P10995-100

HLS Family

HLS-39USB

DATA SHEET

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HLS (MKY39-1) USB Unit

HLS-39USB Data Sheet

The HLS-39USB, featuring the MKY39-1, the center IC of Hi-speed Link System (HLS), is designed to control the HLS through USB communication.
A Windows driver and library are available to facilitate HLS operation by a PC.

Descriptions in this document assume that you have already read the following documents. Please carefully read them in advance.

- HLS Introduction Guide
- HLS Technical Guide
- MKY36 User's Manual
- MKY39-1 / MKY39-2 Data Sheet
- MKY39-1 / MKY39-2 Reference Manual

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2 MKY36-compatible mode

1 General description

1.1 Hardware specifications

Table 1.1 Specifications list

Category		Item	Value	Note
Product		Name	HLS USB unit	
		Type number	HLS-39USB	
		External dimensions	W30 × H100 × D85 mm	DIN rail mounting available
		Weight	130 g	
Power supply rating	(1)	Supply voltage	5 V DC ±5%	USB bus powered (via Type-C connector)
		Current consumption	160 mA or less	
	(2)	Supply voltage	24 V DC ±10%	Supplied through terminal block (M3 screws). 24 V is used if both (1) and (2) are provided.
		Current consumption	50 mA or less	
Environmental rating		Operating temperature	0 to 40°C	
		Operating humidity	30 to 85%	No condensation
		Storage temperature	0 to 60°C	
		Storage humidity	15 to 90%	No condensation
USB		Connector	Type-C	
		Vendor ID	0x203C	StepTechnica
		Product ID	0x3901	Normal mode
			0x3603	MKY36-compatible mode
		Communication method	CDC by virtual COM port	Phase 1
HLS		Connector	RJ45, two pieces	
		Device	MKY39-1	
		Transmission mode	Full-duplex / Half-duplex	
		Baud rate	12 M / 6 M / 3 M bps	Managed by selecting BCR from software, including SA and OWN.
Setting mechanism		Setting switch	8 positions	Selecting the unit ID and MKY36-compatible mode
		Transmission mode switch	Single pole	Switching between the full-duplex mode and the half-duplex mode
		Termination resistor switch	Single pole	
Indicators		LED	PWR	Green
			SCAN	Green
			CHK1	Orange
			CHK2	Red
Accessories		None		Please prepare a USB cable.

1.2 Function description

The HLS-39USB is used to connect a PC to HLS (Hi-speed Link System) network.

Users can use the MKY39-1 functions easily for evaluation purposes when building an HLS system and for development of satellites, by accessing Windows driver and library supplied separately by StepTechnica.

The MKY36-compatible mode is available so that the environment used with the HLS-36USB can be transferred to this product for continuous use.



Certain functions are no longer supported by HLS-39USB. For details, refer to "2 MKY36-compatible mode".

1.3 Block diagram

The HLS-39USB is assembled with multiple boards.

