General Specifications

GS 34M6H46-01E

YHLS Master Module
YHLS Slave Units
(for implementing high-speed remote I/O)

FA-M3

Table of Contents

General Specifications

YHLS Slave Units

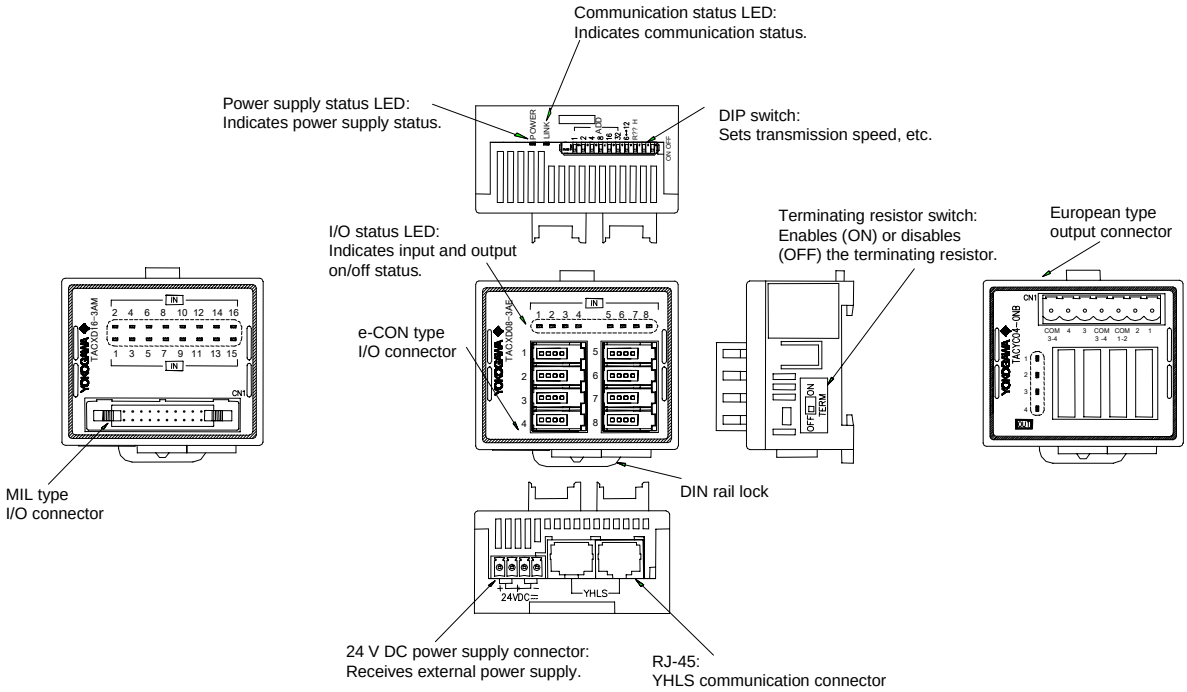
FA-M3

■ General

The YHLS slave units are remote I/O units controlled by the YHLS master module (F3LH02-0N) via high-speed communication. The YHLS master module can control a maximum of 32 YHLS slave units per port.
YHLS slave units are available in the following seven types to suit different applications.

- TACXD08-3AE is an e-CON-type DC input unit with 8 input points.
- TACXD16-3AM is a MIL-type DC input unit with 16 input points.
- TACYD08-1AE is an e-CON-type TR output unit with 8 output points.
- TACYD16-1AM is a MIL-type TR output unit with 16 output points.
- TACYC04-0NB is a European-type relay output unit with 4 output points.
- TACWD08-3NE is the e-CON-type DC input/TR output unit with 4 input points and 4 output points.
- TACWD16-3NM is the MIL-type DC input/TR output unit with 8 input points and 8 output points.

