

Your Global Automation Partner



TBEN-LF EtherNet/IP™ Configuration Guide

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1 General Information

1.1 About these instructions

The following configuration guide describes the setup, functions, and use of the TBEN-LF stations. It helps you to plan, design, and implement the system for its intended purpose.

Note*: Please read this manual carefully before using the system. This will prevent the risk of personal injury or damage to property or equipment. Keep this manual safe during the service life of the system. If the system is passed on, be sure to transfer this manual to the new owner as well.

1.2 Explanation of symbols used

1.2.1 Warnings

Action-related warnings are placed next to potentially dangerous work steps and are marked by graphic symbols. Each warning is initiated by a warning sign and a signal word that expresses the gravity of the danger. The warnings have absolutely to be observed:



DANGER!

DANGER indicates an immediately dangerous situation, with high risk, the death or severe injury, if not avoided.



WARNING!

WARNING indicates a potentially dangerous situation with medium risk, the death or severe injury, if not avoided.



ATTENTION!

ATTENTION indicates a situation that may lead to property damage, if it is not avoided.



NOTE

In NOTES you find tips, recommendations and important information. The notes facilitate work, provide more information on specific actions and help to avoid overtime by not following the correct procedure.

➤ CALL TO ACTION

This symbol identifies steps that the user has to perform.

➔ RESULTS OF ACTION

This symbol identifies relevant results of steps

Italic Text in Italic is associated with the function of the third party software or application (E.g. *Controller Organizer*)

1.3 Contents

The TBEN-LF EtherNet/IP configuration guide provides information about configuration of the following modules:

- TBEN-LF-16DIP
- TBEN-LF-16DOP
- TBEN-LF-8DIP-8DOP
- TBEN-LF-16DXP

The “TBEN-LF”, assigned to the product family, is used throughout the guidet to describe the common features of the devices.

The complementary documentation and files:

- TBEN-LF data sheets
- EDS files revision 2.7

The Rockwell PLC demo:

- 1756-L72 controller v30
- 1756-EN2TR Ethernet Bridge
- Studio5000 Logic Designer V30

1.4 Feedback about these instructions

We make every effort to ensure that these instructions are as informative and as clear as possible. If you have any suggestions for improving the design or if some information is missing in the document, please send your suggestions to techdoc@turck.com.

1.5 Technical support

For additional support, email inquiries to appsupport@turck.com, or call Application Support at 763-553-7300, Monday-Friday 8AM-5PM CST.

2 Getting Started

2.1 About this document

The configuration guide provides information about configuration of the TBEN-LF including:

- Address switches
- IP address assignment
- Configuration options with Rockwell and Omron PLCs



NOTE

The device data sheet and technical information is available for download at www.turck.us

2.2 Factory default IP address

The TBEN-LF default rotary switches are set at 000 with default IP address of:

- IP address: 136.129.1.1
- Netmask: 255.255.0.0



NOTE

Position 000 is used to “Restore” or recover the default IP address if lost or forgotten.

2.3 Address switches

The device has 3 rotary address switches (see Figure 2.2 below). The position of the them determines the mode of operation.

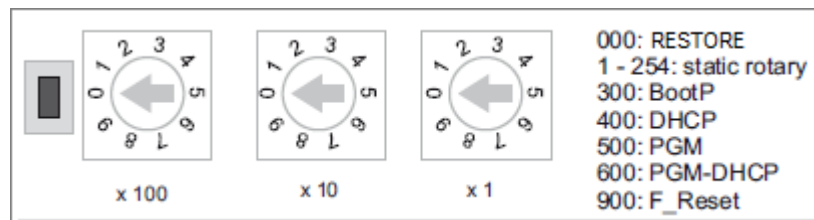


Figure 2.1 – Rotary switches



NOTE

- Protective cover opened - **Protection class IP65/IP67/IP69K not warranted**
- Screw the protective cover over the rotary coding-switches firmly
 - Check if seal of the protective cover is correctly placed
-

Table 2.1 below provides a description of the device action when switches are set to a specific position and the device is powered up.

Switch position	Mode	Description
000	Restore	IP address is restored to 136.129.1.1
001,...,254	Static rotary mode	Sets the last octet of IP address in range [1...254].
300	BOOTP	BOOTP client is active and requesting an IP address
400	DHCP	DHCP client is active and requesting an IP address
500	PGM	Device comes up with the last IP address saved in EEPROM. IP address is programmable.
600	PGM-DHCP	DHCP client is active and requesting an IP address. When IP address is acquired, the device transitions to PGM mode.
900	Factory Reset	Device is reset to the factory default setup.

Table 2.2: Address Modes

2.3.1 Static rotary mode

Set the last octet of the IP address using the rotary switches in the range [xxx = 1,..., 254], e.g. 136.129.1.**120** or 10.10.10.**120**.

2.3.2 BOOTP mode (300) and DHCP mode (400)

When rotary switches are set to either 300 or 400, the device BOOTP or DHCP client is active, requesting an IP address assignment. The setup procedure - from any switch position:

- Turn OFF device power and set switches to 300 or 400
- Turn ON device power
- Start BOOTP / DHCP server and assign IP address
- Wait for the acknowledgement from the server
- Set rotary switches to either the last octet of the IP address or to 500 (PGM)
- Cycle the power.

2.3.3 PGM mode (500)

When rotary switches are set to 500 while device is powered, the current IP address, Netmask and Gateway addresses are saved into the EEPROM. The IP address is programmable and may be changes using TURCK Service Tool. The setup procedure – from any switch position set switches to 500 and then cycle the power.

2.3.4 PGM-DHCP mode (600)

When out-of-box TBEN-LF is powered for the first time, while the rotary switches are set to 600, the device DHCP client is enabled and running. Use any DHCP server to assign the IP address. When IP address is acquired, the DHCP client is disabled and device transitions to the PGM mode.

2.3.5 Factory Reset mode (900)

When rotary switches are set to 900 and the power is cycled, the device resets itself to the factory default mode (out-of-box). The QC setup is deleted; the ETH1 and ETH2 ports are set to Autonegotiation and Auto-MDIX.

From any switch position:

- Set address switches to 900
- Cycle the power of the device and wait 10sec
- Set switches to either static address 1...254 or specific mode of operation 300/400/500/600
- Cycle the power.

2.3.6 Restore IP Address (000)

When rotary switches are set to 000 and the power is cycled, the IP address is set to 136.129.1.1. The device preserves custom data /setup while restoring IP address.

From any switch position:

- Set the address switches to 000
- Cycle the power of the device and wait 10sec
- Set switches to either static position or 300/400/500/600 mode
- Cycle the power.

