

## HLS High Speed Link System for FA Machinery Control Model R7F4DH HLS Remote I/O Module

- Compact, all-in-one package
- 16 discrete inputs or outputs and 8 discrete I/O modules selectable
- Easy-to-wire connection typically used for machinery control:
  - Mini-clamp (e-CON) connector
  - MIL connector
  - Spring cage (tension clamp) type terminal



### HLS OPEN FIELD NETWORK DEDICATED FOR MACHINERY CONTROL SYSTEMS

HLS, High Speed Link System, is an FA control network complying with SEMI Standard E54.17, proposed by StepTechnica Co., Ltd.

One master can connect to the maximum of 63 slave modules and control at the maximum of 2016 discrete I/O signals within 1 millisecond. Input data at each slave node is copied cyclically to the master's internal memory, and output data stored at the master is copied in turn to the slaves' memory, thus the network realizes continuous ultra-high speed communication with high reliability, ideal for machinery control applications.

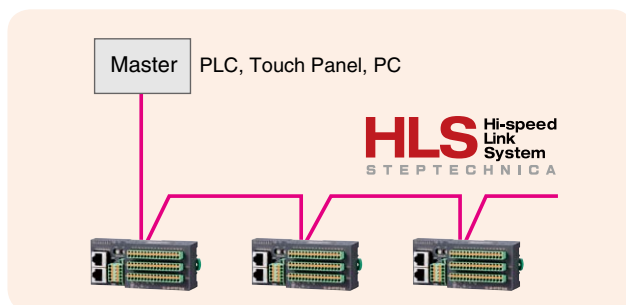
### HLS REMOTE I/O MODULES WITH VARIETY OF CONNECTING STYLES

The R7F4DH, M-System's remote I/O module for HLS network, is designed specifically for installation in control panels for FA machinery, featuring its compact and shallow depth package, flexibility in mounting both vertically or horizontally on wall or DIN rail.

Three connection styles, "mini-clamp" connector standardized by various Japanese/Asian FA sensor vendors, MIL connector for high reliability demands, and "spring cage" terminal with fast wiring, are selectable.

MINI-CLAMP CONNECTOR	MIL CONNECTOR	SPRING CAGE TERMINAL
<p><b>R7F4DH-1</b></p>  <p>Easy, quick and reliable IDC termination using standard pliers (e-CON compliant)</p>	<p><b>R7F4DH-2, R7F4DH-3</b></p>  <p>MIL standard connector for flat cables</p>	<p><b>R7F4DH-4</b></p>  <p>Quick push-in bridging system using a standard minus screwdriver; Pluggable terminal block</p>

### Ultra High Speed and Long Distance Transmission



#### ■ Response time at full-duplex mode

	12 Mbps	6 Mbps	3 Mbps
4 nodes	60.7 $\mu$ s	121.4 $\mu$ s	242.7 $\mu$ s
8 nodes	121.4 $\mu$ s	242.7 $\mu$ s	485.4 $\mu$ s
16 nodes	242.7 $\mu$ s	485.4 $\mu$ s	960.7 $\mu$ s
32 nodes	485.4 $\mu$ s	960.7 $\mu$ s	1.942 ms
63 nodes	955.5 $\mu$ s	1.911 ms	3.822 ms

#### ■ Transmission distance

	12 Mbps	6 Mbps	3 Mbps
100 m (328 ft)	200 m (656 ft)	300 m (984 ft)	

## AVAILABLE I/O TYPES & POINTS

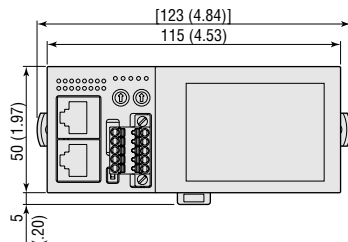
Model No. R7F4DH-X-	NPN Input	PNP Input	NPN Output	PNP Output
DA16A	16	---	---	---
DA16B	---	16	---	---
DC16A	---	---	16	---
DC16B	---	---	---	16
DAC16A	---	8	8	---
DAC16B	8	---	---	8
DAC16C	8	---	8	---
DAC16D	---	8	---	8

## COMMON SPECIFICATIONS

Power input	24 Vdc $\pm$ 10%, ripple 10% p-p max.
Power input connection	TFMC 1,5/5-STF-3,5 (Phoenix Contact)
Dielectric strength	1500 Vac @ 1 minute between isolated circuits
Insulation resistance	$\geq$ 100 M $\Omega$ with 500 Vdc
Operating temperature	-10 to +55°C (14 to 131°F)
Operating humidity	30 to 90% RH (non-condensing)
Mounting	DIN rail (35 mm wide) or wall
Communication mode	Full-duplex or half-duplex
Terminating resistor	Built-in (Selected with the DIP SW)
Network connection	RJ-45 connector
Network cable	Full-duplex: ZHY262PS, ZHT262PS Half-duplex: ZHY221PS

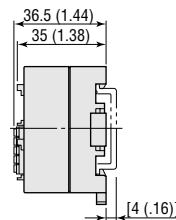
## EXTERNAL DIMENSIONS unit: mm (inch)

FRONT VIEW

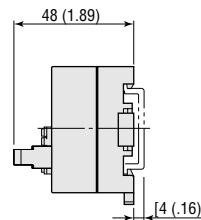


SIDE VIEW

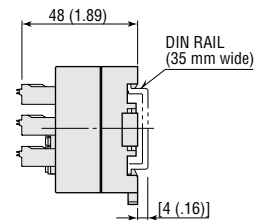
• e-CON Connector



• MIL Connector



• Spring Cage Terminal



## I/O CONNECTION

e-CON connector	3M Mini-Clamp plug 37104-XXXX-000FL (recommended)
MIL connector	OMRON MIL socket XG4M-2030 (recommended)
Spring cage terminal	Phoenix Contact terminal block FMC1,5/16-ST-3,5 (provided)

## INPUT SPECIFICATIONS

ON voltage / current	$\geq$ 15 Vdc / $\geq$ 3.5 mA
OFF voltage / current	$\leq$ 5 Vdc / $\leq$ 1 mA
ON delay	$\leq$ 0.5 msec.
OFF delay	$\leq$ 0.5 msec.

## OUTPUT SPECIFICATIONS

Rated output current	0.1 A per point, 1.6 A per common (16-point output) 0.1 A per point, 0.8 A per common (8-point output)
Residual voltage	$\leq$ 1.2 V
ON delay	$\leq$ 0.5 msec.
OFF delay	$\leq$ 0.5 msec.
Overload current protection	Current limited when overcurrent is detected
Overheat protection	Output turned off when overheat is detected

## Advantages of Using HLS

- **Ultra-high speed response realizes high performance control**

Constant and stable communication is ensured thanks to the constant-cycle scanning method. A data sample in error is simply rejected without retries by the master until a correct data is obtained in the next cycle.

- **High noise immunity by automatic waveform correction function**
- **Long distance transmission without losing the overall speed**

Waveforms distorted by noise or long distance are automatically reconstructed, and data checking is performed simultaneously to ensure the data accuracy.

- **Built-in protocol enables simple program development**

Communication protocol is built into the network ICs, thus eliminating a need for the user to develop the application software from scratch.

## HLS Application Examples

- **Semiconductor manufacturing equipment: laser drilling machine, exposure machine, coater/developer, wafer cleaning system, wafer testing system, PV (solar cell), UV (coating, curing) equipment**
- **Injection molding machines**
- **Large printers**
- **Welding machines**
- **NC machine tools**
- **Telemetering and data logging system for manufacturing systems, building management systems**

Your local representative: