application-specific robot designs (EA and ES)
- E7N narrow bypass package
- Yaskawa creates Software Tools such as an estimator, predictor and calculator which helps figure out energy savings, harmonic levels and CO2 emissions
- J1000 and V1000 Simulators - These are actual replicas of Yaskawa's newest drives in the J1000 and V1000 that let you become familiar with and test using the products before you buy them
- Yaskawa's new Sigma-5 servomotor features the luxury of coming with both autotuning and vibration suppression to enhance its performance
- Yaskawa announces that its servomotors can connect to National Instruments LabView through the use of MECHATROLINK
- Yaskawa commits to a partnership contract with KW Software to be their sole supplier of the IEC software to be used on their MP2000 series motion controllers
- Yaskawa and Sun-Wa Technos join forces to handle the technical service and sales support for the high-voltage switch business