**AC Servo Systems**

**LS Electric AC Servo Systems**

The LS Electric families of brushless servo systems are fully digital and offer a rich set of features to cover a broad range of motion control applications. There are 46 standard servo motors, with and without holding brakes, which can be operated in combination with any of 13 standard servo drives.

The LS families include standard accessories such as: factory-made encoder cables & power/breaker cables, and DIN-rail mount 1/O break-out kits for easy connection of external command and I/O signals, optional external braking resistors, and optional AC input filters and even a set of matched gearboxes available in three gear ratios for each motor.

**Basic and intermediate features at fantastic prices!**

LS Electric Servos provide the most requested features: setup wizards, auto tuning, built-in indexer and more — in an extremely cost-effective package. If you need more advanced features or more torque output — please checkout our SureServo® servo systems, with a more extensive feature set and IC motor power up to 15kW. See the next page for a comparison chart.

**Why use a servo?**

Servo systems provide the highest possible level of performance for precise control of position, velocity, and torque. Compared to lower cost stepping systems, servo systems provide:

- More torque at higher speeds (up to 5,000 rpm)
- Higher response with closed-loop control (high first order)
- Increased output accuracy

**Worry-Free System Selection!**

Use our online LS servo system selector to properly size and specify all the requested features: setup wizards, auto tuning, built-in indexer and more — in an extremely cost-effective package. If you need more advanced features or more torque output — please checkout our SureServo® servo systems, with a more extensive feature set and IC motor power up to 15kW. See the next page for a comparison chart.

**Servo System Features**

- Control via analog speed or torque signal, high-speed pulse train, or internal indexing
- Free Drive CM set-up software
- Compatible with most AutomationDirect PLCs; or any other host controller or HMI
- IP20 Motors and IP65 Gearboxes
- Servo drives feature on-board motion controller (initiate moves with PLC outputs or with serial Modbus communication)
- Field upgradable firmware to keep your systems up-to-date
- Professionally manufactured cables for motor power, encoder feedback, and brake - with standard and continuous flexing cable options

**Need more torque?**

The L7C & L7P families also offer matched sets of gear reducers to increase the available output torque or to solve inertia mismatch problems with high-mass loads (Rule-of-thumb for highest performance: keep the reflected load inertia within a factor of 10:1 of the motor.)

**L7C Basic Servo Systems**

- 5 Sizes from 100W to 15kW
- Low inertia models
- 250VAC single-phase input power

**L7P Intermediate Servo Systems**

- 12 Sizes from 100W to 15kW
- Low and medium inertia models
- 230VAC & 460VAC, three-phase input power

**Precise Encoder Feedback**

The L7C & L7P families use different encoder technology. Both are very accurate — so for many applications it may not be a critical factor. The L7C motors have a 17-bit incremental encoder, while the L7P motors sport a 19-bit absolute encoder:

- 17-bit Incremental encoders (L7C motors)
- Highly accurate (+10/-10V signal from a motion controller, PLC, or potentiometer. Just scale the voltage signal to your desired speed or torque (in the servo drive), it’s that simple. These servo drives even allow an “analog deadband” setting to eliminate jitter or drift when using a manual (potentiometer) signal for speed control.

**Internal Indexing:**

Get high-performance/full-blown motion control with a simple PLC (or no PLC at all). LS servos accept standard PLC discrete outputs to command internal pre-defined moves OR use serial communications (Modbus) commands to set dynamic speeds & distances AND to initiate those moves. You can even use the internal indexer to provide manual machine control with just a few buttons and switches. For example, use a selector switch to select a predefined move from an index, and then use a pushbutton to START that move. Simple registration operations can even be handled with the built-in indexer — see the user manual for details.

**Motor Size - vs - Input Power Options**

**L7C Basic Servo Systems**

<table>
<thead>
<tr>
<th>Motor Size</th>
<th>Input Power Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>230VAC 1-Phase</td>
<td></td>
</tr>
<tr>
<td>75W</td>
<td>20W</td>
</tr>
<tr>
<td>15kW</td>
<td>20W</td>
</tr>
</tbody>
</table>

**L7P Intermediate Servo Systems**

<table>
<thead>
<tr>
<th>Motor Size</th>
<th>Input Power Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>230VAC 1-Phase</td>
<td></td>
</tr>
<tr>
<td>100W</td>
<td>20W</td>
</tr>
<tr>
<td>15kW</td>
<td>20W</td>
</tr>
</tbody>
</table>

**Flexcible Control Mode Options**

**Analog Velocity or Torque Control:** Both L7C and L7P systems accept a +10V/-10V signal from a motion controller, PLC, or potentiometer. Just scale the voltage signal to your desired speed or torque (in the servo drive), it’s that simple. These servo drives even allow an “analog deadband” setting to eliminate jitter or drift when using a manual (potentiometer) signal for speed control.