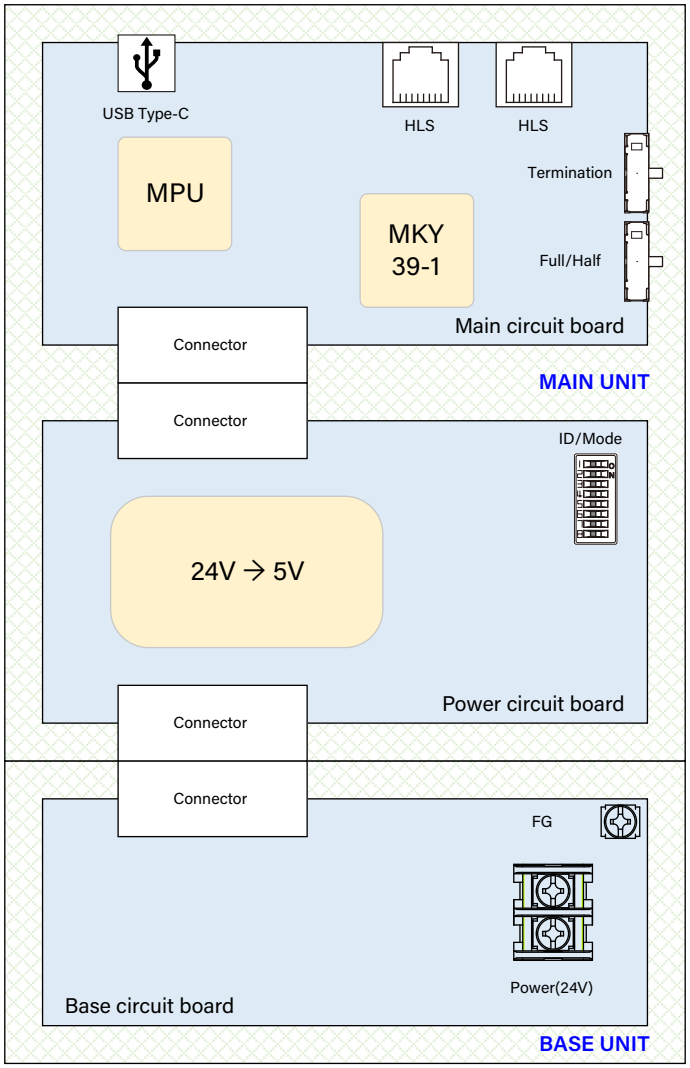


Fig. 1.1 Block diagram

Caution

Please DO NOT detach circuit boards on the main unit from the housing, though the base unit and the main unit can be separated.
Please also take precautions to protect the electronic components from damage caused by electrostatic discharge when touching the internal circuit boards.

1.4 Connectors

1.4.1 HLS communication connector

Two RJ45 connectors are provided for HLS communication.
Both have the same pin assignments as shown in Table 1.2.

Table 1.2 HLS communication connector pin assignment

Pos	ID	Function	
		Full-duplex mode	Half-duplex mode
1	N.C.	Not used	
2	N.C.	Not used	
3	N.C.	Paired transmission signal, receiving, non-inverted	Not used
4	TRX–	Paired transmission signal, sending, inverted	Paired transmission signal, sending/receiving, inverted
5	TRX+	Paired transmission signal, sending, non-inverted	Paired transmission signal, sending/receiving, non-inverted
6	N.C.	Paired transmission signal, receiving, inverted	Not used
7	N.C.	Not used	
8	FG	Frame ground	



With the termination resistor turned on, the HLS-39USB unit is set to terminate the transmission line. Connect a cable to one of the connectors and leave the other open.
If it is not at the termination point, turn off the termination resistor and connect cables to both connectors.

1.4.2 USB connector

The HLS-39USB is connected to a PC through USB. It is equipped with a Type-C connector. It can be used not only for USB communication but also for driving the unit by supplying 5 V power.

Table 1.3 USB communication connector pin assignment

Pos		ID	Function
A1	B1	GND	GND (power supply 0 V)
A2	B2	N.C.	Not used
A3	B3	N.C.	Not used
A4	B4	VBUS–	VBUS (power supply 5 V)
A5	B5	CC	Internally pulled down
A6	B6	DP	USB communication differential signal, non-inverted
A7	B7	DN	USB communication differential signal, inverted
A8	B8	SBU	Internally pulled down
A9	B9	VBUS	VBUS (power supply 5 V)
A10	B10	N.C.	Not used
A11	B11	N.C.	Not used
A12	B12	GND	GND (power supply 0 V)

1.4.3 24 V input power supply terminal block

A terminal block (M3) is equipped on the base circuit board to connect 24 V power supply.

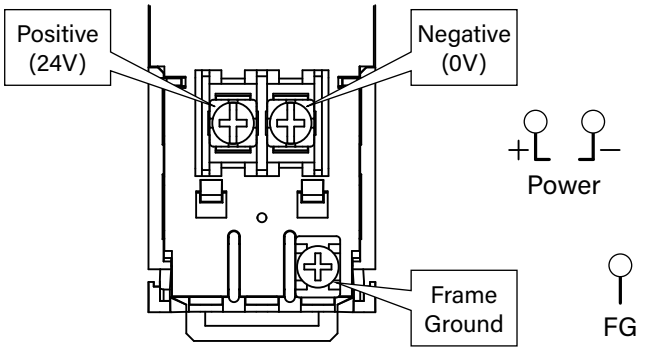


Fig. 1.2 24 V input power supply terminal block

Table 1.4 Power supply terminal assignment

Pos	Function
+24	Power supply (positive = 24 V)
0V	Power supply (negative = 0 V)
FG	Frame ground

Caution

While 24 V power is supplied at the terminal block, 5 V power supply through VBUS of the USB connector is not used. This means that HLS communication continues even after the USB cable is removed.

