

## Remote I/O R7G4H Series

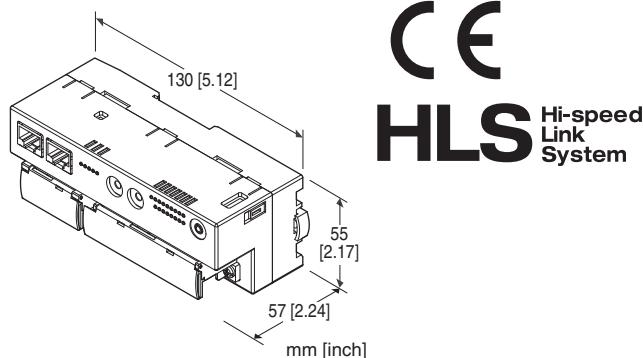
### HI-SPEED LINK SYSTEM I/O MODULE

(HLS-compatible, high-speed DC voltage/current input, 4 points, isolated, screw terminal block)

#### Functions & Features

- High-speed DC voltage/current input via HLS
- Easy parameter setting of individual channels with the configurator software

HLS is the abbreviation for “Hi-speed Link System” of Step Technica Co., Ltd.



## MODEL: R7G4HH-A-SVF4-R[1]

### ORDERING INFORMATION

- Code number: R7G4HH-A-SVF4-R[1]
- Specify a code from below for [1].  
(e.g. R7G4HH-A-SVF4-R/H/E/Q)
- Specify the specification for option code /Q  
(e.g. /C01/SET)

### TERMINAL BLOCK

- A: Screw terminal block for power supply
- RJ-45 Modular jack for communication
- Screw terminal block for I/O

### I/O TYPE

**SVF4:** DC voltage /current input (10 V/20 mA), high-speed, 4 points

### POWER INPUT

DC power  
**R:** 24 V DC  
 (Operational voltage range:  $\pm 10\%$ ; ripple 10 %p-p max.)

### [1] OPTIONS (multiple selections)

- Communication Mode
- blank:** Full-duplex
- /H:** Half-duplex
- Communication Connector Pin Assignment
- Blank:** 3, 4 - 5, 6 pair wiring  
(The HLS related device standard pin assignment)
- /E:** 4, 5 - 3, 6 pair wiring (Ethernet cable pin assignment)
- Other Options
- blank:** none
- /Q:** Option other than the above (specify the specification)

### SPECIFICATIONS OF OPTION: Q (multiple selections)

- COATING (For the detail, refer to our web site.)
- /C01:** Silicone coating
- /C02:** Polyurethane coating
- /C03:** Rubber coating
- EX-FACTORY SETTING
- /SET:** Preset according to the Ordering Information Sheet  
(No. ESU-7777-SVF4)

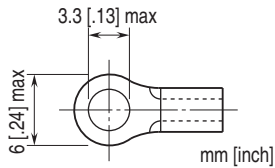
### RELATED PRODUCTS

- PC configurator software (model: R7CFG)
- Downloadable at our web site.  
 A dedicated cable is required to connect the module to the PC. Please refer to the internet software download site or the users manual for the PC configurator for applicable cable types.

### GENERAL SPECIFICATIONS

- Connection**
- HLS:** RJ-45 Modular Jack
- Power input, input:** M3 separable screw terminals  
(torque 0.5 N·m)
- Screw terminal material:** Nickel-plated steel
- Solderless terminal:** Refer to the drawing at the end of the section.
- Recommended manufacturer:** Japan Solderless Terminal MFG.Co.Ltd, Nichifu Co.,Ltd
- Applicable wire size:** 0.25 to 1.65 mm<sup>2</sup> (AWG 22 to 16)
- Housing material:** Flame-resistant resin (gray)
- Isolation:** Input 0 to input 1 to input 2 to input 3 to HLS or FE to power
- Input bias adjustment:** Configurable via R7CFG
- Input gain adjustment:** Configurable via R7CFG
- Input range:** Selectable with the DIP SW on the top of the unit or configurable via R7CFG
- Number of times of averaging:** Configurable via R7CFG
- Status indicator LEDs:** PWR and ERR LEDs indicate operating conditions of the unit. (Refer to the instruction manual for detail)

■ Recommended solderless terminal



## HLS COMMUNICATION

**Communication mode:** Full-duplex or half-duplex

**Network cable**

• Shield cable

**Full-duplex communication:**

ZHY262PS / ZHT262PS (Shinko Seisen Industry Co., Ltd.)