**Pulse Train:** This is the most popular option for PLC-based control; both LS systems accept a high-speed pulse input signal up to 1MHz (line driver) or 200kHz (open collector). If your PLC has a slower pulse train output (max speed), the servo drive is happy to scale the values. Works with all Automation Direct PLC families (hardware must support high-speed outputs). LS servo systems also accept quadrature pulse and CW/CCW input signals for encoder following applications.

**Servo control algorithms can be complicated, but your control scheme doesn’t have to be!**
What type of input power is available?
This question is often essential to selecting a servo family. If you only have 110VAC available, or if you have 230V but only in single-phase – that may dictate which family of servo system you must choose. But we offer capable systems for any power input type.

What type of encoder is required?
See the previous page for an explanation of the encoder types and resolutions that are offered.

How do you control a servo system?
The previous page also has a breakdown of the various ways to control your servo system.

Do you need deadband?
Analog applications may benefit from adjustable input deadband, when there is an "at rest" position of the shaft/load where no motion is desired – but the analog signal is not 100% stable. Without deadband the servo system may create unwanted "jitter". Application examples include rotary tables or conveyors that are controlled by potentiometers (operator controlled speed).

What is inertiaMismatch?
Inertia mismatch is when the fairly small inertia of the servo motor rotor/shaft is attached to a high-inertia load. Dynamic applications with high hit rates will always benefit from a lower inertia ratio. Servo systems can overcome mismatches to a point – but performance may suffer. So, it's a good idea to keep the inertia of the driven load as small as possible. But sometimes mismatches are unavoidable.

What is registration?
Registration refers to the capability of matching the speed and position of one axis-of-motion with that of another. Examples include printing on a moving target, flying shear applications, or punching or drilling accurately on a moving part. The servo system must be able to accurately sense the target and match the motion of the target during the active (or "registered") portion of the process.

**Table: L7C Basic Servo Systems**

<table>
<thead>
<tr>
<th>Motor Size</th>
<th>5 sizes - 100W to 1kW (with brake and non-brake models)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply</td>
<td>230 VAC 1 phase</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>Yes</td>
</tr>
<tr>
<td>Motor Encoder Resolution</td>
<td>131,072 (17 bit) Incremental</td>
</tr>
<tr>
<td>Secondary Encoder Position Feedback</td>
<td>No</td>
</tr>
<tr>
<td>Encoder Output</td>
<td>Yes</td>
</tr>
<tr>
<td>PWM/DIR, C/CHINW &amp; AB Quad Modes</td>
<td>Yes (1Mhz line driver and 200kHz open collector)</td>
</tr>
<tr>
<td>Position Registers</td>
<td>Position Registers (up to 64)</td>
</tr>
<tr>
<td>Position Limits</td>
<td>Position Limits (up to 99)</td>
</tr>
<tr>
<td>Homing</td>
<td>Yes</td>
</tr>
<tr>
<td>USB Software Connectivity</td>
<td>Yes</td>
</tr>
<tr>
<td>Communications Available</td>
<td>RS-422/485 Modbus-RTU Built-in</td>
</tr>
<tr>
<td>Regenerative and Dynamic Breaking</td>
<td>Yes</td>
</tr>
<tr>
<td>Digital Inputs</td>
<td>10 configurable</td>
</tr>
<tr>
<td>Digital Outputs</td>
<td>5 configurable, 3 fixed for alarms</td>
</tr>
<tr>
<td>Analog Outputs</td>
<td>0</td>
</tr>
</tbody>
</table>