■ Removing the main unit

The main unit must be removed to access the base circuit board for wiring.
Detach the main unit following the next steps and proceed to wiring.

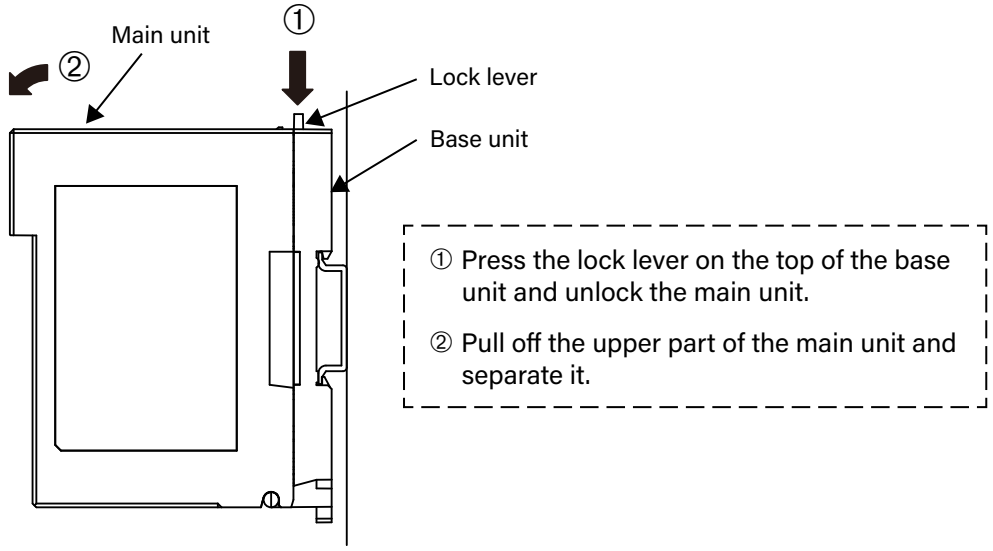


Fig. 1.3 Removing the main unit

■ Installing the main unit

Once the wiring to the terminal block is finished, attach the main unit following the next steps.

