# Programming & **Control Manual**

## DMR PC 6-50

V1





Motor Power Company s.r.l. Via Leonardo Da Vinci, 4 42024 Castelnovo Sotto Reggio Emilia - Italia Tel. +39 0522 682710 - Fax +39 0522 683552 info@motorpowerco.it - motorpowerco.com Cap. Soc. 250.000.00€ I.v. - R.E.A. di RE 175521 Iscr.Reg.Impr. di RE n.01308390358 - N. Mecc. RE 010210 C.F. e P.IVA IT 01308390358



Motor Power Company s.r.I. Via Leonardo Da Vinci, 4 42024 Castelnovo Sotto Reggio Emilia - Italia Tel. +39 0522 682710 - Fax +39 0522 683552 info@motorpowerco.it - motorpowerco.com Cap. Soc. 250.000.00€ I.v. - R.E.A. di RE 175521 Iscr.Reg.Impr. di RE n.01308390358 - N. Mecc. RE 010210 C.F. e P.IVA IT 01308390358



## 1. Sommario

2	. General Information
	Document Versioning4
	Introduction4
	Notice:4
	Device commissioning5
3	Commissioning the device in PROFINET6
	PROFINET IO device model6
	_12_Bytes_Input Sub module8
	_12_Bytes_Output Sub module10
	Services for Acyclic Data (Records)11
	MRP (Media Redundancy Protocol)13
	Address setting in PROFINET
	PROFINET naming convention14
	Connecting the device to a Siemens PLC via PROFINET15
	Add the GSDML file
	Add servo drive to PROFINET network16
	Connecting the devices to the PLC17
	Assigning the PROFINET device name17
	Setting the IP address in TIA Portal
	Connecting the device online with the controller
	Acyclic Write/Read Parameters Objects19
	How to read/write parameters records19
	FUNCTION BLOCK FOR R/W PARAMETERS 20
	FB WRREC
	FB RDREC
4	Commissioning the device in EtherNet/IP
	Common EtherNet/IP features24
	EtherNet/IP classes



Assembly Object (0x04)	24
Identity Object (0x01)	27
TCP/IP Interface Object (0xF5)	29
VSC Vendor Specific Class	32
Init Parameters Class (101)	32
Parameter Gateway Class (100)	33
Connecting the devices to a Rockwell PLC with EtherNet/IP	36
Adding the device to the project	
Setting initialization Parmeters	
Going online with the PLC	41
5. Commissioning the device in EtherCAT	42
EtherCAT features	42
Process Data Objects	42
Inputs- Controller data Inputs	42
Outputs- Controller data ouputs	44
Service Data Object	46
Object Dictionary	46
Installing ESI files	54
Connecting the device with the controller	56
Setting startup parameters	58
Firmware upgrade over FoE with EtherCAT	59
EtherCAT Stack FW Update	60
Drive FW Update via FoE	62



## 2. General Information

#### **Document Versioning**

Version	Date	Author	Note
V1	01/03/2023	Michele Piacentini	First Release

#### Introduction

This document is intended to describe DMR PC commissioning with industrial Ethernet fieldbus.

For installation of the device and cabling please use INSTALLATION GUIDE at <u>www.motorpowerco.com</u>.

The multiprotocol device can be operated with the three industrial Ethernet protocols:

- PROFINET RT
- EthernNet/IP
- EtherCAT

Every product code has its own fixed fielbus as the following table show:

Part Number	Product code	Fieldbus Type
DMR PC-6/50 H P X	051700000004	PROFINET RT
	051700000006	
DMR PC-6/50 H E X	051700000005	EtherCAT
	051700000007	
DMR PC-6/50 H EI X	05170000009	EtherNet/IP
	05170000008	

#### Notice:

This guide is delivered subject to the following conditions and restrictions: This guide contains proprietary information belonging to Motor Power Company srl. Such information is supplied solely for the purpose of assisting users of the Motor Power Company devices and servo drive in its installation and configuration.

- The text and graphics included in this manual are for the purpose of illustration and reference only. The specifications on which they are based are subject to change without notice.
- Motor power Company and the Motor power Company logo are trademarks of Motor Power Company srl.
- Information in this document is subject to change without notice.



#### Device commissioning

the dedicated UI can be used to configure the device parameters and check the network status.

To connect with device via UI check the INSTALLATION GUIDE at <u>www.motorpowerco.com</u>.

A fieldbus status specific diagnostic is possible.

Also parameterization of the drive is possible.

Device Explorer III				_ 🗆 X
File View Windows Tool ?				MOTOR POWER COMPARY
ni 💉 🔜 💾 🖄 🎢	术 📕 Axis #1: -		📫 📕 Axis #2: -	STOP
Connected Device:	- Info Bootloader Version:	1003	RS-485 Address:	247
- Uevice Parameters	Firmware Version: Product Code:	1040 50397442	Baud Rate:	460800 👻
u -	Revision Number: Serial Number:	4294967295 4294967295	Can Open	
— → mpuyouput	And the second s		Can Node ID #1: Can Node ID #2: Bit Rate:	1 2 1000Kbps 👻
Modbus Charts Scope CanOpen Profinet Ethe	rCAT EthernetIP	Newews NI ONT () PC-8/50		Apply
Status				
Connected				
Not Connected				
Initialization				
Stopped				

FIGURE 1



## 3. Commissioning the device in PROFINET

#### **PROFINET IO features**

	Description
PROFINET specification	V2.35
Conformance Class	2.35
MinCycle Time	1ms (los update limited to 2ms)
Topology Detection	Supported
Automatic Address Setting	Supported
Acyclic communication	Supported
MRP Client	Supported
Diagnostics	Supported
Network Load Class	3
Fast Startup	Supported

#### PROFINET IO device model

The technical properties of PROFINET IO devices are defined via their device description file, the GSDML file. A PROFINET IO device consists of 1...n slots, which can also contain 1...n sub slots. Sub slots are placeholders for sub modules and establish the interface to the process. Sub modules can contain parameters, data and diagnostics.

Slot 0 is always reserved as Device Access Point (DAP). The DAP contains the physical interface to the Ethernet network and represents the device. The other slots and sub slots represent the other device functions. The structure is defined by the manufacturer of field devices. It is not necessary that every slot or respectively sub slot is related to physical functions. The allocation of the slots and sub slots and thus the assignment of functions (operation mode, diagnostics, etc.) is done in the configuration software of the PROFINET controller. This device model allows manufacturers to design modular and flexible decentralized field devices. User are flexible in configuring decentralized field devices.



😚 📑 🔚 Save project 进 🐰 🤠 🛅 🗙 崎 🛨 🗇		📓 💋 Go online 💋 Go o	ffline			<search in<="" th=""><th>project&gt;</th><th></th><th></th><th></th><th></th><th></th></search>	project>					
Project tree	Progetto DM	/IR PC ▶ Ungrouped dev	/ices ▶ net	v5repns	[MPC PC [	0UO V2.00	D]				_ •	×
Devices								🚽 Topology view	/ 📥 Ne	twork view	Device view	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Devic	e overview										
		Module	Rack	Slot	Laddress	O address	Туре	Article no.	Firmware	Comment		
Progetto DMR PC		<ul> <li>netw5repns</li> </ul>	0	0			MPC PC DUO V2.00	1234.567	V5.3.1			~
Add new device		▶ PN-IO	0	0 X1			netxy5repns					T
Devices & networks		12 Bytes Input 1	0	1	6879		12 Bytes Input					
<ul> <li>PLC_1 [CPU 1215C DC/DC/DC]</li> </ul>		12 Bytes Output 1	0	2		6879	12 Bytes Output					
Pevice configuration			0	3								
Q Online & diagnostics			0	4								
Program blocks			0	5								1
Technology objects			0	6								
External source files			0	7								
PLC tags			0	8								
PLC data types	jë -		0	9								L
Watch and force tables	8		0	10								
Image: Second	_ is		0	11								
Traces				12								
Device proxy data			0	12								
Program info			0	15								
PLC alarm text lists			0	14								
Local modules			0	15								
Distributed I/O			0	16								
Ungrouped devices			0	17								
Security settings			0	18								
Common data			0	19								
Documentation settings			0	20								
Languages & resources			0	21								
Online access			0	22								
No. Datalla signa			0	23	-	-		Dreportion	2 lafa			Ē
Details view								S Properties			iosucs	
	General											
Name												
	No	'properties' available.										
	No	'properties' can be shown a	t the moment.	There is e	ither no obj	ect selected	l or the selected obje	ct does not have any displaya	able properti	es.		

FIGURE 2 TIA PORTAL SLOT AND SUBSLOT

Besides slot 0 (DAP) all other slots of device contain only one sub slot. For this reason slots and sub slots are described as synonyms in the following.

Slot number.	Name	Description	Pluggable devices
0	MPC PC DUO	Interface of the device to PROFINET IO, Device Access Point	DeviceAccess Point Ethernet interface Ethernet port 0 Ethernet port 1
1	_12_Bytes_Input	Inputs from the drive to controller. It also addresses configuration parameters for the drive	Fixed to Standard Data Input Image
2	_12_Bytes_Output	Outputs from the PLC to drive, to control the device	Fixed to Standard Data Output Image



### \_12\_Bytes\_Input Sub module

This sub module is fixed in slot 1 and not changeable.

#### Process Input Data

12 bytes are controller inputs send by drive. Drive operates in velocity mode.

Byte	Bit	Category	Designation	Туре	Comments
0	.0	Sensors	Photo Eye 1 motor 1	BOOL	True = sensor active
0	.1	Sensors	Photo Eye 2 motor 1	BOOL	
0	.2	Sensors	Photo Eye 3 motor 1	BOOL	
0	.3	Sensors	Photo Eye 1 motor 2	BOOL	
0	.4	Sensors	Photo Eye 2 motor 2	BOOL	
0	.5	Sensors	Photo Eye 3 motor 2	BOOL	
0	.6	Spare		BOOL	Spare
0	.7	Spare		BOOL	
1	.0	Digital Input	Digital input 1 motor 1	BOOL	True = digital input active
1	.1	Digital Input	Digital input 2 motor 1	BOOL	
1	.2	Digital Input	Digital input 3 motor 1	BOOL	
1	.3	Digital Input	Digital input 1 motor 2	BOOL	
1	.4	Digital Input	Digital input 2 motor 2	BOOL	
1	.5	Digital Input	Digital input 3 motor 2	BOOL	
1	.6	Spare		BOOL	Spare
1	.7	Spare		BOOL	
2 – 3		Motor 1 error	Fault Register	UINT16	Canopen drive error
		code			code as per CiA DS-402
4 - 5		Motor 2 error	Fault Register	UINT16	Canopen drive error
		code			code as per CIA DS-402
6		feedback	speed motor I		(-1000100 per cent of
7		Motor 2	Speed motor 2	INT8	"Max Motor Velocity")
0			Actual current motor 1	ΙΝΙΤΟ	Actual current in
0		motor 1	Actual culterit motor 1		percentage of peak
					current(-100100)
9		Actual Torque	Actual current motor 2	INT8	Actual current in
		motor 2			percentage of peak
					current(-100100)
10		Spare		BYTE	Spare
11		Spare		BYTE	Spare



#### Fault Register Description

This pararagraph describes the fault register

The Motor 1/2 error code gives information about the fault occurred in the drives. More than one faults could be visible at the same time. In this case their values are added.

A detailed list of possible faults:

Bit	Fault type	Description	Value
number			(hex)
0	OVER_VOLTAGE	Power supply voltage goes	0x01
		above to the maximum admitted	
		value	
1	UNDER_VOLTAGE	Power supply voltage goes	0x02
		below to the maximum admitted	
		value	
2	PEAK_MOTOR_CURRENT	Motor peak current exceeded	0x04
3	RATED_MOTOR_CURRENT	Motor rated current exceeded	0x08
6	HALL SIGNALS	Feedback error	0x40
4	SHORT_CIRCUIT		0x10
8	POSITION_TRACKING_ERROR	Position following error exceeded	0x100
9	VELOCITY_TRACKING_ERROR	Speed following error exceeded	0x200
10	OVERVELOCITY	Maximum motor velocity	0x400
		exceeded	
12	DRIVE_OVERTEMPERATURE	Maximum frive temp reached	0x1000
13	FIELDBUS_CYCLE_TIME	Fieldbus cyclic messages timeout	0x2000

#### Parameters

PNU	Name	Description	Туре	Default Value
2	DC Bus Voltage Param	Bus Operating Voltage	Unsigned16	48(V)
155	Acceleration Axis 1	Ramp profile acceleration/deceleration for the motor	Unsigned32	1000 (rpm/s)
157	Deceleration Axis 1	Ramp profile acceleration/deceleration for the motor	Unsigned32	1000 (rpm/s)



347	Acceleration Axis 2	Ramp profile acceleration/deceleration for the motor	Unsigned32	1000 (rpm/s)
349	Deceleration Axis 2	Ramp profile acceleration/deceleration for the motor	Unsigned32	1000 (rpm/s)
151	Max Motor Velocity Axis 1	Max veloxity for the motor to be used in target/feedback for process data	Unsigned32	2500 rpm
343	Max Motor Velocity Axis 2	Max veloxity for the motor to be used in target/feedback for process data	Unsigned32	2500 rpm

#### \_12\_Bytes\_Output Sub module

12 bytes are controller output send by PN IO controller.