**Table: L7P Intermediate Servo Systems**

<table>
<thead>
<tr>
<th>Motor Size</th>
<th>12 sizes - 100W to 7kW (with brake and non-brake models)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply</td>
<td>230/460 VAC 3 phase (230 VAC 1 phase up to 2KW)</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>Yes</td>
</tr>
<tr>
<td>Motor Encoder Resolution</td>
<td>Yes</td>
</tr>
<tr>
<td>Secondary Encoder Position Feedback</td>
<td>Yes</td>
</tr>
<tr>
<td>Encoder Output</td>
<td>Yes</td>
</tr>
<tr>
<td>PWM/DIR, C/CHINW &amp; AB Quad Modes</td>
<td>Yes (1Mhz line driver and 200kHz open collector)</td>
</tr>
<tr>
<td>Position Registers</td>
<td>Position Registers (up to 64)</td>
</tr>
<tr>
<td>Position Limits</td>
<td>Position Limits (up to 99)</td>
</tr>
<tr>
<td>Homing</td>
<td>Yes</td>
</tr>
<tr>
<td>USB Software Connectivity</td>
<td>Yes</td>
</tr>
<tr>
<td>Communications Available</td>
<td>RS-422/485 Modbus-RTU Built-in</td>
</tr>
<tr>
<td>Regenerative and Dynamic Breaking</td>
<td>Yes</td>
</tr>
<tr>
<td>Digital Inputs</td>
<td>16 configurable</td>
</tr>
<tr>
<td>Digital Outputs</td>
<td>8 configurable</td>
</tr>
<tr>
<td>Analog Outputs</td>
<td>2 configurable</td>
</tr>
</tbody>
</table>

**Table: SureServe®2 Servo Systems**

<table>
<thead>
<tr>
<th>Motor Size</th>
<th>13 sizes - 100W to 7kW (with brake and non-brake models)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply</td>
<td>230/460 VAC 3 phase (230 VAC 1 phase up to 2KW)</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>Yes</td>
</tr>
<tr>
<td>Motor Encoder Resolution</td>
<td>Yes</td>
</tr>
<tr>
<td>Secondary Encoder Position Feedback</td>
<td>Yes</td>
</tr>
<tr>
<td>Encoder Output</td>
<td>Yes</td>
</tr>
<tr>
<td>PWM/DIR, C/CHINW &amp; AB Quad Modes</td>
<td>Yes (1Mhz line driver and 200kHz open collector)</td>
</tr>
<tr>
<td>Position Registers</td>
<td>Position Registers (up to 64)</td>
</tr>
<tr>
<td>Position Limits</td>
<td>Position Limits (up to 99)</td>
</tr>
<tr>
<td>Homing</td>
<td>Yes</td>
</tr>
<tr>
<td>USB Software Connectivity</td>
<td>Yes</td>
</tr>
<tr>
<td>Communications Available</td>
<td>RS-422/485 Modbus-RTU Built-in</td>
</tr>
<tr>
<td>Regenerative and Dynamic Breaking</td>
<td>Yes</td>
</tr>
<tr>
<td>Digital Inputs</td>
<td>10 configurable + 3 virtual</td>
</tr>
<tr>
<td>Digital Outputs</td>
<td>6 configurable</td>
</tr>
<tr>
<td>Analog Outputs</td>
<td>2 configurable</td>
</tr>
</tbody>
</table>

For the latest prices, please check AutomationDirect.com.
**L7C AC Servo Systems**

**Drive features**
- Power: 100W–1kW single-phase 220VAC
- Fully digital with up to 1kHz velocity loop response
- Easy setup and diagnostics with built-in keypad/display or the DriveCM PC-based software
- Field upgradeable firmware ensures the drive can always be upgraded to the latest operating system
- Command options include:
  - ± 10V torque or velocity command
  - Pulse train or master encoder position command (accepts line driver or open collector) with real-time selectable electronic gearing
  - Internal Indexer for position/speed-based moves. 64 individual move statements can be configured in the drive. Each Index contains its own distance, speed, accel, decel, and dwell parameters. These indexes can be set up through DriveCM software or modified in real-time with serial communication (PLC, HMI, etc.). The indexes can be initiated via Digital Inputs or through serial comms.
- The 1 kHz bandwidth allows for high-level automatic tuning. Several modes of tuning are available including Off-Line Auto Tuning (the drive initiates its own move commands while Auto tuning), On-Line Auto Tuning (an external controller sends the move commands while the drive Auto tunes), and Manual Tuning (all tuning values are adjusted by the user).
- Optically isolated digital inputs (10) and (5) general purpose (user-configurable) outputs + (3) outputs permanently configured as alarm/status binary code, analog inputs for speed and torque control (2), and line driver output for encoder (with scalable resolution).
- Advanced Scope feature that can monitor a variety of command and status signals, including output speed, torque, power, etc.

