IAI
Quality and Innovation

Ladder Programming Software for MSEP-LC

LC-LADDER

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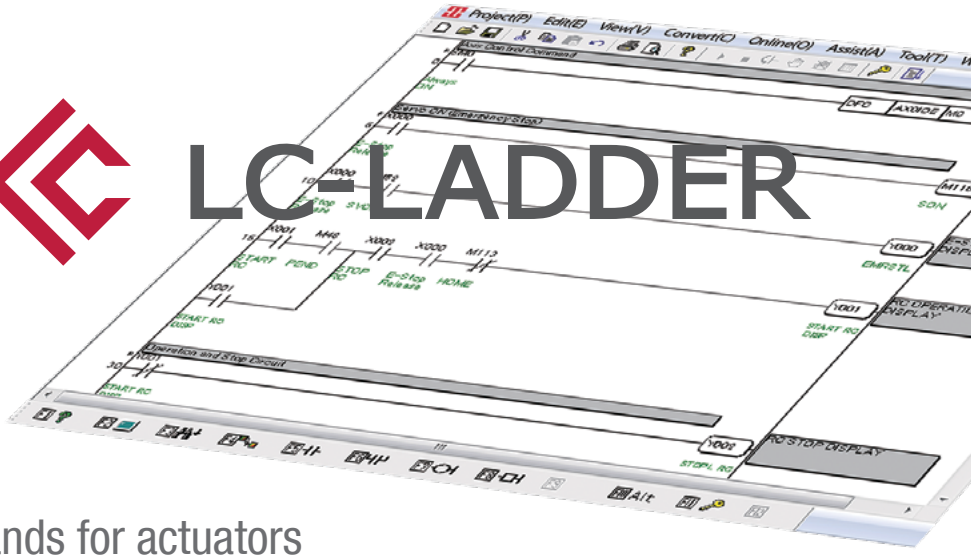
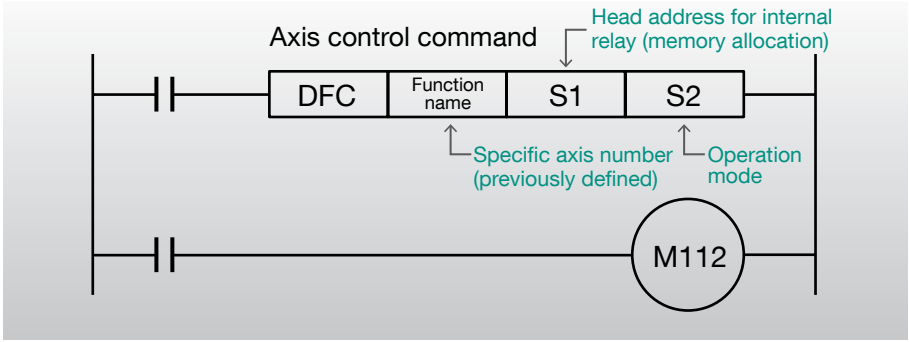


Features

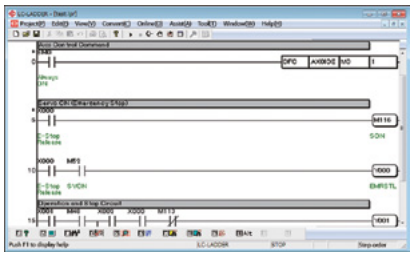
1 Simple operation commands for actuators

Controlling actuators with ROBO Cylinder position controllers used to require hard work to write ladder programs. PLC memory allocation needed to be considered, signals sent to the position controller, position numbers defined, and movements triggered with the correct timing. However, the MSEP-LC's DFC command makes programming simple, providing static allocation of internal memory and timing-free command sending.