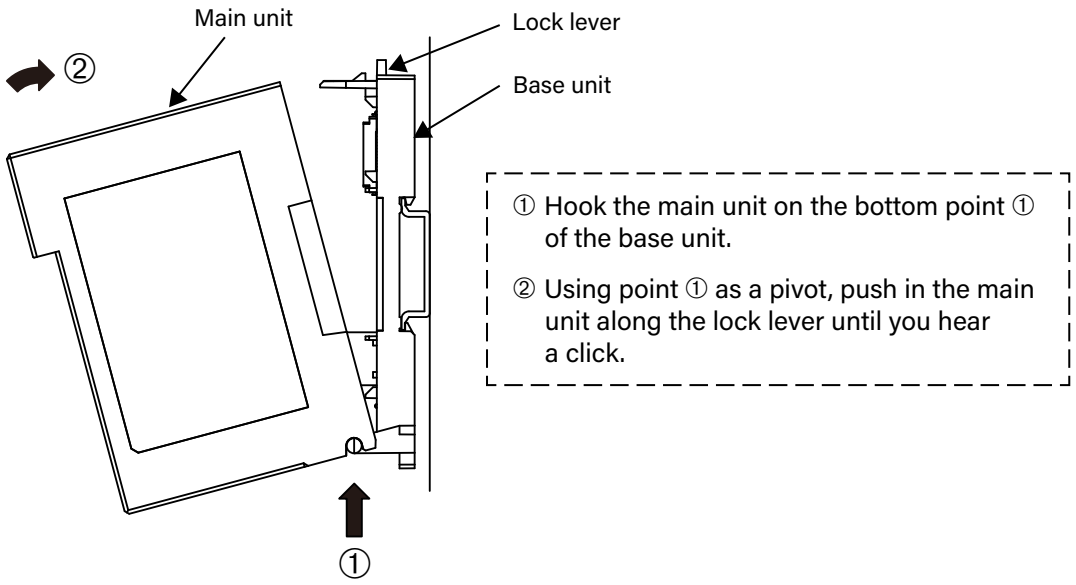


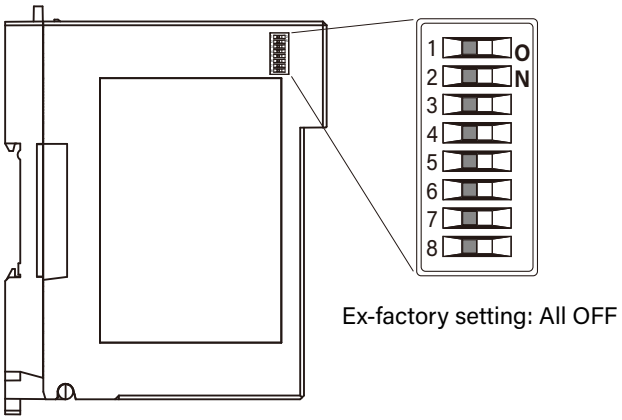
Fig. 1.4 Installing the main unit

1.5 Setting switches

Caution Switches are small electronic components. Use a soft-tipped plastic screwdriver or similar tool when operating them. Metal screwdrivers may damage them.

1.5.1 Setting switch (8-position)

The switch is used to select ID numbers for identification of multiple units connected to single PC, and to enable MKY36-compatible mode.



Ex-factory setting: All OFF

Table 1.5 Setting switch functions

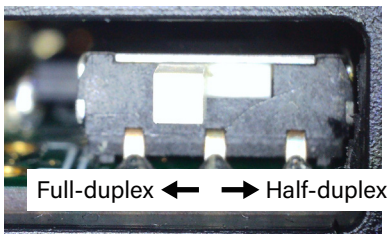
Pos	ID	Function
1	ID0	ID number setting Each of four units identified by ID = 0 through 3 (2 bits)
2	ID1	
3	N.C.	Not used
4	Mode	MKY36-compatible mode at ON
5	N.C.	Not used
6	N.C.	Not used
7	N.C.	Not used
8	N.C.	Not used

Leave the unused switch positions at OFF.

Caution Operate the switch while the power supply is off.
The switch state is read only at the startup of power supply.

1.5.2 Transmission mode switch

The switch selects either the full-duplex or the half-duplex mode for HLS communication.

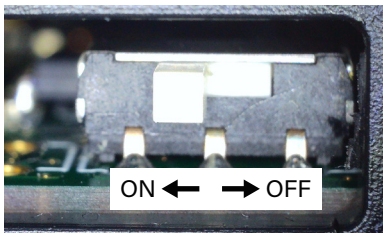


Ex-factory setting: Full-duplex

Caution Make sure that the transmission mode selected by the switch matches the BCR setting of the MKY39-1.

1.5.3 Termination switch

The switch enables or disables the termination resistor for HLS communication.
Turn on the switch to enable the resistor, and off to disable it.