Byte	Bit	Category	Designation	Туре	Comments
0	.0	Digital Output	Digital output 1 motor 1	BOOL	True = digital output active
0	.1	Digital Output	Digital output 2 motor 1	BOOL	Available when digital
0	.2	Digital Output	Digital output 1 motor 2	BOOL	outputs are set as "Generic
0	.3	Digital Output	Digital output 2 motor 2	BOOL	output" on SW interface
0	.4	Spare		BOOL	
0	.5	Spare		BOOL	Sin orre
0	.6	Spare		BOOL	spare
0	.7	Spare		BOOL	
1	.0	Enable AX 1	Digital enable motor 1	BOOL	True = motor enable
1	.1	Enable AX 2	Digital enable motor 2	BOOL	True = motor enable
1	.2	Begin AX 1	Digital begin motor 1	BOOL	True = target enable
1	.3	Begin AX 2	Digital begin motor 2	BOOL	True = target enable
1	.4	Reset Fault AX1	Reset Fault motor 1	BOOL	True on rising edge = clear fault
1	.5	Reset Fault AX2	Reset Fault motor 2	BOOL	True on rising edge = clear fault
1	.6	Reset Pos AX1	Reset Position motor 1	BOOL	True on rising edge = homing to 0 on actual position
1	.7	Reset Pos AX2	Reset Position motor 2	BOOL	True on rising edge = homing to 0 on actual position
2		Motor 1 target	Speed/Position motor 1	INT8	Target speed/position
3		Motor 2 target	Speed/Position motor 2	INT8	Motor Velocity")



4	Torque Limit AX1	Current Limitation motor 1	INT8	Max current available on motor (percentage 100% of Peak current)
5	Torque Limit AX2	Current Limitation motor 2	INT8	Max current available on motor (percentage 100% of Peak current )
6	Spare		BYTE	Spare
7	Spare		BYTE	Spare
8	Spare		BYTE	Spare
9	Spare		BYTE	Spare
10	Spare		BYTE	Spare
11	Spare		BYTE	Spare

### Services for Acyclic Data (Records)

NAME	TYPE	PNU- Index	Description	R/W	UNIT	RANGE
Actual position Axis 1	int32	693	Actual incremental position	Read only	User Unit	-2147483648  2147483648
Actual position Axis 2	int32	743	Actual incremental position	Read only	User Unit	-2147483648  2147483648
Bootloader version	unit16	666	Bootloader version	Read only		0 65536
Serial number	unit32	648	Serial number del drive	Read only		0 4294967296
Firmware version	unit16	640	Firmware version del drive	Read only		0 65536
Fault register Axis 1	unit16	669	Fault register See Table	Read only		0 65536
Fault register Axis 2	unit16	719	Fault register See Table	Read only		0 65536
Actual DC BUS voltage	unit16	653	Actual DC BUS voltage	Read only	Volts	0 65536
Drive temperature	unit16	662	Actual drive temperature*100	Read only	°C*100	0 65536
I2T Protection Type Axis1	unit16	256	I2T type potection active in the motor	R/W		01
12T Protection Type	unit16	448	I2T type	R/W		01



Axis2			potection active in the motor			
Acceleration Axis 1	unit32	155	Profile Velocity Acceleration Axis 1	R/W	User Unit (rpm/s Default)	0 4294967296
Acceleration Axis 2	unit32	347	Profile Velocity Acceleration Axis 2	R/W	User Unit (rpm/s Default)	0 4294967296
Deceleration Axis 1	unit32	157	Profile Velocity Deceleration Axis 1	R/W	User Unit (rpm/s Default)	0 4294967296
Deceleration Axis 2	unit32	349	Profile Velocity Deceleration Axis 2	R/W	User Unit (rpm/s Default)	0 4294967296
Max Motor Velocity Axis 1	unit32	151	Max Motor Velocity Axis 1	R/W	User Unit (rpm Default)	0 4294967296
Max Motor Velocity Axis 2	unit32	343	Max Motor Velocity Axis 2	R/W	User Unit (rpm Default)	0 4294967296
Overvelocity Axis 1	unit32	169	Velocity Admissible Limit For Motor	R/W	User Unit (rpm Default)	0 4294967296
Overvelocity Axis 2	unit32	361	Velocity Admissible Limit For Motor	R/W	User Unit (rpm Default)	0 4294967296
Velocity Following Error Window Axis 1	unit32	167	Velocity Following Error Window in Velocity Mode	R/W	User Unit (rpm Default)	0 4294967296
Velocity Following Error Window Axis 2	unit32	359	Velocity Following Error Window in Velocity Mode	R/W	User Unit (rpm Default)	0 4294967296
Nominal current Axis 1	unit16	142	Motor nominal current Axis 1	R / W	Arms	0 65536
Peak current Axis 1	unit16	143	Motor peak current Axis 1	R / W	Arms	0 65536
Nominal current Axis 2	unit16	334	Motor nominal current Axis 2	R / W	Arms	0 65536
Peak current Axis 2	unit16	335	Motor peak current Axis 2	R / W	Arms	0 65536



Clear Fault Ax1	unit16	548	Clear Axis 1 Fault on 0->1 edge	R / W		01
Clear Fault Ax2	unit16	598	Clear Axis 2 Fault on 0->1 edge	R / W		01
Save to EEPROM	unit16	514	Store actual parameters in NVM	Write only		01
Actual torque Ax1	Int16	674	Actual torque in Iq active on axis	Read only	Milliamps peak	- 32.76832.7 677
Actual torque Ax2	Int16	724	Actual torque in Iq active on axis	Read only	Milliamps peak	- 32.76832.7 677
Analog In Ax1	Int16	674	Analog input value for Axis 1	Read only	mV	- 32.76832.7 677
Analog In Ax1	Int16	724	Analog input value for Axis1	Read only	mV	

#### MRP (Media Redundancy Protocol)

The device supports MRP.

MRP is a standardized protocol according to IEC 62439. It describes a mechanism for media redundancy in ring topologies. With MRP, a defective ring topology with up to 50 nodes is detected and reconfigured in the event of an error. With MRP a trouble-free switch-over is not possible.

A Media Redundancy Manager (MRM) checks the ring topology of a PROFINET network defined by the network configuration for functionality. All other network nodes are Media Redundancy Clients (MRC). In the error-free state, the MRM blocks normal network traffic on one of its ring ports, with the exception of the test telegrams. The physical ring structure thus becomes a line structure again at the logical level for normal network traffic. If a test telegram fails to appear, a network error has occurred. In this case, the MRM opens its blocked port and establishes a new functioning connection between all remaining devices in the form of a linear network topology.

The time between ring interruption and recovery of a redundant path is called reconfiguration time. For MRP, this is a maximum of 200 ms. Therefore, an application must be able to compensate for the 200 ms interruption. The reconfiguration time always depends on the Media Redundancy Manager (e.g. the PROFINET PLC) and the I/O cycle and watchdog times set here. For PROFINET, the response monitoring time must be selected accordingly > 200 ms.

Motor Power Company s.r.l. Via Leonardo Da Vinci, 4 42024 Castelnovo Sotto Reggio Emilia - Italia Tel. +39 0522 682710 - Fax +39 0522 683552 info@motorpowerco.it - motorpowerco.com Cap. Soc. 250.000.00€ i.v. - R.E.A. di RE 175521 Iscr.Reg.Impr. di RE n.01308390358 - N. Mecc. RE 010210 C.F. e P.IVA IT 01308390358



It is not possible to use Fast Start-Up in an MRP network.

MRDP is not supported

#### Address setting in PROFINET

In IP-based communication, the field devices are addressed by means of an IP address. PROFINET uses the Discovery and Configuration Protocol (DCP) for IP assignment.

When delivered, each field device has, among other things, a MAC address. This information is sufficient to give the respective field device a unique name.

The address is assigned in two steps:

- Assignment of a unique plant specific name to the respective field device.
- Assignment of the IP address from the IO-Controller before the system start-up based on the plant-specific (unique) name.

#### **PROFINET** naming convention

The names are assigned via DCP. The device name is checked for correct spelling during input. The following rules apply for the use of the device name according to PROFINET specification V2.3.

- All device names must be unique.
- Maximum name size: 240 characters Allowed:
  - Lower case letters a...z
  - o Numbers 0...9
  - Hyphen and dot
- The name may consist of several components separated by a period. A name component, i.e. a string between two dots, may be a maximum of 63 characters long.
- The device name must not start or end with a hyphen.
- The device name must not start with "port-xyz" (y...z = 0...9).
- The name must not have the form of an IP address (n.n.n, n = 0...999).
- Do not use special characters.
- Do not use capital letters.



#### Connecting the device to a Siemens PLC via PROFINET

This section provides an overview of the necessary steps for the parameterisation and configuration of the master. The following procedure is recommended:

- Add the GSDML file
- Add servo drive to PROFINET network
- Specify the device name

On the controller side, the servo drive must be integrated into the PROFINET network. The following section describes this, based on an example using integration under SIEMENS SIMATIC S7.

#### Add the GSDML file

If the servo drive is not included in the device or hardware catalogue, the GSDML file must be installed first. The GSDML file can be found in the software folder in the specific download area at <u>www.motorpowerco.com</u>. To install it go to "Options>Manage general station description files".

٦	Manage general station description files 🛛 🕹 🗙								
	Installed GSDs GSDs in the project								
	Source path: C:\Users\Siemens\Desktop\DUETAD_FNB_2\Progetto_CoP_FnB\AdditionalFiles\GSD								
	Content of imported path								
	File	Version	Language	Status	Info				
	GSDML-V1.00-MPC-PC_DUO PNS-2	V1.00	English, Ger	Already installed	PROFINET I				
	GSDML-V1.10-MPC-DUET_AD PNS	V1.10	English, Ger	Already installed	PROFINET I				
	GSDML-V2.35-HILSCHER-NETX 90	V2.35	English, Ger	Already installed	PROFINET I				
				Delete Install	Cancel				

FIGURE 3 - MANAGE GENERAL STATION DESCRIPTION FILES



**NOTE**: GSDML file is available at <u>www.motorpowerco.com</u>

Motor Power Company s.r.l. Via Leonardo Da Vinci, 4 42024 Castelnovo Sotto Reggio Emilia - Italia Tel. +39 0522 682710 - Fax +38 0522 683552 info@motorpowerco.it - motorpowerco.com Cap. Soc. 250.000.00€ i.v. - R.E.A. dl RE 175521 Iscr.Reg.Impr. dl RE n.01308390358 - N. Mecc. RE 010210 C.F. e P.IVA IT 01308390358



#### Add servo drive to PROFINET network

To integrate the servo drive into the PROFINET network, the servo drive must be selected in the hardware catalog. The Pallet Conveyor drive device can be found in "Other field devices > PROFINET IO > I/O > Hilscher Gesellschaft für Systemautomation mbH > PNS"



#### FIGURE 4 PROFINET DEVICE SELECTION IN HARDWARE CATALOG

The Drive head module must be dragged and dropped into the topology view of the device configuration. After the selection of the network view, the servo drive must be assigned to an I/O controller via the link "Not assigned".

Progetto DMR PC → Devices & networks		_ # = ×	Hardware catalog 📰 🗈 🕨
	🚪 Topology view	A Network view	Options
💦 Network 🔛 Connections 🛛 HMI connection 🔍 🕮 👯			
		<u>^</u>	✓ Catalog
			«Search»
		=	
PLC_1	netxvSrepns		Filter Profile: <all></all>
	MPC PC DOO V2		PC systems
	PLC_1		Drives & starters
			Image: Instruction of the second
PN	IF 1		Detecting & Monitoring
			Distributed I/O
			Image: Power supply and distribution
		z	Field devices
		1 Sta	Other field devices
			Additional Ethernet devices
			▼ m PROFINETIO
			Controllers
			✓ In Drives
			Metronix
			► Li SIEMENS AG
			Encoders
			Gateway
			▼ 10
			AMK Arnold Mļller GmbH & Co. KG
			Hilscher Gesellschaft für Systemautom
			Motor Power Compani S.r.l.
		$\sim$	Motor Power Company
< III	> 100%	· · · · · · · · · · · · · · · · · · ·	<ul> <li>Motor Power Company S.r.I</li> </ul>
CSD device 1 [Device]	Descention 1		✓ Im PNS
dan gewice_i [newice]	S Properties		MPC PC DUO V2.00
General IO tags System constants Texts			SIEMENS AG
General		^	Image: Interview Components
General		I	PLCs & CPs
			Sensors
Name	GSD device_1		Valves
Author	Siamanr		PROFIBUS DP
- Addion	Sections		< III >
Comment			> Information

FIGURE 5 ADDING GSDML FILE IN TIA PORTAL

Motor Power Company s.r.l. Via Leonardo Da Vinci, 4 42024 Castelnovo Sotto Reggio Emilia - Italia Tel. +39 0522 682710 - Fax +38 0522 683552 info@motorpowerco.it - motorpowerco.com Cap. Soc. 250.000.00€ i.v. - R.E.A. di RE 175521 Iscr.Reg.Impr. di RE n.01308390358 - N. Mecc. RE 010210 C.F. e P.IVA IT 01308390358



#### Connecting the devices to the PLC

- Select the device from the Hardware catalog and drag it into the Device & networks editor.
- Connect the devices to the PLC in the **Devices & networks** editor.

