



Application Note AN2041

D-Series

Getting started with EtherNet/IP™

V1.00

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Abstract

This Application Note describes a simple example of use to get started with the EtherNet/IP™ interface of the Dimetix D-Series laser distance sensors.

This Application Note is provided as is without any warranty for any problems this sample may cause.

File: AN2041 Getting started with_EtherNetIP V100.odt



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1 Document scope

This document covers an Application Note written for the Dimetix D-Series Laser Distance Sensors with EtherNet/IP™ interface. The following topics are discussed:

- Safety instructions
- Application Note descriptions

2 Safety instructions



This Application Note is written for qualified system integrators to help doing an application specific sensor configuration.

Before using the D-Series sensor also the safety related information in the D-Series Technical Reference Manuals must be consider.



Looking into the laser beam may be hazardous to the eyes.

• Do not look into the laser beam. Make sure the laser is aimed above or below eye level. (particularly with fixed installations, in machines, etc.).



Take precaution against electrostatic discharge (ESD) when the D-Series laser distance sensors exchangeable cover is open.

- Generally the sensor with removed exchangeable cover is a sensitive device and can be damaged by electrostatic discharge.
- Only handle the device properly grounded and with care.
- No warranty will be granted on improper handling and / or ESD caused problems.

3 Introduction

3.1 Overview

This document contains a simple application of use to start with the EtherNet/IP™ interfaces of the Dimetix D-Series laser distance sensors. The simple example includes the relevant information and instructions to get started with the corresponding PLC and to handle the process data and the acyclic read / write services of the sensor.

This document describes a simple example of use to get started with the EtherNet/IP™ interface of the Dimetix D-Series laser distance sensors. All information and instructions necessary to understand this example of use and to run it on an Allen Bradley CompactLogix PLC are included. The used example project for the Allen Bradley PLC can be downloaded from the Dimetix website (<u>www.dimetix.com</u>).

The following functions are covered by this example:

- Process input / output data
 - Measurement Control Start / Stop continuous distance measurement
 - Distance Integer / Distance Float Distance data of the laser sensor
 - Distance Unit Selected distance unit number for distance data
- Acyclic read / write services
 - Serial Number Read serial number of laser sensor
 - Distance Unit Read / Write distance unit number for distance data

Additionally, the following protocol specific features are covered too:

Configuration / Change of IP address

For detail information about the laser sensor or the Industrial Ethernet (PROFINET®, EtherCAT® or EtherNet/IPTM) interface, please see the corresponding Technical Reference Manual on the Dimetix website (<u>www.dimetix.com</u>). Please note, the used designations in this document refer to the previously mentioned Technical Reference Manuals.

For questions, comments or technical support concerning this document please contact us (<u>service@dimetix.com</u>). Please note, we are able to support you regarding our laser distance sensor but we only have limited support possibilities regarding the EtherNet/IP™ networks as well as for the used PLC's.

3.2 Prerequisites – Hardware & Software

The following hardware and software are used to create this example:

- PLC hardware: Allen Bradley CompactLogix 1769-L30ER
- PLC software: Studio 5000 Logix Designer V24 Ensure the Logix Designer software is installed and running correctly.
- Sensor hardware: Dimetix laser distance sensor with correct assembled EtherNet/IP[™] interface (for details about assembling the exchangeable cover with EtherNet/IP[™], see the Technical Reference Manual of the Industrial Ethernet on the Dimetix website).
- Sensor software: Only the EDS file of the Dimetix sensor. No additional sensor software.

Remark: The Logix Designer V24 is not the newest version, but for this simple example sufficient for the used basic functions. As additional information: Starting with the version V32, unsigned data types are now also supported.

Most Allen Bradly PLC's have a "RUN/REM/PROG" switch. For example, this switch must be set to PROG to load / program the PLC project onto the PLC.

The "RUN/REM/PROG" switch must be set to RUN to set the RUN flag in the Run/Idle header of the process data frames. Otherwise the output data will not be taken over in the Dimetix laser distance sensor and the safe values of the device are activated.

The "RUN/REM/PROG" switch must be set to RUN to set the RUN flag in the Run/Idle header of the process data frames. Otherwise the Dimetix laser distance sensor does not take over the output data and the safe values of the device are activated.







4 Description file (EDS)

First of all the EDS file of the laser distance sensor must be added / installed. This can be done over the Logix Designer software menu, Tools \rightarrow EDS Hardware Installation Tool. Then select the right EDS file path for the installation. See figure 1 and 2 for more details.

The latest EDS file for the Dimetix laser distance sensor with EtherNet/IP™ can be downloaded from <u>www.dimetix.com/IndustrialEthernet</u>.