■ Components and Functions



■ Specifications

Performance Specifications

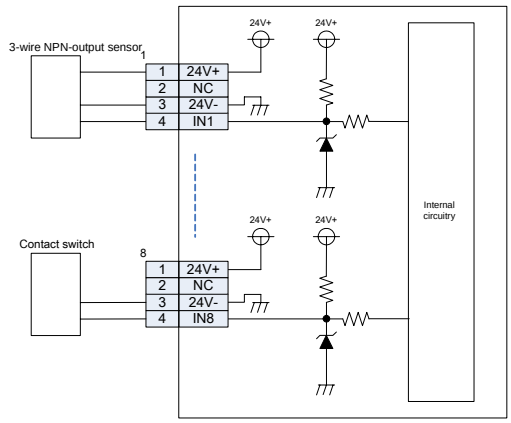
Item			TACXD08-3AE	TACXD16-3AM	TACYD08-1AE	TACYD16-1AM	TACYC04-0NB	TACWD08-3NE	TACWD16-3NM
Input specifications	Input type		DC voltage (sink type)		–			DC voltage (sink type)	
	Number of points		8	16	—			4	8
	Points/common		8	16	—			4	8
	Isolation method		Not isolated		–			Not isolated	
	Rated input voltage		24 V DC		–			24 V DC	
	Operating voltage range		20.4 to 26.4 V DC		–			20.4 to 26.4 V DC	
	Rated input current		4.3 mA/point		–			4.3 mA/point	
	Input impedance		5.6 kΩ		–			5.6 kΩ	
	Operating voltage	ON	16.0 V DC min. (between the input and 24V+ terminals)		–			16.0 V DC min. (between the input and 24V+ terminals)	
		OFF	5.8 V DC max. (between the input and 24V+ terminals)		–			5.8 V DC max. (between the input and 24V+ terminals)	
	Response time	OFF→ON	1.0 ms max.		–			1.0 ms max.	
		ON→OFF	1.0 ms max.		–			1.0 ms max.	
	Interrupt		None						
	Input connector		e-CON, 4 pins	MIL, 20 pins	–			e-CON, 4 pins	MIL, 20 pins
	Input display		LED (lit when input is turned on)		–			LED (lit when input is turned on)	
Output specifications	Output type		–		Transistor contact		Relay contact	Transistor contact	
	Number of points		–		8	16	4	4	8
	Points/common		–		8	16	2	4	8
	Isolation method		–		Not isolated		Physical isolation	Not isolated	
	Rated load voltage		–		24 V DC		24 V DC 250 V AC	24 V DC	
	Maximum load current		–		0.1 A/point		0.1 A/point	0.1 A/point	
	Minimum load voltage/current		–		–		5.0 V DC, 1.0 mA	–	
	Response time	OFF→ON	–		0.05 ms max.		10.0 ms max.	0.05 ms max.	
		ON→OFF	–		0.5 ms max.		5.0 ms max.	0.5 ms max.	
	Service life	Mechanical	–		–		20,000,000 operations or more	–	
		Electrical	–		–		100,000 operations*1 or more	–	
	ON voltage		–		0.5 V DC max.		–	0.5 V DC max.	
	Off-time leak current		–		0.1 mA max.		–	0.1 mA max.	
	Output connector		–		e-CON, 4 pins	MIL, 20 pins	European terminal block, 7 pins	e-CON, 4 pins	MIL, 20 pins
	Output status at YHLS communication failure or program stop		–		As per the 3-element DIP switch setup (H or R) H: HOLD, R: RESET				
	Output display		–		LED (lit when output is turned on)			LED (lit when output is turned on)	
Power supply	External power supply*2		20.4 to 26.4 V DC						
	Dissipating current		80 mA	140 mA	30 mA	30 mA	70 mA	60 mA	90 mA
	Weight		75 g						
Common specifications*3	Insulation resistance		5 MΩ min. between the group of DC terminals for external connection and the communication shield terminal when measured with a 500 V DC megohmmeter						
	Withstanding voltage		1500 V AC for one minute between the group of DC terminals for external connection and the communication shield terminal						
	Operating ambient temperature		0 to 55°C						
	Operating ambient humidity		30 to 90% RH (with no dew)						
	Operating ambient atmosphere		No corrosive or flammable gas, no significant dust						
	Storage ambient temperature		-25 to 70°C						
	Storage ambient humidity		30 to 90% RH (with no dew)						
	Mounting method		DIN rail						
	Vibration resistance *4		Withstanding 10 vibration sweeps in X, Y and Z directions each according to JIS C0040, where each vibration sweep features 0.075 mm single-side amplitude for 10-58 Hz and 9.8 m/s^2 acceleration for 58-150,000 Hz						
	Impact resistance *4		Withstanding an impact of 98 m/s^2 three times in X, Y and Z directions each						
	External dimensions		See the External Dimensions drawing.						
	Communications mode		2-wire, half-duplex						
	Transmission speed		6M bps/12M bps						
	Synchronization		Bit synchronization						
	Error detection		CRC-12						
	Communication range		Total 200 m (at 6M bps)/100 m (at 12M bps)						
	Maximum number of units connected		32 units/port						
	Networking topology		Multidrop connection						
	Impedance		100 Ω						