2.4 TURCK Service Tool (TST)

The TURCK Service Tool can be downloaded from the TURCK Web site:

- Enter “TURCK Service Tool” in the search field
- Follow the link
- Download and install the tool
- The tool is used for the management of the TURCK devices only

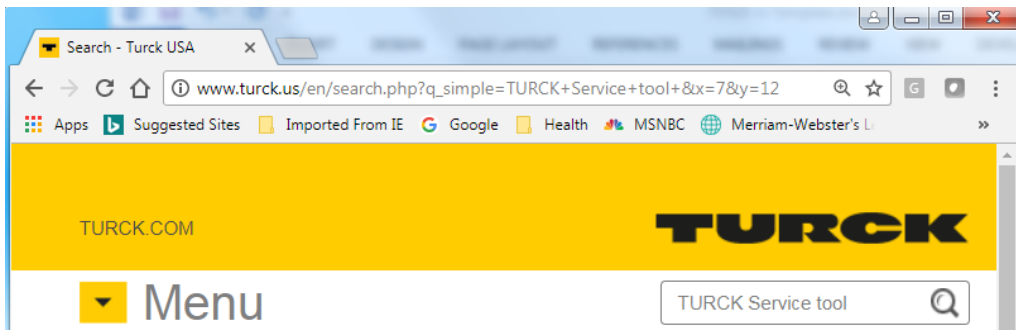


Figure 2.3 – TURCK Web page

The tool has a set of action buttons in the tool bar:

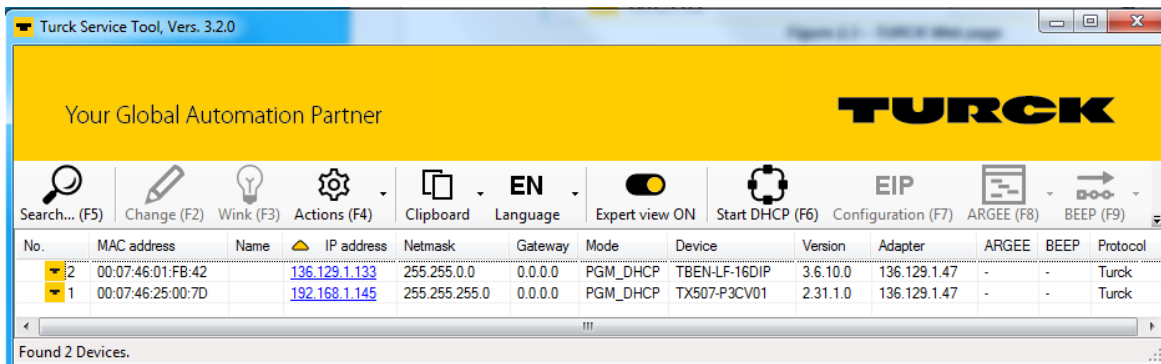


Figure 2.4 – Service Tool

The tool features are:

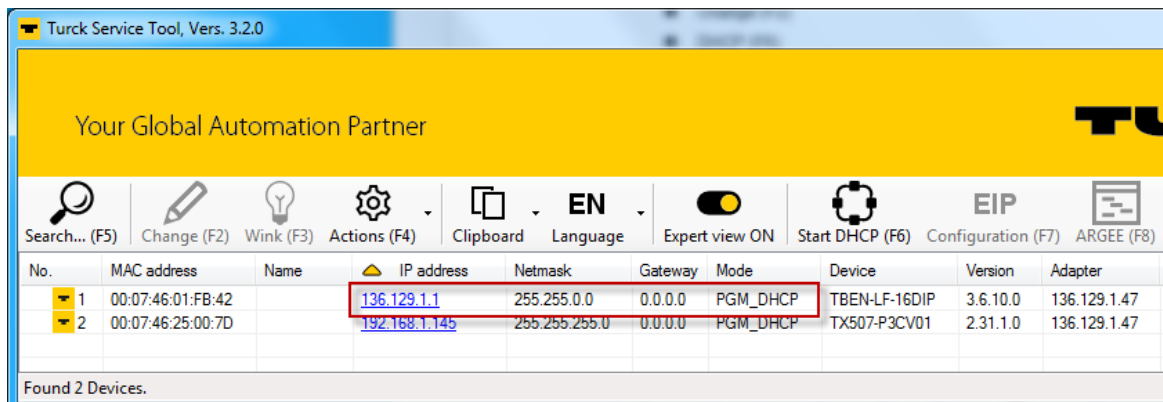
- It scans for existing devices (F5). All devices are found by using DCP (PROFINET Standard) and IBTP (TURCK Service Protocol) protocols. The IBTP protocol provides extended information such as FW version and operating mode improved scanning are read out of TURCK devices and displayed.
- It set an IP address (F2)
- It locates device using Wink function (F3)
- Actions menu that resets the device to the factory default or reset network (F4)
- It assigns the PROFINET name to the device
- It supports Clipboard menu
- Expert view, when enabled, provides additional functions like DHCP Server, ARGEE and BEEP features by TURCK multiprotocol device
- DHCP server
- ARGEE status
- BEEP status

Frequently used action buttons / functions are:

- Search (F5)
- Change (F2)
- DHCP (F6)
- Action (F4)

2.4.1 Search (F5)

The *Search* is used to identify TURCK multiprotocol device on the continuous physical network segment, including devices connected to the layer 2 switches. The IP address 136.129.1.1 appears when the device is in the PGM-DHCP mode and DHCP client is active. The IP address transitions to 0.0.0.0 when DCHP server is started.



No.	MAC address	Name	IP address	Netmask	Gateway	Mode	Device	Version	Adapter
1	00:07:46:01:FB:42		136.129.1.1	255.255.0.0	0.0.0.0	PGM_DHCP	TBEN-LF-16DIP	3.6.10.0	136.129.1.47
2	00:07:46:25:00:7D		192.168.1.145	255.255.255.0	0.0.0.0	PGM_DHCP	TX507-P3CV01	2.31.1.0	136.129.1.47

Found 2 Devices.

Figure 2.5 – Search function

2.4.2 DHCP Server (F6)

The IP address may be assigned to the device using DHCP server (F6). Procedure:

- *Search* (F5) to discover device with address 136.129.1.1
- *Start DHCP* server (F6)
- Select network adapter in the *DHCP server settings* page and click *Start DHCP*

