PositionServo - Digital Servo Drive and Controller

NOW WITH AUTO-TUNING!

Flexible, simple, economical

NOW WITH MotionView® OnBoard

Lenze

For Sales and Support, Contact Walker EMD • Toll-free: (800) 876-4444 • Tel: (203) 426-7700 • Fax: (203) 426-7800 • www.walkeremd.com

Lenze | Our promise

Commitment to Simplicity

By making the PositionServo easy to install, set up and program, we provide the ideal motor control solution for both OEM designers and electrical system engineers. An innovative and removable EPM memory chip allows instant programming of multiple drives either before or after installation, and the simple, intuitive front panel display facilitates on-site operation.

Commitment to Quality

From product design to manufacture, service and training, quality is at the foundation of Lenze's corporate philosophy. A quality product is built of superior materials by highly skilled personnel equipped with state-of-the art instruments. And a quality product is backed by expert training, knowledgeable sales representatives and experienced repair personnel. Continuous life cycle improvement fueled by our pledge to our Customers drives our technology forward. We feel so strongly about quality that each of our products is backed with a two-year warranty.

Commitment to Innovation

We pride ourselves on delivering products to the market that are designed to meet specific customer needs. Our broad portfolio of innovative products covers very simple variable speed applications through complex motion control. Each product is positioned so that our customers pay only for the level of technology their particular application requires. The PositionServo provides both the basic torque control of a simple servo drive and the full programmability of a high-level motion controller.

Commitment to Technical Support

Experienced engineers are on hand to help customers at all levels solve their problems and find the best solutions for their applications. End users can also be assured that Lenze is always there throughout the life cycle of it's products. Technical info, literature and manuals are available from our website or the worldwide network of Lenze's branches and certified distributors.

Commitment to Performance

Each Lenze product is in a class by itself when it comes to performance. We are not satisfied with average performance. The PositionServo's smooth performance derives from a very low torque ripple, quick settling time, 64-bit indexing and more. The PositionServo did not reach the marketplace until it outperformed our competitors and exceeded our own rigorous performance requirements. By using the most innovative components, we are able to provide this level of performance at a great value.

Our Promise

At Lenze it is not good enough to deliver on part of a promise. All of our products including the PositionServo deliver the entire package: Value, Quality, Innovation, Simplicity and Performance.

Lenze

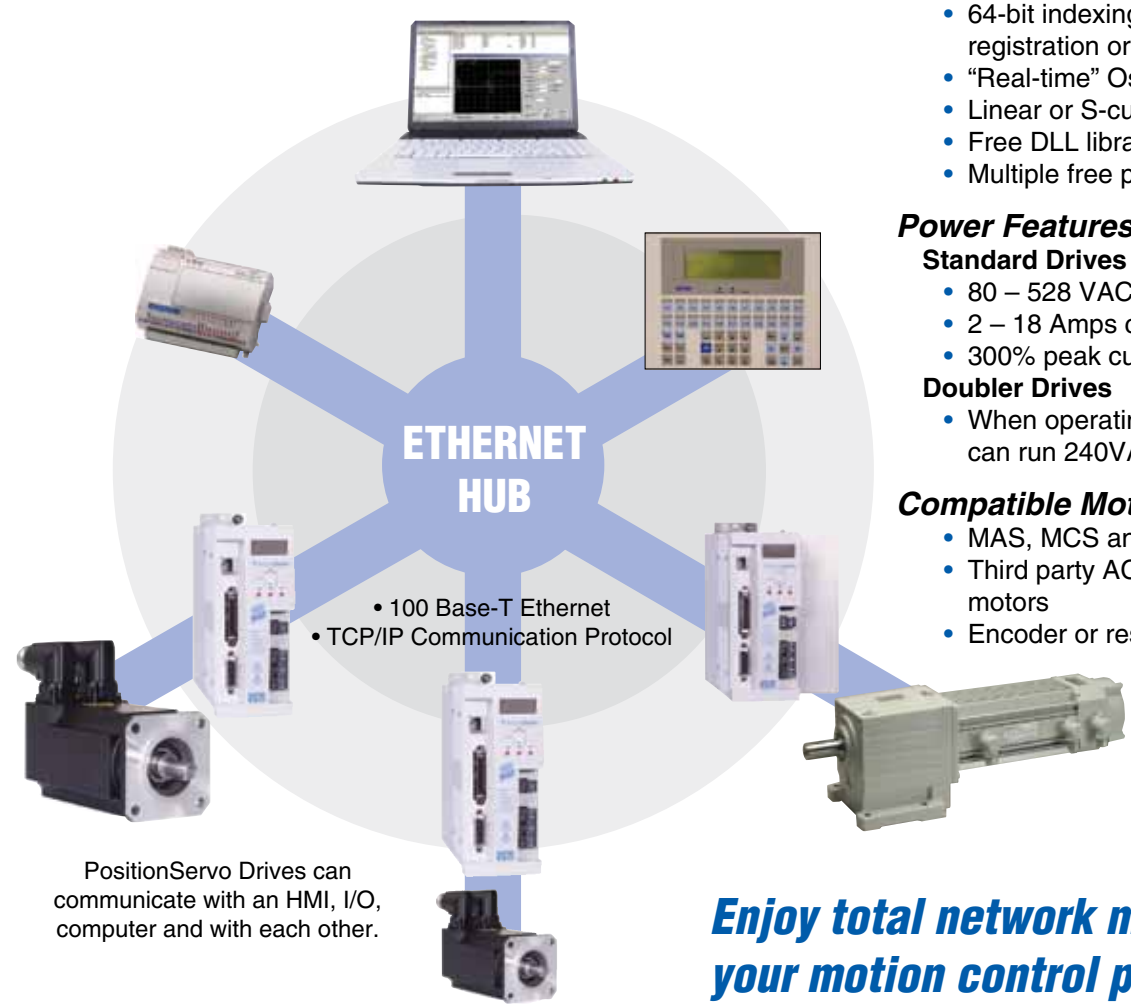
PositionServo with programming capability, & even more features