**Motor features**
- Low inertia models:
  - 100W, 200W, 400W, 750W and 1kW
  - Speeds up to 5,000 rpm
- Permanent magnet 3-phase synchronous motor
- Keyed drive shafts support clamp-on style couplings or key-style couplings
- Integrated encoder with 17-bit resolution (131,072 pulses per revolution)
- Optional 24 VDC spring-set holding brakes (AYK2 motors)
- Standard hook-up cables for motor power, encoder, and brake (separate brake cable for brake motors)
- Motor cables available in standard or flex-rated lengths of 3, 5, 10, and 20m
- Standard 50-pin DIN-rail mounted break-out kit for the drive’s CN1 connector (with screw terminal connections), or 50-pin cables with flying leads

**Tuning Technology**

The L7C drive closes the loop on current, velocity, and position (depending on control mode selection). The 1kHz bandwidth in the drive assures precise speed and current control and easy tuning. Proportional gain, integral gain and compensation, feed forward compensation, command low pass filter, and four (4) notch filters for resonance suppression are available. Auto Tuning has been greatly improved and can tune FBL/FCL motors up to 20:1 inertia mismatch.

There is an inertia estimation function that analyzes the motor and load to measure how much inertia is coupled to the motor. The drive has several tuning methods available:

- Online Auto Tuning—the drive can either tune the load live while an external controller moves the load to different positions or using the drive’s internal tuning motion profile.
- Offline Auto Tuning—the drive tunes the load using the drive’s internal tuning motion profile.
- Manual Tuning—all parameters are available to give power users the ultimate flexibility to tune their systems.

**Built-in Indexer**

While the L7C drives can accept traditional commands from host controllers, they can also provide their own internal motion control. 64 point-to-point position moves can be configured in the drive. These moves can be populated through the DriveCM configuration software or they can be written to by a PLC through the drive’s RS422/485 serial port. The moves can be initiated by digital inputs or by serial commands. and can be sequenced internally with delays in between the moves or moves can be linked together so they are processed one after the other. Multi-axis systems can be controlled via digital inputs, or serial communication. The motion can be commanded from a powerful external controller that sends out high speed pulses to each drive, or the motion can be initiated by a low-level controller (the simplest CLICK PLC) since each drive has a powerful indexer inside. Applications include press feeds, auger fillers, rotary tables, robots for pick and place, test or assembly operations, drilling, cutting, tapping, and similar applications using simple index moves for single or multi-axis motion.

**Optional Holding Brake**

Each L7C motor can be ordered with an optional 24VDC spring-set holding brake that holds the motor in place when power is removed.

**LS Electric MSS Series**

**In-Line Planetary Precision Gearboxes for Servo Motors**

Need more torque from the motor? Have an inertia balancing issue in your design? The LS Electric MSS series gearboxes easily mate to FBL/FCL motors. Everything you need to mount your LS electric servo is included!

- Three gear ratios available (5:1, 10:1, 20:1)
- Mounting hardware included for attaching to FBL/FCL motors.
- Industry-standard mounting dimensions
- Thread-in mounting style
- Very low backlash: 7 arc-min single stage (5:1 and 10:1 ratios), 9 arc-min for two-stage (20:1 ratios)
- 1-year warranty

www.automationdirect.com
LS Electric L7C servo drives are fully digital and include over 300 parameters to configure the drive for almost any application. For convenience, the parameters are grouped into several categories:

- Basic parameters
- Gain parameters
- I/O parameters
- Velocity parameters
- Misc. parameters
- Monitor parameters
- Index parameters

All parameters have commonly used default values which allow you to operate the L7C drive “out-of-the-box”. The drive auto-detects the LS servo motor (through the serial encoder) and sets up the default gains and limits based on the connected motor.