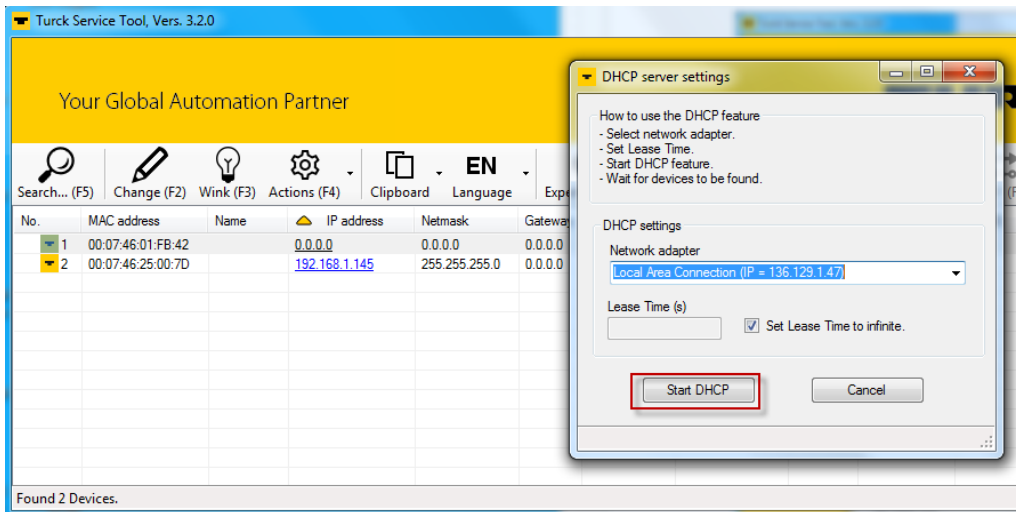


Figure 2.6 – Initialize DHCP server

- Highlight the device with 0.0.0.0 IP address

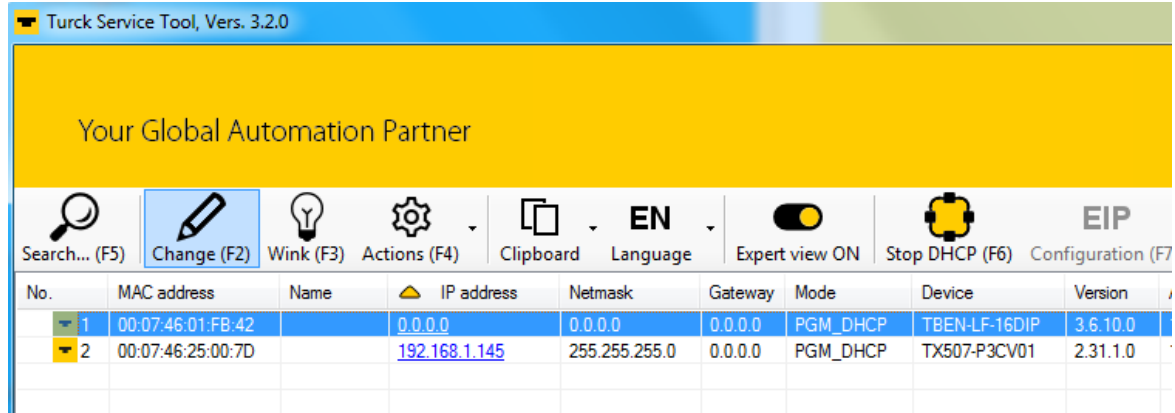


Figure 2.7 – Device DHCP client active view

- Click Change (F2); A "Change device configuration" pop-up page appears
- Assign IP address and click at Set in device button

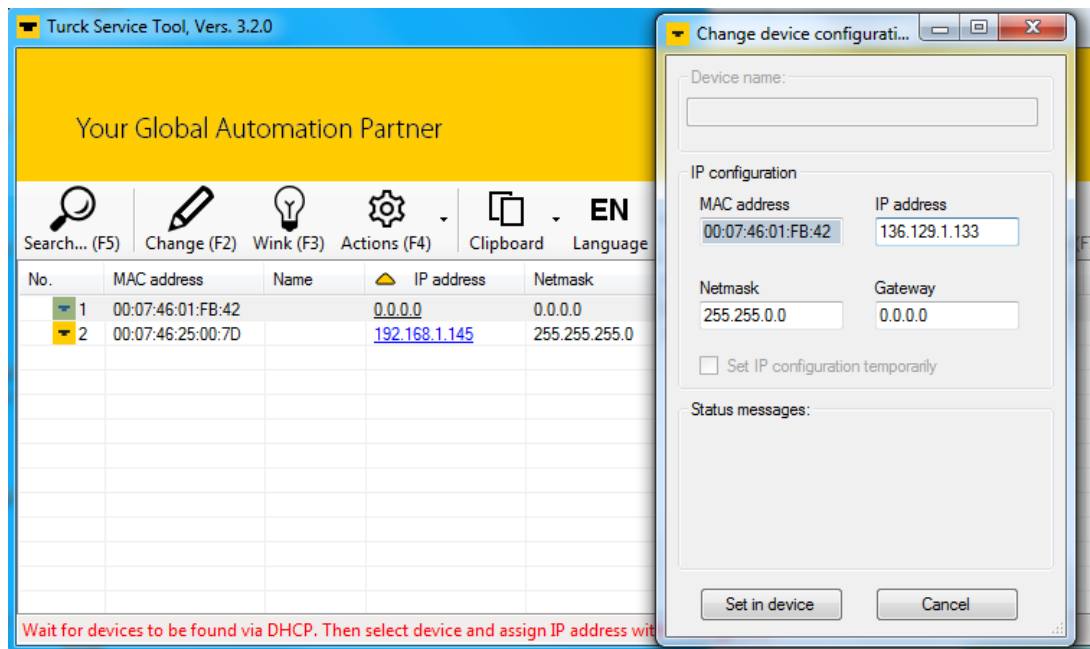


Figure 2.8 – Set IP Configuration

- Click at *Stop DHCP (F6)* button

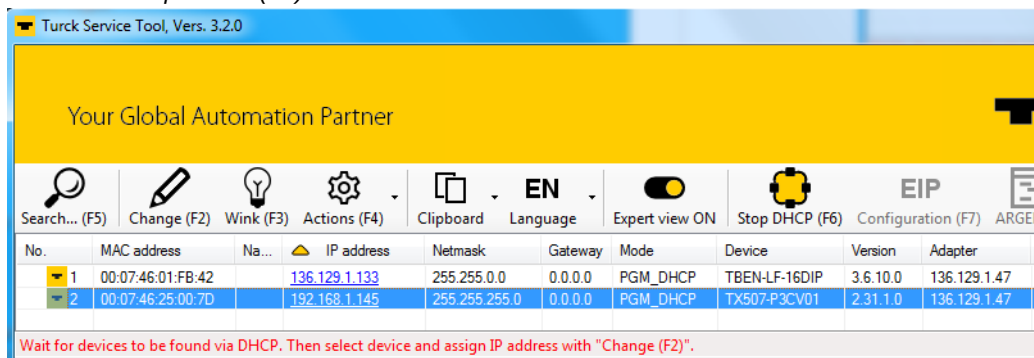


Figure 2.9 – Stop DHCP server

3 TBEN-LF Quick View

3.1 Installation instruction and pinout

The summary of the device installation guidance, connector's assignment, power distribution and grounding requirements are as follows.

3.1.1 Dimensions and connector assignment

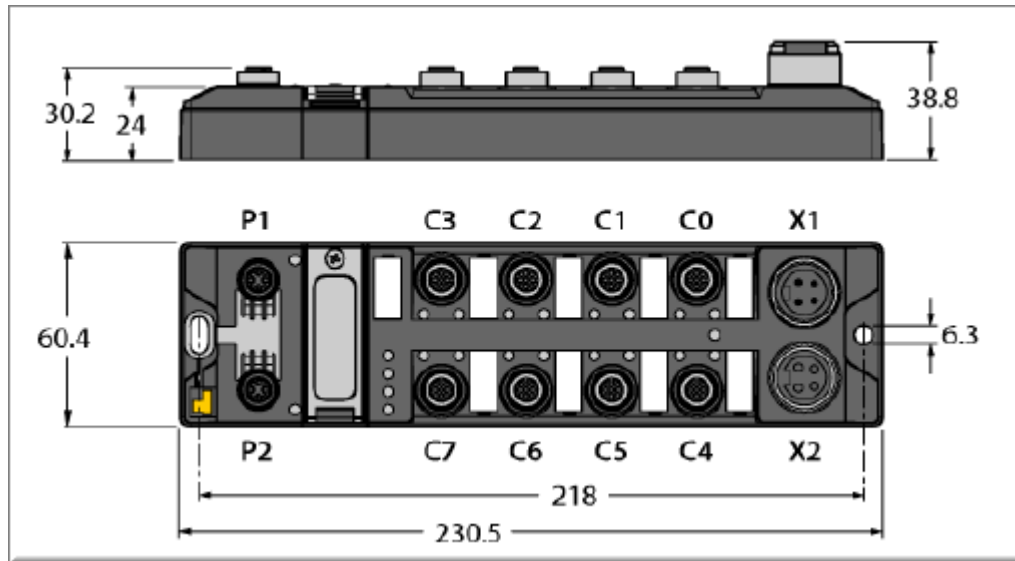


Figure 3.1 – Connector assignment

3.1.2 Ethernet P1 and P2 connectors pin assignment

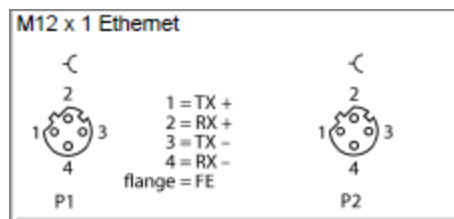


Figure 3.2 – P1 and P2 connector pinout

3.1.3 Discrete IO connector pin assignment

➤ Discrete inputs

Connect digital sensors to the device according to the pin assignment.