PositionServo
Servo drive/controller

The PositionServo is the one drive that has it all. From basic torque control to full programmability, you choose your level of control.

The PositionServo can perform along with most high-level motion controllers, but with a simple-to-use interface and clean Ethernet connection.

Model 940: Encoder-based PositionServo (E94P)
Model 941: Resolver-based PositionServo (E94R)



PositionServo Drives can communicate with an HMI, I/O, computer and with each other.

Drive Features
- Torque, velocity and position control
- Electronic gearing
- Removable “EPM” memory
- UL, cUL, CE(LVD & EMC)
- ISO13849-1 safety standard (optional)
- Two-year warranty

Inputs/Outputs
- 11 Programmable + 1 dedicated digital input
- 4 Programmable + 1 dedicated digital output
- 2 Programmable analog inputs
- 1 Programmable analog output

Communication Features
- Free MotionView OnBoard
- RJ-45 Standard Ethernet Modbus TCP/IP, EtherNet/IP
- Optional DeviceNet, RS485 PPP or Modbus RTU slave, CANopen, PROFIBUS-DP

Programmability/Control
- Auto Tuning
- 64-bit indexing (incremental, absolute, registration or segmented moves)
- “Real-time” Oscilloscope
- Linear or S-curve accel & decel
- Free DLL library
- Multiple free program examples

Power Features
Standard Drives
- 80 – 528 VAC input
- 2 – 18 Amps continuous rms current
- 300% peak current

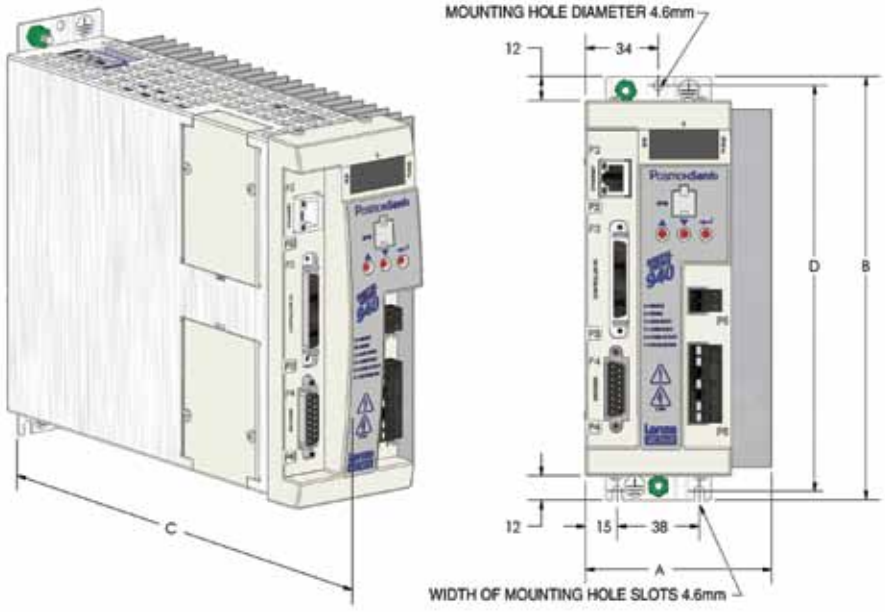
Doubler Drives
- When operating at 120VAC, Doubler Drives can run 240VAC motors at full speed.