Item		TACXD08-3AE	TACXD16-3AM	TACYD08-1AE	TACYD16-1AM	TACYC04-0NB	TACWD08-3NE	TACWD16-3NM
	Terminating resistor	Built-in (enabled or disabled switchable)						
	Communication connector	RJ-45 modular connector						
	Number of slave addresses required	1						

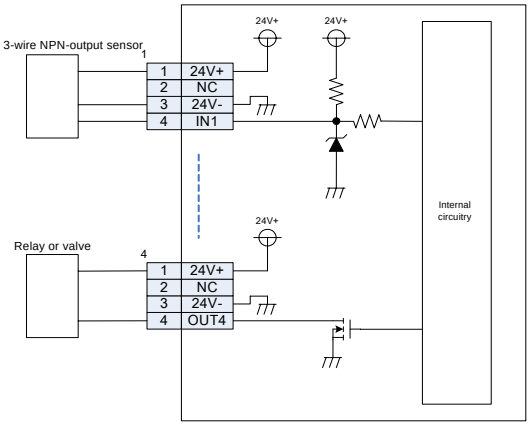
*1: For resistance load of 1 A at 250 V AC or 1 A at 30 V DC.
*2: The power supply must be provided with a noise filter.
*3: Operating and storage temperature and humidity for these units differ from other FA-M3 modules. For these units, this performance specification takes precedence over the general specification for the FA-M3 modules.
*4: If installed on an aluminum DIN rail (35 mm wide and 7.5 mm high) and secured with proper fastener fittings.