The drive can still be easily configured to your specific application, however. The Drive CM configuration software has a built-in Setup Wizard that will guide you through all the basic setup parameters. So, whether you want to use high speed pulse input, analog velocity, analog torque, or the powerful internal indexer for a control mode (or any multi-mode combination of these modes), the Setup Wizard will quickly and easily get your application started – from setting up the I/O to determining the appropriate homing sequence.

After configuration is complete, the Auto Tune features of the drive will get your application tuned for optimal responsiveness and performance.

For the latest prices, please check AutomationDirect.com.
**LS Electric**

**L7C Series AC Servo Systems**

---

**Encoder Connector**
9-pin watertight connector (8 pins used) for the 17-bit serial encoder. The encoder transmits motor/encoder identification information to the drive at power-up and it sends position feedback during operation.

**Motor Power Connector**
4-pin watertight connector for motor power (U, V, W, and ground)

**Non-Braking Motor**

---

**Low Inertia Motors**
Low inertia designs result in high responsiveness and high speeds.
- 100W 60mm flange
- 200W 60mm flange
- 400W 60mm flange
- 750W 80mm flange
- 1kW 80mm flange

---

**Keyed Shafts**
"FBL and FCL motors are supplied with extra-large keyways, and slightly oversized keys which must be “fitted” into the keyway for performance and longevity. Clamp or compression couplings (without key) are recommended."
- 100W 14mm diameter shaft
- 200W 14mm diameter shaft
- 400W 14mm diameter shaft
- 750W 19mm diameter shaft
- 1kW 19mm diameter shaft

---

**Encoder Connector**
9-pin watertight connector (8 pins used) for the 17-bit serial encoder. The encoder transmits motor/encoder identification information to the drive at power-up and it sends position feedback during operation.

**Motor Power Connector**
4-pin watertight connector for motor power (U, V, W, and ground)

**Brake Motor**

---

**Brake Power Connector**
2-pin watertight connector available on brake motors only. The 24VDC brake is located between the motor coils and the encoder. Motors ending in AYK2 have brakes. The brakes must have 24VDC applied to them before the motor is set in motion.

---

**Keyed Shafts**
"FBL and FCL motors are supplied with extra-large keyways, and slightly oversized keys which must be “fitted” into the keyway for performance and longevity. Clamp or compression couplings (without key) are recommended."
- 100W 14mm diameter shaft
- 200W 14mm diameter shaft
- 400W 14mm diameter shaft
- 750W 19mm diameter shaft
- 1kW 19mm diameter shaft

---

**IP67 Housing**

---

All LS Electric L7C motors have keyed shafts for use with servo-grade clamp or compression couplings (recommended) or servo-grade keyed couplings. Some sanding/filing of the key may be required before pressing into the keyway. Do not modify the shaft/keyway.

---

For the latest prices, please check AutomationDirect.com.
L7P Series AC Servo Systems

Drive features

- Power: 100W–7.5 kW three-phase 230VAC/460VAC
  100W–2.2 kW single-phase 230VAC capable
- Fully digital control with up to 1kHz velocity loop response
- Easy setup and diagnostics with DriveCM PC-based software
- Field upgradeable firmware ensures the drive can always be upgraded to the latest operating system
- Command options include:
  - ±10V torque or velocity command
  - Pulse train or master encoder position command (accepts line driver or open collector)
  - Internal Indexer for position/speed-based moves include the option for simple registration correction. 64 individual move statements can be configured in the drive. Each index contains its own distance, speed, accel, decel, and dwell parameters. These indexes can be set up through DriveCM software or modified in real-time with serial communication (PLC, HMI, etc.). The indexes can be initiated via Digital Inputs or through serial comm.
- The 1 kHz bandwidth allows for high-level automatic tuning. Several modes of tuning are available including Off-Line Auto Tuning (the drive initiates its own move commands while Auto tuning), On-Line Auto Tuning (an external controller sends the move commands while the drive Auto tunes), and Manual Tuning (all tuning values are adjusted by the user).
- (16) Optically isolated digital inputs and (8) general purpose (user configurable) outputs, analog inputs for speed and torque control (2), and line driver and open collector output for encoder (with scalable resolution). Two configurable analog outputs for monitoring various servo parameters (actual speed, torque, current, position, etc.)
- Advanced Scope feature that can monitor a variety of command and status signals, including output speed, torque, power, etc.