Compatible Motors
- MAS, MCS and MCA Series
- Third party AC permanent magnet synchronous motors
- Encoder or resolver feedback

Enjoy total network management of your motion control products…

PositionServo | Specifications

Continuous Current (rms)	2A	4A	6A	8A	9A	10A	12A	18A
Drive Input Voltage								3Ø Only
80-264 VAC, 1Ø or 3Ø w/out EMC Filter*	E94_020Y2N_ _	E94_040Y2N_ _		E94_080Y2N_ _		E94_100Y2N_ _	E94_120Y2N_ _ E94_120Y2C_ _	E94_180T2N_ _ E94_180T2C_ _
80-264 VAC, 1Ø w/integrated EMC Filter	E94_020S2F_ _	E94_040S2F_ _		E94_080S2F_ _		E94_100S2F_ _		
320-528 VAC, 3Ø w/out EMC Filter*	E94_020T4N_ _	E94_040T4N_ _	E94_060T4N_ _ E94_060T4C_ _		E94_090T4N_ _ E94_090T4C_ _			
45-264 VAC Input, 1Ø 240 VAC Max Output w/out EMC Filter*	E94_020S1N_ _	E94_040S1N_ _						
Input Frequency	48 - 62 Hz							
24V External Input (Keep Alive)	24VDC +/-20%							
* **External Filter Options**	Footprint E94ZF04T4A1	Footprint E94ZF07T4A1	Sidemount E94ZF10T4A1	Footprint E94ZF15T4A1	Sidemount E94ZF12T4A2	Footprint E94ZF15T4A2	Sidemount (1Ø) E94ZF24S2A1	
Drive Ouput								
Continuous Power @ 240VAC	800 Watts	1.7 kW		3.3 kW		4.2 kW	5.0 kW	7.5 kW
Continuous Power @ 480VAC	1.7 kW	3.3 kW	5.0 kW		7.5 kW			
Peak Current (rms) Overload**	6 Amps	12 Amps	18 Amps	24 Amps	27 Amps	30 Amps	36 Amps	54 Amps
**Peak Current (rms) Capability	Adjustable up to 300% X continuous current (rms) rating @ 8 kHz for 2 sec Adjustable up to 250% X continuous current (rms) rating @ 16 kHz for 2 sec							
Performance Servo Output	Encoder-based Drive Accuracy: ± 1 Encoder Count Resolver-based Drive Accuracy: ± 1.32 Arc-Minutes (14-bit resolution) Commutation: Sinusoidal							
Torque Operation Mode	Reference: ± 10VDC, 12-bit; scalable Torque Range: 100:1 Update rate: 65 µs							
Velocity Operation Mode	Reference: ± 10VDC, 12-bit; scalable Regulation: ± 1RPM Update rate: 512 µs Speed Range: 5000:1 with 4096 ppr encoder							
Position Operation Mode	Reference: 0 to 2 MHz, scalable master to reference ratio Minimum Pulse Width: 500 nanoseconds Update rate: 512 µs							
Inputs/Outputs								
11 Programmable Digital Inputs	5-24VDC, optically isolated							
1 Dedicated Digital Input-Enable	5-24VDC, optically isolated							
4 Programmable Digital Outputs	5-24VDC @ 100mA, optically isolated open collector							
1 Dedicated Digital Output-Ready	5-24VDC @ 100mA, optically isolated open collector							
2 Analog Inputs	+/- 10V differential,12-bit							
1 Analog Output	± 10V single-ended, 10-bit							
Feedback								
Encoder Input	Up to 2MHz							
Resolver Input	12 – bit resolution							
Communications								
Standard	RJ-45 Standard Ethernet Modbus TCP/IP, EtherNet/IP							
Optional	DeviceNet, RS485 PPP or Modbus RTU Slave, CANopen, PROFIBUS-DP							
Standards	UL, cUL, CE(LVD & EMC), CTick ISO 13849-1 Safety Standard (optional)							