External Connection Diagrams

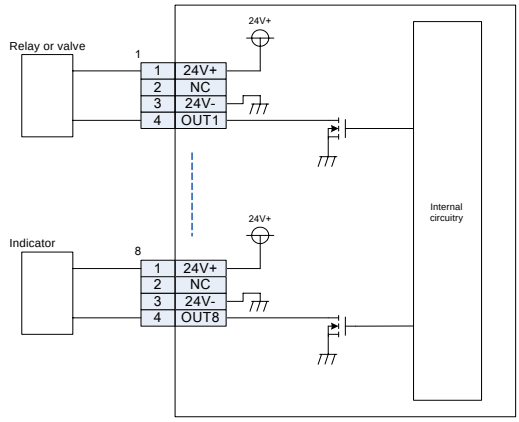
TACXD08-3AE



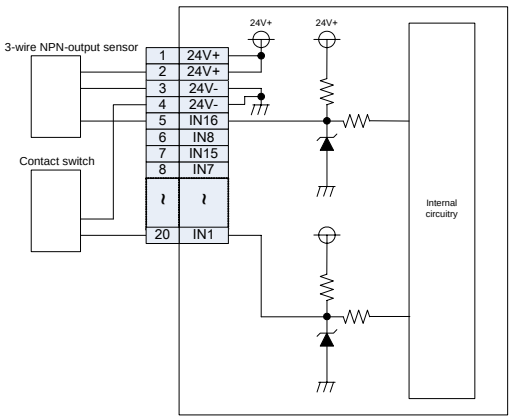
TACWD08-3NE



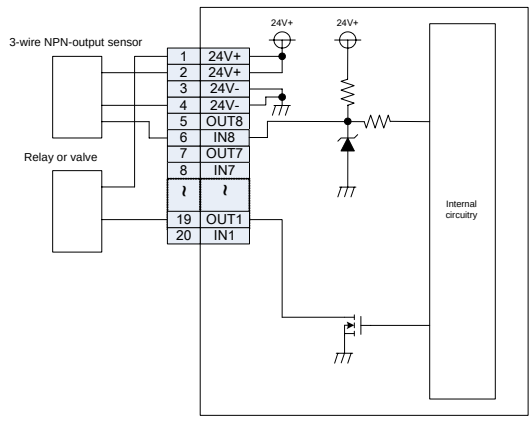
TACYD08-1AE



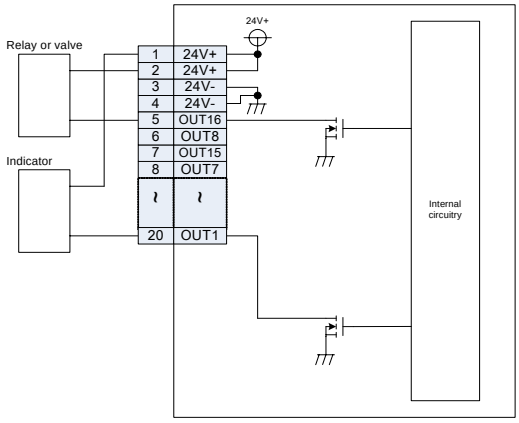
TACXD16-3AM



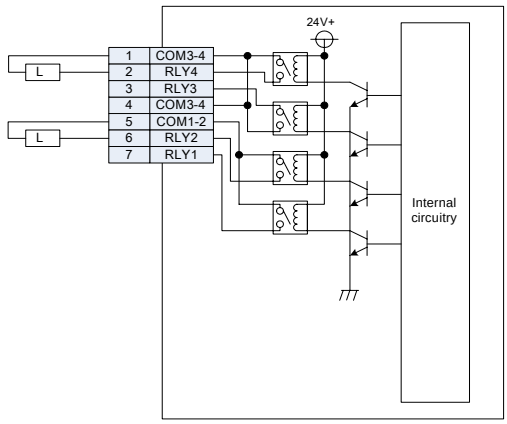
TACWD16-3NM



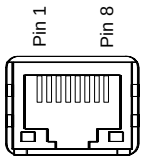
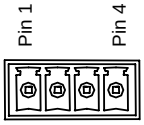
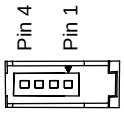
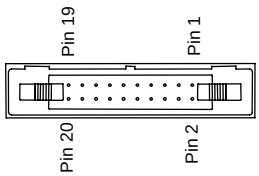
TACYD16-1AM

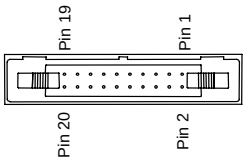


TACYC04-0NB



■ Connector Pin Assignment

Connectors	Description	YHLS Slave Units
YHLS communication connector (RJ-45 modular connector)	 2-wire, half-duplex 1 NC 2 NC 3 TRD+ 4 TRD- 5 NC 6 NC 7 NC 8 SHIELD Recommended connector: 5-569550-3 (from Tyco Electronics AMP)	TACXD08-3AE TACXD16-3AM TACYD08-1AE TACYD16-1AM TACYC04-0NB TACWD08-3NE TACWD16-3NM
24 V DC power supply connector	 1 24 V+ 2 24 V+ 3 24 V- 4 24 V- Recommended connector : AKZ1550/4-3.81-GREEN (from Phoenix Mechano) Applicable wire size : AWG20-16 (0.5-1.25 mm^2)	TACXD08-3AE TACXD16-3AM TACYD08-1AE TACYD16-1AM TACYC04-0NB TACWD08-3NE TACWD16-3NM
e-CON-type I/O interface connector	 4 IN1-8 OUT1-8 3 24 V- 2 NC 1 24 V+ Recommended connector: 37104-□□□□-000FL (from Sumitomo 3M) (See Sumitomo 3M Connector Table)	TACWD08-3NE TACXD08-3AE TACYD08-1AE
MIL-type I/O interface connector (for 16 inputs)	 20 IN1 19 IN9 18 IN2 17 IN10 16 IN3 15 IN11 14 IN4 13 IN12 12 IN5 11 IN13 10 IN6 9 IN14 8 IN7 7 IN15 6 IN8 5 IN16 4 24 V- 3 24 V- 2 24 V+ 1 24 V+ Recommended connector: see MIL Connector Table.	TACXD16-3AM