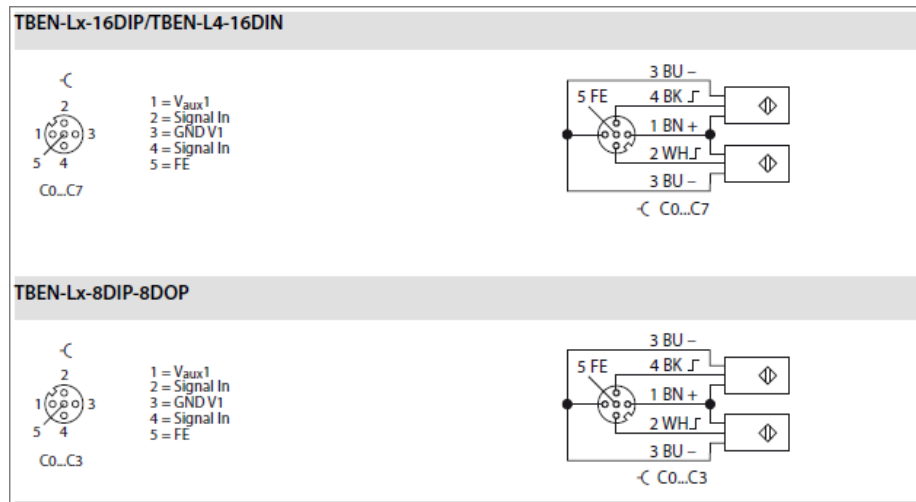


Figure 3.3 – Discrete input wiring diagram

➤ Discrete outputs

Connect digital actuators to the device according to the pin assignment.