Progetto DMR PC + Devices & networks			
	🚪 Topology view	hetwork view	Device view
Ketwork 👖 Connections 🕅 connection 💌 🐨 🖏 🛄 🍳 🛨			
			^
PIC_1 CPU 1215C	netxv5repns MPC PC DUO V2		=
PN/IE_1			
			1
			2
			~
<	> 1009		

FIGURE 6-CONNECTING DEVICE TO THE PLC

#### Assigning the PROFINET device name

- Select Online access  $\rightarrow$  Online & diagnostics.
- Functions  $\rightarrow$  Assign PROFINET device name.
- Assign the desired PROFINET device name with Assign name.

Save project 🚐 🐰 🗐 🛱 🗙 🔊 ± 🖓	🗄 🖪 🔢 🕼 🖳 🌌 Go online	🖉 Go offline 🛛 👫 🚺	x - 11 500	ch in project	- <b>G</b>				
Project tree	🛛 🖣 Progetto DMR PC 🕨 Ungrou	ped devices 🕨 netxv5rep	ns [MPC PC DUO \	(2.00]					- • •
Devices									
8	Diagnostics     General     Diagnostic status	Assign PROFINET devi	ice name						
Progeto buskr.       Add new device       Devices & networks       Vervices & networks       Vervice configuration       Violate & disgnostics       Image: A configuration       Violation of the signal source files       Image: A configuration       Violation of the signal source files       Image: A configuration       Violation of the signal source files       Violation of the source tables       Violation of the source tables       Violation of the source tables       Vice prove data	Channel diagnostics     FROFINET interface [X1]     Functions     Assign IP address     Assign IP address     Asset to factory settings		Configured PP PROFINET de D Online access Device filter Onlyshe Onlyshe	OFINET de vice name: evice type: w devices of w devices wi	vice		<b>.</b>		
Program info PLC alarm text lists				w devices wi	thout names				
Gai Local modules     Gai Distributed IIO     Gai Distributed IIO     Gai Distributed IIO     Gai Distributed IIO     Gai Distributed IIO System (100): PMIE_1     Gai Distributed IIO System (100): PMIE_1     Gai Distributed IIO Distributed IIIO Distributed IIIIO Distributed IIIIO Distributed IIIO Distr		Accessible dev IP address	ices in the network: MAC address	Device	PROFINET device name	Status			
Details view	×	>							
	netxv5repns [MPC PC DUO	V2.00]		LIED	Harber III	Properties	Info 1	Diagnostics	
Name	General IO tags General Catalog information FROFINET interface [X1] General	System constants Tex PROFINET interface General	xts [X1]						
	Ethernet addresses	~ ·							

FIGURE 7- TIA-PORTAL – ASSIGNING THE PROFINET DEVICE NAME

Motor Power Company s.r.l. Via Leonardo Da Vinci, 4 42024 Castelnovo Sotto Reggio Emilia - Italia Tel. +39 0522 682710 - Fax +39 0522 683552 info@motorpowerco.it - motorpowerco.com Cap. Soc. 250.000.00 vi.v. - R.E.A. di RE 175521 Iscr.Reg.Impr. di RE n.01308390358 - N. Mecc. RE 010210 C.F. e P.IVA IT 01308390358



#### Setting the IP address in TIA Portal

- Select Device  $\rightarrow$  Properties tab  $\rightarrow$  Ethernet addresses.
- Assign the desired IP address.

Progetto DMR PC + Ungrouped devices + netxv5repns [MPC PC DUO V2.00]	_ # = ×
	🛃 Topology view 🛔 Network view 📑 Device view
🔐 пetx/Srepns [MPC PC DUO V2 🔽 🔛 🕎 🎇 🔚 🛄 🔍 🛨	Device overview
	A      Constraints     C
netxv5repns [MPC PC DUO V2.00]	Properties
General IO tags System constants Texts	
General     Catalog information     PROFINET interface [X1]	
PROFINET interface [X1]     General     General	
Advanced options     Advanced options     Interface options     Fort 1 [X1 P1]     Port 2 [X1 P2]	 ∧ ∀
Ethernet addresses	
, Interface networked with	
Subnet: PINIE_1 Add nev	vsubnet
IP protocol	
IP address: 1921680     Subnet mask: 255255     ✓ Synchronize	55 . 0 router settings with IO controller
Use router Router address: 0 . 0 . 0	. 0
PROFINET	
15	

FIGURE 8 ASSIGNING THE IP ADDRESS

#### Connecting the device online with the controller

Start the online mode (Go online).



Project tree		DuetAD_PN_Example_ver1_0 ▶ Devices & networks		
Devices			Topology view A Network view	Device view
192		Notwork 22 Connections HM connection		
DuetAD PN Example ver1 0			# TO system: PEC_1.PROFINETTO-Sys	stem (100)
Add new device				1 =
A Devices & networks		PLC_1	netxv5repns	
▼ 1 PLC 1 [CPU 1215C DC/DC/DC]		CPU 1215C	MPC DUET AD V	
Device configuration			PLC_1	
Q Online & diagnostics				1
Program blocks				
Technology objects		PLC	_1.PROFINET IO-Syste	2
External source files				18
PLC tags	•			- 7
PLC data types				- 8
Watch and force tables				
Online backups				
🕨 📴 Traces				
Device proxy data				
Program info				
PLC alarm text lists				
Local modules	<b></b>			
PLC_1 [CPU 1215C DC/DC/DC]	<b></b>			
Distributed I/O	<b></b>	2	> 100%	
Ungrouped devices			2 100%	<u>. Y</u>
Security settings		GSD device_1 [Device]	🖳 Properties 🚺 Info 🚺 🗓 Diagnosti	ics 📃 🗖 🗖 🗸
🕨 🥁 Common data		General IO tags System constants Texts		
Documentation settings		Canada		
Languages & resources		General		
Online access				
Displayhide interfaces	*		Name: CCD device 1	
			Name: GSD device_1	
✓ Details view			Author: Siemens	
Details view		Co	mment:	~
✓ Details view				
Details view				
Details view				

FIGURE 9 TIA-PORTAL – ONLINE MODE

#### Acyclic Write/Read Parameters Objects

#### How to read/write parameters records

Acyclic data exchange using the "Record Data CR" can be used for parameter assignment or configuration of IO devices or reading out status information. This is accomplished with the read/ write frames using standard IT services via TCP/IP1, in which the different data records are distinguished by their index. Data records are freely definable by device manufacturers.

The controller can send read/write record to the device. Each record is composed by 16 or 32 bits.

Parameters are based on 16bit register regardless on their type. 32bit parameters uses 2 16bit register.

For instance a given parameter whose type is Int8 (1 byte) will need anyway to use 16bit (2 byte has to be exchange) memory via records exchange in PROFINET, whereas an Uint32 (4 byte) will use 2 16 bit register and then 4 bytes of data exchange.

Motor Power Company s.r.l. Via Leonardo Da Vinci, 4 42024 Castelnovo Sotto Reggio Emilia - Italia Tel. +39 0522 682710 - Fax +39 0522 683552 info@motorpowerco.it - motorpowerco.com Cap. Soc. 250.000,00€ i.v. - R.E.A. di RE 175521 Iscr.Reg.Impr. di RE n.01308390358 - N. Mecc. RE 010210 C.F. e P.IVA IT 01308390358



#### FUNCTION BLOCK FOR R/W PARAMETERS

You can use the RDREC (Read data record) and WRREC (Write data record) instructions with PROFINET.

Instructions			∎ ∎ ►
Options			
10 40	<del>8</del> 5		
> Favorites			
✓ Basic instructions			
Name	Description	Version	
General			
Bit logic operations		V1.0	
Timer operations		V1.0	
Figure 1 Counter operations		V1.0	
Comparator operations			
Math functions		V1.0	
Move operations		<u>V2.3</u>	
Conversion operations			
Program control operati		V1.1	
Word logic operations		V1.4	
Shift and rotate			
<ul> <li>Extended instructions</li> </ul>			
Name	Description	Version	
DP & PROFINET			^
- RDREC	Read data record	V1.0	=
- WRREC	Write data record	<u>V1.1</u>	=
🖶 GETIO	Read process image	V1.1	
= SETIO	Transfer process image	V1.2	
ETIO_PART	Read process image area	V1.2	
ETIO_PART	Transfer process image	V1.2	
=- RALRM	Receive interrupt	V1.0	_
- D ACT DP	Enable/disable DP slaves	V1 7	~
> Technology			
> Communication			
> Optional packages			

FIGURE 10-RDREC&WRREC FB IN TIAPORTAL

#### **FB WRREC**

Use the WRREC instruction to transfer a data RECORD with the record number INDEX to a DP slave/PROFINET IO device component addressed by ID, such as a module in the central rack or a distributed component (PROFINET IO). Assign the byte length of the data record to be transmitted. The selected length of the source area RECORD should, therefore, have at least the length of LEN bytes.

Select	Meaning
IN	
REQ	REQ = 1, starts data transmission
ID	Hardware identifier of the channel
INDEX	Number of the data set to be written (index)
MLEN	Maximum length of the data to be written



OUT	
VALID	New data set written and complete
BUSY	BUSY = 1: Write operation not yet completed
ERROR	ERROR = 1: Error while writing
STATUS	Error code of the function block
LEN	Length of the written data
IN/OUT	
RECORD	Destination memory area for the written data

	"	WRREC_DB_1		
		WRREC Variant		
_	EN		ENO -	
_	REQ		DONE	-
_	ID		BUSY	-
-	INDEX		ERROR	-
_	RECORD		STATUS	_

FIGURE 11-WRREC FB

#### **FB RDREC**

Use the RDREC instruction to read a data record with the number INDEX from the component addressed by the ID, such as a central rack or a distributed component(PROFINET IO). Assign the maximum number of bytes to read in MLEN. The selected length of the target area RECORD should have at least the length of MLEN bytes.

Select	Meaning
IN	
REQ	REQ = 1, starts data transmission
ID	Hardware identifier of the channel
INDEX	Number of the data set to be read (index)
MLEN	Maximum length of the data to be read
OUT	
VALID	New data set read and complete
BUSY	BUSY = 1: Read operation not yet completed
ERROR	ERROR = 1: Error while reading
STATUS	Error code of the function block
LEN	Length of the read data
IN/OUT	
RECORD	Destination memory area for the read data (here in the example DB10)





FIGURE 12 -RDREC FB

#### Selecting the HW ID fot RDREC/WRREC

The Hardware Identifier of the channel can be chosen independently among the modules of the station in question.

Use ID of \_12\_Bytes\_Output or \_12\_Bytes\_Input independently.

TIA	Sigmons C: Wsore/Sigmone/Documents/Progetti T	14 v15\Progette DMP PC\Progette DMP PC							_
VISI	sienens - Closersisienensbocumentsprogetti i	TA VISHOgetto DMR PCProgetto DMR PC							
Pro	oject Edit View Insert Online Options Tools	Window Help							
2	י אַ אָאָ אָאָ אָאָ אָאָ אָאָ אָאָ אָאָ	🖄 🛄 🛄 🖳 🙀 🎾 Go online 🖉 Go offlin	• <b>67 LB LF X = 11</b> 🧕	earch in project>	ì				
	Project tree	Progetto DMR PC  Ungrouped devices	hetxv5repns [MPC PC DUO V2.0	00]					<u>×</u>
	Devices			🛃 Тор	ology viev	w 📥 Network view	Devi	ce view	
	1 I I I I I I I I I I I I I I I I I I I	netxv5repns [MPC PC DUO V2 💌 🗮 🕎	6 🗄 🔲 🍳 ±		Device	overview			1
rks				^	1			at .	
Å.	▼ 📄 Progetto DMR PC	· ·		=	<b>T</b>	Module	Rack	SIOT	
B	🌁 Add new device	a115				<ul> <li>■ PNHO</li> </ul>	0	0.11	<b></b>
8	📩 Devices & networks	5350				Port 1	0	0 X1	-
<u>i</u>	PLC_1 [CPU 1215C DC/DC/DC]	re.				Port 2	0	0 X1	-
ě	Ungrouped devices			-		12 Bytes Input_1	0	1	
	Security settings			1		12 Bytes Output_1	0	2	
	Common data	_		1			0	3	
	Contraction settings	_		÷.			0	4	
	Contine access	• •					0	5	
	Card Reader/USB memory						0	6	
							0	7	
							0	•	
				~			0	10	~
		< II	> 100%		<		, in the second s	>	÷
		12 Bytes Input 1 [12 Bytes Input]		10 p	roportios	1 Info 🙃 🛛 Diag	nostice		
				5.	ropercies		lostics		
		General IO tags System constant	s lexts						-
		Show hardware system constant 💌							
		Name	Туре	Hardware identi. Us	ed by	Comment			
		<pre></pre>	Hw_SubModule	277 PL	.C_1				_
									_
									- 1
									- 1
	M Datails view	-							
	• Details view	-							
		-							
									_
	Name								_
									- 1

FIGURE 13 - HARDWARE IDENTIFIER OF THE CHANNEL

 Motor Power Company s.r.l.

 Via Leonardo Da Vinci, 4

 42024 Castelnovo Sotto Reggio Emilia - Italia

 Tel. +39 0522 682710 - Fax +39 0522 683552

 info@motorpowerco.it - motorpowerco.com

 Cap. Soc. 250.000.00 € I.v. - R.E.A. di RE 175521

 Iscr.Reg.Impr. di RE n.01308390358 - N. Mecc. RE 010210

 C.F. e P.IVA IT 01308390358



#### 12 Bytes Inputs\_1 Module Parameters

Some motion parameters can be configured directly in TIA Portal. Their value is written to the drive each time the station is initialized.