<table>
<tr><th>Connectors</th><th>Description</th><th>YHLS Slave Units</th></tr>
<tr><td>MIL-type I/O interface connector
(for 16 outputs)</td><td> 

<table>
<tr><td>20</td><td>OUT1</td><td>19</td><td>OUT9</td></tr>
<tr><td>18</td><td>OUT2</td><td>17</td><td>OUT10</td></tr>
<tr><td>16</td><td>OUT3</td><td>15</td><td>OUT11</td></tr>
<tr><td>14</td><td>OUT4</td><td>13</td><td>OUT12</td></tr>
<tr><td>12</td><td>OUT5</td><td>11</td><td>OUT13</td></tr>
<tr><td>10</td><td>OUT6</td><td>9</td><td>OUT14</td></tr>
<tr><td>8</td><td>OUT7</td><td>7</td><td>OUT15</td></tr>
<tr><td>6</td><td>OUT8</td><td>5</td><td>OUT16</td></tr>
<tr><td>4</td><td>24 V-</td><td>3</td><td>24 V-</td></tr>
<tr><td>2</td><td>24 V+</td><td>1</td><td>24 V+</td></tr>
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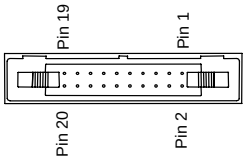
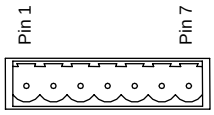
Recommended connector: see MIL Connector Table.</td><td>TACYD16-1AM</td></tr>
<tr><td>MIL-type I/O interface connector
(for 8 inputs and 8 outputs)</td><td> 

<table>
<tr><td>20</td><td>IN1</td><td>19</td><td>OUT1</td></tr>
<tr><td>18</td><td>IN2</td><td>17</td><td>OUT2</td></tr>
<tr><td>16</td><td>IN3</td><td>15</td><td>OUT3</td></tr>
<tr><td>14</td><td>IN4</td><td>13</td><td>OUT4</td></tr>
<tr><td>12</td><td>IN5</td><td>11</td><td>OUT5</td></tr>
<tr><td>10</td><td>IN6</td><td>9</td><td>OUT6</td></tr>
<tr><td>8</td><td>IN7</td><td>7</td><td>OUT7</td></tr>
<tr><td>6</td><td>IN8</td><td>5</td><td>OUT8</td></tr>
<tr><td>4</td><td>24 V-</td><td>3</td><td>24 V-</td></tr>
<tr><td>2</td><td>24 V+</td><td>1</td><td>24 V+</td></tr>
</table>
Recommended connector: see MIL Connector Table.</td><td>TACWD16-3NM</td></tr>
<tr><td>European-type I/O interface connector
(for 4 relay outputs)</td><td> 

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<tr><td>1</td><td>COM3-4</td></tr>
<tr><td>2</td><td>RLY4</td></tr>
<tr><td>3</td><td>RLY3</td></tr>
<tr><td>4</td><td>COM3-4</td></tr>
<tr><td>5</td><td>COM1-2</td></tr>
<tr><td>6</td><td>RLY2</td></tr>
<tr><td>7</td><td>RLY1</td></tr>
</table>
Recommended connector: AKZ950/7-5.08-GREEN (from Phoenix Mechano)</td><td>TACYC04-0NB</td></tr>
</table>

■ I/O Connectors

Item	e-CON Type	MIL Type	European Type
YHLS slave units	TACXD08-3AE TACYD08-1AE TACWD08-3NE	TACXD16-3AM TACYD16-1AM TACWD16-3NM	TACYC04-0NB
Compliant connectors	37104-□□□□-000FL (manufacturer: Sumitomo 3M) See Sumitomo 3M Connector Table below.	See MIL Connector Table below.	AKZ950/7-5.08-GREEN