Too	ols <u>W</u> indow <u>H</u> elp	
	Options	
	Security	•
9	Documentation <u>L</u> anguages	
	Import	•
	Export	•
9	EDS Hardware Installation Tool	
	<u>M</u> otion	•
	Custom Tools	
Ħ	Co <u>n</u> trolFLASH	

Figure 1: Studio 5000 software menu, Tools \rightarrow EDS Hardware Installation Tool.

Rockwel	I Automation's EDS Wizard
_	istration Bectronic Data Sheet file(s) will be added to your system for use in Rockwell Automation applications.
• F	Register a gingle file
O F	Register a directory of EDS files 🔲 Look in subfolders
<u>N</u> am	ed:
	DIMETIX_LaserDistanceSensorDX400_EIP_V1_1.edg
(i	If there is an icon file (ico) with the same name as the file(s) you are registering then this image will be associated with the device.
	To perform an installation test on the file(s), click Next
	< Zurück Weiter > Abbrechen

Figure 2: Rockwell Automation's EDS Wizard. Selection and installation of the EDS source file.

After this step the Dimetix Laser Distance Sensor will be available in the module catalog of the Logix Designer software as a EtherNet/IP™ module. For details see the next chapter 5.

5 Module configuration

5.1 New / Add module

The Laser Distance Sensor adapter device can now be added using the context menu entry New Module. Then the corresponding device can be selected and added to the network. For details see figure 3 and 4.

Remark: The device name "Laser Distance Sensor DX400" stands for all Dimetix D-Series Laser Distance Sensor types.



5 Module configuration



Controller Organizer	ſ		- ↓ X
🖃 🗁 Controller La	serSensorDX400_	Example_V24_2002	17
🖉 Controlle	-		
Controlle	er Fault Handler		
Power-U	p Handler		
🖨 🖓 Tasks			
📄 🤕 MainTas			
🕁 🕞 Main	-		
Unsched	-		
Add-On Inst			
	ructions		
Logical Mod	al		
I/O Configur			
1769 Bus			
🗍 🗍 🚺 [0] 17	69-L30ER LaserSe	nsorDX400_Examp	le_V24_200217
Ether:			n –
	New Module		24_200217
	Discover Modul	es	
	Paste	Ctrl+V	
	Properties	Alt+Enter	
	Print	•	

Figure 3: Controller Organizer – Context menu (right click) \rightarrow New Module... to add a new module to the network

Modultyp auswählen			
Katalog Modulerkennung Favoriten			
dx400	Filter Löschen		Filter anzeigen ≽
Catalog Number	Description	Vendor	Category
50063x and 500702	Laser Distance Sensor DX400	DIMETIX AG	Generic Device(keyable)
	5		
			Þ
1 von 409 Modultypen Gefunden			Zu Favoriten hinzufügen
V Beim Erstellen schließen			Erstellen Schließen Hilfe

Figure 4: Module type selection – Select the corresponding module type, in this example "Laser Distance Sensor DX400". Optional use the filter possibility to filter the available module types.

5.2 Connection configuration

The configuration of the connection type to "I/O Basic" is done in figure 5. This configuration allows the input and output (I/O) data exchange and handling.

Connection types	Descriptions
I/O Basic	Allows the handling of input and output (I/O) data of the module.
Listen Only Basic	Allows a second connection (listen only) to an already existing connection.
Input Only Basic	Allows only the handling of the input data of the module.

Remark: Important differences between the connection types in the table below.





5 Module configuration

Controller Organizer 🗸 🕂 🗙	Module Properties: Local (50063x and 500702 1.001)	
- 🖉 Controller Tags	General Connection Module Info Parameters Internet Protocol Port Configuration Network	
- Controller Fault Handler		
Power-Up Handler	Type: 50063x and 500702 Laser Distance Sensor DX400	
😑 😋 Tasks 🔓 🤯 MainTask	Vendor: DIMETIX AG	
HainProgram	Parent: Local	
MainProgram Unscheduled Programs	Name: DX400 Ethemet Address	
- Add-On Instructions	Description: Private Network: 192.168.1. 10	
⊕- 🗁 Data Types	IP Address:	
- 🗀 Trends		
	Host Name:	
E-California I/O Configuration		
🖮 🎹 1769 Bus	-	
[0] 1769-L30ER LaserSensorDX400_Example_V24_200217		
- 💑 Ethernet	Module Definition	
— 1769-L30ER LaserSensorDX400_Example_V24_200217	Revision: 1.001	
🔩 \$0063x and \$00702 DX400	Bectronic Keying: Compatible Module	
	Connections: VO Basic, Assembly Instance Input Basic=150,	
	Change	
	Unarge	
	Status: Offine OK Cancel Acoly Help	
	Status: Offline OK Cancel Apply Help	
	Module Definition	
	Revision: 1 🔹 001 🗢	
	Bectronic Keying: Compatible Module	
	Lectorisc reging. Compassie module	
	Connections:	
	Name Remote Data	
	VO Basic Input: Assembly Instance Input Basic	150
	Output: Assembly Instance Output Basic	100
	Erro VO Basic	
	Listen Only Basic	
	Input Only Basic	
	ОК	Cancel Help
The Constroller Organizer It. Lonical Organizer	a Para	

Figure 5: Module properties (General tab) – Change the connection type to "I/O Basic" (Exclusive-Owner connection). Module Properties \rightarrow General tab \rightarrow Change... button \rightarrow Selection of "I/O Basic".