NAME	Module	TYPE	Description	R/W	UNIT	RANGE
DC BUS voltage	12 Bytes Input_1	unit16	DC Bus working voltage	Read only	Volts	0 65536
12T Protection Type Axis2	12 Bytes Input_1	unit16	I2T type potection active in the motor	R/W		01
Acceleration Axis 1	12 Bytes Input_1	unit32	Profile Velocity Acceleration Axis 1	R/W	User Unit (rpm/s Default)	0 4294967296
Acceleration Axis 2	12 Bytes Input_1	unit32	Profile Velocity Acceleration Axis 2	R/W	User Unit (rpm/s Default)	0 4294967296
Deceleration Axis 1	12 Bytes Input_1	unit32	Profile Velocity Deceleration Axis 1	R/W	User Unit (rpm/s Default)	0 4294967296
Deceleration Axis 2	12 Bytes Input_1	unit32	Profile Velocity Deceleration Axis 2	R/W	User Unit (rpm/s Default)	0 4294967296
Max Motor Velocity Axis 1	12 Bytes Input_1	unit32	Max Motor Velocity Axis 1	R/W	User Unit (rpm Default)	0 4294967296
Max Motor Velocity Axis 2	12 Bytes Input_1	unit32	Max Motor Velocity Axis 2	R/W	User Unit (rpm Default)	0 4294967296



## 4. Commissioning the device in EtherNet/IP

#### Common EtherNet/IP features

Features	Description
Address Assingment	DHCP/BOOTP supported
DLR	Supported
Quick Connect	Supported
ACP	Supported
UCMM	Supported
Explicit Messages	Connected (class 3) and
	unconnected
Number of TCP connections	3
Number of CIP connections	10
Input assembly instance	100
Output assembly instance	101
Configuration assembly Instance	102

#### EtherNet/IP classes

#### Assembly Object (0x04)

The Assembly Object combines attributes of several objects and allows data to be sent from one object to another or to receive data in a targeted manner

The following description of the Ethernet Link Object is taken from the CIP specification, Vol. 2, Rev. 2.1 by ODVA & ControlNet International Ltd.

#### Instance attributes

Attr. no.	Attribute Name	Get/Set	Туре	Value
0x03	Data	S	ARRAY OF BYTE	Identifies a special product in a device type.
0x04	Size	G	UINT	Number of bytes in attribute 3: 256 or variable 12 default

#### Common Services

Service Class Instance Service name
-------------------------------------



code			
14	Yes	Yes	Get_Attribute_Single Returns the content of a specified attribute.

#### Consuming Assembly Instance (Instance 100)

These are the input data for the device and are used for controlling the device

Byte	Bit	Category	Designation	Туре	Comments
0	.0	Digital Output	Digital output 1 motor 1	BOOL	True = digital output active
0	.1	Digital Output	Digital output 2 motor 1	BOOL	Available when digital
0	.2	Digital Output	Digital output 1 motor 2	BOOL	outputs are set as "Generic
0	.3	Digital Output	Digital output 2 motor 2	BOOL	output" on SW interface
0	.4	Spare		BOOL	Spare
0	.5	Spare		BOOL	
0	.6	Spare		BOOL	
0	.7	Spare		BOOL	
1	.0	Enable AX 1	Digital enable motor 1	BOOL	True = motor enable
1	.1	Enable AX 2	Digital enable motor 2	BOOL	True = motor enable
1	.2	Begin AX 1	Digital begin motor 1	BOOL	True = target enable
1	.3	Begin AX 2	Digital begin motor 2	BOOL	True = target enable
1	.4	Reset Fault AX1	Reset Fault motor 1	BOOL	True on rising edge = clear fault
1	.5	Reset Fault AX2	Reset Fault motor 2	BOOL	True on rising edge = clear fault
1	.6	Reset Pos AX1	Reset Position motor 1	BOOL	True on rising edge = homing to 0 on actual position
1	.7	Reset Pos AX2	Reset Position motor 2	BOOL	True on rising edge = homing to 0 on actual position
2		Motor 1 target	Speed/Position motor 1	INT8	Target speed/position (-1000100 per cent of "Max
3		Motor 2 target	Speed/Position motor 2	INT8	Motor Velocity")
4		Torque Limit AX1	Current Limitation motor 1	INT8	Max current available on motor (percentage 100% of Peak current )
5		Torque Limit AX2	Current Limitation motor 2	INT8	Max current available on motor (percentage 100% of Peak current )
0		spare		BIIF	spare



Motor Power Company s.r.I. Via Leonardo Da Vinci, 4 42024 Castelnovo Sotto Reggio Emilia - Italia Tel. +39 0522 682710 - Fax +39 0522 683552 info@motorpowerco.it - motorpowerco.com Cap. Soc. 250.000,00€ i.v. - R.E.A. di RE 175521 Iscr.Reg.Impr. di RE n.01308390358 - N. Mecc. RE 010210 C.F. e P.IVA IT 01308390358



7	Spare	BYTE Spare
8	Spare	BYTE Spare
9	Spare	BYTE Spare
10	Spare	BYTE Spare
11	Spare	BYTE Spare

#### Fault Register Description

This pararagraph describes the fault register

The Motor 1/2 error code gives information about the fault occurred in the drives. More than one faults could be visible at the same time. In this case their values are added.

A detailed list of possible faults:

Bit	Fault type	Description	Value
number			(hex)
0	OVER_VOLTAGE	Power supply voltage goes	0x01
		above to the maximum admitted	
		value	
1	UNDER_VOLTAGE	Power supply voltage goes	0x02
		below to the maximum admitted	
		value	
2	PEAK_MOTOR_CURRENT	Motor peak current exceeded	0x04
3	RATED_MOTOR_CURRENT	Motor rated current exceeded	0x08
6	HALL SIGNALS	Feedback error	0x40
4	SHORT_CIRCUIT		0x10
8	POSITION_TRACKING_ERROR	Position following error exceeded	0x100
9	VELOCITY_TRACKING_ERROR	Speed following error exceeded	0x200
10	OVERVELOCITY	Maximum motor velocity	0x400
		exceeded	
12	DRIVE_OVERTEMPERATURE	Maximum frive temp reached	0x1000
13	FIELDBUS_CYCLE_TIME	Fieldbus cyclic messages timeout	0x2000

#### Producing Assembly Instance (Instance 101)

Byte	Bit	Category	Designation	Туре	Comments
0	.0	Sensors	Photo Eye 1 motor 1	BOOL	True = sensor active
0	.1	Sensors	Photo Eye 2 motor 1	BOOL	
0	.2	Sensors	Photo Eye 3 motor 1	BOOL	
0	.3	Sensors	Photo Eye 1 motor 2	BOOL	
0	.4	Sensors	Photo Eye 2 motor 2	BOOL	
0	.5	Sensors	Photo Eye 3 motor 2	BOOL	
0	.6	Spare		BOOL	Spare



0	.7	Spare		BOOL	
1	.0	Digital Input	Digital input 1 motor 1	BOOL	True = digital input active
1	.1	Digital Input	Digital input 2 motor 1	BOOL	
1	.2	Digital Input	Digital input 3 motor 1	BOOL	
1	.3	Digital Input	Digital input 1 motor 2	BOOL	
1	.4	Digital Input	Digital input 2 motor 2	BOOL	
1	.5	Digital Input	Digital input 3 motor 2	BOOL	
1	.6	Spare		BOOL	Spare
1	.7	Spare		BOOL	
2 – 3		Motor 1 error	Fault Register	UINT16	Canopen drive error code
		code			as per CiA DS-402
4 - 5		Motor 2 error	Fault Register	UINT16	Canopen drive error code
		code			as per CiA DS-402
6		Motor 1	Speed motor 1	INT8	Actual speed/position
_		feedback			(-1000100 per cent of
7		Motor 2	Speed motor 2	INI8	"Max Motor Velocity")
		feedback			
8		Actual lorque	Actual current motor I	INI8	Actual current in
		motor I			percentage of peak
•					current(-100100)
9		Actual lorque	Actual current motor 2	IN18	Actual current in
		motor 2			percentage of peak
10		Cip outo			Current(-100100)
10		spare		BIIE	spare
11		Spare		BYIE	Spare

#### Identity Object (0x01)

The following description of the Ethernet Link Object is taken from the CIP specification, Vol. 2, Rev. 2.1 by ODVA & ControlNet International Ltd.

#### Instance Attribute

Attr. no.	Attribute name	Get/set	Туре	Value
1	Vendor	G	UINT	Contains the manufacturer ID. 0x11C
2	Product type	G	UINT	Shows the general product type. Communications Adapter 12dez = 0x0C
3	Product code	G	UINT	Identifies a special product in a device type. default: 771



4	Revision n Major n Minor	G	STRUCT OF: n USINT n USINT	Revision of the device which is represented by the Indentity Object. n 0x01 n 0x01
5	Device status	G	WORD	WORD
6	Serial number	G	UDINT	Contains the last 3 bytes of the MAC ID
7	Product name	G	STRUCT OF: USINT STRING [13]	i.e.: MPC_PC_V1_EIP
8	State	G	UINT8	Present State of the Device

#### Device Status

Bit	Name	Definition
01	Reserved	default = 0
2	Configured	TRUE = 1: The application in the device has been configured (default setting).
3	Reserved	Default = 0
47	Extended Device Status	0011 = no I/O connection established 0110 = at least one I/O connection is in RUN mode 0111 = at least one I/O connection established, all in IDLE mode All other settings = reserved
8	Minor recoverable fault	Recoverable fault, e.g.: n Undervoltage n Force-Mode in DTM active n Diagnostic active at I/O channel
910	Reserved	
11	Diag	Common error bit
1215	Reserved	Default = 0

#### Common services

Service Code         Class         Instance         Service Name	
---	--



1	Yes	Yes	Get_Attribute_All Returns a predefined list of object attributes
5	No	Yes	Reset Starts the reset service for the device
14	Yes	Yes	Get_Attribute_Single Returns the content of a specified attribute.
16	No	No	Set_Attribute_Single Modifies a single attribute

#### TCP/IP Interface Object (0xF5)

The following description of the Ethernet Link Object is taken from the CIP specification, Vol. 2, Rev. 1.1 by ODVA & ControlNet International Ltd.

#### Class attributes

Attr. no.	Designation	Get/set	Туре	Value
1	Revision	G	UINT	1
2	Max. object instance	G	UINT	1
3	Number of instances	G	UINT	1
6	Max. class identifier	G	UINT	7
7	Max. instance attribute	G	UINT	6

#### Instance attributes

Attr. no.	Designation	Get/set	Туре	Value
1	Status	G	DWORD	Interface status
2	Configuration capability	G	DWORD	Interface capability flag
3	Configuration control	G/S	DWORD	Interface control flag
	Physical link object	G	STRUCT	
4	Path size		UINT	Number of 16 bit words: 0x02
	Path		Padded EPATH	0x20, 0xF6, 0x24, 0x01
5	Interface configuration	G	Structure of:	TCP/IP network interface configuration
	IP address	G	UDINT	Actual IP address



	Network mask	G	UDINT	Actual network mask
	Gateway addr.	G	UDINT	Actual default gateway
	Name server	G	UDINT	0 = no server address configured
	Name server 2	G	UDINT	0 = no secondary server address configured
	Domain name	G	UDINT	0 = no Domain Name configured
6	Host name	G	string	0 = no host name configured
7	Safety Network	G	UDINT	
8	TTL Value	G/S		
9	Master Config	G	UDINT	
10	Select Acd	G		
11	Last Conflict Detected	G/S	UDINT	
12	QuickConnect	G/S	BOOL	= deactivate = activate
13	Encap. Inactivity Timeout	G/S	UDINT	

#### Common Services

Service code.	Class	Instance	Meaning
1	Yes	Yes	Get_Attribute_All
2	No	No	Set_Attribute_All
14	Yes	Yes	Get_Attribute_Single
16	No	Yes	Set_Attribute_Single



#### Interface Status

Bit	Designation	Meaning
03	Interface configuration status	Indicates the status of the Interface Configuration attribute: • 0 = The Interface Configuration attribute has not beenconfigured • 1 = The Interface Configuration attribute contains validconfiguration. 215 = reserved
431	Reserved	

The Status attribute indicates the status of the TCP/IP network interface.

#### Configuration Capability

The Configuration Capability indicates the device's support for optional network configuration capability.

Bit	Designation	Meaning	Value
0	BOOTP client	The device is capable of obtaining its network configuration via BOOTP.	1
1	DNS client	The device is capable of resolving host names by querying a DNS server.	0
2	DHCP client	The device is capable of obtaining its network configuration via DHCP.	1

#### Configuration control

The Configuration Control attribute is used to control network configuration options.

Bit	Designation	Meaning
03	Startup configuration	Determines how the device shall obtain its initial configuration. 0 = The device shall use the interface configuration values previously stored (for example, in non-volatile memory or via hardware switches, etc). 13 = reserved
4	DNS Enable	Always 0
531	Reserved	Set to 0



#### Interface Configuration

This attribute contains the configuration parameters required to operate a TCP/IP device.

To change this attribute, proceed as follows:

- Read out the attribute.
- Change the parameters.
- Set the attribute.

The TCP/IP Interface Object appese the new configuration upon completion of the Set service. If the value of the Startup Configuration bits (Configuration Control attribute) is 0, the new configuration is stored in non-volatile memory.

The device does not reply to the set service until the values are safely stored to non-volatile memory.