**Half-duplex communication:**

ZHY221PS (Shinko Seisen Industry Co., Ltd.)

• Dual-shield cable

ZHY262PBA (Shinko Seisen Industry Co., Ltd.)

**Transmission distance:**

12 Mbps: 100 meters (328 ft)

6 Mbps: 200 meters (656 ft)

(Baud rate configurable with DIP SW; factory default: 12 Mbps)

Note: The above transmission distance is a reference value when the HLS master unit is one-to-one connected to the HLS slave unit (R4GHH) with a designated double shielded cable. The actual distance may differ depending on the system configuration (types of the master/slave units, communication cable, the number of slaves connected, etc.), settings, and/or the installation environment.

**Terminating resistor:** Built-in (Selected with the DIP SW; factory default: disabled)

**Status indicator:** RUN

(Refer to the instruction manual for details.)

**Station address:** Selectable with rotary switch

(Refer to the instruction manual for details.)

## INPUT SPECIFICATIONS

■ DC Current

Input resistor: 50 Ω

Input range: -20 to +20 mA DC, 0 to 20 mA DC,

4 to 20 mA DC

■ Narrow span voltage

Input resistance: ≥ 100 kΩ

Input range: -1 to +1 V DC, 0 to 1 V DC, -0.5 to +0.5 V DC

■ Wide span voltage

Input resistance: ≥ 1 MΩ

Input range: -10 to +10 V DC, -5 to +5 V DC,

0 to 10 V DC, 0 to 5 V DC, 1 to 5 V DC

## INSTALLATION

**Current consumption**

• DC: Approx. 70 mA

**Operating temperature:** -10 to +55°C (14 to 131°F)

**Storage temperature:** -20 to +65°C (-4 to +149°F)

**Operating humidity:** 30 to 90 %RH (non-condensing)

**Atmosphere:** No corrosive gas or heavy dust

**Mounting:** Surface or DIN rail (35 mm rail)

**Weight:** 210 g (0.46 lb)

## PERFORMANCE

**Conversion accuracy:** ±0.1 %

**Conversion rate:** 200 μsec. per 4 channels

**Data range:** 0 - 10000 of the input range

**Temp. coefficient:** ±0.015 %/°C (±0.008 %/°F)

**Input delay time:** ≤ 1 msec. (0 - 90 %)

**Insulation resistance:** ≥ 100 MΩ with 500 V DC

**Dielectric strength:** 1500 V AC @ 1 minute

(input 0 to input 1 to input 2 to input 3 to HLS or FE to power)

## STANDARDS & APPROVALS

**EU conformity:**

EMC Directive

EMI EN 61000-6-4

EMS EN 61000-6-2

RoHS Directive

## PC CONFIGURATOR

The following parameters can be set with using PC Configurator Software (model: R7CFG)

Refer to the users manual for the R7CFG for detailed operation of the software program.

### ■ SETTINGS FOR INDIVIDUAL CHANNELS

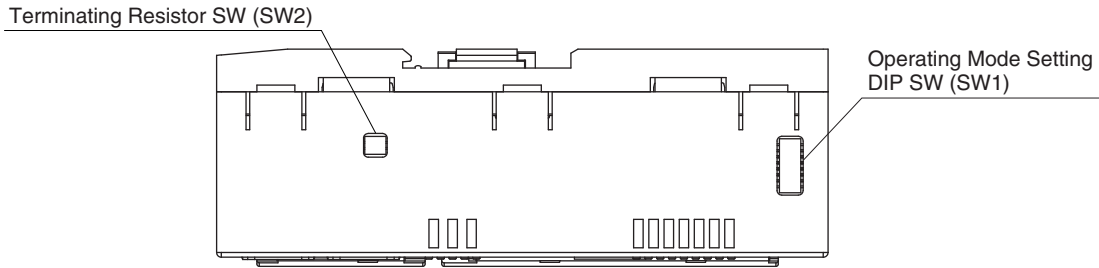
PARAMETER	SETTING RANGE	DEFAULT SETTING
Validating/ Invalidating	Valid Invalid	Valid
Input range	-10 – +10 V DC -5 – +5 V DC -1 – +1 V DC 0 – 10 V DC 0 – 5 V DC 1 – 5 V DC 0 – 1 V DC -0.5 – +0.5 V DC -20 – +20 mA DC 0 – 20 mA DC 4 – 20 mA DC	-10 – +10 V DC
Bias	-320.00 – +320.00 (%)	0.00 (%)
Gain	-3.2000 – +3.2000	1.0000
Zero scale	-32 000 – +32 000	0
Full scale	-32 000 – +32 000	10 000

