

# Magnescale

Display Unit

# LT80-NE

Read all the instructions in the manual carefully before use and strictly follow them.

Keep the manual for future references.

This manual corresponds to the software version 1.07.00 or later.

PLC Link Manual

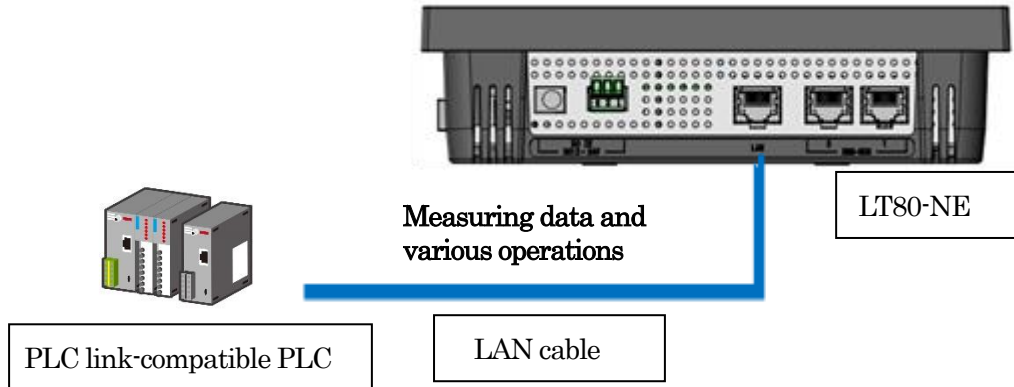
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## 1. Overview

The PLC link function is available using the general-purpose LAN port of the LT80-NE.

By establishing a PLC link connection, it is possible to send and receive data without preparing a communication program on the PLC side.



## 2. Compatible PLC

For the LT80-NE to read from and write to the PLC's memory, the PLC must support one of the following communication protocols.

Refer to the instruction manual of the PLC manufacturer to see whether the PLC to be used is compatible.

PLC manufacturer	Protocol	Transport layer	ASCII	Binary
Mitsubishi Electric Corporation	MC protocol 1E frame	TCP	○	○
		UDP	○	○
	MC protocol 3E frame	TCP	○	○
		UDP	○	○
OMRON Corporation	FINS command	TCP	-	○
		UDP	-	○
Keyence Corporation	Host-link	TCP	○	-
		UDP	○	-

### 3. Communication Specifications

The LT80-NE provides access to the arbitrarily set starting addresses of the operation flag area, the display parameter area, the measuring data area, and the commands area.

#### 3-1. Operation flag area (for one unit)

The operation flag area is used for operations such as reset and display changes for the LT80-NE.

Offset	Data name	Description
0x0000	Update display parameter	bit0-15: Set the bits corresponding to each frame number to 1.
0x0001	Reset	bit0-15: Set the bits corresponding to each frame number to 1.
0x0002	Recall preset	bit0-15: Set the bits corresponding to each frame number to 1.
0x0003	Start	bit0-15: Set the bits corresponding to each frame number to 1.
0x0004	Load reference point	bit0-15: Set the bits corresponding to each frame number to 1.
0x0005	Pause	bit0-15: Set the bits corresponding to each frame number to 1.
0x0006	Latch start	bit0: Start, bit1: Stop
0x0007	Cache data trigger	When bit0 is set to 1, the data of all units is cached. When bit15 is set to 1, the data cache is cleared.
0x0008	Request measuring data	When bit0 is set to 1, the data of this unit is sent.
0x0009	Request command execution	When bit0 is set to 1, the commands area command is executed.
0x000A	Update display parameter complete	The update display parameter area value is stored here when the processing is complete.
0x000B	Reset complete	The reset area value is stored here when the processing is complete.
0x000C	Recall preset complete	The recall preset area value is stored here when the processing is complete.
0x000D	Start complete	The start area value is stored here when the processing is complete.
0x000E	Load reference point complete	The load reference point area value is stored here when the processing is complete.
0x000F	Latch start complete	The latch start value is stored here when the processing is complete.
0x0010	Cache data complete	The cache data trigger value is stored here when the processing is complete.
0x0011	Transmit measuring data complete	The request measuring data area value is stored here when the processing is complete.
0x0012	Execute command complete	The request command execution area value is stored here when the processing is complete.