An attempt to set any of the components of the Interface Configuration attribute to invalid values results in an error (status code 0x09) returned from the Set service. If initial configuration is obtained via BOOTP or DHCP, the Interface Configuration attribute components are all 0 until the BOOTP or DHCP reply is received. Upon receipt of the BOOTP or DHCP reply, the Interface Configuration attribute shows the configuration obtained via BOOTP/DHCP.

#### Host name

This attribute contains the device's host name. The host name attribute is used when the device supports the DHCP-DNS Update capability and has been configured to use DHCP upon start up. The mechanism allows the DHCP client to transmit its host name to the DHCP server. The DHCP server then updates the DNS records on behalf of the client

#### VSC Vendor Specific Class

It is possible to write/read some specific parameters as user parameters to PC drive adapter.

Instance ID is always 0x01.

#### Init Parameters Class (101)

ATTR No.	Designation	Def value	ACCESS	type	Meaning
100	ACC_AX1	2000	G/S	UDINT	Profile acceleration of Ax1 in user units
101	ACC_AX2	2000	G/S	UDINT	Profile acceleration of Ax2 in user units
102	DEC_AX1	2000	G/S	UDINT	Profile deceleration of Ax1 in user units
103	DEC_AX2	2000	G/S	UDINT	Profile deceleration



					of Ax2 in user units
104	MAX MOTOR VEL AX1	0x10	G/S	UDINT	Max motor velocity for profile in Ax1 (user units)
105	MAX MOTOR VEL AX2	0x100	G/S	UDINT	Max motor velocity for profile in Ax2 (user units)
106	DC BUS VOLTAGE IN USE	48	G/S	UINT	Speed following error exceeded
107	ACTUAL POS AX1		G	DINT	Actual position for Ax1 (High speed shaft) in user unit
108	ACTUAL POS AX2		G	DINT	Actual position for Ax2 (High speed shaft) in user unit
109	ACTUAL TORQUE AX1		G	INT	Actual torque in milliamps for Ax1
110	ACTUAL TORQUE AX2		G	INT	Actual torque in milliamps for Ax2

Common Services

Service code.	Class	Instance	Meaning		
14	Yes	Yes	Get_Attribute_Single		
16	No	Yes	Set_Attribute_Single		

#### Parameter Gateway Class (100)

Expert users are allowed to read/write all the parameters of the device via Explicit messages.

Parameters are divided into 16bit parameters and 32 bits parameters.

An offset off 0x900 (2304) in the attribute ID is applied to reach the desired parameters index of the PC servo drive.

Instance ID is always 0x01.

For instance if it is needed to access parameter index 2 of the device, proper attribute ID has to be 0x902.

Here is a list of parameters that can be configured to the device:

Attribute No Designation Mean	Get/ Set	ТҮРЕ	UNIT	Value
-------------------------------	-------------	------	------	-------



693 + 2304	Actual position Axis 1	Actual incremental position	D	DINT	User Unit	-2147483648  2147483648
743 + 2304	Actual position Axis 2	Actual incremental position	G	DINT	User Unit	-2147483648  2147483648
666 + 2304	Bootloader version	Bootloader version	G	UINT		0 65536
648 + 2304	Serial number	Serial number del drive	G	UDINT		0 4294967296
640 + 2304	Firmware version	Firmware version del drive	G	UINT		0 65536
669 + 2304	Fault register Axis 1	Fault register See Table	G	UINT		0 65536
719 + 2304	Fault register Axis 2	Fault register See Table	G	UINT		0 65536
653 + 2304	Actual DC BUS voltage	Actual DC BUS voltage	G	UINT	Volts	0 65536
662 + 2304	Drive temperature	Actual drive temperature*1 00	G	UINT	°C*100	0 65536
256 + 2304	12T Protection Type Axis1	I2T type potection active in the motor	G/S	UINT		01
448 + 2304	I2T Protection Type Axis2	I2T type potection active in the motor	G/S	UINT		01
155 + 2304	Acceleration Axis 1	Profile Velocity Acceleration Axis 1	G/S	UDINT	User Unit (rpm/s Default)	0 4294967296
347 + 2304	Acceleration Axis 2	Profile Velocity Acceleration Axis 2	G/S	UDINT	User Unit (rpm/s Default)	0 4294967296
157 + 2304	Deceleration Axis 1	Profile Velocity Deceleration Axis 1	G/S	UDINT	User Unit (rpm/s Default)	0 4294967296
349 + 2304	Deceleration Axis 2	Profile Velocity Deceleration Axis 2	G/S	UDINT	User Unit (rpm/s Default)	0 4294967296
151 + 2304	Max Motor Velocity Axis 1	Max Motor Velocity Axis 1	G/S	UDINT	User Unit (rpm Default)	0 4294967296



343 + 2304	Max Motor Velocity Axis 2	Max Motor Velocity Axis 2	G/S	UDINT	User Unit (rpm Default)	0 4294967296
169 + 2304	Overvelocity Axis 1	Velocity Admissible Limit For Motor	G/S	UDINT	User Unit (rpm Default)	0 4294967296
361 + 2304	Overvelocity Axis 2	Velocity Admissible Limit For Motor	G/S	UDINT	User Unit (rpm Default)	0 4294967296
167 + 2304	Velocity Following Error Window Axis 1	Velocity Following Error Window in Velocity Mode	G/S	UDINT	User Unit (rpm Default)	0 4294967296
359 + 2304	Velocity Following Error Window Axis 2	Velocity Following Error Window in Velocity Mode	G/S	UDINT	User Unit (rpm Default)	0 4294967296
142 + 2304	Nominal current Axis 1	Motor nominal current Axis 1	G/S	UINT	Arms	0 65536
143 + 2304	Peak current Axis 1	Motor peak current Axis 1	G/S	UINT	Arms	0 65536
334 + 2304	Nominal current Axis 2	Motor nominal current Axis 2	G/S	UINT	Arms	0 65536
335 + 2304	Peak current Axis 2	Motor peak current Axis 2	G/S	UINT	Arms	0 65536
548 + 2304	Clear Fault Ax1	Clear Axis 1 Fault on 0->1 edge	G/S	UINT		01
598 + 2304	Clear Fault Ax2	Clear Axis 2 Fault on 0->1 edge	G/S	UINT		01
514 + 2304	Save to EEPROM	Store actual parameters in NVM	S	UINT		01
674 + 2304	Actual torque Ax1	Actual torque in lq active on axis	Read G	INT	Milliamp s peak	- 32.76832.76 77
724 + 2304	Actual torque Ax2	Actual torque in Iq active on axis	G	INT	Milliamp s peak	- 32.76832.76 77
674 + 2304	Analog In Ax1	Analog input value for Axis1	G	INT	mV	- 32.76832.76



						77
724 + 2304	Analog In Ax1	Analog input value for Axis1	G	INT	mV	

#### **Common Services**

Service code.	Class	Instance	Meaning
14	Yes	Yes	Get_Attribute_Single
16	No	Yes	Set_Attribute_Single

#### Connecting the devices to a Rockwell PLC with EtherNet/IP

#### Installing the EDS file

• Open the EDS Wizard via Tools  $\rightarrow$  Hardware Installation Tool.



FIGURE 14 STUDIO 5000 - OPENING THE HARDWARE INSTALLATION TOOL

Motor Power Company s.r.l. Via Leonardo Da Vinci, 4 42024 Castelnovo Sotto Reggio Emilia - Italia Tel. +39 0522 682710 - Fax +39 0522 683552 info@motorpowerco.it - motorpowerco.com Cap. Soc. 250.000.00 (v. - R.E.A. di RE 175521 Iscr.Reg.Impr. di RE n.01308390358 - N. Mecc. RE 010210 C.F. e P.IVA IT 01308390358



• Follow the instructions in the wizard to install the EDS file.

Rockwell Automation's EDS Wizard	×
Options What task do you want to complete?	<u> </u>
Register an EDS file(s). This option will add a device(s) to our database.	
Unregister a device. This option will remove a device that has been registered by an EDS file from our database.	
<ul> <li>C create an EDS file.</li> <li>This option creates a new EDS file that allows our software to recognize your device.</li> </ul>	
Upload EDS file(s) from the device. This option uploads and registers the EDS file(s) stored in the device.	
	< Zurück Weiter > Abbrechen

FIGURE 15 STUDIO 5000 – EDS WIZARD

• device is registered as a Communications Adapter and can be added to the project later as a slave.

#### Adding the device to the project

• In the project tree open the context menu by right-clicking on the entry of the scanner and click New Module.



A state of the second sec	ngs ne rams / Phas	es		- # - P-11192168 	1.254/Jackplan 1.254/Jackplan PLBL JSR D. KAlsrm	vevor ~ kevor ~ Date re Date re Date re
Ru     Fau     Fa	nor andler ngs ne rams / Phas	es			• • • • • • • • • • • • • • • • • • •	eVO* ▼ JOR R ▲ Be ▼ #
Hull     Hull     Hull     Hull     Hull     Hall	n T andler , ags ne rams / Phas	es			P LBL JSR	ieV0° ₹ Jose R ₹ Bie ₹ ₽
A BAC AND A CONTRACT AND A CONT	oor andler - ags ne rams / Phas	es		in her in	P LBL JSR Alarm	JOIR R
miter miter miter Power, Mot troller Fault Ha er-Up Handler mTask WainProgram Ta MainRoutir the MainRoutir the MainRoutir MainR	oor andler - - ags te rams / Phas	es		rof had Jfi	P LBL JSR Alsrm	JUR R
nizer ler Power, Mot troller Tags troller Fault Ha erer-Up Handler nTask WainProgram Ta MainRoutir cheduled Program Groups Groups Groups rouped Axes instructions pes -Defined ugs -On-Defined teriord	oor andler - - ags te rams / Phas	85		<u>wer <u>k</u> Add-O</u>	Jarm	<u>↓</u> <del>1</del>
nizer Voller Tags troller Fault Ha troller Fault Ha troller Fault Ha troller Fault Ha troller Fault Ha MainRouth MainRouth MainRouth MainRouth Anger MainRouth Cheduled Prog Groups orouped Asse Instructions pes -o-Defined agi -On-Defined temoch	oor andler - ags ne rams / Phas	es				<u>•</u> 4
ler Power_Mot troller Tags troller Tagt Har her-Up Handler hask WainProgram Ta hanRoutr cheduled Prog Groups rouped Axes Instructions pes -Oeffined igs -On-Defined	andler , ags ne rams / Phas	85				
troller Fault Ha troller Fault Ha MainProgram Program Ta MainRoutir MainRoutir Cheduled Prog rouped Axes Instructions pes -On-Defined logs -On-Defined lafined	andler , ags ne rams / Phas	ės				
A service of the ser	ags ne rams / Phas	es				
nTask MainProgram Ta MainRoutir MainRoutir MainRoutir rouped Axes Instructions pes -Defined logs -On-Defined lofined	ags ne rams / Phas	es				
nTask MainProgram Program Ta Program Ta MainRoutir cheduled Prog Groups Groups orouped Axes Instructions pes -Defined igs -On-Defined	ngs ne rams / Phas	ês				
MainProgram Program Ta MainRouttin cheduled Prog Groups Groups a Instructions pes -Defined ugs -On-Defined Joined	ngs ne rams / Phas	es				
Program is MainRoutin Cheduled Prog Groups rouped Axes Instructions pes -Onstructions pes -On-Defined igs -On-Defined defined	ags rams / Phas	es				
cheduled Prog Groups rouped Axes Instructions pes - Defined igs - On-Defined	rams / Phas	es				
Groups rouped Axes Instructions pes - Defined Igs - On-Defined						
rouped Axes Instructions pes Defined Igs On-Defined						
1 Instructions pes -Defined 1gs -On-Defined Infined						
pes -Defined Igs -On-Defined						
-Denneu Igs -On-Defined						
-On-Defined						
lafinad						
ennew .						
dule-Defined						
figuration						
1769-L23E-OB1	Power Mot	or				
1769-L23E-QB1	L Ethernet Po	ort LocalENB				
then 1	New Modu	de				
ompacu	Discover N	lodules				
<b>R</b>	Paste	c	rl+V			
	Drint					
	Fline					
	figuration ipactLogic5322 (769-L23E-Q8: 2009-L23	figuration pact.ogis3228-QB1 Synth (759-123-CB1 Dewer, Mod 759-123-CB1 Dewer, Mod Compact New Mod Discover M Parte Print	figuration 1941-1951-237-QB1 System 1951-237-QB1 System 1951-237-QB1 Ethernet Port LocalENB Compared Concept Hodules Parte CL Print	figuration SpatLage:25213E-CBB System 1554:123F-081 Power_Motor 1554:123F-081 Ethernet Port LoaiENB Compatibility Parts Ctrl+V Print +	figuration partia gis2532E-CB1 System 756-123-CB1 System 756-123-CB1 Enhance For LocalENB Compact Partial Discover Module Discover Module Parte Ctrl-V Print	figuration partial gis23213-CBI System 1754-123-CBI System 1754-123-CBI CONENTE PortLocalENB Compact Partial Discover Modules Partia Ctrl+V Print ,



• Select MPC PC EIP and add it to the project.