### ■ SETTINGS FOR ALL CHANNELS

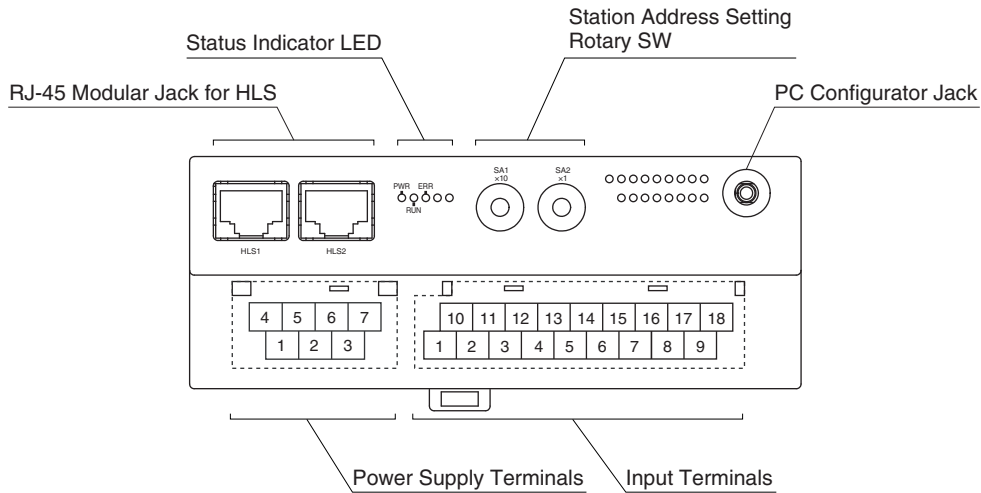
PARAMETER	SETTING RANGE	DEFAULT SETTING
Number of times of averaging	1, 2, 4, 8, 16, 32, 64, 128, 256	1

## EXTERNAL VIEW

### TOP VIEW



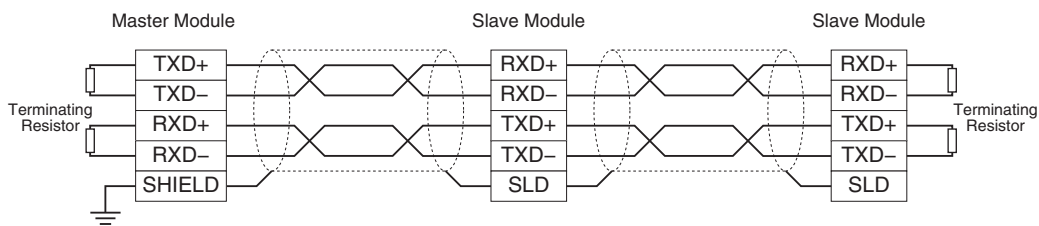
### FRONT VIEW



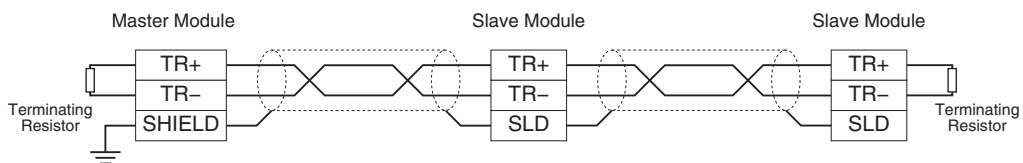
## CONNECTION DIAGRAMS

### MASTER CONNECTION

#### Full-duplex communication



#### Half-duplex communication



Note: Be sure to turn ON the switch of the terminating resistor located at both ends of the modules.