Offset	Data name	Description
0x0013	Latch status	The operating status of the latch module is stored here. bit0-7: 0x00 → Stop, 0x01 → Operating, 0x0F → Alarm bit8-15: 0x00 → Internal, 0x01 → Encoder 0x02 → Encoder (High-speed)
0x0014	Number of cache data	The number of recorded cache data is stored here. (Unsigned integer type: 0 to 300000)
0x0015		
0x0016	Command execution return value*	The execution result of the last completed command is stored here.

\* The command execution return values are as follows.

0x0000: Successful completion

0x0101: The search data does not exist.

0x0201: An undefined command was specified.

An encoder reference command was specified in internal latch mode.

0x0401: The data to be transferred includes data outside the data cache range.

0x0801: The transfer data contains an error.

### 3-2. Display parameter area (for one frame)

The display parameter area is used to switch the display on the measurement display screen.

It is divided into areas for each measurement frame.

Offset	Data name	Description
0x0000	Comparator set number	The comparator set number (1 to 8) is stored here.
0x0001	Output value mode	0: Current value, 1: Maximum value, 2: Minimum value, 3: Peak-to-peak value
0x0002	Display resolution (change prohibited*)	1: 0.1 $\mu\text{m}$ 2: 0.5 $\mu\text{m}$ 3: 1 $\mu\text{m}$ 4: 2 $\mu\text{m}$ 5: 5 $\mu\text{m}$ 6: 10 $\mu\text{m}$

\* This data is applied when the operation flag display parameters are updated.

### 3-3. Measuring data area (for one unit)

The measuring data area is the area where the measuring data is written. The measuring data is written when Request measuring data in the operation flag area is executed.

Also, in the Cache data acquisition command of the commands area described hereafter, the starting device address of the measuring data is specified in the command, but the data structure is the same. When there are multiple measuring data, this data structure is written multiple times. When there are multiple data, the data is padded with 0 so that the cache index noted below is an even address.

Offset	Data name	Description
0x0000	Cache index	Cache index number (Unsigned integer type: 1 to 300000)
0x0001		
0x0002	Latch count	Angle: 0.0001° unit integer value Position: 0.0001 mm unit integer value
0x0003		
0x0004	Measurement result A (*1)	Frame measuring data Integer value of display resolution unit (*3)
0x0005		
0x0006	Measurement result B (*1)	
0x0007		
:	:	
0x0022	Measurement result P (*1)	
0x0023		
0x0024	Comparator judgment result A (*1, *2)	0 to 4: Comparator result 0x000F: Alarm
0x0025		
:	:	
0x0033	Comparator judgment result P (*1, *2)	

(\*1) The results only for the number of display frames are stored left-justified.

(\*2) The comparator results are not stored in Encoder (High-speed) mode.

(\*3) The display resolution of each frame is set on the following screen.

Main menu → Measuring menu → Display frame settings

M1 Frame	Valid	Axis1	Ope.	Axis2	Mode	Disp. Resolution (mm)	Scaling	Preset
A	✓	1	+	--	REAL	0.1µm	1.000000	NaN
B	✓	2	+	--	REAL	0.1µm	1.000000	NaN
C	✓	3	+	--	REAL	0.1µm	1.000000	NaN
D	✓	4	+	--	REAL	0.1µm	1.000000	NaN
E	✓	5	+	--	REAL	0.1µm	1.000000	NaN
F	✓	6	+	--	REAL	0.1µm	1.000000	NaN
G	✓	7	+	--	REAL	0.1µm	1.000000	NaN
H	✓	8	+	--	REAL	0.1µm	1.000000	NaN

The table below shows the correspondence between the display resolution and the setting unit.

Display resolution	Setting unit
0.1 µm	0.1 µm unit
0.5 µm	0.1 µm unit
1 µm	1 µm unit
2 µm	1 µm unit
5 µm	1 µm unit
10 µm	10 µm unit

### 3-4. Commands area

The commands area is the area where the commands are stored. Once the command has been stored, the Cache data acquisition command can be executed by executing Request command execution in the operation flag area.

Offset	Data name
0x0000	Command code
0x0001	Command parameter 1
0x0002	Command parameter 2
0x0003	Command parameter 3
0x0004	Command parameter 4
0x0005	Command parameter 5
0x0006	Command parameter 6
0x0007	Command parameter 7
0x0008	Command parameter 8
0x0009	Command parameter 9
0x000A	Command parameter 10
0x000B	Command parameter 11
0x000C	Command parameter 12
0x000D	Command parameter 13
0x000E	Command parameter 14
0x000F	Command parameter 15



- Cache data acquisition command (displacement reference)

This command can acquire data that has a target frame near the reference value from among the cached data.