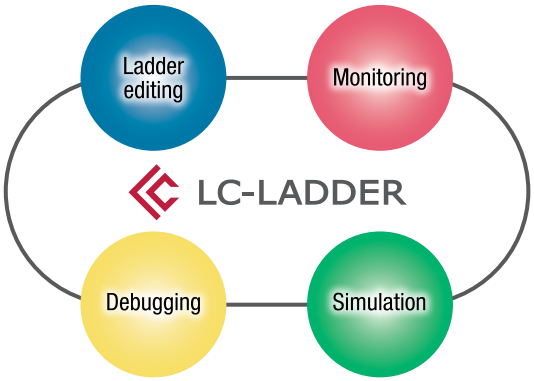
2 Easy to operate, easy-to-read screen

The simple design cuts out rarely-used functions and focuses on operation. Even people who have never written a ladder program before can easily begin coding.



3 Multiple functions

All the functions you need to create and edit ladder software are included, letting you efficiently build your software.



4 Free web download

The software is a free download from our web page, allowing you to create ladder programs before buying the product.

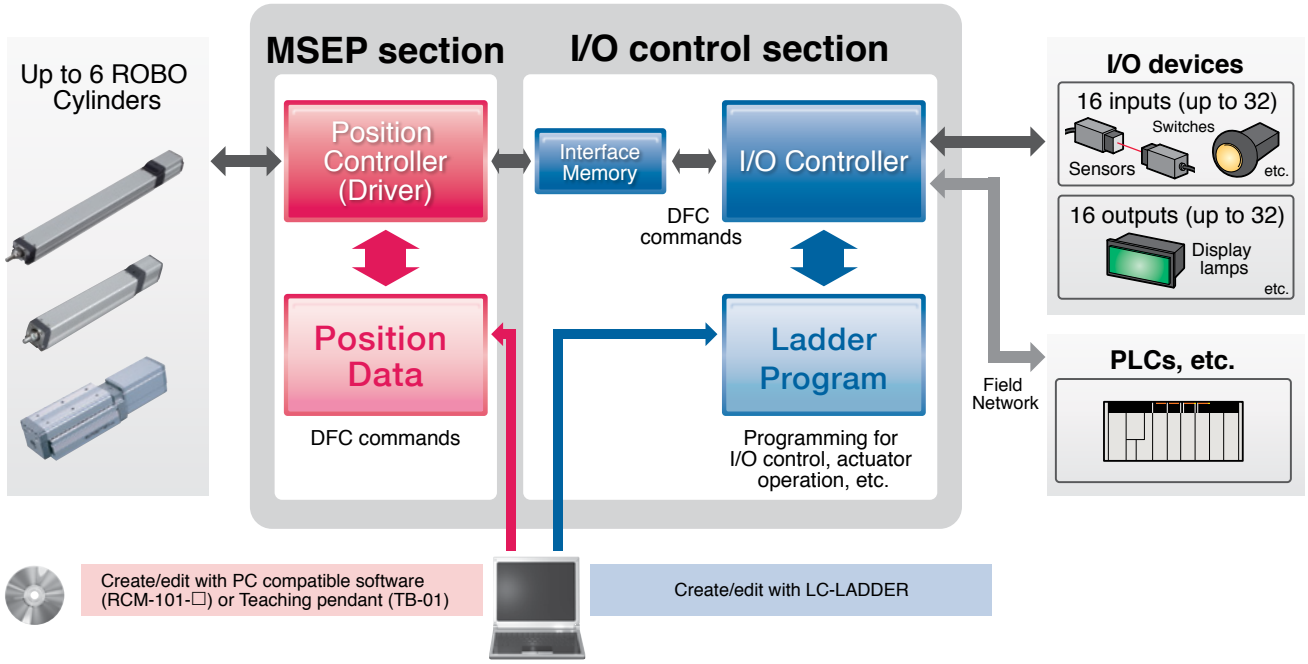
Free www.intelligentactuator.com/lc-ladder/

