

# ETHERNET – Overview

## 5) Pin Assignment and Installation

RJ45 is the most common ETHERNET connector and is available both shielded and unshielded. All pins of the RJ45 connector are used for 1000 Mbit/s (4-pair transmission). Four pins are used for 10/100 Mbit/s (2-pair transmission).

According to the EN 50173 standard, two color codes are defined for installation: T568A and T568B. It makes no difference which color code is used, however the same code should be used consistently throughout the entire installation. Mixing up the two color codes will result in malfunctions.

### Pin assignment RJ 45 - Color code according to EN 50173 – hard wiring:

ETHERNET cables									
Star Quad (ProfiNet)			Regular Twisted Pair						
PIN#	100BASE-TX	Color code	10BASE-T, 100BASE-TX	1000BASE-T		Color code T568A		Color code T568B	
1	Transmit+	yellow	Transmit+	BI_DA+	(bidirectional)	WH/GN		WH/OG	
2	Transmit-	orange	Transmit-	BI_DA-	(bidirectional)	GN		OG	
3	Receive+	white	Receive+	BI_DB+	(bidirectional)	WH/OG		WH/GN	
4	-		-	BI_DC+	(bidirectional)	BU		BU	
5	-		-	BI_DC-	(bidirectional)	WH/BU		WH/BU	
6	Receive-	blue	Receive-	BI_DB-	(bidirectional)	OG		GN	
7	-		-	BI_DD+	(bidirectional)	WH/BN		WH/BN	
8	-		-	BI_DD-	(bidirectional)	BN		BN	

## 6) ETHERNET Categories and Classes

	ProfiNet®	CAT 5e	CAT 5e	CAT 6	CAT 6a	CAT 7
Class	D	D	De	E	Ea	F
Construction	2 pair (AWG 22)	2 pair (AWG 24, AWG 26)	4 pair (AWG 24, AWG 26)	4 pair (26 AWG)	4 pair (26 AWG)	4 pair (26 AWG)
Speed	10/100 Mbit/s	10/100 Mbit/s	10/100/1000 Mbit/s	10/100/1000 Mbit/s	10/100/1000/10000 Mbit/s	10/100/1000/10000 Mbit/s
LAN Applications (max.)	10BASE-T (2 pair) 100BASE-TX (2 pair)	10BASE-T (2 pair) 100BASE-TX (2 pair)	10BASE-T (2 pair) 100BASE-TX (2 pair) 1000BASE-T (4 pair)	10BASE-T 100BASE-TX 1000BASE-T 10GBASE-T	10BASE-T 100BASE-TX 1000BASE-T 10GBASE-T	10BASE-T 100BASE-TX 1000BASE-T 10GBASE-T
Nominal impedance	100 Ohm	100 Ohm	100 Ohm	100 Ohm	100 Ohm	100 Ohm
Bandwidth	100 MHz	100 MHz	100 MHz	250 MHz	500 MHz	600 MHz
Max. length	328 ft (10BASE-T) 328 ft (100BASE-TX)	328 ft (10BASE-T) 328 ft (100BASE-TX)	328 ft (10BASE-T) 328 ft (100BASE-TX) 328 ft (1000BASE-T)	328 ft (10BASE-T) 328 ft (100BASE-TX) 328 ft (1000BASE-T)	328 ft (10BASE-T) 328 ft (100BASE-TX) 328 ft (1000BASE-T) 328 ft (10GBASE-T)	328 ft (10BASE-T) 328 ft (100BASE-TX) 328 ft (1000BASE-T) 328 ft (10GBASE-T)
CAT compatibility	CAT 5e	CAT 5e	CAT 5e	CAT 5e	CAT 5e, CAT 6	CAT 5e, CAT 6, CAT 6a
ISO/IEC standard	-	ISO/IEC 11801	ISO/IEC 11801	ISO/IEC 11801	Amendment 1 to ISO/IEC 11801	ISO/IEC 11801
ANSI/TIA standard	-	ANSI/TIA-568-B	ANSI/TIA-568-C.2	ANSI/TIA-568-C.2	ANSI/TIA-568-C.2	Not recognized