Motor features

- Low and Medium inertia motors available:
  - Low: 100W, 200W, 400W, 750W, 900W, 1kW, and 1.5 kW; @5000rpm
  - Medium: 1.6 kW, 2.2 kW, 3.5 kW, 5.5 kW, and 7.5 kW; @3000rpm
- Permanent magnet 3-phase synchronous motor
- Keyed drive shafts support clamp-on style couplings or key-style couplings
- Integrated multi-turn absolute encoder with 19-bit resolution (524,288 pulses per revolution)
- Optional 24VDC spring-set holding brakes (AMK2 and DMK2 motors)
- Standard hook-up cables for motor power, encoder, and brake (separate brake cable for FBL/FCL brake motors)
- Motor cables available in standard or flex-rated lengths of 3, 5, 10, and 20m
- Standard 50-pin DIN-rail mounted break-out kit for the drive’s CN1 connector (with screw terminal connections), or 50-pin cables with flying leads

Tuning Technology

The L7P drive closes the loop on current, velocity, and position (depending on control mode selection). The 1kHz bandwidth in the drive assures precise speed and current control and easy tuning. Proportional gain, integral gain and compensation, feed forward compensation, command low pass filter, and four (4) notch filters for resonance suppression are available. Auto Tuning has been greatly improved and can tune motors up to 20:1 inertia mismatch. There is an inertia estimation function that analyzes the motor and load to measure how much inertia is coupled to the motor. The drive has several tuning methods available:

- Online Auto Tuning—the drive can either tune the load live while an external controller moves the load to different positions or using the drive’s internal tuning motion profile.
- Offline Auto Tuning—the drive tunes the load using the drive’s internal tuning motion profile.
- Manual Tuning—all parameters are available to give power users the ultimate flexibility to tune their systems.

Built-in Indexer

While the L7P drives can accept traditional commands from host controllers, they can also provide their own internal motion control. 64 point-to-point position moves can be configured in the drive. These moves can be populated through the DriveCM configuration software or they can be written to by a PLC through the drive’s RS422/485 serial port. The moves can be initiated by digital inputs or by serial commands and include the ability to handle simple registration, and can be sequenced internally with delays in between the moves or moves can be linked together so they are processed one after the other.

Multi-axis systems can be controlled via digital inputs, or serial communication. The motion can be commanded from a powerful external controller that sends out high speed pulses to each drive, or the motion can be initiated by a low-level controller (the simplest CLICK PLC) since each drive has a powerful indexer inside. Applications include press feeds, auger fillers, rotary tables, robots for pick and place, test or assembly operations, drilling, cutting, tapping, and similar applications using simple index moves for single or multi-axis motion.

Optional Holding Brake

Each L7P motor can be ordered with an optional 24VDC spring-set holding brake that holds the motor in place when power is removed.

LS Electric MSS Series In-Line Planetary Precision Gearboxes for Servo Motors

Need more torque from the motor? Have an inertia balancing issue in your design? The LS Electric MSS series gearboxes easily mate to FBL/FCL/FE/FF motors. Everything you need for mounting is included!

- Three gear ratios available (5:1, 10:1, 20:1*)
- Mounting hardware included for attaching to FBL/FCL/FE/FF motors
- Industry-standard mounting dimensions
- Thread-in mounting style
- Very low backlash: 7 arc-min single stage (5:1 and 10:1 ratios), 9 arc-min two-stage (20:1 ratios*)
- 1-year warranty

* The available gearbox ratios for the 7.5 kW motors are 5:1, 10:1, and 15:1, but the features are otherwise equivalent.

For the latest prices, please check AutomationDirect.com.
The LS Electric L7P servo drives are fully digital and include over 300 parameters to configure the drive for almost any application. For convenience, the parameters are grouped into several categories including:

- **Basic parameters**
- **Gain parameters**
- **I/O parameters**
- **Velocity parameters**
- **Misc. parameters**
- **Monitor parameters**
- **Index parameters**

All parameters have commonly used default values which allow you to operate the L7P drive “out-of-the-box”. The drive auto-detects the LS servo motor (through the serial encoder) and sets up the default gains and limits based on the connected motor.

The drive can still be easily configured to your specific application, however. The Drive CM configuration software has a built-in Setup Wizard that will guide you through all the basic setup parameters. So, whether you want to use high speed pulse input, analog velocity, analog torque, or the powerful internal indexer for a control mode (or any multi-mode combination of these modes), the Setup Wizard will quickly and easily get your application started – from setting up the I/O to determining the appropriate homing sequence.