5.3 RPI configuration

The configuration of the process data interval time for the selected Laser Distance Sensor is available in the module properties configuration windows (see figure 6 for details). The interval time can be chosen between 1 ms and 100 ms (maximum).

Remark: The RPI value for older PLC systems is limited to a minimum of 2 ms.



5 Module configuration

neral Connection Module Info Parameters	Internet Protocol Port Configuration	on Network		
Name	Requested Packet Interval (RPI) (ms)	Connection over EtherNet/IP	Input Trigger	
/O Basic, Assembly Instance Input Basic = 150,	1.0 ≑ 1.0 - 100.0	Unicast 🗨	Cyclic	
	<i>G</i>			
] Inhibit Module] Major Fault On Controller If Connection Fails V	Vhile in Run Mode			
Module Fault				

Figure 6: Module properties (Connection tab) – Change the Requested Packet Interval (RPI) of the cyclic process data. In this example: 1 ms.

6 Connection established

The establishment of a connection can be achieved by selecting the online mode. This can be done according the details in figure 7.

Offline	, 🗆 RUN
No Forces	<u>G</u> o Online
No Edits	Upload
	Download
	Program Mode
Controller Organize	<u>R</u> un Mode
	<u>T</u> est Mode
📝 Controll	Clear Faults
Controll	-
Power-L	G <u>o</u> To Faults
🖃 🔁 Tasks	Controller Properties
🚊 🗟 MainTa 📖	

Figure 7: Connection establishment – Go Online to establish connection.

Once the connection is established, the status in the module properties window status bar at the bottom is switched to "Running". The status in the status bar is marked in figure 8.



Module Proper	ties: Local (50063x and 500702 1.001)
General Conne	ction Module Info Parameters Internet Protocol Port Configuration Network
Туре:	50063x and 500702 Laser Distance Sensor DX400
Vendor:	DIMETIX AG
Parent:	Local
Na <u>m</u> e:	DX400 Ethernet Address
Description:	@ Private Network: 192.168.1. 10 []
	○ IP <u>A</u> ddress:
	O Host Name:
⊂ Module Defini	tion
Revision:	1.001
Electronic Ke	ying: Compatible Module
Connections:	VO Basic, Assembly Instance Input Basic=150
	Change
Status: Running	OK Cancel Apply Help
Status: Hunning	OK Cancel Apply Help

Figure 8: Module properties - Connection status: "Running" (for established connection)

7 Parameter

The parameter table in figure 9 is continuously updated with sensor data as soon as the connection is established (Online mode). This will be done automatically with the acyclic EtherNet/IPTM read services (Get_Attribute_Single). The parameter group selection offers the possibility to select all parameter or a desired parameter group only.

Remark: The selection of parameter groups is an unlocked feature of the AOP (AOP key in the EDS file). These parameter groups corresponds also to the Technical Reference Manual of the Industrial Ethernet.

💷 Mo	dule Pro	operties: Local (50063x and 500702	1.001)				
Gen	eral Co	nnection Module Info Parameters	Internet Protocol Port Configuration Network				
							E
Gr		<all parameters=""> (All Parameters> </all>					
		Firmware Information	Value	Units	Style	^	A
	8193	Measurement	Start measurem				
	10134 V	Measurement Configuration	0		Decimal	-	
	8195 0	Options Input	Norr			- =	
	8196	Options Output Sensor State				_1	
			8755		Decimal	•	
	8226	Optional Output Data 1	16909060		Decimal	-	
	8227 8228	Optional Output Data 2	• 0		Decimal Decimal	-	
		Optional Output Data 3 Distance Integer	• 0		Decimal	-	
		Distance Float	<u> </u>		Float	-	
		Signal Strength			Decimal	-	
	_	Temperature			Decimal	-	
		Measurement Actuality	No new measurem		Decimar		
		Measurement Reserved	0	-	Decimal		
		Sensor State	Er 🗸			÷.,	
		1		4		•	
	sert Fac	tory Defaults			Set	←	
	Bon Loo	any boldure			201		
							-
1 0) The v	values displayed here are read directly	from the module. These values are not stored in the controlle	r and are	e not sent to th	ne	
	modul	le when a connection is established.	Click Set to write updated values to the module.				
Status	Runnir	ng	OK Cancel	Apply		<u>H</u> elp	-

Figure 9: Module properties (Parameter tab) – Parameter view (from EDS file) with available parameter group selections.