## TERMINAL ASSIGNMENTS

### ■ INPUT TERMINAL ASSIGNMENT

10	11	12	13	14	15	16	17	18
VL0	I0	VL1	I1	NC	VL2	I2	VL3	I3
1	2	3	4	5	6	7	8	9
VH0	COM0	VH1	COM1	NC	VH2	COM2	VH3	COM3

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	VH0	Wide span volt. 0	10	VL0	Narrow span volt. 0
2	COM0	Common 0	11	I0	Current range 0
3	VH1	Wide span volt. 1	12	VL1	Narrow span volt. 1
4	COM1	Common 1	13	I1	Current range 1
5	NC	No connection	14	NC	No connection
6	VH2	Wide span volt. 2	15	VL2	Narrow span volt. 2
7	COM2	Common 2	16	I2	Current range 2
8	VH3	Wide span volt. 3	17	VL3	Narrow span volt. 3
9	COM3	Common 3	18	I3	Current range 3

4	5	6	7
NC	NC	+24V	0V
1	2	3	
NC	NC	FE	

- 1. NC                    -
- 2. NC                    -
- 3. FE                    Functional earth
- 4. NC                    -
- 5. NC                    -
- 6. +24V                Power supply (24V DC)
- 7. 0V                    Power supply (0V)

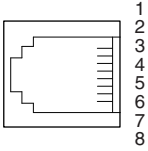
## ■ COMMUNICATION CABLE CONNECTIONS

**Recommended connector** : TM21P-88P; Hirose Electric (does not come with the unit)

### • COMMUNICATION CONNECTOR PIN ASSIGNMENT

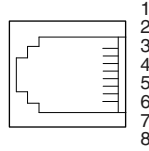
**Blank** : 3, 4 - 5, 6 pair wiring (M-System HLS related device standard pin assignment)

#### Full duplex communication



1. NC	Unused
2. NC	Unused
3. TXD+	Network (Slave, transmission +)
4. TXD-	Network (Slave, transmission -)
5. RXD+	Network (Master, transmission+)
6. RXD-	Network (Master, transmission-)
7. NC	Unused
8. SLD	Shield

#### Half duplex communication

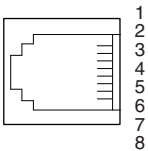


1. NC	Unused
2. NC	Unused
3. TR+	Network (+)
4. TR-	Network (-)
5. NC	Unused
6. NC	Unused
7. NC	Unused
8. SLD	Shield

### • COMMUNICATION CONNECTOR PIN ASSIGNMENT

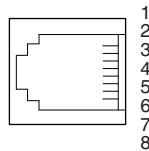
**/E** : 4, 5 - 3, 6 pair wiring (Ethernet cable pin assignment)

#### Full duplex communication



1. NC	Unused
2. NC	Unused
3. TXD+	Network (Slave, transmission +)
4. RXD-	Network (Master, transmission-)
5. RXD+	Network (Master, transmission+)
6. TXD-	Network (Slave, transmission -)
7. NC	Unused
8. SLD	Shield

#### Half duplex communication



1. NC	Unused
2. NC	Unused
3. NC	Unused
4. TR-	Network (-)
5. TR+	Network (+)
6. NC	Unused
7. NC	Unused
8. SLD	Shield

## DATA CONVERSION

### ■ INPUT RANGE AND DATA CONVERSION (FACTORY DEFAULT SETTING)

Analog input data is converted into digital representations of 0 – 100% proportional to each scaled range.

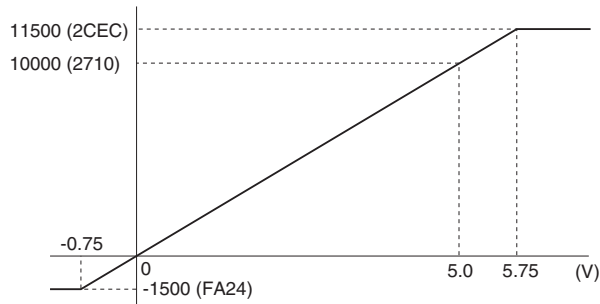
The converted % values are multiplied by 100 and expressed in 16 bits.