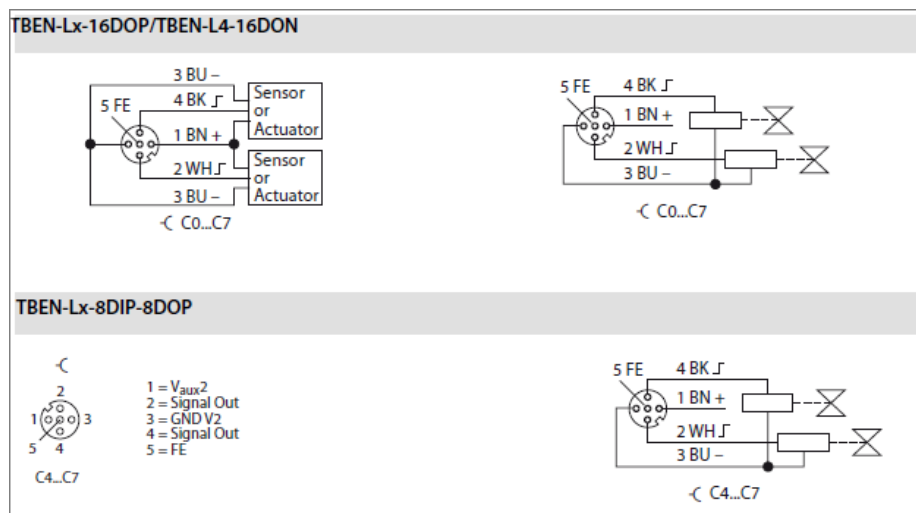


Figure 3.4 – Discrete output wiring diagram

➤ **Discrete combined IO**

Connect digital combined IO to the device according to the pin assignment

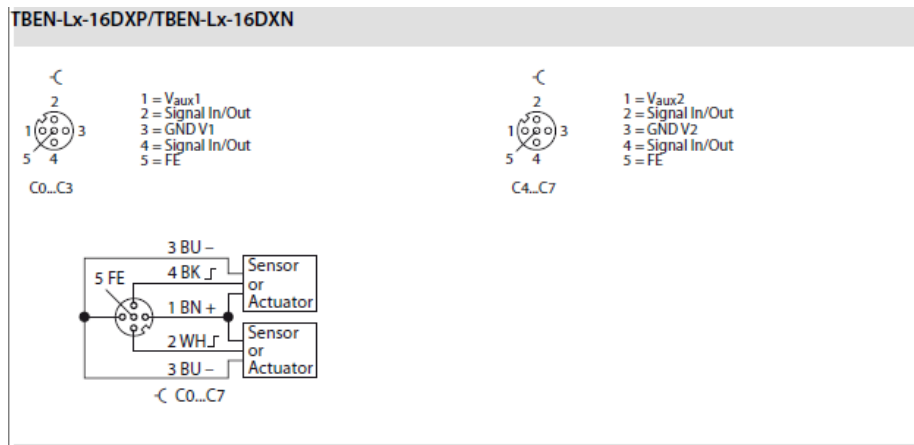


Figure 3.5 – Discrete combined IO wiring diagram

3.1.4 Power connector pin assignment and distribution

➤ Connect power to the device according to the pin assignment

Pin assignment

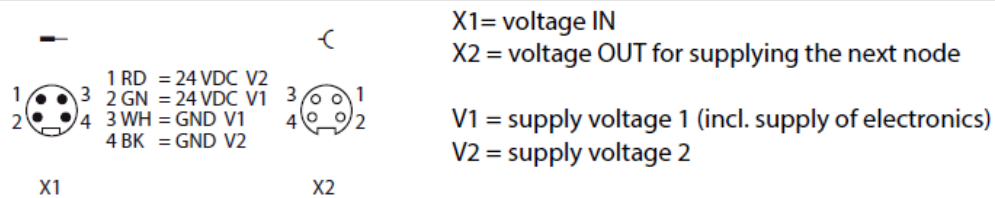


Figure 3.6 – X1 and X2 connector pinout

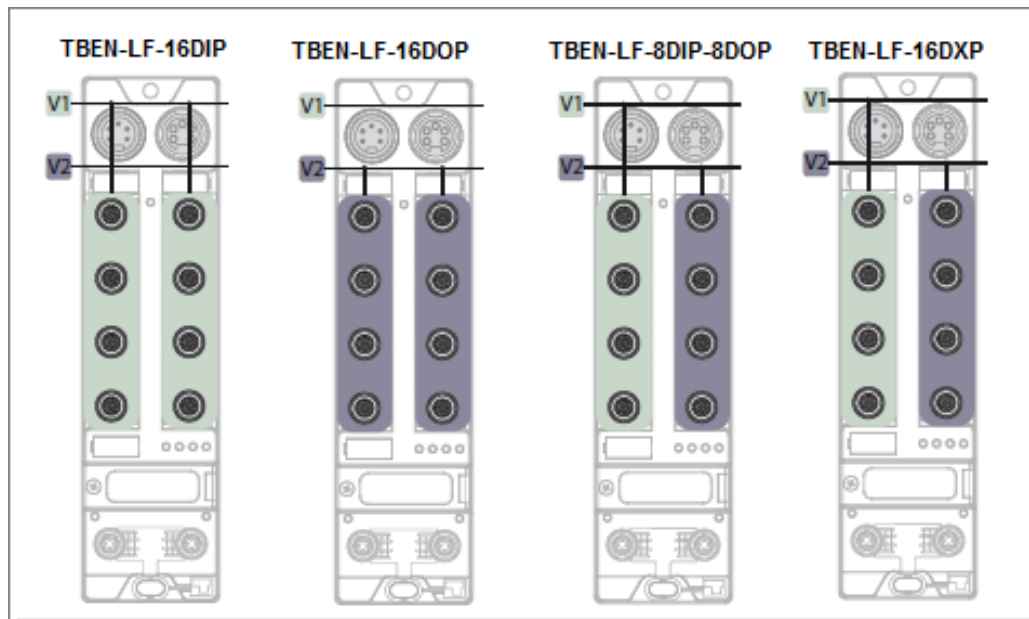


Figure 3.7 – V1 and V2 power distribution

3.1.5 LEDs

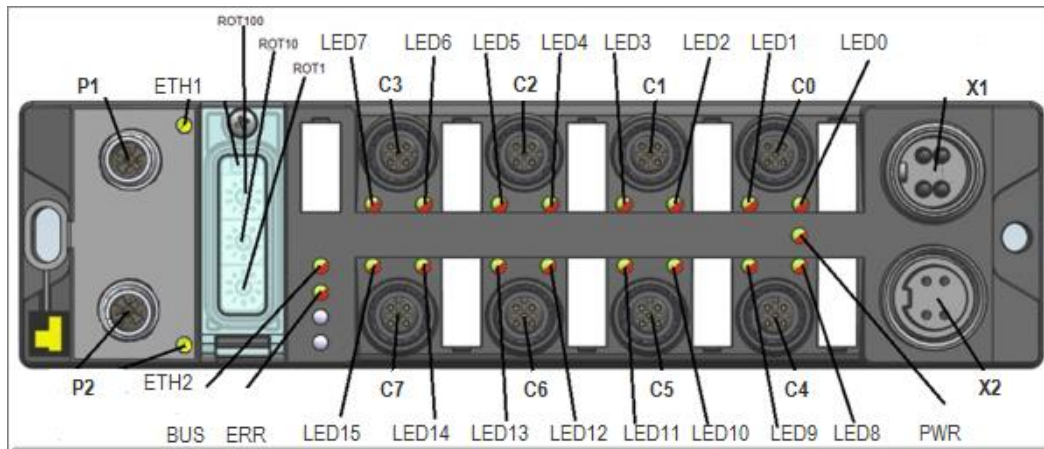


Figure 3.8 – LED assignment

LED	Color	Status	Meaning	Remedy
PWR	green	off	V1 missing or < 18 VDC	Check V1
		on	V1 and V2 OK	
		blinking	V2 missing or < 18 VDC	Check V2
ETHx	green	on	Link established, 100Mbps	
		blinking	Ethernet traffic, 100Mbps	
	yellow	on	Link established, 10Mbps	
		blinking	Ethernet traffic, 10Mbps	
	none	off	No Ethernet link	Check Ethernet connection
ERR	green	on	No diagnostic message	
	red	on	Diagnostic message pending	
BUS	green	on	Active connection to a master	
		blinking	Device is ready for operation	
	red	on	IP address conflict	Check duplicate IP address
			Restore mode (900)	Check setup of rotary switches
			Connection timeout	Check media
		blinking	Blink / wink command active	
	red/green	on	Autonegotiation	
			BootP/DHCP client active	Waiting for IP address assignment

Figure 3.9 – Module LED behavior

TBEN-LF-16DIP LED Status I/O				
LED	Color	Status	Meaning	Remedy
LED 0...15	green	on	Input active	
		off	Input off	
	red blinking		Overcurrent at input	Check short condition

TBEN-LF-16DOP LED Status I/O				
LED	Color	Status	Meaning	Remedy
LED 0...15	green	on	Output active	
		off	Output off	
	red blinking		Overcurrent at output	Check short condition

TBEN-LF-16DXP LED Status I/O				
LED	Color	Status	Meaning	Remedy
LED 0...15	green	on	IO signal active	input or output
		off	IO signal off	input or output
	red	blinking	Overcurrent at input	Check input short condition
		Solid	Overcurrent at output	Check output short condition

TBEN-LF-8DIP-8DOP LED Status I/O				
LED	Color	Status	Meaning	Remedy
LED 0...7	green	on	Input active	
		off	Input off	
	red blinking		Overcurrent at input	Check short condition
LED 8...15	green	on	Output active	
		off	Output off	
	red		Overcurrent at output	Check short condition

Figure 3.10 – IO LED behavior

3.2 IO data maps

■ TBEN-LF-16DIP

TBEN-LG-16DIP																	
Input Map	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
Word 0		FCE	ETH2	ETH1	CFG	COM	V1		V2								DIAG
Word 1	I-15	I-14	I-13	I-12	I-11	I-10	I-9	I-8	I-7	I-6	I-5	I-4	I-3	I-2	I-1	I-0	
Word 2			EC 5	reserved											EM 0		
Word 3	reserved								Error C7	Error C6	Error C5	Error C4	Error C3	Error C2	Error C1	Error C0	
Output Map	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
Word 0	reserved																

■ TBEN-LF-16DOP

TBEN-LG-16DOP																	
Input Map	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
Word 0		FCE	ETH2	ETH1	CFG	COM	V1		V2							DIAG	
Word 1			EC 5	reserved										EM 0			
Word 2	OSC 7	OSC 6	OSC 5	OSC 4	OSC 3	OSC 2	OSC 1	OSC 0	reserved								
Word 3	reserved								OSC 15	OSC 14	OSC 13	OSC 12	OSC 11	OSC 10	OSC 9	OSC 8	
Output Map	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
Word 0	reserved																
Word 1	O-15	O-14	O-13	O-12	O-11	O-10	O-9	O-8	O-7	O-6	O-5	O-4	O-3	O-2	O-1	O-0	

■ TBEN-LF-8DIP-8DOP

TBEN-LG-8DIP-8DOP																	
Input Map	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
Word 0		FCE	ETH2	ETH1	CFG	COM	V1		V2								DIAG
Word 1	reserved								I-7	I-6	I-5	I-4	I-3	I-2	I-1	I-0	
Word 2			EC 5	reserved											EM 0		
Word 3	OSC-7	OSC-6	OSC-5	OSC-4	OSC-3	OSC-2	OSC-1	OSC-0	reserved				Error C3	Error C2	Error C1	Error C0	
Output Map	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
Word 0	reserved																
Word 1	reserved								O-7	O-6	O-5	O-4	O-3	O-2	O-1	O-0	

■ TBEN-LF-16DXP

TBEN-LG-16DXP																	
Input Map	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
Word 0		FCE	ETH2	ETH1	CFG	COM	V1		V2								DIAG
Word 1	I-15	I-14	I-13	I-12	I-11	I-10	I-9	I-8	I-7	I-6	I-5	I-4	I-3	I-2	I-1	I-0	
Word 2			EC 5	reserved												EM 0	
Word 3	OSC 7	OSC 6	OSC 5	OSC 4	OSC 3	OSC 2	OSC 1	OSC 0	Error C7	Error C6	Error C5	Error C4	Error C3	Error C2	Error C1	Error C0	
Word 4	reserved								OSC 15	OSC 14	OSC 13	OSC 12	OSC 11	OSC 10	OSC 9	OSC 8	
Output Map	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
Word 0	reserved																
Word 1	O-15	O-14	O-13	O-12	O-11	O-10	O-9	O-8	O-7	O-6	O-5	O-4	O-3	O-2	O-1	O-0	

IO Map key:

Device status word	Meaning
DIAG	Module Diagnostics Available
V2	Undervoltage Field Supply V2 <18V
V1	Undervoltage Field Supply V1 <18V
COM	Modulebus Communication Lost
CFG	Modulebus Configuration Error
ETH1	Ethernet Port 1 Errors
ETH2	Ethernet Port 2 Errors
FCE	Force Mode Enabled
Device scheduled diagnostics	
EM0	Internal slot 0
EC5	Diagnostics active
Error-Cx	Input short at connector Cx [x=0, 1, ..., 7]
OSC-x	Output short at condition at output x [x=0, 1, ..., 15]
Device IO channels	
I-x	Input channel [x=0, 1, ..., 15]
O-x	Output channel [x=0, 1, ..., 15]