8 Controller tags – Input / Output

The controller tags are generated automatically by adding the module (DX400 device) to the network. At the same time, also the mapping of the device process data into the DX400:I (Input) and DX400:O Output) tags will be done. The available input tags are shown in figure 11 and the available output tags in figure 12.

Remark: The Add-On-Profile (AOP) key to unlock additional features is integrated in the EDS file of the Dimetix laser sensor (see figure 10 for this information). No action needs to be taken.

	vord	
1_10C_De	etails_License	Commen
ield Valu	e (NOTE: In the EDS, this will appear as writ	tten here!)
		Add
		Add
Field	Field Value	Delete

Figure 10: Add-On-Profile (AOP) Key / License in EDS file – Unlocks additional features e.g. showing real data types instead of an unspecific data array

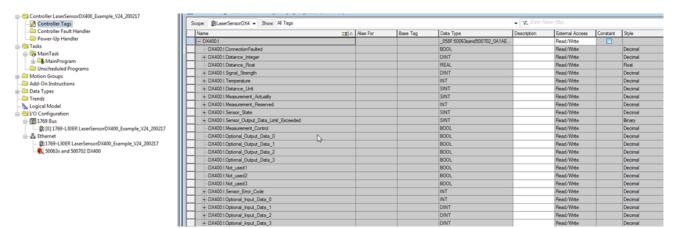


Figure 11: Controller tags – Available input tags according EDS file (Name, data type, etc.)

Scope: 🗓 LaserSensorDX4 🗸 Show: All Tags				 Enter Name Riter 			
_== 스	Alias For	Base Tag	Data Type	Description	External Access	Constant	Style
			SINT		Read/Write		Decimal
			BOOL		Read/Write		Decimal
			SINT		Read/Write		Decimal
			BOOL		Read/Write		Decimal
			_058F:50063xand500702_0A1AE		Read/Write		
			_058F:50063xand500702_BF8982		Read/Write		
			INT		Read/Write		Decimal
			INT		Read/Write		Decimal
			DINT		Read/Write		Decimal
			DINT		Read/Write		Decimal
			DINT		Read/Write		Decimal
	∆ 8 =	III △ Alias For	Image: Second secon	SINT BOOL SINT BOOL 	Image: Second	Image: Second	Image: Second

Figure 12: Controller tags – Available output tags according EDS file (Name, data type, etc.)

9 Controller tags – All

The controller tag list in figure 13 shows all available controller tags. This list contains the already mentioned automatically generated tags during the module adding process (see the previous chapter 8) and some other tags used for this example.

Since the used PLC system has no digital I/O, tags were used to trigger the corresponding services (see the tags Serial_Number_Read_Ctrl, Distance_Unit_Read_Ctrl and Distance_Unit_Write_Ctrl).



DIMETIX LASER DISTANCE SENSORS

9 Controller tags – All

ope: DaserSensorDX4 - Show: All Tags					▼ Enter N.	ime Alter			
Name	-B 0	Alias For	Base Tag	Data Type	Description	External Access	Constant	Style	 Properties
∃-Distance_Unit_Read				SINT		Read/Write		Decimal	Ž↓ 🗆 🖌 Extended Prop
Distance_Unit_Read_Ctrl				BOOL		Read/Write		Decimal	• General
⊕ Distance_Unit_Write				SINT		Read/Write		Decimal	□ Data
Distance_Unit_Write_Ctrl				BOOL		Read/Write		Decimal	Value
+ DX400:1				_058F:50063xand500702_0A1AE		Read/Write			Force Mask
- DX400:0				_058F:50063xand500702_BF8982		Read/Write			Produced Connection
DX400:0.Measurement_Control				INT		Read/Write		Decimal	Consumed Connection
+ DX400.0.Optional_Output_Data_0				INT		Read/Write		Decimal	Parameter Connections {0:0}
+ DX400:0.Optional_Output_Data_1				DINT		Read/Write		Decimal	New Connection
+ DX400.0.Optional_Output_Data_2				DINT		Read/Write		Decimal	
+ DX400:O.Optional_Output_Data_3				DINT		Read/Write		Decimal	
Explicit ReadDistanceUnit				MESSAGE		Read/Write			
ExplicitReadSerialNumber				MESSAGE		Read/Write			
ExplicitWriteDistanceUnit				MESSAGE		Read/Write			=
Measurement_StartStop				BOOL		Read/Write		Decimal	
Reset_Acyclic_Values				BOOL		Read/Write		Decimal	
+ Serial_Number				DINT		Read/Write		Decimal	
Serial_Number_Read_Ctrl				BOOL		Read/Write		Decimal	
							(m)		
									*

Figure 13: Controller tags – All available tags in the controller. In gray \rightarrow Automatically generated tags (DX400:I, DX400:O). In white \rightarrow Manually created tags (e.g. Distance_Unit_Read).