After configuration is complete, the Auto Tune features of the drive will get your application tuned for optimal responsiveness and performance.

For the latest prices, please check AutomationDirect.com.
**Servo motor overview**

**Encoder Connector**
9-pin watertight connector for the 19-bit serial encoder. The encoder transmits motor/encoder identification information to the drive at power-up and it sends position feedback during operation.

**Brake Power Connector**
2-pin watertight connector available on FBL/FCL brake motors only. The 24VDC brake is located between the motor coils and the encoder. Motors ending in AMK2 and DMK2 have brakes. The brakes must have 24VDC applied to them before the motor is set in motion.

**Low Inertia Motors**
Low inertia designs (AMK series) result in high responsiveness at high speeds for lighter loads.
- 100–1000W motors available
- 60 and 80 mm flanges

**Keyed Shafts**
FBL and FCL motors are supplied with extra-large keyways, and slightly oversized keys which may need to be “fitted” into the keyway for performance and longevity. Clamp or compression couplings (without key) are recommended.
- 100W 14mm diameter shaft
- 200W 14mm diameter shaft
- 400W 14mm diameter shaft
- 750W 19mm diameter shaft
- 1000W 19mm diameter shaft

**FE/FF Series Motor**

**Encoder Connector**
17-pin watertight connector for the 19-bit serial encoder. The encoder transmits motor/encoder identification information to the drive at power-up and it sends position feedback during operation.

**Motor Power Connector**
4-pin watertight connector for motor power (U, V, W, and ground). For brake models, also supports brake wiring.

**Low and Medium Inertia Motors**
Low inertia designs (AMK series) result in high responsiveness at high speeds for lighter loads.
- 1500W motors with 130mm flanges available

Medium inertia designs (DMK series) result in high responsiveness at moderate speeds for heavier loads.
- 1600–7500W motors available
- 130 and 180 mm flanges

**Integrated Power**

- 1-800-633-0405

For the latest prices, please check AutomationDirect.com.
**Drive CM Configuration Software**

Drive CM is an optional free downloadable configuration software package for LS Electric L7C drives. A PC may be directly connected to the servo drive via any standard USB-A to USB-miniB cable (SV2-PGM-USB15 or SV2-PGM-USB30 recommended).

**Features**

- Easy-to-use setup wizard guides you through the most common setup functions.
- Digital I/O / Jog Control allows the user to operate the servo system from the PC. This allows the servo to perform some basic motion and check the I/O during startup.
- Parameter Object editor for setting up all drive parameters.
- Tune and check the servo response in real-time using the scope feature.
- Upload and download the drive configuration. Save the drive configuration as a file for backup or future use.
- Edit the drive configuration.
- View all drive faults.
- View drive variable trends in real-time.
- Set up 64 internal Indexes (point-to-point moves) that can be triggered by digital inputs or serial communications. Indexes can repeat and can initiate another Index when one move completes.

**Download**

Download the Drive CM software from AutomationDirect’s LS Electric support page:

[https://support.automationdirect.com/products/lselectric.html](https://support.automationdirect.com/products/lselectric.html)

**Parameter Object Editor**

The Drive CM configuration tool logically organizes all servo drive object parameters for viewing and editing using the Object Dictionary screen. Each parameter has a factory default that usually allows the servo to run “out-of-the-box”.

The parameters can be easily changed with available setting ranges displayed. Tuning modes and parameters can also be changed using Drive CM. After the parameters have been defined, the complete setup can be stored and archived. Drive configurations can be uploaded, edited, saved, and downloaded as often as necessary.

Using the Drive CM software you can also configure your drive and program your motion without having to be connected to the drive.
Drive Software, continued

Digital I/O, Jog Control, and Scope

The Digital I/O/Jog Control screen allows the user to operate the servo system from the PC. This is a great aid during start-up to allow the servo to perform some basic motion and to check the I/O.

Drive CM also includes a powerful scope function that allows the user to have as many as four channels of data displayed simultaneously. Each channel has a drop-down table to select the data to be displayed. The scope has the ability to save traces to a file and load those traces for offline review/analysis. This function is a valuable tool for tuning L7C drives.