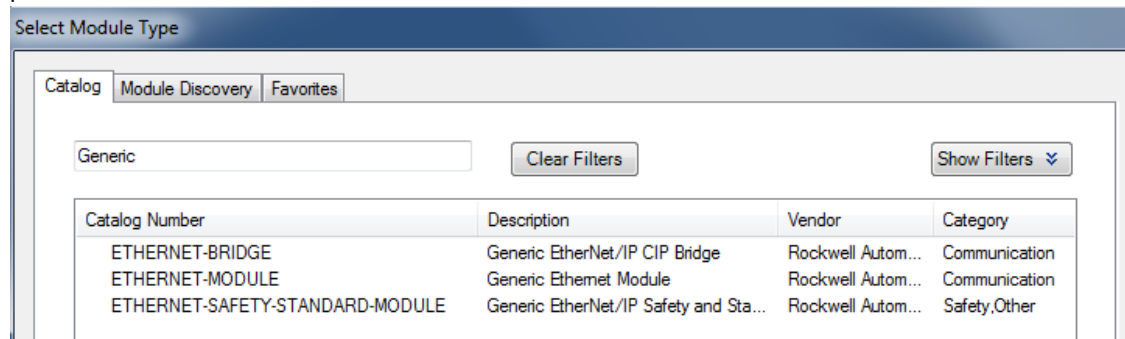
■ TBEN-LG Configuration assembly data and size

Configuration Assembly Data								
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	reserved							
Byte 1	reserved							
Byte 2	reserved							
Byte 3	reserved							
Byte 4	reserved							
Byte 5	reserved							
Byte 6	reserved							
Byte 7	reserved							
Byte 8	reserved							
Byte 9	reserved							QC
Byte 10	reserved							
Byte 11	reserved							
Byte 12	reserved							
Byte 13	reserved							
Byte 14	reserved							
Byte 15	reserved							

QC = QC enable / disable bit

3.3 Generic device configuration

The TBEN-LF is configured with the Rockwell PLCs using “*ETHERNET MODULE – Generic Ethernet Module*” profile:



TBEN-LF configuration requirements:

- Catalog Number: Generic Ethernet Module
- Comm.Format: Data – INT
- Select “Connection Parameters” listed for specific device as follows:

Device	Connection Parameters	Assembly Instance	Data Size
TBEN-LF-16DIP	Input	103	4 [16-bit]
	Output	104	1 [16-bit]
	Configuration	106	16 [8-bit]
TBEN-LF-16DOP	Input	103	4 [16-bit]
	Output	104	2 [16-bit]
	Configuration	106	16 [8-bit]
TBEN-LF-8DIP-8DIP	Input	103	4 [16-bit]
	Output	104	2 [16-bit]
	Configuration	106	16 [8-bit]
TBEN-LF-16DXP	Input	103	5 [16-bit]
	Output	104	2 [16-bit]
	Configuration	106	16 [8-bit]

Figure 11: TBEN-LF connection summary

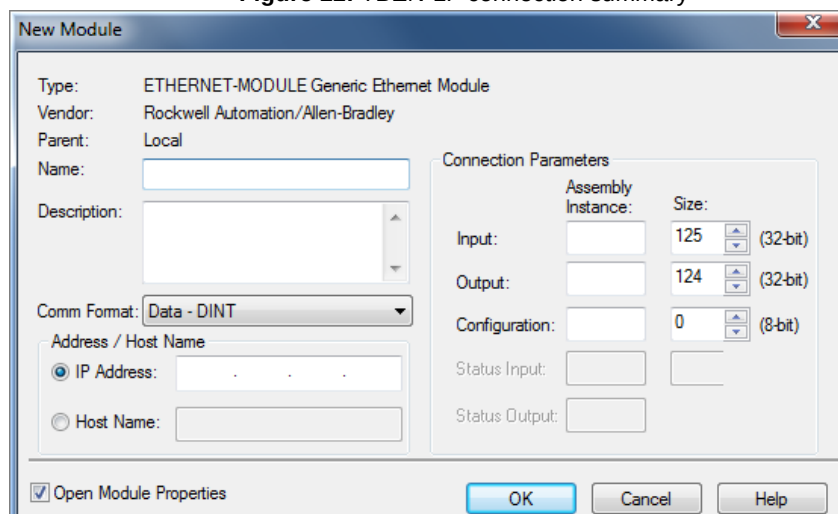


Figure 12: New Module page

3.3.1 TBEN-LF-16DIP

The screenshot shows the 'Module Properties Report: Local (ETHERNET-MODULE 1.001)' window. The 'General' tab is selected. The 'Name' field is 'TBEN_16DIP'. The 'Description' field shows 'Type: TBEN-LF-16DIP', 'Id: 100003912', and 'EIP: V2.7.35.x'. The 'Comm Format' is 'Data - INT'. The 'Address / Host Name' section has 'IP Address' selected with the value '136 . 129 . 1 . 31'. The 'Connection Parameters' section shows 'Input: 103' with 'Size: 4 (16-bit)', 'Output: 104' with 'Size: 1 (16-bit)', and 'Configuration: 106' with 'Size: 16 (8-bit)'. 'Status Input' and 'Status Output' are empty.

Parameter	Value	Size	Bit Width
Input	103	4	16-bit
Output	104	1	16-bit
Configuration	106	16	8-bit

Figure 13: TBEN-LF-16DIP configuration page

3.3.2 TBEN-LF-16DOP

The screenshot shows the 'Module Properties Report: Local (ETHERNET-MODULE 1.001)' window. The 'General' tab is selected. The 'Name' field is 'TBEN_16DOP'. The 'Description' field shows 'Type: TBEN-LF-16DOP', 'Id: 100003915', and 'EIP: V2.7.35.x'. The 'Comm Format' is 'Data - INT'. The 'Address / Host Name' section has 'IP Address' selected with the value '136 . 129 . 1 . 32'. The 'Connection Parameters' section shows 'Input: 103' with 'Size: 4 (16-bit)', 'Output: 104' with 'Size: 2 (16-bit)', and 'Configuration: 106' with 'Size: 16 (8-bit)'. 'Status Input' and 'Status Output' are empty.

Parameter	Value	Size	Bit Width
Input	103	4	16-bit
Output	104	2	16-bit
Configuration	106	16	8-bit

Figure 14: TBEN-LF-16DOP configuration page

3.3.3 TBEN-LF-16DXP

The screenshot shows the 'Module Properties Report: Local (ETHERNET-MODULE 1.001)' window. The 'General' tab is selected. The 'Name' field is 'TBEN_16DXP'. The 'Description' field shows a table with the following data:

Type	Value
Type	TBEN-LF-16DXP
Id	100003914
EIP	V2.7.35x

The 'Comm Format' is set to 'Data - INT'. The 'Address / Host Name' section has the 'IP Address' radio button selected, with the value '136 . 129 . 1 . 34'. The 'Connection Parameters' section on the right shows the following settings:

Input/Output	Assembly Instance	Size	Bit Size
Input	103	5	(16-bit)
Output	104	2	(16-bit)
Configuration	106	16	(8-bit)
Status Input			
Status Output			

Figure 15: TBEN-LF-16DXP configuration page

3.3.4 TBEN-LF-8DIP-8DOP

The screenshot shows the 'Module Properties Report: Local (ETHERNET-MODULE 1.001)' window. The 'General' tab is selected. The 'Name' field is 'TBEN_8DIP_8DOP'. The 'Description' field shows a table with the following data:

Type	Value
Type	TBEN-LF-8DIP-8DOP
Id	100003913
EIP	V2.7.35x

The 'Comm Format' is set to 'Data - INT'. The 'Address / Host Name' section has the 'IP Address' radio button selected, with the value '136 . 129 . 1 . 35'. The 'Connection Parameters' section on the right shows the following settings:

Input/Output	Assembly Instance	Size	Bit Size
Input	103	4	(16-bit)
Output	104	2	(16-bit)
Configuration	106	16	(8-bit)
Status Input			
Status Output			

Figure 16: TBEN-LF-8DIP-8DOP general page

4 EtherNet/IP Class Objects

The TBEN-LF supports following CIP¹ objects:

CIP Object Classes	
Class Code	Object type
01 (0x01)	Identity Object
04 (0x04)	Assembly Object
06 (0x06)	Connection Manager
71 (0x47)	DLR Object
72 (0x48)	QoS Object
245 (0xF5)	TCP/IP Interface Object
246 (0xF6)	Ethernet Link Object

Figure 4.1 – EtherNet/IP standard objects

The Vendor Specific objects are defined hereafter:

VSC Object Classes	
Following	Object type
Class Code	Object type
100 (0x64)	Gateway Object
117 (0x75)	DXP Object

Figure 4.2 – Vendor Specific objects

Common service:

Common class and instance services	
Service code	Service Name
01 (0x01)	Get_Attribute_All
05 (0x05)	Reset
14 (0x0E)	Get_Attribute_Single
16 (0x10)	Set_Attribute_Single

Figure 4.3 – Common services

¹ The CIP Networks Library, Volume 1, Common Industrial, Protocol (CIP™) by ODVA, Edition 3.24, April 2018
The CIP Networks Library, Volume 2, EtherNet/IP Adaptation of CIP, by ODVA, Edition 1.23, April 2018

4.1 EtherNet/IP Standard Objects

Identity Object					Class code: 01 (0x01)
Instance 1 (0x01) Attributes					
Attribute	Access	Name	Data type	Value	
1 (01h)	Get	Vendor	UINT	48	(0x0030)
2 (02h)	Get	Product Type	UINT	12	(0x000C)
3 (03h)	Get	Product Code	UINT	Device specific code	
4 (04h)	Get	Revision major	USINT	2	
		Revision minor	USINT	7	
		Revision Internal		35	
5 (05h)	Get	Device Status	WORD	Status	
6 (06h)	Get	Serial Number	UDINT	Device specific number	
7 (07h)	Get	Product name	STRING[length]	TBEN-LF-xxxx	
Supported services					
Service code	Class		Instance	Service	
01 (0x01)			yes	Get_Attribute_All	
05 (0x05)			yes	Reset	
14 (0x0E)			yes	Get_Attribute_Single	

Figure 4.5 – Identity Object

Assembly Object					Class code: 04 (0x04)
Instance 103 (0x67) Attributes					
Attribute	Access	Name	Data type	Value	
3 (03h)	Get	Input data	ARRAY of BYTE		
4 (04h)	Get	Size	UINT	Number of bytes in Attr 3	
Instance 104 (0x68) Attributes					
Attribute	Access	Name	Data type	Value	
3 (03h)	Get	Output data	ARRAY of BYTE		
4 (04h)	Get	Size	UINT	Number of bytes in Attr 3	
Supported services					
Service code	Class		Instance	Service	
14 (0x0E)			yes	Get_Attribute_Single	

Figure 4.6 – Assembly Object



NOTE

Refer to the following reference for the omitted attribute values:
 The CIP Networks Library, Volume 1, Common Industrial, Protocol by ODVA, Edition 3.24, April 2018
 The CIP Networks Library, Volume 2, EtherNet/IP Adaptation of CIP, by ODVA, Edition 1.23, April 2018

Connection Manager				Class code: 06 (0x06)
Attribute	Access	Name	Data type	Value
Supported services				
Service code		Class	Instance	Service name
84 (0x54)			yes	FWD_OPEN_CMD
78 (0x4E)			yes	FWD_CLOSE_CMD

Figure 4.7 – Connection Manager Object

DLR Object					Class code: 71 (0x47)
Class attributes					
Attribute	Access	Name	Data type	Value	
1 (0x01)	Get	Revision	UINT	3	
Instance 1 attributes					
Attribute	Access	Name	Data type	Value	
1 (0x01)	Get	Network topology	USINT		
2 (0x02)	Get	Network status	USINT		
10 (0x0A)	Get	Active supervisor address	STRUCT.		
12 (0x0C)	Get	Capability flags	DWORD		
Supported services					
Service code		Class	Instance	Service	
14 (0x0E)		yes	yes	Get_Attribute_Single	

Figure 4.8 – DLR Object

QoS Object					Class code: 72 (0x48)
Instance 1 attributes					
Attribute	Access	Name	Data type	Value	
4 (0x04)	Set	DSCP Urgent	USINT		
5 (0x05)	Set	DSCP Scheduled	USINT		
6 (0x06)	Set	DSCP High	USINT		
7 (0x07)	Set	DSCP Low	USINT		
8 (0x08)	Set	DSCP Explicit	USINT		
Supported services					
Service code		Class	Instance	Service	
14 (0x0E)			yes	Get_Attribute_Single	
16 (0x10)			yes	Set_Attribute_Single	

Figure 4.9 – QoS Object

TCP/IP Object				Class code: 245 (0xF5)
Class attributes				
Attribute	Access	Name	Data type	Value
1 (01h)	Get	Revision	UINT	3
2 (02h)	Get	Max instance	UINT	1
3 (03h)	Get	No. of instances	UINT	1
Instance 1 attributes				
Attribute	Access	Name	Data type	Value
1 (0x01)	Get	Status	DWORD	
2 (0x02)	Get	Configuration capability	DWORD	
3 (0x03)	Get	Configuration control	DWORD	
4 (0x04)	Get	Physical Link	Structure of:	
		Path Size	UINT	
		Path	Padded EPATH	
5 (0x05)	Get	Interface Configuration	Structure of:	
	Get	IP address	UDINT	
	Get	Network mask	UDINT	
	Get	Gateway address	UDINT	
	Get	Name server	UDINT	
	Get	Name server 2	UDINT	
	Get	Domain name	UDINT	
6 (0x06)	Get	Host name	String	
10 (0x0A)	Set	ACD Enable	Bool	
11 (0x0B)	Get/Set	Last Conflict detect	Structure of:	
12 (0x0C)	Get/Set	QuickConnet	Bool	
Supported services				
Service code	Class		Instance	Service
01 (0x01)			yes	Get_Attribute_All
14 (0x0E)	yes		yes	Get_Attribute_Single
16 (0x10)			yes	Set_Attribute_Single

Figure 4.10 – TCP/IP Object

Ethernet Link Object				Class code: 246 (0xF6)
Class attributes				
Attribute	Access	Name	Data type	Value
1 (0x01)	Get	Revision	UINT	3
2 (0x02)	Get	Max instance	UINT	3
3 (0x03)	Get	No. of instances	UINT	3
Instance 1, 2, 3, attributes				
Attribute	Access	Name	Data type	Value
1 (0x01)	Get	Interface speed	UDINT	
2 (0x02)	Get	Interface flags	DWORD	
3 (0x03)	Get	Physical address	Array of USINT	
4 (0x04)	Get	Interface counters	Structure of UDINT:	
5 (0x05)	Get	Media counters	Structure of UDINT:	
6 (0x06)	Set	Interface control	Structure of:	
		Control bits	WORD	
		Forced intf. Speed	UINT	
7 (0x07)	Get	Interface type	USINT	
10 (0x0A)	Set	Interface label	SHORT_STRING	
14 (0x0D)	Get	Ethernet errors	UDINT	
15 (0x0F)	Get	Link down counters	UDINT	
Supported services				
Service code	Class		Instance	Service
01 (0x01)			yes	Get_Attribute_All
14 (0x0E)	yes		yes	Get_Attribute_Single
16 (0x10)			yes	Set_Attribute_Single
76 (0x4C)			yes (attr. 4, 5)	Get_and_Clear