10 PLC application

10.1 Main routine

In the task tree the "MainRoutine" program can be found (see figure 14 for details). This main routine consists of different program segments (called "rugs") used for this EtherNet/IPTM example.

Remark: All these "rugs" are processed continuously with the maximum possible PLC processing time.

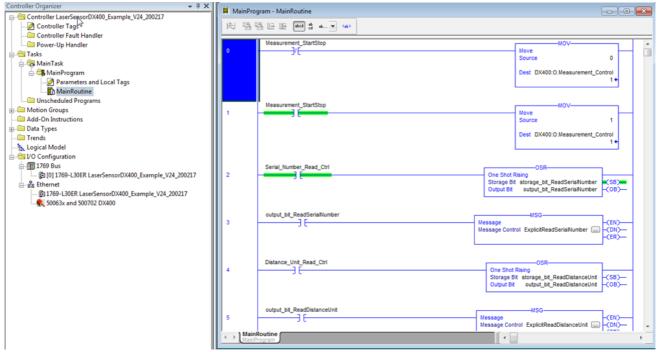


Figure 14: Main Program – Main Routine: View of the main program routines. PLC runs all program routines with max. possible cycle time.





10.2 Local tags

Local tags are temporary variable. In this example the local tags in figure 15 are used for triggering the acyclic services via OSR¹ blocks (for details see chapter 10.4.

ope: 🏤 Main Program 👻 Show: All Tags					•	Y. Enter Name Filter					
Name	28 A	Usage	Alias For	Base Tag	Data Type	Description	External Access	Constant		Properties	
output_bit_ReadDistanceUnit		Local			BOOL		Read/Write		Decin	21 🖬 🖌 🗖	tended Pr
output_bit_ReadSerialNumber		Local			BOOL		Read/Write		Decin	General	
output_bit_WriteDistanceUnit		Local			BOOL		Read/Write		Decin	Data	
storage_bit_ReadDistanceUnit		Local			BOOL		Read/Write		Decin	Value	
storage_bit_ReadSerialNumber		Local			BOOL		Read/Write		Decin	Force Mask	
storage_bit_WriteDistanceUnit		Local			BOOL		Read/Write	(m)	Decin	Produced Connecti	
										Consumed Connect Parameter Connect	
									1	E	

Figure 15: Main Program – List of local tags used in this example main program routines.

10.3 Measurement control

The "Measurement_Control", a part of the cyclic process output data, is used to start and stop the distance measurements of the laser distance sensor. In this example the "Measurement_Control" can be set to "1" or "0" with the associated controller tag. See figure 16 for the corresponding main routine 0 and 1.

🛱 MainPro	gram - MainRoutine		×
陶鹽	ša ⊡ ⊞ ded 3 a		
0	Measurement_StartStop	Move Source 0 Dest DX400:0.Measurement_Control 1 €	* III
1	Measurement_StartStop	MOV- Source 1 Dest DX400;O.Measurement_Control 1 €	

Figure 16: Main Program – Main Routine 0 & 1: Control of the process data output "Measurement Control" to start (1) / stop (0) distance measurements.

10.4 Acyclic read / write services

The acyclic read and write services are used to e.g. read device information and to configure the sensor. In this example the serial number and the distance unit are used to demonstrate the basic principle of reading or writing acyclic parameters. See chapter 10.4.3 to 10.4.5 for the corresponding routines.

10.4.1 Basic information (MSG messages)

The mentioned services can be programmed using the MSG instruction block. This block is available by default and no additions need to be added. Some selected information for the configuration of this block is shown in the table below. Detailed information can be found in the Rockwell documentation.

¹ OSR (One Shot Rising) instruction: Detailed information for the OSR instruction can be found in the Rockwell documentation.



Message configuration	Descriptions
Message Type	CIP Generic as default.
Service Type	Service type e.g. "Get Attribute Single" for acyclic read service or "Set Attribute Single" for acyclic write service.
Class, Instance, Attribute	EtherNet/IP™ access information of the corresponding parameter. See the Technical Reference Manual of the Industrial Ethernet for this information.
Error Code, Extended Error Code	In case of an error (.ER tag of the corresponding parameter is set, see figure 20 for details) the Error Code and Extended Error Code must be evaluated.
Timed Out	Not relevant.