● Sumitomo 3M Connector Table

Cover Color	Wire-mount Plug (4 pins)	Compatible Conductors		
		AWG No.	Cross-sectional area (mm^2)	External wire diameter (mm)
Red	37104-3101-000FL	24-26	0.14-0.3 (exclusive)	0.8-1.0
Yellow	37104-3122-000FL	24-26	0.14-0.3 (exclusive)	1.0-1.2
Orange	37104-3163-000FL	24-26	0.14-0.3 (exclusive)	1.2-1.6
Green	37104-2124-000FL	20-22	0.3–0.5 (inclusive)	1.0-1.2
Blue	37104-2165-000FL	20-22	0.3–0.5 (inclusive)	1.2-1.6
Gray	37104-2206-000FL	20-22	0.3–0.5 (inclusive)	1.6-2.0

● MIL Connector Table

Pressure contact type	Socket	PS-20SM-D4P1-1C (from JAE)
	Strain relief	PS-SR20M2 (from JAE)
Crimp type	Socket housing	PS-D4C20 (from JAE)

■ Communication Connector and Cable

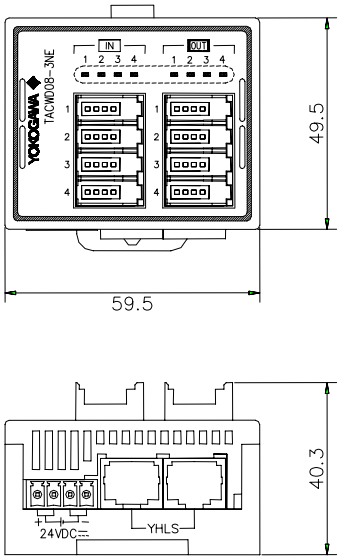
- Recommended communication connector
  Manufacturer: Tyco Electronics AMP
  Model code: 5-569550-3
- Recommended communication cable
  Manufacturer: BLACK BOX
  Model code: EVNSL70A
  Impedance: 100 Ω

■ Model and Suffix Codes

Model	Suffix Code	Style Code	Option Code	Description
TACXD08	-3AE	…	…	DC input (sink type), 24 V DC, 8 inputs, e-CON
TACXD16	-3AM	…	…	DC input (sink type), 24 V DC, 16 inputs, MIL
TACYD08	-1AE	…	…	Transistor output (sink type), 24 V DC, 0.1 mA, 8 outputs, e-CON
TACYD16	-1AM	…	…	Transistor output (sink type), 24 V DC, 0.1 mA, 16 outputs, MIL
TACYC04	-0NB	…	…	Relay output , 24 V DC/250 V AC, 1A, 4 outputs, European
TACWD08	-3NE	…	…	Input/output (sink type), 24 V DC, 4 inputs/4 outputs, e-CON
TACYD16	-3NM	…	…	Input/output (sink type), 24 V DC, 8 inputs/8 outputs, MIL

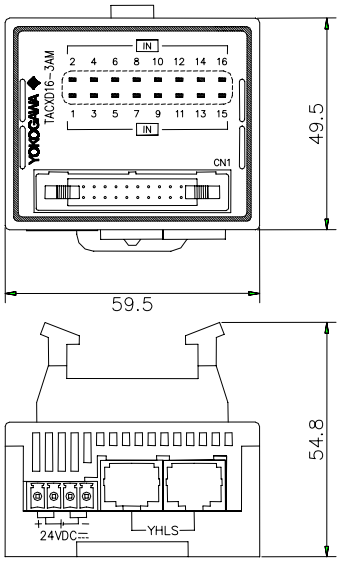
■ External Dimensions

e-CONType:
TACXD08-3AE/TACYD08-1AE/TACWD08-3NE

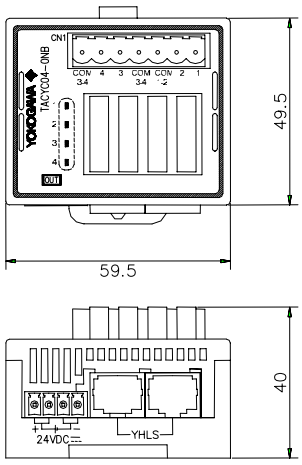


MILType:
TACXD16-3AM/TACYD16-1AM/TACWD16-3NM

Unit: mm



European Type:
TACYC04-0NB



General Specifications

YHLS Master Module
(F3LH02-0N)

FA-M3

GS 34M6H46-01E

■ General

Yokogawa High-speed Link System (YHLS) master module has two YHLS interface ports. It allows easy implementation of a 1:N high-speed remote I/O system. Up to 63 slaves can be connected per port to provide 1008 inputs and 1008 outputs.