Figure 4.11 – Ethernet Link Object

4.2 EtherNet/IP Vendor Specific Objects

Gateway Object				Class code: 100 (0x64)
Instance 2 attributes				
Attribute	Access	Name	Data type	Value
109 (0x6D)	Get	GW Status Word	WORD	Structure of:
115 (0x73)	Get/Set	On Connection timeout	USINT	0: Switch IO Faulted
				1: Switch IO OFF
				2: Switch IO Hold
138 (0x8A)	Get/Set	Enable GW Status word	DWORD	0 = no; 1=yes
139 (0x8B)	Get/Set	Enable GW Control word	DWORD	0 = no; 1=yes
Supported services				
Service ode	Class		Instance	Service
14 (0x0E)			yes	Get_Attribute_Single
16 (0x10)			yes	Set_Attribute_Single

Figure 4.20 – Gateway Object

DXP Object				Class code: 117 (0x75)
Instance 1 attributes				
Attribute	Access	Name	Data type	Value
113 (71h)	Get	Digital In/Out – Input value	DWORD	0 - "Channel 0", 1 - "Channel 1", 2 - "Channel 2", 3 - "Channel 3", 4 - "Channel 4", 5 - "Channel 5", 6 - "Channel 6", 7 - "Channel 7", 8 - "Channel 8", 9 - "Channel 9", 10 - "Channel 10", 11 - "Channel 11", 12 - "Channel 12", 13 - "Channel 13", 14 - "Channel 14", 15 - "Channel 15", 16-31 – reserved,
115 (73h)	Get	Digital In/Out – Output value	DWORD	0 - "Channel 0", 1 - "Channel 1", 2 - "Channel 2", 3 - "Channel 3", 4 - "Channel 4", 5 - "Channel 5", 6 - "Channel 6", 7 - "Channel 7", 8 - "Channel 8", 9 - "Channel 9", 10 - "Channel 10", 11 - "Channel 11", 12 - "Channel 12", 13 - "Channel 13", 14 - "Channel 14", 15 - "Channel 15", 16-31 – reserved,

119 (77h)	Get	Digital In/Out – Output overcurrent	DWORD	0 - "Channel 0", 1 - "Channel 1", 2 - "Channel 2", 3 - "Channel 3", 4 - "Channel 4", 5 - "Channel 5", 6 - "Channel 6", 7 - "Channel 7", 8 - "Channel 8", 9 - "Channel 9", 10 - "Channel 10", 11 - "Channel 11", 12 - "Channel 12", 13 - "Channel 13", 14 - "Channel 14", 15 - "Channel 15", 16-31 – reserved,
121 (79h)	Get	Digital In/Out – Input overcurrent VAUX	DWORD	0 - "Channel 0", 1 - "Channel 1", 2 - "Channel 2", 3 - "Channel 3", 4 - "Channel 4", 5 - "Channel 5", 6 - "Channel 6", 7 - "Channel 7", 8-31 – reserved,
127 (7Fh)	Get / Set	Digital In/Out – Invert digital input	UDINT	0 - "Channel 0", 1 - "Channel 1", 2 - "Channel 2", 3 - "Channel 3", 4 - "Channel 4", 5 - "Channel 5", 6 - "Channel 6", 7 - "Channel 7", 8 - "Channel 8", 9 - "Channel 9", 10 - "Channel 10", 11 - "Channel 11", 12 - "Channel 12", 13 - "Channel 13", 14 - "Channel 14", 15 - "Channel 15", 16-31 – reserved,
137 (89h)	Get / Set	Digital In/Out – Manual reset output after overcurrent	DWORD	0 - "Channel 0", 1 - "Channel 1", 2 - "Channel 2", 3 - "Channel 3", 4 - "Channel 4", 5 - "Channel 5", 6 - "Channel 6", 7 - "Channel 7", 8 - "Channel 8", 9 - "Channel 9", 10 - "Channel 10", 11 - "Channel 11", 12 - "Channel 12", 13 - "Channel 13", 14 - "Channel 14", 15 - "Channel 15", 16-31 – reserved,
139 (8Bh)	Get / Set	Digital In/Out – Activate output	DWORD	0 - "Channel 0", 1 - "Channel 1", 2 - "Channel 2", 3 - "Channel 3", 4 - "Channel 4", 5 - "Channel 5", 6 - "Channel 6", 7 - "Channel 7", 8 - "Channel 8", 9 - "Channel 9", 10 - "Channel 10",

					11 - "Channel 11", 12 - "Channel 12", 13 - "Channel 13", 14 - "Channel 14", 15 - "Channel 15", 16-31 – reserved,
149 (95h)	Get / Set	Digital In/Out 0 – Pulse stretch	USINT	0-255	
150 (96h)	Get / Set	Digital In/Out 1 – Pulse stretch	USINT	0-255	
151 (97h)	Get / Set	Digital In/Out 2 – Pulse stretch	USINT	0-255	
152 (98h)	Get / Set	Digital In/Out 3 – Pulse stretch	USINT	0-255	
153 (99h)	Get / Set	Digital In/Out 4 – Pulse stretch	USINT	0-255	
154 (9Ah)	Get / Set	Digital In/Out 5 – Pulse stretch	USINT	0-255	
155 (9Bh)	Get / Set	Digital In/Out 6 – Pulse stretch	USINT	0-255	
156 (9Ch)	Get / Set	Digital In/Out 7 – Pulse stretch	USINT	0-255	
157 (9Dh)	Get / Set	Digital In/Out 8 – Pulse stretch	USINT	0-255	
158 (9Eh)	Get / Set	Digital In/Out 9 – Pulse stretch	USINT	0-255	
159 (9Fh)	Get / Set	Digital In/Out 10 – Pulse stretch	USINT	0-255	
160 (A0h)	Get / Set	Digital In/Out 11 – Pulse stretch	USINT	0-255	
161 (A1h)	Get / Set	Digital In/Out 12 – Pulse stretch	USINT	0-255	
162 (A2h)	Get / Set	Digital In/Out 13 – Pulse stretch	USINT	0-255	
163 (A3h)	Get / Set	Digital In/Out 14 – Pulse stretch	USINT	0-255	
164 (A4h)	Get / Set	Digital In/Out 15 – Pulse stretch	USINT	0-255	
Supported services					
Service code	Class		Instance	Service	
14 (0x0E)			yes	Get_Attribute_Single	
16 (0x10)			yes	Set_Attribute_Single	

Figure 4.20 – DXP Object

**NOTE**

Pulse stretch is a trigger to an internal TOF timer. The timer stretches an input discrete single In 10msec increments. The time base is 10msec. Example:

0 = timer disabled (default value)

1 = 10 msec delay

10 = 100 msec delay

**ATTENTION!**

DXP object attributes cannot be SET while PLC – TBEN connection is running.

DXP object attributes supported by TBEN-LF						
Attribute	113 (71h)	115 (73h)	119 (77h)	121 (79h)	127 (7Fh)	137 (89h)
Parameter name	Digital In/Out - Input value	Digital In/Out - Output value	Digital In/Out - Overcurrent	Digital In/Out - Input overcurr. VAUX	Digital In/Out - Invert digital input	Digital In/Out - Manual reset after overcurr.
TBEN-LF-16DIP	✓			✓	✓	
TBEN-LF-16DOP		✓	✓			✓
TBEN-LF-16DXP	✓	✓	✓	✓	✓	✓
TBEN-LF-8DIP-8DOP	✓	✓	✓	✓	✓	✓

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