Overrange input is possible from -15 to +115% of the nominal range.

When the signal exceeds the limit, the data is fixed at -15% or +115%.

#### • Input Range 0 – 5V DC

Input Value	Input %	Converted Data, Decimal	Converted Data, Hex
≤ -0.75V	-15%	-1500	FA24
0V	0%	0	0
5V	100%	10000	2710
≥ 5.75V	115%	11500	2CEC



## RESPONSE TIME

Response time of analog input module (R7G4HH-A-SVF4; slave) is time from when 0 to 100% stepwise signal change is applied to the module until the communication ASIC of the module transmits 90% of input signal.

$T_{COM}$ : HLS scan time

HLS scan time varies according to communication method, the number of operating slave stations (FS), transmission rate ( $T_{BPS}$ ), and the hop count (LF).

· Full-duplex communication

LF = 0 : HLS scan time =  $182 \times FS \times T_{BPS}$  (sec.)

LF = 1 to 7: HLS scan time =  $(184 + (144 \times LF)) \times FS \times T_{BPS}$  (sec.)

· Half-duplex communication

LF = 0 : HLS scan time =  $354 \times FS \times T_{BPS}$  (sec.)

LF = 1 to 7: HLS scan time =  $(328 + (144 \times LF)) \times FS \times T_{BPS}$  (sec.)

$T_{INF}$ : Input unit response time ≤ Delay time of input circuit ( $T_a$ ) + (Conversion rate x Moving average order) ( $T_b$ ) + Input internal processing time ( $T_c$ ) (HLS scan time x 2)

e.g.

Number of moving average: 1,

Communication: Full-duplex,

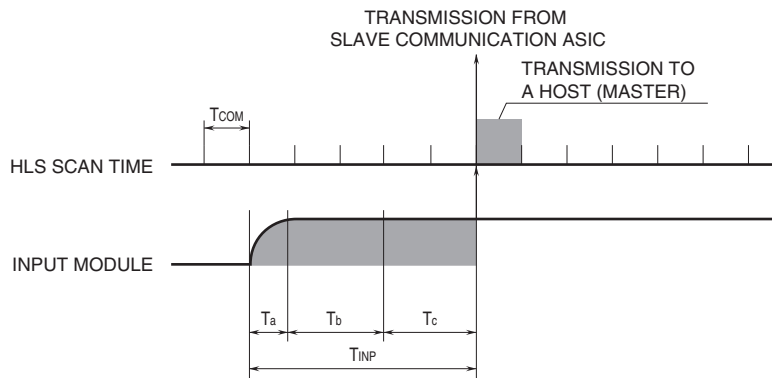
Number of operating slave station (FS): 63,

Transmission rate ( $T_{BPS}$ ): 12Mbps,

the hop count (LF): 0

HLS scan time ( $T_{COM}$ ):  $182 \times 63 \times 1 / 12 M = 0.9555$  [msec.]

Input unit response time ( $T_{INF}$ ): Delay time of input circuit (1 msec.) + Conversion rate (0.2 msec.) x Number of moving average (1 time) + Input internal processing time (0.9555 msec. x 2) = 3.1 [msec.]

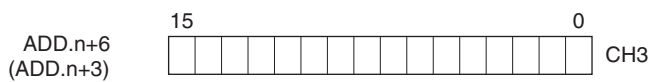
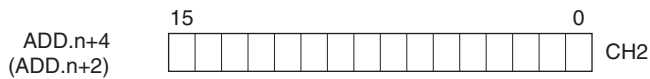
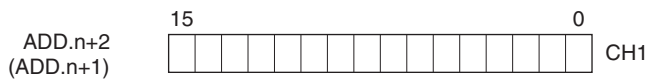


## I/O DATA DESCRIPTIONS

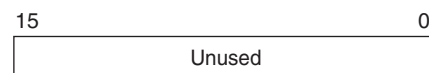
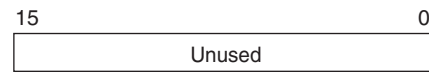
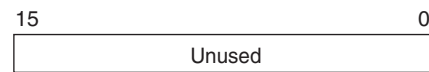
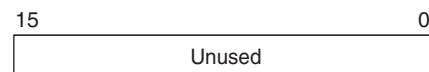
Scaling of analog input module is configurable with the configurator software (model: R7CFG). Refer to the software manual for details.