Offset	Data name	Description
0x0000	Command code	0x0101
0x0001	Command parameter 1	Target frame Specify with 0, 1, 2, ..., 15 in order of frame A, B, C, ..., P.
0x0002	Command parameter 2	Search start index (Unsigned integer value: 1 to 300000)
0x0003	Command parameter 3	
0x0004	Command parameter 4	Reference value
0x0005	Command parameter 5	Integer value of display resolution unit
0x0006	Command parameter 6	Number of near data (forward)
0x0007	Command parameter 7	Number of near data (backward)
0x0008	Command parameter 8	Device address
0x0009	Command parameter 9	
0x000A	Command parameter 10	Device type
0x000B	Command parameter 11	Search direction (0: Backward, 1: Forward)
0x000C	Command parameter 12	Reserved
0x000D	Command parameter 13	
0x000E	Command parameter 14	
0x000F	Command parameter 15	

\* How to specify the device type is described hereafter.

\* Search results are stored left-justified with the specified device address first in order from the smallest cache index.

- Cache data acquisition command (latch count reference)

This command can acquire data that has a latch count near the reference value from among the cached data.

Offset	Data name	Description
0x0000	Command code	0x0102
0x0001	Command parameter 1	Reserved
0x0002	Command parameter 2	Search start index
0x0003	Command parameter 3	(Unsigned integer value: 1 to 300000)
0x0004	Command parameter 4	Reference value
0x0005	Command parameter 5	Angle: 0.0001° unit integer value Position: 0.0001 mm unit integer value
0x0006	Command parameter 6	Number of near data (forward)
0x0007	Command parameter 7	Number of near data (backward)
0x0008	Command parameter 8	Device address
0x0009	Command parameter 9	
0x000A	Command parameter 10	Device type
0x000B	Command parameter 11	Search direction (0: Backward, 1: Forward)
0x000C	Command parameter 12	Reserved
0x000D	Command parameter 13	
0x000E	Command parameter 14	
0x000F	Command parameter 15	

\* How to specify the device type is described hereafter.

\* Search results are stored left-justified with the specified device address first in order from the smallest cache index.

- Cache data acquisition command (index reference)

This command can acquire data from among the cached data by specifying the cache index.

Offset	Data name	Description
0x0000	Command code	0x0103
0x0001	Command parameter 1	Reserved
0x0002	Command parameter 2	Search start index (Unsigned integer value: 1 to 300000)
0x0003	Command parameter 3	
0x0004	Command parameter 4	Reserved
0x0005	Command parameter 5	
0x0006	Command parameter 6	
0x0007	Command parameter 7	Number of near data (backward)
0x0008	Command parameter 8	Device address
0x0009	Command parameter 9	
0x000A	Command parameter 10	Device type
0x000B	Command parameter 11	Reserved
0x000C	Command parameter 12	
0x000D	Command parameter 13	
0x000E	Command parameter 14	
0x000F	Command parameter 15	

\* How to specify the device type is described hereafter.

\* Search results are stored left-justified with the specified device address first in order from the smallest cache index.

