

Cable Length: Maximum 20 m (between IO-Link master and IO-Link device)

Field Network Connection

Connectors and Cables

If the network type is EtherCAT, connect the upstream side (master side) on the Ethernet cable to Ethernet connector P1 and the downstream side to Ethernet connector P2.

If it is not EtherCAT, it can be connected to either the left ot right Ethernet connector.

Use an Ethernet cable (CAT.5) that conforms to the standard (1000BASE-T, 100BASE-TX, 10BASE-T).

For details, refer to the user's manual of each field network master.

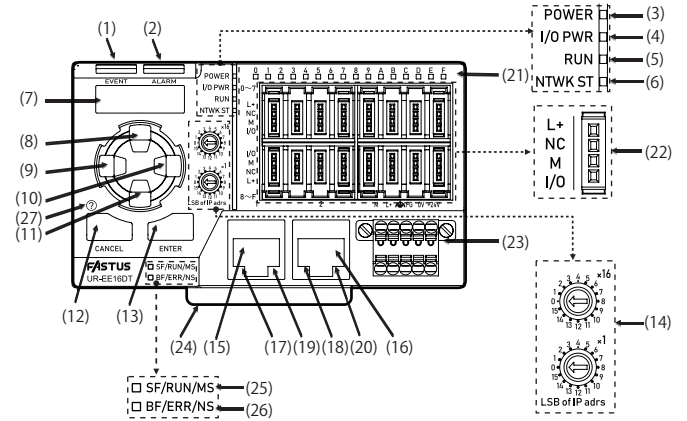
Network topology

It depends on the field network type.

Example) For EtherNet/IP, star configuration, linear bus configuration, or device level ring configuration

For details, refer to the user's manual of each field network master.

7. Part Names



No.	Name	Function
(1)	EVENT LED (yellow)	Blinks while an event is occurring on one of the connected IO-Link devices.
(2)	ALARM LED (red)	Blinks while this product is detecting an error.
(3)	POWER LED (green)	The status of the unit power supply of this product is displayed.
(4)	I/O PWR LED (green)	The status of the I/O power supply is displayed.
(5)	RUN LED (green)	Lights when the internal IC of the field network starts up.
(6)	NTWK ST LED (green)	Displays the status of the field network communication. Illuminated: Normal communication Blinking: Communication interruption Off: Not communicating
(7)	Display	Displays settings and status.
(8)	[ ↑ ] key	Operate menu settings.
(9)	[ ← ] key	
(10)	[ → ] key	
(11)	[ ↓ ] key	
(12)	[CANCEL] key	
(13)	[ENTER] key	
(14)	The 4th octet setting switch for this product's IP address	Sets the 4th octet of unit's IP address that is sum of the value on the upper switch multiplied by 16 and the value on the lower switch.
(15)	Ethernet connector P1	PORT1 connector (RJ45 connector) for the field network connection For EtherCAT, it is IN
(16)	Ethernet connector P2	PORT2 connector (RJ45 connector) for the field network connection. For EtherCAT, it is OUT.
(17)	DATA LED (yellow)	Lights when data is being sent/received via Ethernet.
(18)	DATA LED (yellow)	
(19)	LINK LED (green)	
(20)	LINK LED (green)	Lights when the Ethernet connection is enabled.
(21)	0 to F LEDs (orange)	Display the ON/OFF status of inputs or outputs.
(22)	e-CON connector for devices	L+ :Supplies 24 VDC to input/output devices. M :Supplies 0 V to input/output devices. I/O :Supplies signals to input/output devices.
(23)	Power terminal block (0V, +24V)	Supplies unit power (+24V, 0V), FG, and I/O power (L+, M).
(24)	DIN rail mounting hook	The part where the lower hook on the back of this product slides for attaching/removing the product to/from the DIN rail.
(25)	SF/RUN/MS LED	Displays the status of the field network.
(26)	BF/ERR/NS LED	
(27)	?	
		Pressing this button will show an error message on the display.