### ■ ANALOG INPUT DATA

#### · Di area



#### · Do area

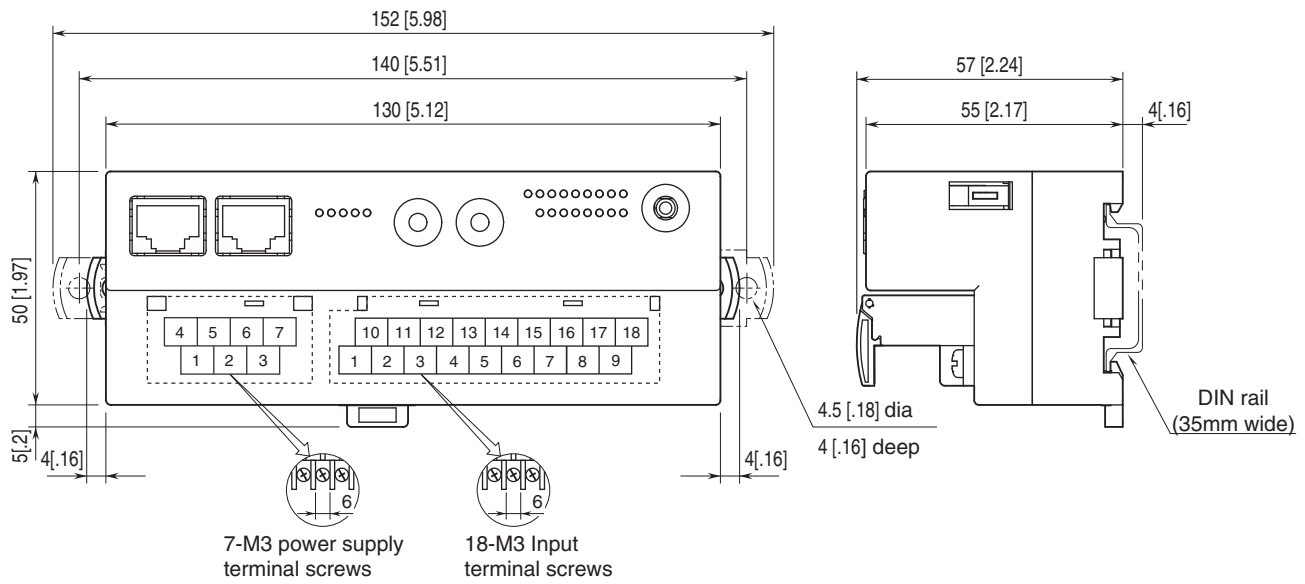


Data is represented in 16-bit binary.  
 Negative value is represented in 2's complements.  
 Assignment for half-duplex communication in parentheses.