#### How to specify the device type

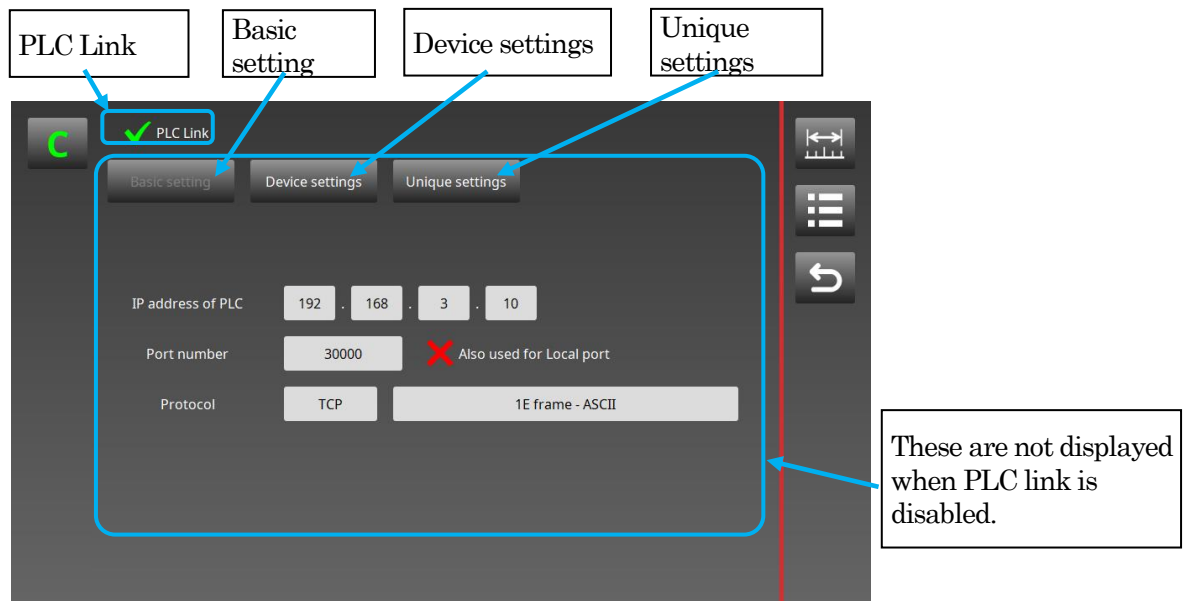
Protocol	Device	Setting value
1E frame - ASCII	D	0x4420
1E frame - Binary	D	0x4420
3E frame (Q/L) - ASCII	D	0x2A44
3E frame (Q/L) - Binary	D	0x00A8
3E frame (iQ-R) - ASCII	D	0x2A44
3E frame (iQ-R) - Binary	D	0x00A8
FINS command	D	0x0082
Host-link	DM	0x4D44

## 4. PLC Link Settings Screen

This is used to make the PLC Link settings.

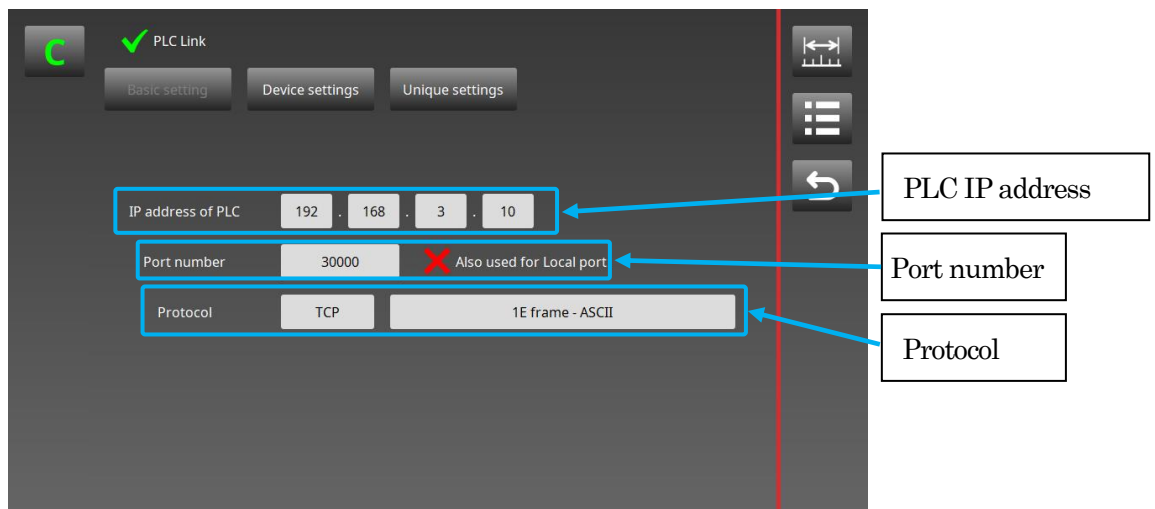
Follow the procedure below and make the settings.

Main menu → System settings → PLC Link settings



- PLC Link  
To enable PLC link, set “✓” in the check box.  
\* The PLC Link setting becomes valid the next time the power is turned on after making the setting.
- Basic setting  
Transitions to the PLC Link - Basic setting screen.
- Device settings  
Transitions to the PLC Link - Device settings screen.
- Unique settings  
Transitions to the PLC Link - Unique settings screen.