MSEP-LC Functions

6-Axis Position Controller with I/O Control

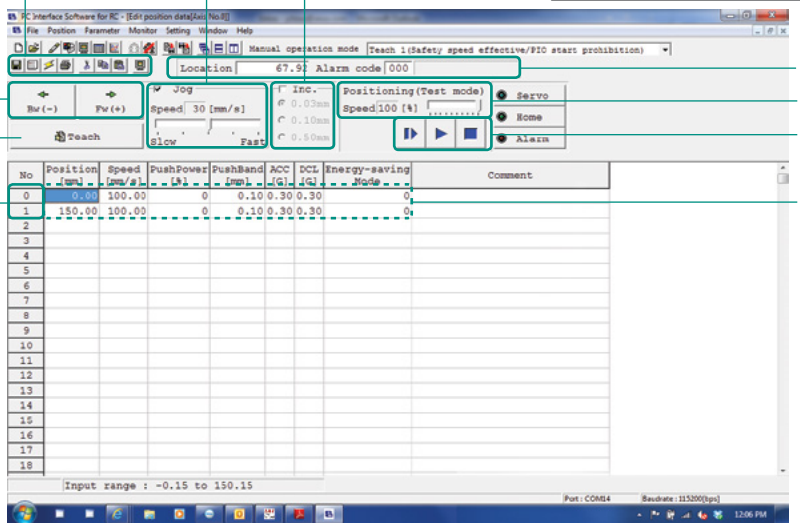
MSEP-LC

MSEP-LC internal structure



Position Data

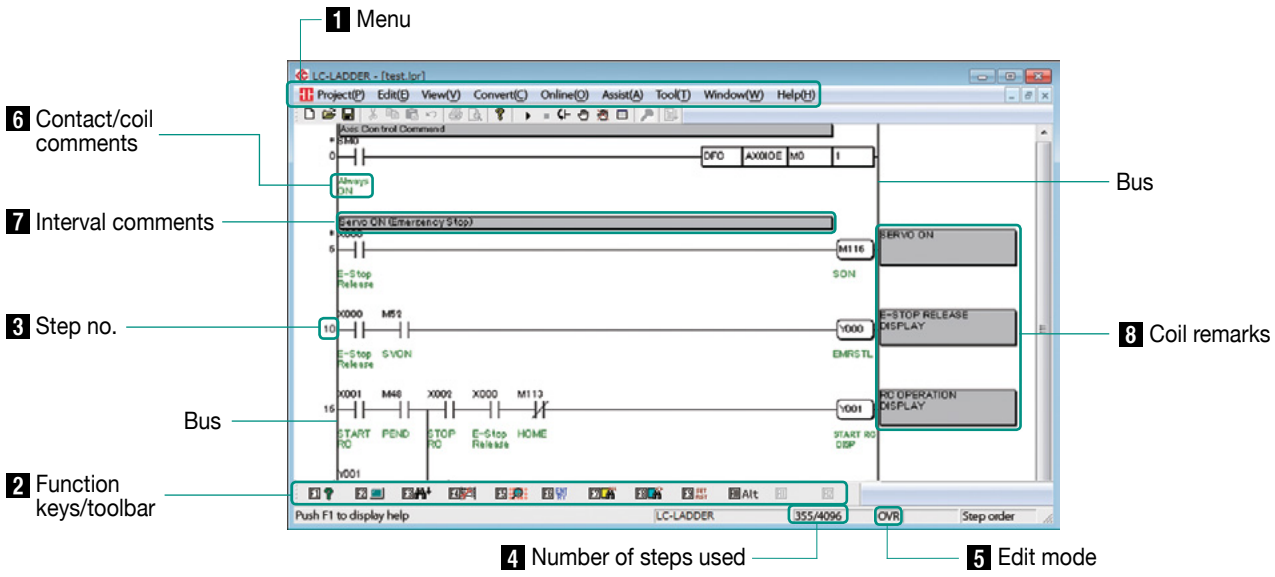
Position Data Input/Editing Screen



Ladder Program

Simple and Easy Ladder Program Data Input

Inputting Ladder Program Data



1 [Menu]	Select and execute commands from Edit, View and other menus.
2 [Function keys/toolbar]	The toolbar lets you use function keys to select AND circuits and other components when writing ladder programs.
3 [Step no.]	The step number of the relevant circuit block.
4 [Number of steps used]	The number of steps used in the ladder program.
5 [Edit mode]	Shows whether the program is in insert or overwrite mode.
6 [Contact/coil comments]	Displays comments for the relevant contact point or coil.
7 [Interval comments]	Descriptions for program routines and other comments displayed in the program intervals.
8 [Coil remarks]	Comments for commands and coils connected to the buses on the right-hand side.