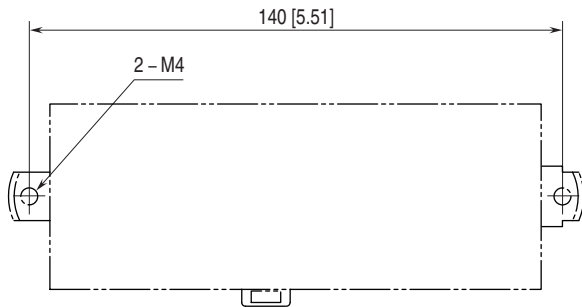


# MODEL: R7G4HH-A-SVF4

## EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



## MOUNTING REQUIREMENTS unit: mm [inch]

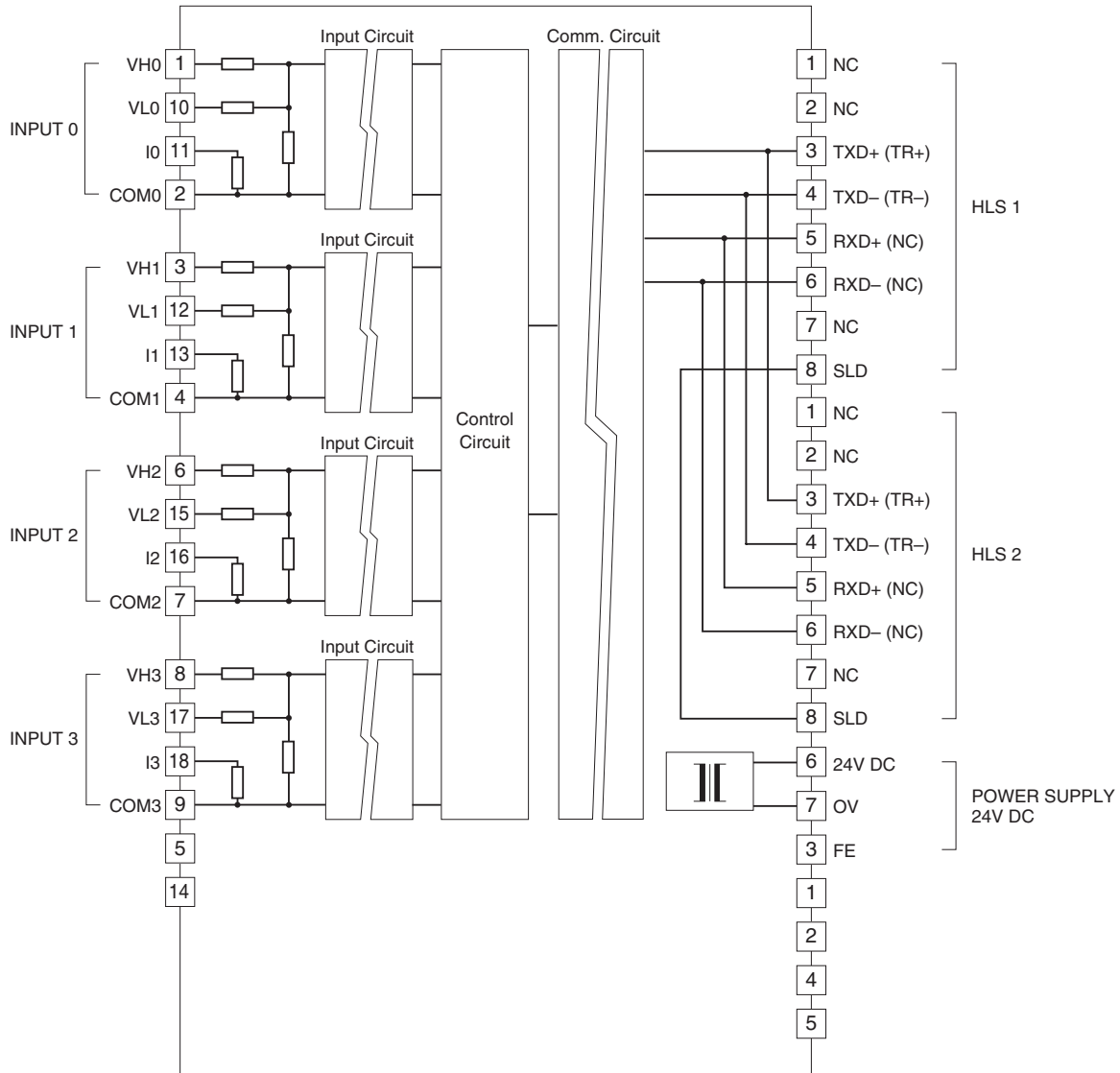


## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

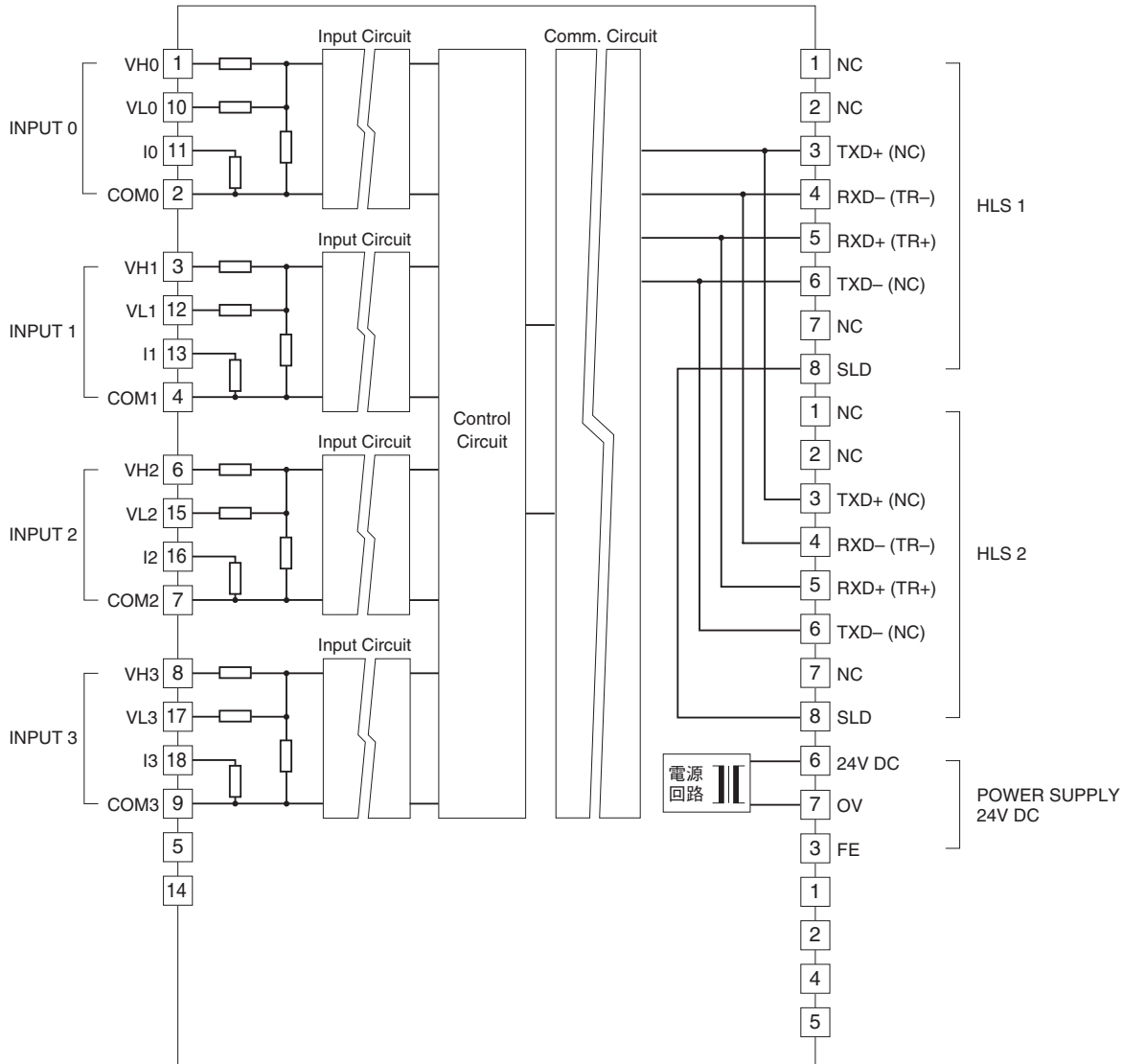
Note: In order to improve EMC performance, bond the FE terminal to ground.

Caution: FE terminal is NOT a protective conductor terminal.

### ■ 3, 4 - 5, 6 PAIR WIRING (M-System HLS related device standard pin assignment)

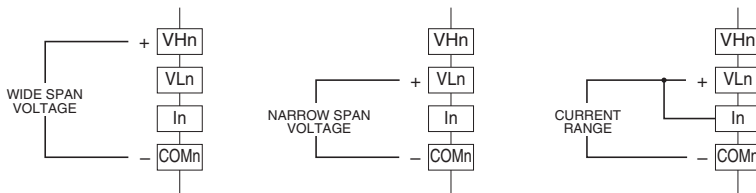


## ■ 4, 5 - 3, 6 PAIR WIRING (Ethernet cable pin assignment)



Note: Terminal numbers in parentheses are for half-duplex communication model.

## ■ Input Connection Examples



Be sure to close across VLn and In terminals for a current input.



Specifications are subject to change without notice.