😰 RSLogix 5000 - Power_Motor [1769-L23E-QB1 20.13]* - [MainProgram - MainRoutine		
File Edit View Search Logic Communications Tools Window Help		_ @ >
🏦 😂 🖬 📾 🐰 印 🖙 A(48).4 🛶 🌉 4	<u>ଲୁ 🕞 🏹 🗣 ପ୍ର୍</u>	Select a Language 👻 🦻
Offline BUN EM Pathy P.11192.168.12		
No Forces		
No Edits 🔒 EAT	3L JER JXR RET SER TND HCR UID UIE SFR SFP EOT EMENT AFI NOP	•
□	Alarm 🙏 Bit 🙏 Timer 🙏 Input 🙏 Comp 🙏 Comp 🙏 Move 🙏 File 🏌 File 🔏 Segu 🙏 Equi 👌 Prog 🔏 For/ 🔏 Spec 🗶 Trig 🠇	Adva 🕻 Math 🕻 Moti 🕻 Moti 🥻 Moti 🕻 Moti 🕻 Moti 🕻 Moti 🕻 Adva 🕻 ASCI 🕻 ASCI
Controller Organizer		
Controller Power Motor		
Controller Tags		•
🖴 Controller Fault Handler	(End)	
- Power-Up Handler		
E-Call Tasks		
Main Program		
Program Tags	Select Module Type	
MainRoutine	Catalog Module Discovery Favorites	
- 🔤 Unscheduled Programs / Phases		
🖶 🛅 Motion Groups	hi Gleve Filters A Hide Filters	
Ungrouped Axes		
Add-On Instructions	Module Type Category Filters	E Contraction of the second
User-Defined	V CIP Motion Safety Drive Device	
🖶 🙀 Strings	Communication     Advanced Energy Industries, Inc.	
- 🦗 Add-On-Defined	Communications Adapter Cognex Corporation	
Predefined	V Convoler • V Danoss •	
I Module-Defined		
- Tellus	Catalog Number Description Vendor Category	
🗄 📰 CompactLogio5323E-QB1 System	0118 000C 0303 MPC PC V1 EIP Hilscher SmbH Communications Ada	
- 📴 1769-L23E-QB1 Power_Motor		
🖨 🛷 1769-L23E-QB1 Ethernet Port LocalENB		
- The Ethernet		
Im CompactBus Local		
	A III P	
	1 of 401 Mark in Turner Found	
	T di voti module rypes round	
	Close on Create Close Heb	
		<mark>.a</mark> . An
	MainRoutine'	
Des de		Dura (C-0) (C) (C)



In the window New Module → General enter the device name and IP address of the device.





#### FIGURE 18 NEW MODULE, SETTING NAME AND IP ADDRESS

General* Connection* Module Info	Connection			
Internet Protocol Port Configuration	Name	. Requested Packet Interval (RPI) (ms)	Connection over EtherNet/IP	Input Trigger
	Exclusive Owner	10.0 1.0 - 3200.0	Unicast	Cvelic
	Inhibit Module	ls While in Run Mode		

#### FIGURE 19-OPTIONAL-SET CONNECTION PARAMETERS

![](_page_40_Picture_6.jpeg)

![](_page_41_Picture_1.jpeg)

• The device appears as Ethernet slave in the project tree.

FIGURE 20 STUDIO 5000 – DEVICE IN THE PROJECT TREE

#### **Setting initialization Parmeters**

#### Going online with the PLC

- Search the network via the Who Active button.
- Select the PLC.
- Set the communication path via Set Project Path.

![](_page_41_Picture_9.jpeg)

![](_page_41_Picture_10.jpeg)

![](_page_42_Picture_1.jpeg)

FIGURE 21 STUDIO 5000 – SETTING THE COMMUNICATION PATH

- Select the PLC.
- Click Go online.
- Click **Download** In the following dialog (Connect To Go Online)

## 5. Commissioning the device in EtherCAT

EtherCAT uses an implicit addressing of the network nodes. The EtherCAT master automatically addresses all connected slaves. A manual addressing or identification is only required for applications such as for toolchange applications (Hot Connect).

#### EtherCAT features

- CoE (CAN over EtherCAT)
- FoE (File over EtherCAT)
- SDO
- 1 TPDO/RPDO no mapping available.
- Free Run mode, maximum data update 2ms.

#### Process Data Objects

#### Inputs- Controller data Inputs

Inputs are organized as the list below. No mapping is available.

PDO in length is 28 bytes

![](_page_42_Picture_18.jpeg)

![](_page_42_Picture_19.jpeg)

Byte	Bit	Category	Designation	Туре	Comments
0	.0	Sensors	Photo sensor 1 motor 1	BOOL	
0	.1	Sensors	Photo sensor 2 motor 1	BOOL	
0	.2	Sensors	Photo sensor 3 motor 1	BOOL	True = sensor active
0	.3	Sensors	Photo sensor 1 motor 2	BOOL	
0	.4	Sensors	Photo sensor 2 motor 2	BOOL	
0	.5	Sensors	Photo sensor 3 motor 2	BOOL	
0	.6	Spare		BOOL	Spare
0	.7	Spare		BOOL	
1	.0	Digital Input	Digital input 1 motor 1	BOOL	
1	.1	Digital Input	Digital input 2 motor 1	BOOL	
1	.2	Digital Input	Digital input 3 motor 1	BOOL	Truc - digital input active
1	.3	Digital Input	Digital input 1 motor 2	BOOL	nde – digital input de live
1	.4	Digital Input	Digital input 2 motor 2	BOOL	
1	.5	Digital Input	Digital input 3 motor 2	BOOL	
1	.6	Spare		BOOL	Spara
1	.7	Spare		BOOL	
2		CanOpen	Mode of operation display motor 1	INT8	Canopen mode of operation code as per CiA DS-402
3		CanOpen	Mode of operation display motor 2	INT8	Canopen mode of operation code as per CiA DS-402
4-5		CanOpen	Status Word motor 1	UINT16	Canopen Status Word as per CiA DS-402
6-7		CanOpen	Status Word motor 2	UINT16	Canopen Status Word as per CiA DS-402
8-11		CanOpen	Actual Velocity motor 1	INT32	Canopen Actual Velocity as per CiA DS-402
12-15		CanOpen	Actual Velocity motor 2	INT32	Canopen Actual Velocity as per CiA DS-402
16-19		CanOpen	Actual Position motor 1	INT32	Canopen Actual Position as per CiA DS-402
20-23		CanOpen	Actual Position motor 2	INT32	Canopen Actual Position as per CiA DS-402
24-25		CanOpen	Actual Torque motor 1	INT16	Canopen Actual Torque as per CiA DS-402
26-27		CanOpen	Actual Torque motor 2	INT16	Canopen Actual Torque as per CiA DS-402

![](_page_43_Picture_3.jpeg)

TwinCAT Project8 +	х						
Name	[X]	Online	Туре	Size	>Addr	In/Out	Linked to
🔁 Sensors In		0x00	BYTE	1.0	39.0	Input	
🔁 Digital IO In		0x00	BYTE	1.0	40.0	Input	
🔁 Mode Of Op Dis		0	SINT	1.0	41.0	Input	
🔁 Mode Of Op Dis		0	SINT	1.0	42.0	Input	
😤 Status Word 1	Х	5728	UINT	2.0	43.0	Input	nDataln1[0] . nDataln1 . l
🔁 Status Word 2		5696	UINT	2.0	45.0	Input	
🔁 Actual Velocity 1		0	DINT	4.0	47.0	Input	
🔁 Actual Velocity 2		0	DINT	4.0	51.0	Input	
👻 Actual Position 1		848	DINT	4.0	55.0	Input	
🔁 Actual Position 2		0	DINT	4.0	59.0	Input	
🔁 Actual Torque 1		0	INT	2.0	63.0	Input	
👻 Actual Torque 2		0	INT	2.0	65.0	Input	

#### FIGURE 22-TWINCAT RPDO

#### **Outputs- Controller data ouputs**

Outputs are organized as the list below. No mapping is available.

PDO in length is 28 bytes

Byte	Bit	Category	Designation	Туре	Comments			
0	.0	Digital Output	Digital output 1 motor 1	BOOL				
0	.1	Digital Output	Digital output 2 motor 1	BOOL	True = digital output active Available when digital outputs			
0	.2	Digital Output	Digital output 1 motor 2 BOOL are s		are set as "Generic output" on SW interface			
0	.3	Digital Output	Digital output 2 motor 2	BOOL				
0	.4	Spare		BOOL				
0	.5	Spare		BOOL	Spare .			
0	.6	Spare		BOOL	spare			
0	.7	Spare		BOOL				
1		CanOpen	Mode of Operation motor 1	INT8	Canopen mode of operation as per CiA DS-402			

![](_page_44_Picture_8.jpeg)

2	CanOpen	Mode of Operation motor 2	INT8	Canopen mode of operation as per CiA DS-402
3-4	CanOpen	Control Word motor 1	UINT16	Canopen Control Word as per CiA DS-402
5-6	CanOpen	Control Word motor 2	UINT16	Canopen Control Word as per CiA DS-402
7-10	CanOpen	Target Velocity motor 1	INT32	Canopen Target Velocity as per CiA DS-402
11-14	CanOpen	Target Velocity motor 2	INT32	Canopen Target Velocity as per CiA DS-402
15-18	CanOpen	Target Position motor 1	INT32	Canopen Target Position as per CiA DS-402
19-22	CanOpen	Target Position motor 2	INT32	Canopen Target Position as per CiA DS-402
23-24		Max Current motor 1	UINT16	Current torque limits in In/1000. If 0 the limit is not active.
25-26		Max Current motor 2	UINT16	Current torque limits in In/1000. If 0 the limit is not active.
27		Spare	BYTE	Spare

TwinCAT Project8 👎	×						
Name	[X]	Online	Туре	Size	>Addr	In/Out	Linked to
🛋 Digital IO Out		0x00	BYTE	1.0	39.0	Output	
Spare Spare		0x00	BYTE	1.0	40.0	Output	
🔊 Mode of Operati		0	SINT	1.0	41.0	Output	
🔊 Mode of Operati		0	SINT	1.0	42.0	Output	
Control Word 1		0	UINT	2.0	43.0	Output	
Control Word 2		0	UINT	2.0	45.0	Output	
Target Velocity 1		0	DINT	4.0	47.0	Output	
Target Velocity 2		0	DINT	4.0	51.0	Output	
Target Position 1		0	DINT	4.0	55.0	Output	
Target Position 2		0	DINT	4.0	59.0	Output	
Max Current 1		0	UINT	2.0	63.0	Output	
Max Current 2		0	UINT	2.0	65.0	Output	

FIGURE 23-TWINCAT TPDO

![](_page_45_Picture_5.jpeg)