In the figures 17, 18 and 19 the configurations used for the MSG instruction are shown (example to read out the serial number of the module).

lessage Cor Configuratio	nfiguration - ExplicitR	lead Serial Numbe	r 🔓	×
Message	Type: CIP Gene	eric		
Service Type:	Get Attribute Single	•	Source Element: Source Length:	0 (Bytes)
Service Code: Instance:	e (Hex) Class:		Destination Element:	Serial_Number - New Tag
O Enable	O Enable Waiting	⊖ Start	O Done	Done Length: 4
 Error Coo Error Path: Error Text: 	de: Extend	ded Error Code:	Abbrechen	Timed Out

Figure 17: Message configuration (MSG) – Configuration tab: Configurations used to read the "Serial Number" (in this example).

Message Configuration - E	·	×
Path: DX400		Browse
DX400		
Broadcast:	~	
Communication Method		
© CIP ○ DH+ C	hannel: 🛛 🔭 Destination Link:	0
CIP With Source ID	ource Link: 0 💌 Destination Node:	0 🔹 (Octal)
Connected	Cache Connections	Large Connection
O Enable O Enable W	′aiting ◯ Start ◯ Done Done	Length: 4
O Error Code:	Extended Error Code:	med Out 🗲
Error Path:		
Error Text:	OK Abbrechen Obe	mehmen Hilfe

Figure 18: Message configuration (MSG) - Communication tab: Configurations used to read the "Serial Number" (in this example).



10 PLC application



Configuration	Communication T	ag			
Name:	ExplicitReadSerial	Number			
Description:			^		
			-		
Type:	Base				
Data Type:	MESSAGE				
Scope: Extemal Access:	∰ LaserSensorD) Read/Write	K400_Example_V	24_200217		
) Enable	O Enable Waiting	⊖ Start	O Done	Done Length: 4	
O Error Code:	Extend	led Error Code:		📃 Timed Out 🗲	
Error Path:					
Error Text:		ОК	Abbrechen	Obemehmen	Hilfe

Figure 19: Message configuration (MSG) – Tag tab: No configuration used (in this example)

In of case of an error the Error Code and Extended Error Code in the .ER tag of the corresponding parameter must be evaluated. See figure 20 for more details.

-Explicit ReadSerialNumber	MESSAGE	Read/Write	
+ Explicit Read Serial Number Rags	INT	Read/Write	Hex
-ExplicitReadSerialNumber.EW	BOOL	Read/Write	Decimal
-Explicit Read Serial Number. ER	BOOL	Read/Write	Decimal
-Explicit Read Serial Number. DN	BOOL	Read/Write	Decimal
-ExplicitReadSerialNumber.ST	BOOL	Read/Write	Decimal
-Explicit Read Serial Number. EN	BOOL	Read/Write	Decimal
Explicit Read Serial Number. TO	BOOL	Read/Write	Decimal
Explicit Read Serial Number. EN_CC	BOOL	Read/Write	Decimal
+ Explicit Read Serial Number. ERR	INT	Read/Write	Hex
+ Explicit Read Serial Number. EXERR	DINT	Read/Write	Hex
+ ExplicitReadSerialNumber.ERR_SRC	SINT	Read/Write	Decimal
Explicit Read Serial Number. Dive LEN	INT	Read/Write	Decimal
Explicit ReadSerialNumber.REQ_LEN	INT	Read/Write	Decimal
+ Explicit Read Serial Number Destination Link	INT	Read/Write	Decimal

Figure 20: Message configuration (MSG) - .ER tag of SerialNumber: This tag will be set in an error condition / error case.

10.4.2 Parameter initialization

For EtherNet/IP™ no specific parameter initialization procedure is used during the establishment of the connection. Consequential all device parameters can be simple configured after the connection is established by using the acyclic read and write services (MSG blocks) at the system start or if needed at anytime during operation.

10.4.3 Serial number – Read

The routines in figure 21 show the acyclic read service (MSG) to read the serial number of the module. This read service can be triggered with the associated controller tag "Serial_Number_Read_Ctrl". So that this acyclic message instruction is only done once, the OSR (One Shot Rising) instruction block is used in addition.



Figure 21: Main Program - Main Routine 2 & 3: Acyclic service (MSG) to read "Serial Number" of the device.





10.4.4 Distance unit – Read

The routines in figure 22 show the acyclic read service (MSG) to read the distance unit of the module. This read service can be triggered with the associated controller tag "Distance_Unit_Read_Ctrl". So that this acyclic message instruction is only done once, the OSR (One Shot Rising) instruction block is used in addition.