8. Specifications

General Specifications

Item		Specifications
Power supply voltage		24 VDC +/-15% (SELV and LIM power supplies, or UL 1310 Class 2 power supplies) *1
Current consumption		195 mA
Insulation resistance		5 megohm or more (between external power supply and unit power supply at 500 VDC)
Input/output common		Sink/source switchable per channel
Connectors	Field network:	2x RJ45 socket
	Power supply:	Spring clamp terminal block, 5 positions x 2 rows
	Input/output:	16 x 4-pole e-CON connector for devices
Indicators		POWER LED (green), EVENT LED (yellow), ALARM LED (red), I/O LED (orange)
Display		OLED (Display language: English, Japanese, Simplified Chinese, Traditional Chinese, Korean, French, Spanish, German, Portuguese, Italian)
Environmental resistance	Operating temperature/humidity	0 to +55°C/5 to 95% RH *2 (no freezing or condensation)
	Storage temperature/humidity	-25 to +75°C/5 to 95% RH (no freezing or condensation)
	Vibration resistance	IEC 61131-2 compliant
	Shock resistance	IEC 61131-2 compliant
	Atmosphere	No corrosive gas
	Operating altitude	0 to 2000 m
	Installation location	In door use
	Degree of protection	IP20 (Not UL Certied)
Overvoltage category		II or less
Pollution degree		2 or less
Applicable regulations	EMC	EMC Directive (2014/30/EU)
	Environment	RoHS Directive (2011/65/EU), China RoHS (Regulation 32)
Applicable standard		EN 61131-2
NRTL certification		UL Listed Programmable Controllers Certified for US and Canada
Company standards		Noise resistance: Feilen Level 3 cleared
Compatible DIN rail		TH35-7.5Fe, TH35-7.5Al
Cable Length		Between power supply and IO-Link master: Maximum 30m Between IO-Link Master and IO-Link device: Maximum 20m
Compatible wire		Power terminal block: AWG 24 to 16 e-CON connector for devices: Depends on e-CON plug specifications
Material		Housing: PC Keys and DIN rail mounting hook: POM Terminal block: PA e-CON connector for devices: LCP
Weight		Approx. 165 g (including terminal block, when not wired)
Included accessories		Instruction manual, Power terminal block 2x Protective caps for RJ45 connector (attached to the unit)

\*1. Use a Class 2 power supply or a power supply compliant with SELV (Safety Extra-Low Voltage) circuit and LIM (Limited Energy Circuit) circuit standards.  
\*2. When used as a UL certified product, the following must be applied.  
Total value of I/O output load current: 2.0A/16 points or less, specified ambient temperature: 0 to 55°C  
2.5A/16 points or less, specified ambient temperature: 0 to 50°C

Functional Specifications

Item	Specifications
Basic IO-Link communication	Cyclic communication, acyclic communication, event communication
Allocation of process data of IO-Link devices to this product	Process data can be automatically allocated from the actual IO-Link devices or manually set for each channel
IO-Link devices verification	For each channel, the type of connected IO-Link device (*) can be verified with that of the IO-Link device registered in this product. * Model ID only, model ID plus serial number, or model ID plus model name can be selected for each channel.
I/O operation for communication errors	Holding or clearing process data or PNP/NPN output data can be specified when IO-Link communication or field network communication is disconnected.

Field Network Communication Specifications

Item	Specifications
Network type	Selectable in the setting menu: - EtherNet/IP (default) - Ethernet and Modbus/TCP - CC-Link IE Field Basic - EtherCAT
Communication port	2× RJ45 socket

EtherNet/IP specifications

Item	Specifications
Field network communication protocol	EtherNet/IP
Applicable version	Ethernet/IP adapter
Transmission speed	10 M (10BASE-T), 100 Mbps (100BASE-TX)
Cable	Twisted pair cable (STP) Category 5/5e or higher
Ethernet connection type	Star configuration, linear bus configuration, or device level ring configuration
Distance between nodes	Within 100 m
IP address configuration	Static IP address only

Ethernet and Modbus/TCP specifications

Item	Specifications
Field network communication protocol	Modbus TCP/UDP communication or socket communication
Transmission speed	10 M (10BASE-T), 100 Mbps (100BASE-TX)
Cable	Twisted pair cable (STP) Category 5/5e or higher
Ethernet connection type	Star configuration, linear bus configuration

CC-Link IE Field Basic specifications

Item	Specifications
Field network communication protocol	CC-Link IE Field Basic communication or UDP socket communication
Transmission speed	100 Mbps (100BASE-TX)
Cable	Twisted pair cable (STP) Category 5/5e or higher
Ethernet connection type	Star configuration, linear bus configuration

EtherCAT specifications

Item	Specifications
Field network communication protocol	EtherCAT
Transmission speed	100 Mbps (100BASE-TX)
Cable	Twisted pair cable (STP) Category 5/5e or higher
Ethernet connection type	Daisy chain configuration, branch wiring configuration and ring type.