Ladder Edit Software Covers Everything from Ladder Program Data Editing to Debugging

Main Features

1 Create/edit ladder programs

1 [Create/edit programs]
Insert circuit symbols, then cut, copy, paste and reuse them

2 [Create/display comments]
Create and display comments for contact points/coils, intervals and coil remarks

3 [Search]
Search for step numbers, contact points/coils, and commands

4 [Reposition]
Group reposition a/b contact points; reposition contacts/coils

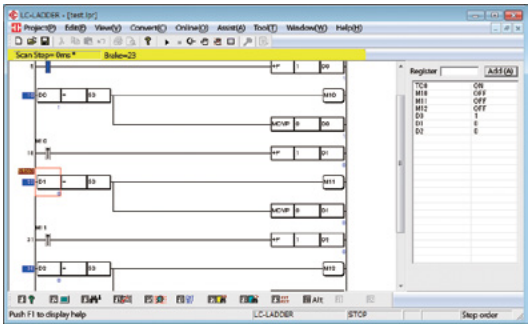
5 [List displays]
- List step numbers for areas where defined contact points/coils are used
- List usage points for defined contact points/coils
- List timer/counter settings

6 [Print ladder programs]

2 Debug/run functions

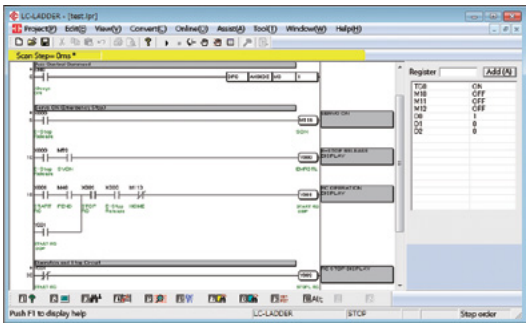
The software can abort the program in the following conditions, then run one step at a time – useful for debugging.

- Abort program at change in contact point/coil states (on to off, off to on)
- Abort program at change in word memory state (defined memory value is reached)
- Abort program at defined circuit block



3 Monitoring functions

- Monitor current values for contact points/coils added to monitor list
- Monitor all current contact point/coil values and turn contact points/coils (bit memory) on/off
- Change current values of contact points/coils (bit memory) and numerical data (word memory)
- Monitor abort triggers for contact points/coils (bit memory)



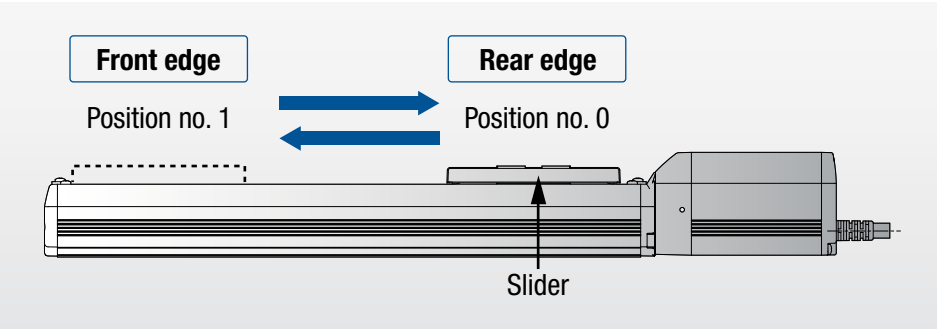
4 Simulations (Test runs)

Simulate the program on a PC (axis control and other DFC commands not available)

Sample Program

Example Two-Point Round-Trip Ladder Program

This program moves the slider forward (position no.0) and back (position no. 1).