## Service Data Object

Only the manufacturer specific index range of the object dictionary is listed

Image: Sector Sector         Image: Se	IwinCAT Project8 - TcXaeShell File Edit View Project Build Debug TwinCAT TwinSAFE	PLC Team Sco	pe Tools Window Help							
Build 402422 (Loaded)          if all all all all all all all all all al	🛛 🛛 - 〇   🎦 - 🎦 - 😩 🔛 🚰   从 🗇 台   ウ - ペ -   Releas	e 🛛 TwinCAT	RT (x64) - Attach.	•	- 🎜			- 4	٦	â 🗞 🚯
Solution Sphere       • ↓ XX         Solution Sphere       • ↓ XX         Construction Sphere       • ↓ XX	🔋 Build 4024.32 (Loaded) 🔹 📮 🔛 🔟 💆 🛠 🍥 🔯 🍡 🏍	TwinCAT Project8	✓ <local></local>	• <sub>=</sub>	-	- 1-2	▶ = €	÷ ?	☆ →≣ (	) 🕯 🖆
General Beter/CM         General Beter/CM         Color           Statuto	Solution Explorer 👻 🕂 🗙	TwinCAT Project8	<mark>⊨ ×</mark> Output Error List							
Search Solution Explorer (Curl +)         P-           Boldston TwincAI Project8 (1 project)         Adamond           WincAI Project8 (1 project)         Maxmond           WincTow         Job Coll back Stop Deceleration And2         PNV           Maxmond         PNV         Colocomode (1 project)           WincTow         Job Coll back Stop Deceleration And2         PNV           Diptet Stoper (Curl Back Stop Deceleration And2         PNV         Colocomode (1 project)           WincTow         Job Project Stoper (2 project)         PNV         Colocomode (1 project)           WincTow         Job Project Stoper (2 project)         PNV         Colocomode (1 project)	○ ○ 🏠 🛱 - To - @ 🗡 🗕	General EtherCA	Process Data Startup CoE-C	Online Online						
↓         Active         ∑index Life         ∑index Life         ∑index Life         ∑index Life           ↓         Twint CAT Projects         ∑index Life	Search Solution Explorer (Ctrl+ è)				_					
▲ WoncAT Project8           ▲ WonconcAT Project8 <td>J Solution 'TwinCAT Project8' (1 project)</td> <td>Update L</td> <td>st 🔄 Auto Update 🗹</td> <td>Single Update Show Off</td> <td>ine Data</td> <td></td> <td></td> <td></td> <td></td> <td></td>	J Solution 'TwinCAT Project8' (1 project)	Update L	st 🔄 Auto Update 🗹	Single Update Show Off	ine Data					
▲ SYSTM         Addio Statup         Module OD (Mac Prot:         0           ▲ Real-Time         Bage         Value         Paral-Time         <	TwinCAT Project8	Advanced								
I cense         I cense         Rage         Vale           ● Real-Time         ● VO liel Tark         ● VO liel Tark         ● VO liel Tark           ● Real-Time         ● VO liel Tark         ● VO liel Tark         ● VO liel Tark           ● Real-Time         ● VO liel Tark         ● VO liel Tark         ● VO liel Tark           ● Real-Time         ● VO liel Tark         ● VO liel Tark         ● VO liel Tark           ● Real-Time         ● Vo liel Tark         ● Vo liel Tark         ● Vo liel Tark           ● Real-Time         ● Vo liel Tark         ● Vo liel Tark         ● Vo liel Tark           ● Real-Time         ● Vo liel Tark         ● Vo liel Tark         ● Vo liel Tark           ● No Control         ● Vo liel Tark         ● Vo liel Tark         ● Vo liel Tark           ● No Control         ● Vo liel Tark         ● Vo liel Tark         ● Vo liel Tark           ● No Control         ● Vo liel Tark         ● Vo liel Tark         ● Vo liel Tark           ● No Control         ● Vo liel Tark         ● Vo liel Tark         ● Vo liel Tark           ● No control         ● Vo liel Tark         ● Vo liel Tark         ● Vo liel Tark           ● No control         ● Vo liel Tark         ● Vo liel Tark         ● Vo liel Tark           ● No control         ●	SYSTEM	Add to Start	Jp Online Data	Module OD (AoE Port):	0					
<ul> <li> <ul> <li></li></ul></li></ul>										
■ 100 min       1202       Profile Decletation Ava2       Profile Decletation Ava2       Profile Decletation Ava2         ■ 2010       Profile Decletation Ava2       Profile Decletation Ava2       Profile Decletation Ava2       Profile Decletation Ava2         ■ 2010       Profile Decletation Ava2       Profile Decletation Ava2       Profile Decletation Ava2       Profile Decletation Ava2         ■ 2010       Profile Decletation Ava2       Profile Decletation Ava2       Profile Decletation Ava2       Profile Decletation Ava2         ■ 2010       Construction Ava2       Profile Decletation Ava2       Profile Decletation Ava2       Profile Decletation Ava2         ■ 2010       Construction Ava2       Profile Decletation Ava2       Profile Decletation Ava2       Profile Decletation Ava2         ■ 2010       Construction Ava2       Profile Decletation Ava2       Profile Decletation Ava2       Profile Decletation Ava2         ■ 2010       Construction Ava2       Profile Decletation Ava2       Profile Decletation Ava2       Profile Decletation Ava2         ■ 2010       Construction Ava2       Profile Decletation Ava2	Keal- lime	Index	Name	Flags Value						
2/103       Profile Uceration Aux2       Profile Uceration Aux2       Profile Uceration Aux2       Profile Uceration Aux2         2/103       Profile Uceration Aux3       Profile Uceration Aux3       Profile Uceration Aux3       Profile Uceration Aux3         2/103       Profile Uceration Aux3         2/103       Profile Uceration Aux3         2/103       Profile Uceration Aux3         2/103       Profile Uceration Aux3         2/103       Profile Uceration Aux3       Profi	Pa Tacke	2102	Profile Decleration Axis1	RW 0x000	003E8 (1000)					
all operation       2104       Max Mode Velocity Ava2       RV       0x000002,4 (200)         all cCOM 000 jects       2106       Max Mode Velocity Ava2       RV       0x000002,4 (200)         all cCOM 000 jects       2106       Outlet's top Deceleration Ava3       RW       0x000002,4 (200)         all cOMON       Particle State	Boutes	2103	Profile Decleration Axis2	RW 0x000	003E8 (1000)					
2 100       main feed year Aus       111       00000058 (1000)         2 000       main feed year Aus       111       00000058 (1000)         2 000       main feed year Aus       111       00000058 (1000)         2 000       main feed year Aus       110       00000058 (1000)         2 000       main feed year Aus       110       000000058 (1000)         2 000       main feed year Aus       110       000000058 (1000)         2 000       Fak Register Aus       110       00000000         2 000       Fak Register Aus       110       00000000         2 000       Load neta Aus       RW       000000000         2 0100       Load neta Aus       RW       00000000         2 0100       Load neta Aus       RW       000000000000000000         2 0100       Load neta Aus       RW       000000000000000000000000000000000000		2104	Max Motor Velocity Axis I Max Mater Velocity Axis 2	RW 0x000	009C4 (2500)					
▲ MORTION         Automatic Action	TrCOM Objects	2105	Duick Stop Deceleration Avis1	RW 0x000	003E8 (1000)					
■ NC-Task 1 SAF       = 2008       Fault Register Avia1       PO       0.0000 (0)         ■ NC-Task 1 SVB       = 2008       Fault Register Avia1       PO       0.0000 (0)         ■ Disc       = 2008       Fault Register Avia2       PN       0.00000 (0)         ■ Disc       = 2008       Fault Register Avia2       PN       0.00000 (0)         ■ Disc       = 2008       Fault Register Avia2       PN       0.00000 (0)         = 2008       Fault Register Avia2       RW       0.00000 (0)       =         = 2008       Fault Register Avia2       RW       0.00000 (0)       =         = 200       Lodd Instita Avia2       RW       0.00000 (0)       =         = 200       Lodd Instita Avia2       RW       0.00000 (0)       =         = 200       Lodd Instita Avia2       RW       0.00000 (0)       =         = 200       Lodd Instita Avia2       RW       0.00000 (0)       =         = 200       Lodd Instita Avia2       RW       0.00000 (0)       =         = 200       Lodd Instita Avia2       RW       0.00000 (0)       =         = 200       Instita Fault       Fault Register Avia2       Fault Register Avia2       =         = 0       Digital	MOTION	2107	Quick Stop Deceleration Axis2	RW 0x000	003E8 (1000)					
<ul> <li>PAC-Task 1 SVB             <ul> <li>Page</li> <li>Tables</li> <li>Objects</li> <li>PAKS</li> <li>PAKS<!--</td--><td>NC-Task 1 SAF</td><td>2108</td><td>Fault Register Axis1</td><td>RO 0x000</td><td>0 (0)</td><td></td><td></td><td></td><td></td><td></td></li></ul></li></ul>	NC-Task 1 SAF	2108	Fault Register Axis1	RO 0x000	0 (0)					
	NC-Task 1 SVB	2109	Fault Register Axis2	RO 0x000	0 (0)					
Tables       2108       Profite Vectory, Ass2       RW       0x00000 (0)         Axes       210C       Load Inetia Axis1       RW       0x0000 (0)         Axes       210C       Load Inetia Axis1       RW       0x0000 (0)         Profite Vectory       210C       Load Inetia Axis1       RW       0x0000 (0)         Profite Vectory       210C       Load Inetia Axis1       RW       0x0000 (0)         Profite Vectory       210C       Load Inetia Axis2       RW       0x0000 (0)         Profite Vectory       210C       Load Inetia Axis1       RW       0x0000 (0)         Profite Vectory       Profite Vectory       RW       0x0000 (0)       0         Profite Vectory       Profite Vectory       Profite Vectory       RV       0x000       BYTE       1.0       39.0       Input       0         Profite Vectory       Profite Vectory       Profite Vectory       0       SINT       1.0       42.0       Input       0         Profite Vectory       Profite Vectory       0       SINT       1.0       42.0       Input       0         Profite Vectory       9       Nade Of Op Dis       0       SINT       1.0       42.0       Input       0 <t< td=""><td>1 Image</td><td>210A</td><td>Profile Velocity Axis1</td><td>RW 0x000</td><td>004E2 (1250)</td><td></td><td></td><td></td><td></td><td></td></t<>	1 Image	210A	Profile Velocity Axis1	RW 0x000	004E2 (1250)					
Bit Dejects         210C         Load henta Axis 1         RW         0x0000 (0)           2 HAxes         Bit Axis 1         FALSE         FALSE         FALSE           > with Axis 1         FALSE         FALSE         FALSE         FALSE           > with Axis 1         FW Ubgrade Start         FALSE         FALSE         FALSE           > with Axis 1         Name         Online         Type         Size         >Addr         In/Out         User ID         Linked to           > with Axis 1         Name         Online         Type         Size         >Addr         In/Out         User ID         Linked to           > with Axis 1         Mame         Online         Type         Size         >Addr         In/Out         User ID         Linked to           > with Axis 1         Made Of Op Dis         0         SINT         1.0         40.0         Input         0           Image         Mode Of Op Dis         0         SINT         1.0         43.0         Input         0         Input         0           Image         Status Word 2         5696         UINT         2.0         43.0         Input         0         Input         0         Input         0 </td <td>Tables</td> <td>210B</td> <td>Profile Velocity Axis2</td> <td>RW 0x000</td> <td>004E2 (1250)</td> <td></td> <td></td> <td></td> <td></td> <td></td>	Tables	210B	Profile Velocity Axis2	RW 0x000	004E2 (1250)					
▲ WAXes       PW       0x0000 (0)         ▲ WAXes       FALSE         ▶ W Digrade Start       FALSE         Name       Online       Type         Start Work       Size       > Addr       InvOut         W Digrad Dia       0x00       BYTE       1.0       40.0       Input         © Digrad Dia       0       SINT       1.0       41.0       Input       0         © C++       © Mode Of Op Dis       0       SINT       1.0       42.0       Input       0         © Digrad Dia       X       5696       UINT       2.0       43.0       Input       0         © Discies       © Actual Velocity 1       0       DINT       4.0       47.0       Input       0 <t< td=""><td>Objects</td><td>210C</td><td>Load Inertia Axis1</td><td>RW 0x000</td><td>0 (0)</td><td></td><td></td><td></td><td></td><td></td></t<>	Objects	210C	Load Inertia Axis1	RW 0x000	0 (0)					
▲ Axis 1       → ¥kis 1       → ¥LSE       → FALSE         → ₩ Drive       2FF1       FW Dgrade Start       FALSE         → ₩ Drive       b       2FF1       FW Dgrade Start       FALSE         → ₩ Drive       b       0 mline       Type       Size       > Addr       In/Out       User ID       Linked to         → ₩ Drive       b       0 mline       Type       Size       > Addr       In/Out       User ID       Linked to         → ₩ Drive       Digital IO In       0x00       BYTE       1.0       39.0       Input       0         ■ DLC       SAFETY       © Mode Of Op Dis       0       SINT       1.0       41.0       Input       0         ■ ANALYTICS       © Status Word 1       X       5696       UINT       2.0       43.0       Input       0         ■ Devices       2 Ktual Velocity 1       0       DINT       4.0       47.0       Input       0       -         ■ Devices       2 Ktual Velocity 2       0       DINT       4.0       55.0       Input       -         ■ Devices       2 Ktual Velocity 2       0       DINT       4.0       55.0       Input       -         ■ Devices<	⊿ 🚔 Axes	210D	Load Inertia Axis2	RW 0x000	0 (0)					
	🔺 🚔 Axis 1	2FF0	FW Upgrade Start	FALS	-					
▶         ■         Drive           La         Ctrl         Name         Online         Type         Size         >Addr         In/Out         User ID         Linked to           ▶         Inputs         Sensors In         0x00         BYTE         1.0         39.0         Input         0           ■         Digital IO In         0x00         BYTE         1.0         40.0         Input         0           SAFETY         Mode Of Op Dis         0         SINT         1.0         41.0         Input         0           C ++         Mode Of Op Dis         0         SINT         1.0         42.0         Input         0           ■ Device 2 (Ether CAT)         ■ Status Word 1         X         5696         UINT         2.0         43.0         Input         0           ■ Device 2 (Ether CAT)         ■ Actual Velocity 2         0         DINT         4.0         57.0         Input         0           ■ Image         ■ Actual Velocity 2         0         DINT         4.0         55.0         Input         0           ■ Image         ■ Actual Velocity 2         0         DINT         4.0         55.0         Input         0	👂 👯 Enc	ZFF1	FW Drive Upgrade Start	FALSI	-					
La Ctrl         Name         Online         Type         Size         > Addr         In/Out         User ID         Linked to           ▶ □         Dutputs         9         Sensors In         0x00         BYTE         1.0         39.0         Input         0           SAFETY         9         Digital IO In         0x00         BYTE         1.0         40.0         Input         0         -	▷ ➡I Drive	J								
▶ Inputs       9 Sensors In       0x00       BYTE       1.0       40.0       Input 0         ▶ Outputs       9 Digital IO In       0x00       BYTE       1.0       40.0       Input 0         SAFETY       9 Mode Of Op Dis       0       SINT       1.0       41.0       Input 0         Image C++       9 Mode Of Op Dis       0       SINT       1.0       42.0       Input 0         Image C++       9 Mode Of Op Dis       0       SINT       1.0       43.0       Input 0         Image C++       9 Mode Of Op Dis       0       SINT       1.0       43.0       Input 0         Image C++       9 Mode Of Op Dis       0       SINT       2.0       43.0       Input 0         Image C++       9 Mode Of Op Dis       0       SINT       2.0       43.0       Input 0         Image C++       9 Actual Velocity 1       0       DINT       4.0       47.0       Input 0         Image C+       9 Actual Velocity 2       0       DINT       4.0       55.0       Input 0         Image C+       9 Actual Position 1       0       DINT       4.0       55.0       Input 0         Image C+       9 Actual Position 2       0	🗽 Ctrl	Name		Online	Type	Size	>Addr	In/Out	User ID	Linked to
b         Outputs         Definition         Ox00         BYTE         1.0         53.0         Imput         0           IPLC         Ox00         BYTE         1.0         41.0         Input         0           SAFETY         Mode Of Op Dis         O         SINT         1.0         41.0         Input         0           IPLC         Mode Of Op Dis         O         SINT         1.0         41.0         Input         0           IPLC         Mode Of Op Dis         O         SINT         1.0         41.0         Input         0           IPLC         Mode Of Op Dis         O         SINT         1.0         41.0         Input         0           IPLC         Mode Of Op Dis         O         Sint         1.0         42.0         Input         0           IPLC         Mode Of Op Dis         O         Sint         1.0         42.0         Input         0           IPLC         Mode Of Op Dis         O         Sint Sint         1.0         42.0         Input         0           IPLC         Provices         Extra Volocity         O         Dist         0         Dist         0         Dist         0	Inputs	Sensors In		0.00	DVTE	1.0	20.0	Innut	0	
IPLC       Digital IO III       Digital IO III       Digital IO IIII       Digital IO IIIII       Digital IO IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Outputs	Digital IO In		0x00	DYTE	1.0	40.0	Input	0	
SAFETY       Image of Op Dis       0       Sint 1.0       41.0       input 0       input 0         MALLYTICS       Status Word 1       X       5696       UINT 2.0       43.0       input 0       nDatain1         Image Orices       Status Word 2       5696       UINT 2.0       45.0       input 0       nDatain1         Image Orices       Status Word 2       5696       UINT 4.0       47.0       input 0       nDatain1         Image Orices       Status Word 2       5696       UINT 4.0       51.0       input 0       Input 0         Image Orices       Statual Velocity 1       0       DINT 4.0       55.0       input 0       Input 0         Image Orice 2 (EtherCAT)       Statual Position 1       0       DINT 4.0       55.0       input 0       Input 0         Image Orige Origee	PLC PLC	Maria Of Or Di		0,000	CINIT	1.0	40.0	Input	0	
• • • • • • • • • • • • • • •	SAFETY	Made Of Op Dis		0	SINT	1.0	41.0	Input	0	
▲ NALYTICS       Bastus Worl 2       5696       UNT       2.0       43.0       Input       0       Input       0       Input       0         ▲ Device 2       Device 2       Ether CAT)	56- C++	Chatra Ward 1	····	U EEOE	JUNT	1.0	42.0	Input	0	- Detel-1
Image       2 Actual Velocity 1       0       DINT       4.0       5.0       Input       0         Image       2 Actual Velocity 1       0       DINT       4.0       51.0       Input       0         Image       2 Actual Velocity 2       0       DINT       4.0       55.0       Input       0         Image       2 Actual Velocity 2       0       DINT       4.0       55.0       Input       0         Image       2 Actual Velocity 2       0       DINT       4.0       55.0       Input       0         Image       2 Actual Velocity 2       0       DINT       4.0       55.0       Input       0         Image       2 Actual Position 1       0       DINT       4.0       55.0       Input       0         Image       2 Actual Torque 1       0       INT       2.0       65.0       Input       0         Image       2 Actual Torque 2       0       INT       2.0       65.0       Input       0         ImputS       2 Actual Torque 2       0       BIT       0.1       152.1       Input       0         Image       2 Mactual Torque 2       0       BIT       0.1       152.4.1	ANALY IICS	Status Word 1	~	5090	UINT	2.0	45.0	Input	0	nDataini
▲ The Devices (EtherCAT)       ■ Actual Velocity 1       0       DiNT       4.0       47.0       input       0         ▲ The Devices (EtherCAT)       ● Actual Velocity 2       0       DINT       4.0       51.0       Input       0         ● Image       ● Actual Position 1       0       DINT       4.0       55.0       Input       0         ● Image-Info       ● Actual Position 2       0       DINT       4.0       59.0       Input       0         ● Image-Info       ● Actual Torque 1       0       INT       2.0       63.0       Input       0         ● Info.0ata       ● Actual Torque 2       0       INT       2.0       65.0       Input       0         ● Info.0ata       ● Info.0ata       ● WeState       0       BIT       0.1       1522.1       Input       0         ● Box 2 (DMR PC 5-50/ECS)       ● State       15368       UINT       2.0       154.0       Input       0         ● Mappings       ● Origital 10 Out       0x00       BYTE       1.0       39.0       Output       0		A sture Volg site		0600	DINT	2.0	45.0	Input	0	
Image       P Actual Position 1       0       DINT       4.0       51.0       input       0         Image       P Actual Position 1       0       DINT       4.0       55.0       Input       0         Image       P Actual Position 1       0       DINT       4.0       55.0       Input       0         Image       P Actual Position 2       0       DINT       4.0       55.0       Input       0         Image       Image       P Actual Position 2       0       INT       2.0       63.0       Input       0         Image       Image       P Actual Torque 1       0       INT       2.0       65.0       Input       0         Image       Outputs       P Actual Torque 2       0       INT       2.0       65.0       Input       0         Image       Imoda       P Mostare       P Mostare       0       BIT       0.1       1522.1       Input       0         Image       P Mostare       P State       15368       UINT       2.0       164.0       Input       0         Image       P Orgital IO Out       0x00       BYTE       1.0       39.0       Output       0 <td><ul> <li>Devices</li> <li>Device 2 (CharCAD)</li> </ul></td> <td>Actual velocity</td> <td></td> <td>0</td> <td>DINT</td> <td>4.0</td> <td>47.0</td> <td>input</td> <td>0</td> <td></td>	<ul> <li>Devices</li> <li>Device 2 (CharCAD)</li> </ul>	Actual velocity		0	DINT	4.0	47.0	input	0	
Image     Pactual Position 1     0     DiNT     4.0     53.0     input     0       Image-Info     Image-Info     Image-Info     Image-Info     Image-Info     0     DiNT     4.0     53.0     input     0       Image-Info     Image-Info     Image-Info     Image-Info     Image-Info     0     INT     4.0     53.0     input     0       Image-Info	Device 2 (EtherCAI)	Actual Velocity	2	0	DINT	4.0	51.0	Input	0	
Image mind     P Actual Porque 1     0     DIN1     4.0     59.0     input     0       Implement     P Actual Porque 1     0     INT     2.0     65.0     input     0       Implement     P Actual Porque 1     0     INT     2.0     65.0     input     0       Implement     P Actual Porque 2     0     INT     2.0     65.0     input     0       Implement     P WcState     0     BIT     0.1     152.1     input     0       Implement     P WcState     0     BIT     0.1     1524.1     input     0       Implement     P WcState     15368     UINT     2.0     155.0     input     0       Implement     P WcState     132.68.56.1.3.1:100     AMSADDR     8.0     155.00     input     0       Implement     P Upigital IO Out     0x00     BYTE     1.0     39.0     Output     0	i image ♪■ Image Infe	Actual Position	1	0	DINT	4.0	55.0	Input	0	
> Syncomics       > Actual lorque 1       0       INT       2.0       65.0       input       0         > ■ Outputs       ? Actual lorque 2       0       INT       2.0       65.0       Input       0         > ■ Outputs       ? Actual lorque 2       0       INT       2.0       65.0       Input       0         > ■ Outputs       ? McState       0       BIT       0.1       152.1       Input       0         > ● Drive 1 (DUETAD)       ? InputToggle       0       BIT       0.1       152.4.1       Input       0         > ■ Box 2 (DMR PC 5-50/ECS)       ? State       15368       UINT       2.0       1548.0       Input       0         ■ Mappings       ? Origital IO Out       0x00       BYTE       1.0       39.0       Output       0	■ mage-mo	Actual Position	2	0	DINT	4.0	59.0	input	0	
▶ ■ Outputs       2 Actual lorque 2       0       INI       2.0       65.0       Input       0         ▶ ■ InfoData       2 WcState       0       BIT       0.1       1522.1       Input       0         ▶ ■ InfoData       2 InputToggle       0       BIT       0.1       1524.1       Input       0         ▶ ■ Box 2 (DMR PC 5-50/ECS)       2 State       15368       UINT       2.0       154.0       Input       0         ■ Mappings       Mappings       Pigital IO Out       0x00       BYTE       1.0       39.0       Output       0	b Innuts	Actual lorque I		U	INT	2.0	03.0	input	0	
Image: Solution of the soluti	Dutnuts	Actual lorque 2		U	INI	2.0	05.0	input	U	
Imput loggle         U         Bit         0.1         1524.1         Input         0           Imput loggle	InfoData	WcState		U	BII	0.1	1522.1	input	U	
Image: State         15568         UINI         2.0         1548.0         Input         0           Image: State         15568         UINI         2.0         1548.0         Input         0           Image: State         15568         UINI         2.0         1548.0         Input         0           Image: State         192.168.56.1.3.1:001         AMSADDR         8.0         1550.0         Input         0           Image: State         Image: State         192.168.56.1.3.1:001         AMSADDR         8.0         1550.0         Input         0           Image: State         Image: State         Image: State         192.168.56.1.3.1:001         AMSADDR         8.0         1550.0         Input         0           Image: State         Image: State<	Drive 1 (DUETAD)	nput loggle		U	BII	0.1	1524.1	input	U	
▲ AdsAddr 192.168.56.1.3.1:1001 AMSADDR 8.0 1550.0 Input 0 WC-Task 1 SAF - Device 2 (EtherCAT) 1 □ Digital IO Out 0.000 BYTE 1.0 39.0 Output 0 Digital IO Out 0.000 BYTE 1.0 39.0 Output 0	Box 2 (DMR PC 5-50/ECS)	™ State		15368	UINI	2.0	1548.0	Input	U	
NC-Task 1 SAF - Device 2 (EtherCAT) 1 0x00 BYTE 1.0 39.0 Output 0	A 🔛 Mappings	AdsAddr		192.168.56.1.3.1	IUUT AMSADDR	8.0	1550.0	Input	U	
	NC-Task 1 SAF - Device 2 (EtherCAT) 1	Digital IO Out		0x00	BYIE	1.0	39.0	Output	U	