Note: The module must be installed in the main unit and cannot be installed in a sub-unit.

■ Features

- One module can be used to configure a remote I/O system of up to 4032 I/Os (when two ports are used).
- Maximum transmission distance for each port is 300 m (at 3 Mbps).
- Each port can communicate with a maximum of 63 slaves with response speed of 0.97 ms in full-duplex mode (when the transmission speed is 12 Mbps).
  Hides complicated communications protocols from a user during system implementation.

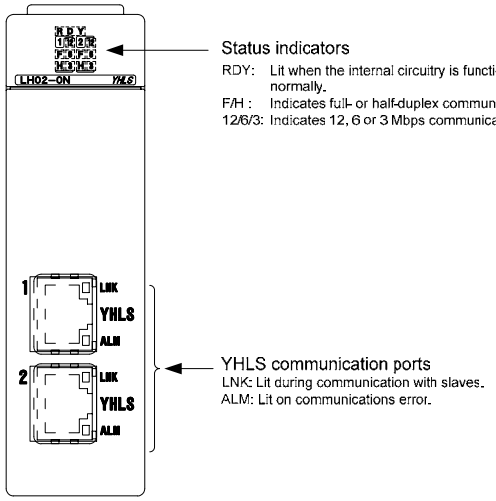
■ Specifications

Item	Specifications
	F3LH02-0N
Transmission speed	3M bps, 6M bps or 12M bps
Maximum Total Transmission distance	300 m (at 3M bps), 200 m (at 6M bps) or 100 m (at 12M bps)
Number of slaves per module	126 slave units max.*1 (63 slaves per port)
Number of I/Os points per module	2016 inputs and 2016 outputs
Communications mode	4-wire full-duplex or 2-wire half-duplex
Synchronization	Bit synchronization
Signal coding	Manchester coding
Networking topology	Bus
Transmission format	YHLS proprietary format
Error detection	RZ check (all-bit check), CRC12
Connection cable	CAT5 or equivalent
Connector	RJ-45
RAS functions	- Withdrawal of slave unit - Automatic slave unit participation - Reset/hold outputs when CPU stops - Network quality monitoring
Terminating resistor	Internal*2
Current consumption	440 mA max.
External dimensions	28.9 (W) x 100 (H) x 83.2 (D) mm*3
Weight	105 g

*1: Some slave devices may impose further restrictions. Check the specifications of slave units used.
*2: The module has a built-in terminating resistor.It must be installed at the end of the remote I/O system.
*3: Excluding protrusions (see External Dimensions for details).

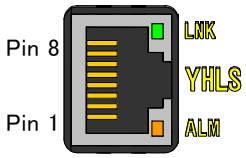
■ Components and Functions

F3LH02-0N



■ External Connection

● Connector Pin Assignment



Front view of the module connector

- For full-duplex communication:

Pin No.	Full-duplex		
	Symbol	Signal flow	
		Master	Slave
1	NC		
2	NC		
3	RXD+	←	
4	RXD-	←	
5	TXD+	→	
6	TXD-	→	
7	NC		
8	SHIELD	←→	

- For half-duplex communication:

Pin No	Half-duplex		
	Symbol	Signal flow	
		Master	Slave
1	NC		
2	NC		
3	TRD+	←→	
4	TRD-	←→	
5	NC		
6	NC		
7	NC		
8	SHIELD	←→	

● Cable

CAT5 shielded cable or equivalent is recommended.
If a different type of cable is recommended for a slave unit by its manufacturer, use that cable instead.

● Connector

RJ-45 shielded modular plug must be used.

■ Operating Environment

There is no restriction on the type of CPU modules that can be used with this module.

■ Model and Suffix Codes

Model	Suffix Code	Style Code	Option Code	Description
F3LH02	-0N	...	...	12M bps max, 2 ports

■ External Dimensions