Axis control command – always on

0 ✳ SM0 — Always on

DFC | AX0IOE | M0 | 1

Keep DFC command running
Operation mode = positioner 1

* DFC command is command that sets the operation of the axis.

Servo on

6 ✳ M62 — CRDY controller ready

M116 — SON

Command: Servo on

Return to origin

10 ✳ M52 — SV servo ON; M49 — HEND Return to origin complete

M113 — HOME

Command: Return to origin

2-point movement between position no. 0/no. 1

16 ✳ M51 — ALM Alarm; M52 — SV servo ON; M49 — HEND Return to origin complete; M32 — PM1

M96 — PC1

Command: Go between position no. 0/no. 1

M48 — PEND Position set; T0 — Timer 20ms

M112 — CSTR

Command: Start signal

20ms

T0 — Timer 20ms

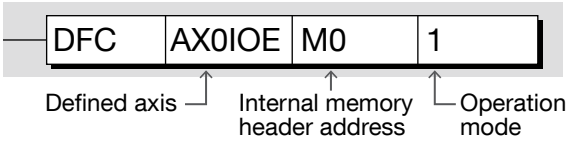
Start after 20ms
After position no. command, delay 20ms and send start signal

* Operations will work without a timer, but depending on the ladder program, use of a timer may make operation more stable.

39 END

Allocating Axis Control (DFC) Commands: Operation Mode = Positioner 1

The operation mode defines what kind of function is performed by turning on which internal relays. For example, in operation mode 1, M112 is the start signal (CSTR) for M0 internal relay header addresses.



Axis no.: 0

End position no.

Current L value	M15	M14	M13	M12	M11	M10	M9	M8	M7	M6	M5	M4	M3	M2	M1	M0
Current H value	M31	M30	M29	M28	M27	M26	M25	M24	M23	M22	M21	M20	M19	M18	M17	M16
PM	M47	M46	M45	M44	M43	M42	M41	M40	M39	M38	M37	M36	M35	M34	M33	M32
Status word	M63	M62	M61	M60	M59	M58	M57	M56	M55	M54	M53	M52	M51	M50	M49	M48
	EMGS	CRDY	Z2	Z1				MEND	ALML		PSFL	SV	ALM	MOVE	HEND	PEND

Command position no.

Target L value	M79	M78	M77	M76	M75	M74	M73	M72	M71	M70	M69	M68	M67	M66	M65	M64
Target H value	M95	M94	M93	M92	M91	M90	M89	M88	M87	M86	M85	M84	M83	M82	M81	M80
PC	M111	M110	M109	M108	M107	M106	M105	M104	M103	M102	M101	M100	M99	M98	M97	M96
Control word	M127	126	M125	M124	M123	M122	M121	M120	M119	M118	M117	M116	M115	M114	M113	M112
	BKRL							JOG+	JOG-		JISL	SON	RES	STP	HOME	CSTR

Contact point/coil		Abbv.	Name	Function
SMO		—	Always-on flag	The always-on contact point.
Input	M32	PM1	End position no.	After detecting position, set to off if position no. 0 reached or on if position no. 1 reached.
	M48	PEND	Position detect end	After movement, set to on if position detect width reached.
	M49	HEND	Origin return end	Set to on if origin return is complete.
	M51	ALM	Alarm	Set to off if controller status normal or on if alarm generated.
	M52	SV	Servo on	Set to on if servo is on.
	M62	CRDY	Controller ready	Set to on if controller preparation is complete.
Output	M96	PC1	Command position no.	If off, movement command is for position no. 0. If on, movement command is for position no. 1.
	M112	CSTR	Start signal	Set to on to begin movement to the defined command position no.
	M113	HOME	Return to origin	Set to on to conduct origin-return operation.
	M116	SON	Servo on	On: servo on; off: servo off.
TO		—	Timer	After setting command position no. (PC1), timer used to delay 20ms before turning on start signal (CSTR).

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