Dimensions					
Type	**A** (mm)	**B** (mm)	**C** (mm)	**D** (mm)	**Weight** (kg)
E94_020S1N_M	68	190	190	182	1.1
E94_040S1N_M	69	190	190	182	1.2
E94_020S2F_M	68	190	235	182	1.3
E94_040S2F_M	69	190	235	182	1.5
E94_080S2F_M	87	190	235	182	1.9
E94_100S2F_M	102	190	235	182	2.2
E94_020Y2N_M	68	190	190	182	1.3
E94_040Y2N_M	69	190	190	182	1.5
E94_080Y2N_M	95	190	190	182	1.9
E94_100Y2N_M	114	190	190	182	2.2
E94_120Y2N_M/E94_120Y2C	68	190/197	235/214	182	1.5/1.4
E94_180T2N_M/E94_180Y2C	68	242/248	235/193	233/232	2.0/1.7
E94_020T4N_M	68	190	190	182	1.5
E94_040T4N_M	95	190	190	182	1.9
E94_060T4N_M/E94_060T4C	68	190/197	235/214	182	1.4/1.5
E94_090T4N_M/E94_090T4C	68	242/248	235/193	233/232	2.0/1.7

PART NUMBER KEY

P = Model 940 Encoder-based drive
R = Model 941 Resolver-based drive
M = MotionView OnBoard, no ISO13849-1 safety compliance
S = MotionView OnBoard, with ISO13849-1 safety compliance

E94P020Y2NEM

E = Incremental encoder (must have E94P drive)
R = Standard resolver (must have E94R drive)

Environment Ratings	
Vibration	2 g (10 - 2000 Hz)
Ambient Operating Temperature Range	0 to 40°C
Ambient Storage Temperature Range	-10 to 70°C
Temperature Drift	0.1% per °C rise
Humidity	5 - 90% non-condensing
Altitude	1500 m/5000 ft [derate by 1% per 300m (1000 ft) above 1500m (5000 ft)]

Command Set

Below is an example list of some of the extensive command set available on the PositionServo.

KEYWORD	Long Name
ASSIGN	Assign Input as Index Bit
DEFINE	Define name
DISABLE	Turns servo OFF
DO/UNTIL	Do/Until
ENABLE	Enables servo
END	END program
EVENT	Starts Event handler
ENDEVENT	END of Event handler
EVENT ON/OFF	Turn events on or off
EVENTS ON/OFF	Globally Enables/disables events
FAULT	User generated fault
GOTO	Go To
GOSUB	Go To subroutine
HALT	Halt the program execution
JUMP	Jump to label from Event handler
ICONTROL ON/OFF	Enables interface control
IF	If/Then/Else
MOVE	Move
MOVED	Move Distance
MOVEP	Move to Position
MOVEDR	Registered Distance Move
MOVEPR	Registered Position Move
MDV	Segment Move
MOTION SUSPEND	Suspend
MOTION RESUME	Resume Motion
ON FAULT/ENDFAULT	Resume Fault Handler
REGISTRATION ON	Registration On
RESUME	Resume Code Execution
RETURN	Return from subroutine
SEND/SEND TO	Send network variable(s) value
STOP MOTION [Quick]	Stop Motion
VELOCITY ON/OFF	Velocity Mode
WAIT	Wait
WHILE/ENDWHILE	While