4	Distance_Unit_Read_Ctrl] [OsR One Shot Rising Storage Bit storage_bit_ReadDistanceUnit Output Bit output_bit_ReadDistanceUnit (0B)—	
5	output_bit_ReadDistanceUnit	MSG	

Figure 22: Main Program – Main Routine 4 & 5: Acyclic service (MSG) to read "Distance Unit" of the device.

10.4.5 Distance unit – Write

The routines in figure 23 show the acyclic write service (MSG) to write the distance unit of the module. This write service can be triggered with the associated controller tag "Distance_Unit_Write_Ctrl". So that this acyclic message instruction is only done once, the OSR (One Shot Rising) instruction block is used in addition.

6	Distance_Unit_Write_Ctrl	One Shot Rising Storage Bit storage_bit_WriteDistanceUnit Output Bit output_bit_WriteDistanceUnit (OB)
7	output_bit_WinteDistanceUnit	Mssage Message Control ExplicitWriteDistanceUnit

Figure 23: Main Program – Main Routine 6 & 7: Acyclic service (MSG) to write "Distance Unit" of the device.

10.5 Reset acyclic values

In this example the controller tags "Distance_Unit_Read" and "Serial_Number" (see chapter 9 for the controller tag list) can be cleared by the associated controller tag "Reset_Acyclic_Values". See figure 24 for the corresponding routines used to reset the acyclic values.

8	Reset_Acyclic_Values	Move Source 0 Dest Distance_Unit_Read 2 €	
9	Reset_Acyclic_Values	MOV Source 0 Dest Serial_Number 70630428 €	

Figure 24: Main Program – Main Routine 8 & 9: Reset some controller tags used for acyclic read services.

11 IP parameter

There are various poss following possibilities P parameter change

There are various possibilities to change the IP parameter of a selected module / device. See chapter 11.1 and 11.2 for details when using the Logix Designer software or the RSLinx tool.

Remark: In general the IP parameters are changed generically without exception with the acyclic service "Set Attribute Single" via the object 0xF5 / Instance 0x01 / Attribute 5.





11.1 Logix Designer

The IP parameter can be changed according figure 25 in the module properties. There will be a warning to indicate that the access to the device will be lost.

Remark: After the change of the IP parameter, the access to the device will then be lost because of different IP parameter in the PLC project and the device.

Module Properties: Local (50063x and 500702 1.001)				_	
General Connection Module Info Parameters Internet Protocol Internet Protocol (IP) Settings IP settings can be manually configured or can be automatically configured to real be automatically configured by the network supports this capability. IP settings	Port Configuration 1	Network			E
IP Settings Configuration			-		
Physical Module IP Address: 192 . 168 . 1 . 11	Subnet Mask:	255 . 255 . 255 . 0			
IP Address in physical module does not match address in general properties (192.168.1.10)	<u>G</u> ateway Address:	0.0.0.0			
Copy IP address from general properties.					
Domgin Name:					
Host Name: Laser Distance Sensor DX4					
	Refresh communi	cation. Set	←		
Status: Running	ОК	Cancel Apply	<u>H</u> elp]	-

Figure 25: Module properties (Internet Protocol tab) – Possibility to change IP parameter (Address, subnet mask, etc). Warning: After change of IP address, no more access to the device possible.

11.2 RSLinx

The RSLinx tool is integrated in the Logix Designer software and basically required to connect to the PLC. This tool scans the network and shows all available devices (scanner and adapter). In figure 26 the scanned network with the Laser Distance Sensor and used PLC is shown.

Na RSLinx Classic Lite - [RSWho - 1]		-				
Eile <u>View</u> <u>Communications</u> <u>Station</u> <u>D</u> DE/OPC Sec <u>urity</u> <u>W</u> indow <u>H</u> elp			_ & ×			
* \$0						
Autobrowse Refresh Pa m Browsing - node 192.168	8.1.10 found					
Workstation, LTTHOMAS1 Born Stance Sensor DX400, Laser Distance Sensor DX400 Born Stance	192.168.1.10 Laser Distan	192.168.1.5 1769-L30ER	k,			
For Help, press F1 02/19/20 03:12 PM						

Figure 26: RSLinx Classic Lite tool (integrated in Logix Designer software) – Network scan: Display all available scanners and adapters.

⋇



The IP parameter can be simple changed with this tool. For details how to do this, see figure 27 and 28.

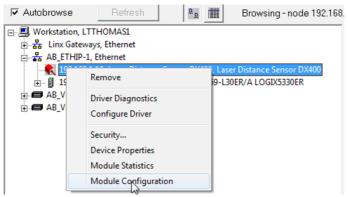


Figure 27: RSLinx Classic Lite tool – Context menu of the desired device \rightarrow Module Configuration: Module configuration window.