Ex-factory setting: ON

1.6 LED indicators

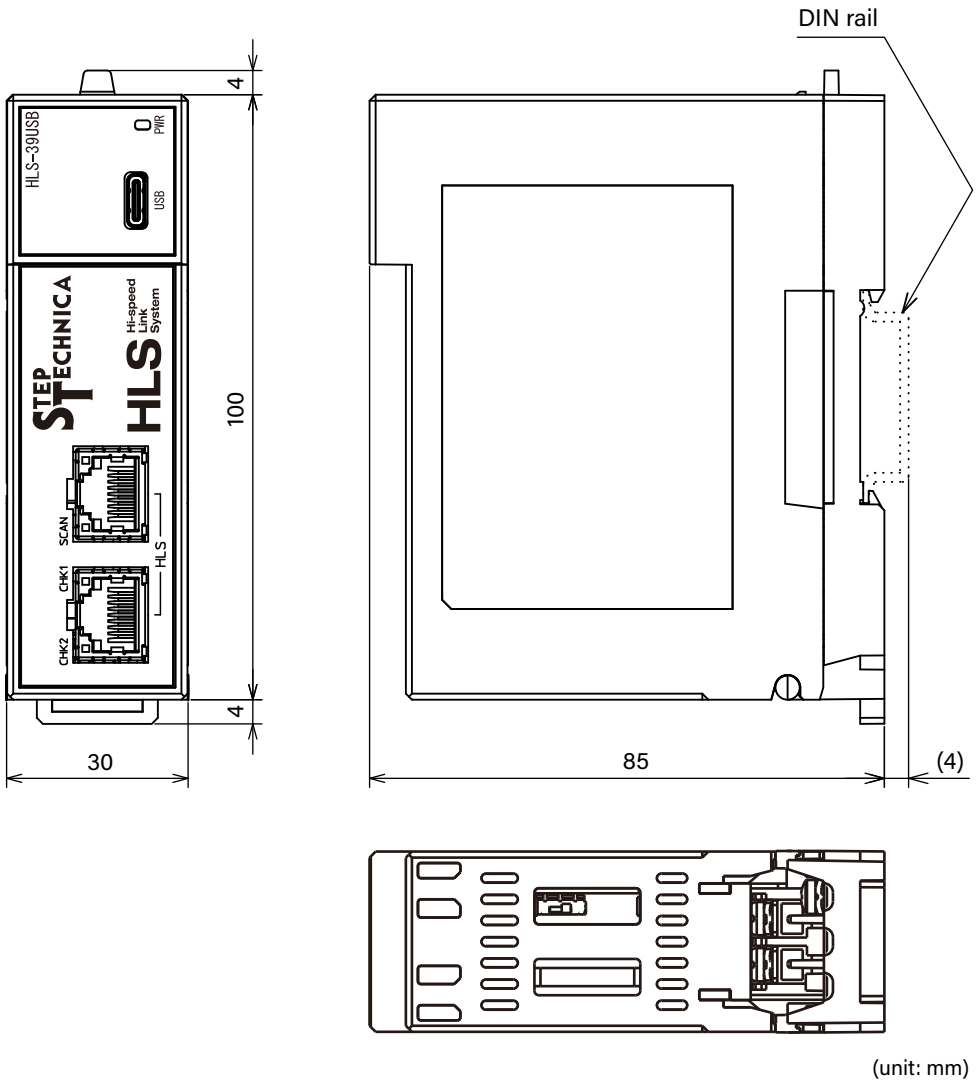
The LEDs' functions are as shown in the following table.

Table 1.6 LED functions

ID	Function
PWR	Startup state ON: Startup complete Fast flashing: Startup in progress Slow flashing: Internal memory error
SCAN	HLS SCAN signal (MKY39-1 output) The light is on while communication with other satellites is established.
CHK1	HLS CHK1 signal (MKY39-1 output) The light turns on when the response from a satellite is lost.
CHK2	HLS CHK2 signal (MKY39-1 output) The light turns on when the response from a satellite is lost three consecutive times.

1.7 External dimensions

Refer to the following drawing for external dimensions.



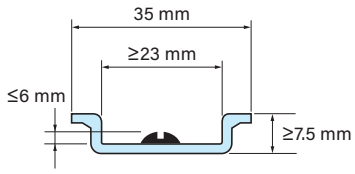
(unit: mm)

Fig. 1.5 External dimensions

1.8 Installing the unit on DIN rail

The unit can be mounted on a DIN rail.
Read the following points of caution and install the unit correctly.

- Turn off the power supply to the unit when mounting/removing the unit.
- Adaptable DIN rail type: Top Hat Rail, TH35 (IEC 60715:1981+A1:1995)



Width	: 35 mm
Height	: 7.5 mm or more
"Hat" width	: 23 mm or more
Screw head height	: 6 mm or less

(7.5 mm high rail)

- Install a DIN rail horizontally.
- Position the unit with its USB connector at the upper side as shown in the external dimensions drawing.
- A space to tilt slightly the unit is needed for mounting or removing it.
- Leave at least 50 mm above and below the unit for power supply wiring and for heat dissipation.