Pick and Place Program Example

```
;********************************* HEADER ********************************
;Title:            Pick and Place example program
;Author:           Product Manager
;Description:      This is a simple program that picks up a part,
;                  moves it to a set position and drops it

;*******************************  I/O List  ******************************
;                  Input A1           -  not used
;                  Input A2           -  not used
;                  Input A3           -  Enabled
;                  Input A4           -  not used
;                  Input B1           -  not used
;                  Input B2           -  not used
;                  Input B3           -  not used
;                  Input B4           -  not used
;                  Input C1           -  not used
;                  Input C2           -  not used
;                  Input C3           -  not used
;                  Input C4           -  not used
;
;                  Output 1           -  Pick Arm
;                  Output 2           -  Gripper
;                  Output 3           -  not used
;                  Output 4           -  not used


;********************** Initialize and Set Variables ******************
UNITS = 1
ACCEL = 75
DECEL =75
MAXV = 10
APOS = 0
;********************************* Events ********************************
;Set Events handling here

;****************************** Main Program *****************************
RESET_DRIVE:
WAIT UNTIL IN_A3   ;Wait until the Enable switch is made before continuing
ENABLE             ;Enable the Drive
PROGRAM_START:
MOVEP  0           ;Move to Pick position
OUT1 = 1           ;Turn on output 1 on to extend Pick arm
WAIT TIME 1000     ;Delay 1 sec to extend arm
OUT2 = 1           ;Turn on output 2 to Engage gripper
WAIT TIME 1000     ;Delay 1 sec to Pick part
OUT1 = 0           ;Turn off output 1 to Retract Pick arm
MOVEP 100          ;Move to Place position
OUT1 = 1           ;Turn on output 1 on to extend Pick arm
WAIT TIME 1000     ;Delay 1 sec to extend arm
OUT2 = 0           ;Turn off output 1 to Disengage gripper
WAIT TIME 1000     ;Delay 1 sec to Place part
OUT1 = 0           ;Retract Pick arm
GOTO PROGRAM_START
END

;***************************** Sub-Routines ******************************
;                  Enter Sub-Routine code here

;************************* Fault Handler Routine ************************
;                  Enter Fault Handler code here
ON FAULT
ENDFAULT
```

Command Flexibility

Every resource on the drive is accessible via a variable or flag.
Including:

- System Staus / Monitoring
- I/O Status / Manipulation
- Motion Control / Monitoring
- PID Gain Sets
- Comunications Set-Up / Monitoring
- Homing Functionality

PositionServo | Connections

Input Power (nominal)

- 1~ 120 VAC with Voltage Doubler Models
- 1~ 200/240 VAC
- 3~ 200/240 VAC
- 3~ 400/480 VAC

Option Bay 1

Communications Options

- RS485 Modbus RTU
- CANopen
- DeviceNet
- PROFIBUS-DP

Ethernet Port

Free MotionView Configuration/Programming Software resides inside each servo controller.

- Modbus TCP/IP
- Ethernet IP

Controller I/O

- 12 Digital Inputs
- 5 Digital Outputs
- Encoder Output
- 2 Analog Inputs
- 1 Analog Output

Feedback

- Model 940 - Quadrature Incremental Encoder (2 MHz)
- Model 941 - Resolver (14-bit)

Optional Safety Function

- Meets ISO13849-1 Standard

LED Display

Bright 4 Digit Indication of:

- Controller Status
- Diagnostics

Status LEDs for:

- Enable
- Regenerating
- Data Entry
- Communication Activity
- Communication Fault
- Program Running

EPM - Electronic Programming Module

Control Pushbuttons

Pushbuttons permit viewing of servo controller conditions, diagnostics and faults.

24VDC - External Power Input

Keeps control circuits active during loss of mains

Braking & DC Bus

- Internal regen circuitry requires only external resistor.
- ± Bus for DC input or load sharing

Motor Output

- U, V, W 3~ for Synchronous AC Brushless Servomotors
- PTC Thermister input

MotionView® OnBoard

All configuration and programming software is INSIDE the drive. No need for managing firmware or software revisions. It is all done for you.

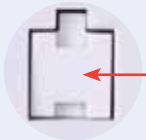
EPM • Electronic Programming Module - Removable Memory

The EPM is the drive's memory (programs and parameters).
The EPM saves time and money. It's as easy as 1, 2, 3…

1. Create your program and parameters in your first drive.
2. Use the EPM Programmer to make multiple copies of the EPM.
3. Insert the copied EPMs into your non-programmed drives, and they are instantly programmed.

Imagine being able to fully program a servo drive in minutes.

Even with no servo experience. And with no power to the drive.



Worldwide Coverage | We're everywhere you are

Positioning our Customers for Success. ***We take our Customer's requirements seriously. A new application is an opportunity to test, prove and expand our drive's capabilities while solving our Customer's motion control needs."***

"Customer Service ***has always been and will always be our number one commitment. Our success depends on it."***

Driving design ***technology forward means we never stop thinking about process improvements. Did we deliver a quality product to market that meets the Customer's needs? That is the key.***

Innovation ***takes art and skill to combine what's new and what's proven to produce a product with exceptional form, fit and function.***

Industrial Drives and Controls... That's All We Do!

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