IO-Link Specifications

Item	Specifications
Basic IO-Link communication	Cyclic communication, acyclic communication, event communication
IO-Link revision	1.1 and 1.0
Communication speed	COM1 (4800 bps) / COM2 (38400 bps) / COM3 (230.4 kbps)
Physical layer	IO-Link-compliant
Minimum cycle time	0.3 ms
Number of ports	16
I/O assignment	Switchable in the following 6 modes by setting for each channel: • Disable mode • IO-Link communication mode • SIO(PNP input) mode • SIO(NPN input) mode • SIO(PNP output) mode • SIO(NPN output) mode

Input/Output Specifications

Item	Specifications
Rated input voltage	24 VDC +/-20% (SELV and LIM power supplies, or UL 1310 Class 2 power supplies) *1
Rated input current (typical)	PNP: 5.5 mA, NPN: 5.0 mA
Insulation method	Transformer, photocoupler insulation
Maximum number of simultaneous input points	100% simultaneous ON

Item		Specifications
Voltage and current at ON		PNP: 15 VDC or higher, 5.5 mA or higher, NPN: 13 VDC or higher, 3.0 mA or higher Note: NPN is the voltage seen from the 24 V side.
Voltage and current at OFF		PNP: 10 VDC or less, 2.0 mA or less, NPN: 8 VDC or less, 2.0 mA or less Note: NPN is the voltage seen from the 24 V side.
Input resistance		PNP: 5.5 mA with constant current circuit load, NPN: 4.7 kΩ
Input response time		0 ms, 0.1 ms, 1 ms, 5 ms, 10 ms, 20 ms (default: 0 ms)
Functions	Input related	• Input hold time • Input filter time • Encoder input (high-speed counter function)

\*1. Use a class 2 power supply or a power supply that conforms to the SELV (Safety Extra-Low Voltage) and LIM circuit (Limited Energy Circuit).

Output Specifications

Item	Specifications
Rated load voltage	10.8 to 26.4 VDC (SELV and LIM power supplies, or UL 1310 Class 2 power supplies) *1
Maximum output load current	Per point: 0.2 A max. Total of 16 points: 2.5 A or less*2
Maximum inrush current	Current limitation by over-current protection function (0.5A)
OFF output leakage current	0.1 mA or less (0.2 mA or less for NPN output)
Maximum output voltage drop (when ON)	PNP: 1.8 V, NPN: 1.6 V
Surge suppressor	Zener diode
Output response time	0.1 ms or less

\*1. Use a class 2 power supply or a power supply that conforms to the SELV (Safety Extra-Low Voltage) and LIM circuit (Limited Energy Circuit).  
\*2. When used as a UL certified product, the following must be applied.  
Total value of I/O output load current: 2.0A/16 points or less, specified ambient temperature: 0 to 55°C  
2.5A/16 points or less, specified ambient temperature: 0 to 50°C

9. Reference Manual

For details, refer to the following manual.

Manual name		No.
IO-Link Master UR-ES16DT, UR-EE16DT User's Manual	Common Edition	UR-ES_UM-E-xxx-xxxx
	EtherNet/IP Edition	UR-ES-EI_UM-E-xxx-xxxx
	Ethernet and Modbus/ TCP Edition	UR-ES-EM_UM-E-xxx-xxxx
	CC-Link IE Field Basic Edition	UR-ES-CL_UM-E-xxx-xxxx
	EtherCAT Edition	UR-ES-EC_UM-E-xxx-xxxx

\*This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

- Support for the China RoHS directive

For details on the support for the China RoHS (the Administrative Measure on the Control of Pollution Caused by Electronic Information Products), see the following website.  
[https://www.optex-fa.com/rohs\\_cn/](https://www.optex-fa.com/rohs_cn/)

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