■ Mounting on DIN rail

1. Pull down the lock lever on the base unit.
   (The spring-loaded lever is stopped and fixed at the lowest position when it is pulled down in the direction of the arrow.)
2. Hook the point ② of the base unit on the upper side of DIN rail.
3. Using point ② as a pivot, push in the lower part of the base unit.
4. Push up the lock lever of the base unit.

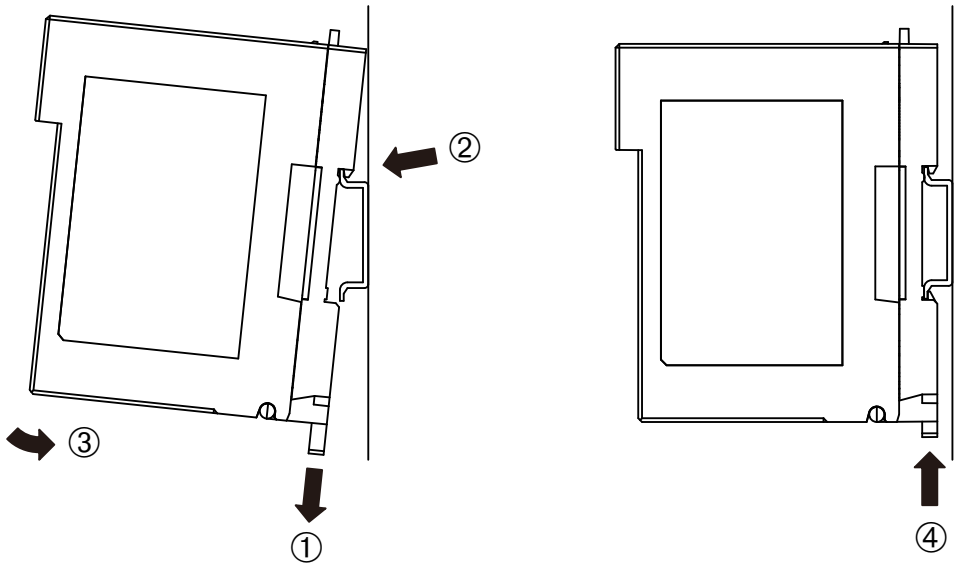


Fig. 1.6 Mounting on DIN rail

■ Removing from DIN rail

1. Insert the tip of a minus screwdriver to the lock lever of the base unit and pull it down until it stops.
2. Pull off the lower part of the unit to remove it.

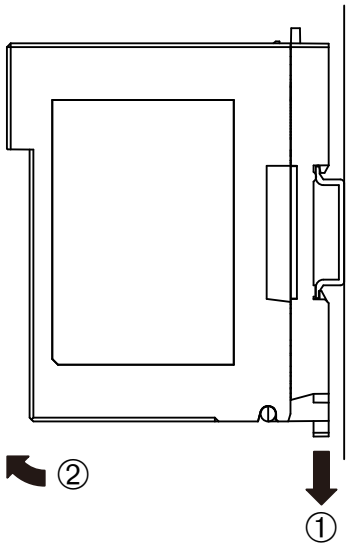


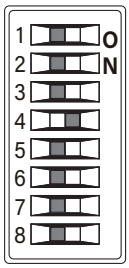
Fig. 1.7 Removing from DIN rail

2 MKY36-compatible mode

The HLS-39USB is equipped with the HLS IC MKY39-1, while the MKY36 was used for the HLS-36USB.
If you replace the HLS-36USB with the HLS-39USB, it is necessary to reinstall the driver and library, and to change control register addresses. (Refer to [**HLS-39USB Reference Manual**] and [**MKY39-1 / MKY39-2 Reference Manual**] for details of registers.)

The MKY36-compatible mode does not guarantee complete compatibility with all applications. However, it can function as MKY36 at least for basic I/O control operations. It can be used with applications such as HLSeditor and ASSIST-HLS.

Set the fourth position of setting switch (8-position) to ON and turn on the power supply to apply the MKY36-compatible mode.



Set the fourth position to ON
(Positions 1 and 2 for unit ID setting)

Caution The mode is unchanged if the switch is operated while the power supply is on.

Refer to [**HLS-39USB Reference Manual**] for details of compatibility.

Revision History

Version No.	Date	Page	Contents
100	November 2026	---	Issued the first edition

Note

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