General Port Configuration	Advanced	d Po	rt Con	figu	ration	N	etwork		
Network Configuration Type	e								
Static	\bigcirc	Dyn	amic						
Use DHCP to obtain i	network co	nfig	uratio	n.					
Our BOOTP to obtain Use BOOTP to obtain a state of the second	n network (conf	igurati	on.					
IP Address:	192		168		1		11		
Network Mask:	255		255		255		0		
Gateway Address:	0		0		0		0		
Primary Name Server:	0		0		0		0		
Secondary Name Server:	0		0		0		0		
Domain Name:									
Host Name: Laser Distance Sensor DX400									
Status: Network Inter	rface Confi	gure	ed						

Figure 28: RSLinx Classic Lite tool – Module Configuration (Port Configuration tab): Change of IP parameters e.g. IP address.

After the IP parameter change (new IP: 192.168.1.11) of the selected device (see figure 28) the "old device" (old IP: 192.168.1.10) will be marked as no longer available. See figure 29 for details. At the same time the device with the new IP parameter (192.168.1.11) is now available in the network.

11 IP parameter



Na RSLinx Classic Lite - [RSWho - 1]			
Bile View Communications Station DDE/OPC Security Window Help			- 8 ×
* \$ 0			
Autobrowse Refresh Browsing - node 192.168.1	.5 found		
Workstation, LTTHOMAS1		Ĩ	
⊕ dim Gateways, Ethernet AB, ETHIP-1, Ethernet 192.168.1.10, Laser Distance Sensor DX400, Laser Distance Sensor DX400 ⊕ 192.168.1.11, Laser Distance Sensor DX400, Laser Distance Sensor DX400 ⊕ 191.192.168.1.5, 1769-130ER LOGIX5330ER, 1769-L30ER/A LOGIX5330ER ⊕ AB, VBP-1, 1789-430FA Virtual Chassis	192.168.1.10 Laser Distan	192.168.1.5 1769-L30ER	192.168.1.11 Laser Distan
B → AB_VBP-2, 1789-A17/A Virtual Chassis B → AB_VBP-2, 1789-A17/A Virtual Chassis			\triangleright
For Help, press F1		NUM	02/19/20 03:17 PM

Figure 29: RSLinx Classic Lite tool - Network scan: Display all available and no longer available scanners and adapters.

In addition to the configuration of the IP parameter, the network configuration type can also be configured. Available network configuration types: Static, DHCP and BOOTP.

Remark: For the DHCP and BOOTP types a corresponding BOOTP / DHCP server is required for the assignment of the IP parameter. In figure 30 an example of the simple test tool from Rockwell "BOOTP/DHCP Server" (free-of-charge) is shown.

87 E	BOOTP/DHCP	Server 2.3	3	63			X
File	Tools He	lp					
R	equest Histo	ory					
	Clear His	tory	Add to Relation List				
	(hr:min:s	Туре	Ethernet Address (MA	IP Address	Hostname	9	
_R	elation List-						
	New	Delete	Enable BOOTP En	able DHCP Dis	able BOOTP	/DHCP	
	Ethernet Ac	ddress (N	1A Type IP Addres	s Hostnam	e Descriptio	n	
^{−St}	tatus						Entries 0 of 256
							0.01230

Figure 30: BOOTP/DHCP Server tool (Simple test tool from Rockwell) – BOOTP / DHCP server to assign IP addresses to devices on the network. Used for dynamic network configuration types (BOOTP, DHCP).



12 Glossary

AOP	Add On Profile key to unlock additional features (integrated in the EDS file).
BOOTP / DHCP	Different network configuration type: Bootstrap Protocol (BOOTP) and Dynamic Host Configuration Protocol (DHCP).
EDS	Electronic Data Sheet file. Describes the properties of an adapter or scanner device.
EtherNet/IP™	EtherNet/IP™ is one of the most popular Industrial Ethernet interfaces.
MOV	Move instruction to move a constant or the content of one memory location to another. Detailed information can be found in the Rockwell documentation.
MSG	Message instruction to use acyclic read or write services. Detailed information can be found in the Rockwell documentation.
OSR	One Shot Rising instruction to set or clear the output bit depending on the status of the storage bit. Detailed information can be found in the Rockwell documentation.
PLC	Programmable Logic Controller
Process data	Cyclic data communication of the Industrial Ethernet interfaces.
RPI	Requested Packet Interval. Cyclic process data exchange interval requested for a module / adapter.

13 Revision history

The release versions and the changes of this technical reference manual are listed below.

Date	Revision	Changes
03.03.2020	V0.01	Initial version of the EtherNet/IP™ Application Note.
20.04.2020	V0.02	Internal feedback and revision version.
12.05.2020	V0.03	Preliminary version of the EtherNet/IP™ Application Note.
20.05.2020	V1.00	First release of the EtherNet/IP™ Application Note.



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