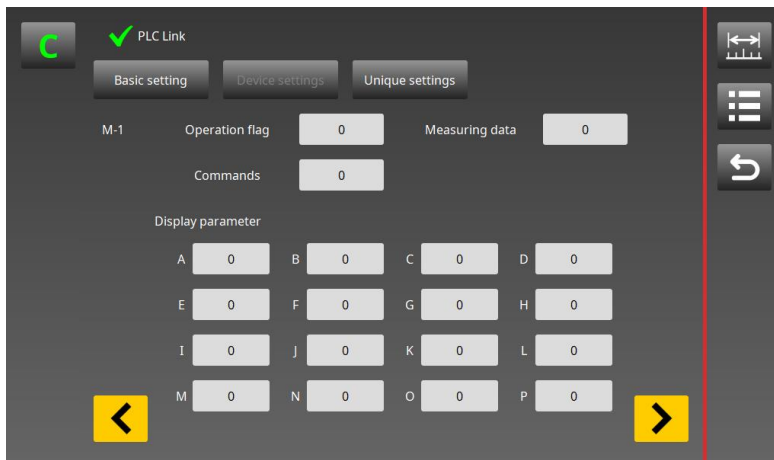
#### 4-1. Basic setting screen



- **IP address of PLC**  
Sets the IP address of the PLC to be connected by PLC link.
- **Port number**  
Sets the port number on the PLC side.  
20000, 21000, 21001 and 22000 are prohibited.  
When “✓” is set in “Also used for local port,” the LT80-NE side also uses the same port number.
- **Protocol**  
Selects the transport layer protocol from the two types, “TCP” or “UDP.”  
Selects the protocol from the following eight options.

Protocol
1E frame - ASCII
1E frame - Binary
3E frame (Q/L) - ASCII
3E frame (Q/L) - Binary
3E frame (iQ-R) - ASCII
3E frame (iQ-R) - Binary
FINS command
Host-link

## 4-2. Device settings screen



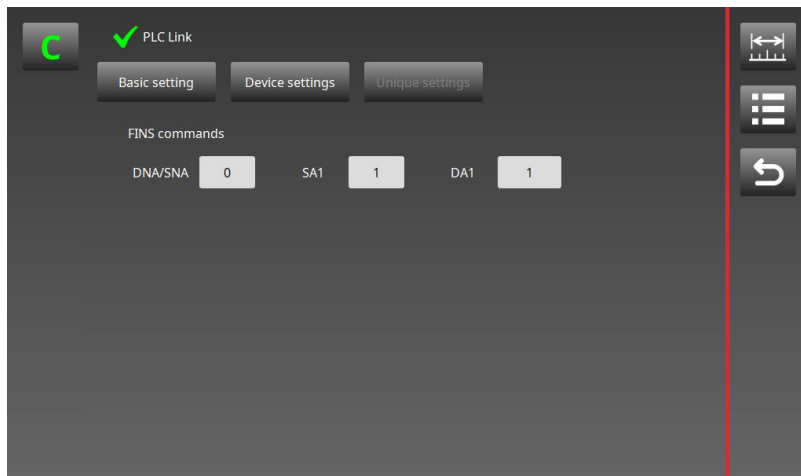
This is used to set the starting addresses of the operation flag area, the measuring data area, the commands area, and the display parameter area.

Each area uses the data registers (D) and data memory (DM) of the PLC. Set addresses that can be used by the PLC.

For the data structure of each area, refer to “3. Communication Specifications.”

- Operation flag  
Sets the starting address of the operation flag area.
- Measuring data  
Sets the starting address of the measuring data area.
- Command  
Sets the starting address of the commands area.
- Display parameter  
Sets the display parameter area for each frame.

#### 4-3. Unique settings screen



These settings must be made only when “FINS command” is selected by the Protocol setting on the Basic setting screen.

For details of the settings, refer to the PLC manual of OMRON Corporation.

- DNA/SNA

Set the destination FINS network address.

The PLC and LT80-NE must be on the same network.

If there is only one network on the PLC side, this is usually set to 0.

- SA1

Set the source FINS node address.

For UDP, set the low-order byte of the IP address of the LT80-NE.

For TCP, no setting is required.

- DA1

Set the destination FINS node address.

For UDP, set the node address of the PLC.

For TCP, no setting is required.

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