FIGURE 24-SDO LIST

#### **Object Dictionary**

#### 0x2001: EtherCat FW Application Version

Object description:	
Index	0x2001
Description	EtherCat FW Application Version
Object Code	Variable
Data Type	UINT32
Category	Optional

![](_page_46_Picture_9.jpeg)

Entry description:	
Access	R
PDO mapping	No
Default Value	0
Range	0 4294967295
Units	

#### 0x2020: Diagnosis Information

Object description:	
Index	0x2020
Description	Diagnostic elements
Object Code	Array
Data Type	UINT32
Category	Optional

Entry description:	
Sub-Index	00
Description	Number of entries
Object Code	Variable
Data Type	Uint8
Category	Optional
Access	R
PDO mapping	NO
Default Value	2
Range	2
Units	

Sub-Index	01
Description	Actual DC bus Voltage
Object Code	Variable
Data Type	Uint16
Category	Optional
Access	R
PDO mapping	NO
Default Value	0
Range	0100
Units	Volts

Sub-Index	02
Description	Actual Drive temperature

![](_page_47_Picture_8.jpeg)

Object Code	Variable
Data Type	INT16
Category	Optional
Access	R
PDO mapping	NO
Default Value	0
Range	-4000+12500
Units	°C*100

Sub-Index	03
Description	Motor 1 temperature
Object Code	Variable
Data Type	INT16
Category	Optional
Access	R
PDO mapping	NO
Default Value	0
Range	-4000+12500
Units	°C*100

Sub-Index	04
Description	Motor 2 temperature
Object Code	Variable
Data Type	INT16
Category	Optional
Access	R
PDO mapping	NO
Default Value	0
Range	-4000+12500
Units	°C*100

#### 0x2100: Profile Acceleration Axis1

Object description:	
Index	0x2100
Description	Profile Acceleration for Axis1
Object Code	Variable
Data Type	UINT32
Category	Optional

Entry description:	
Access	R/W

![](_page_48_Picture_8.jpeg)

PDO mapping	No
Default Value	1000
Range	0 4294967295
Units	User unit based on conversion factor

#### 0x2101: Profile Acceleration Axis2

Object description:	
Index	0x2101
Description	Profile Acceleration for Axis2
Object Code	Variable
Data Type	UINT32
Category	Optional

Entry description:	
Access	R/W
PDO mapping	No
Default Value	1000
Range	0 4294967295
Units	User unit based on conversion factor

#### 0x2102: Profile Deceleration Axis1

Object description:	
Index	0x2102
Description	Profile Deceleration for Axis1
Object Code	Variable
Data Type	UINT32
Category	Optional

Entry description:	
Access	R/W
PDO mapping	No
Default Value	1000
Range	0 4294967295
Units	User unit based on conversion factor

#### 0x2103: Profile Deceleration Axis2

Object description:	
Index	0x2103
Description	Profile Decleration for Axis2

![](_page_49_Picture_11.jpeg)

Object Code	Variable
Data Type	UINT32
Category	Optional

Entry description:	
Access	R/W
PDO mapping	No
Default Value	1000
Range	0 4294967295
Units	User unit based on conversion factor

#### 0x2104: Max Motor Velocity Axis1

Object description:	
Index	0x2104
Description	Max motor velocity Axis1
Object Code	Variable
Data Type	UINT32
Category	Optional

Entry description:	
Access	R/W
PDO mapping	No
Default Value	3000
Range	0 4294967295
Units	User unit based on conversion factor

#### 0x2105: Max Motor Velocity Axis2

Object description:	
Index	0x2105
Description	Max motor velocity Axis2
Object Code	Variable
Data Type	UINT32
Category	Optional

Entry description:	
Access	R/W
PDO mapping	No
Default Value	3000
Range	0 4294967295

![](_page_50_Picture_10.jpeg)

Units User unit based on conversion factor	
--	--

#### 0x2106: Quick Stop Deceleration Axis1

Object description:	
Index	0x2106
Description	Stop Deceleration Axis1 for emergency stop
Object Code	Variable
Data Type	UINT32
Category	Optional

Entry description:	
Access	R/W
PDO mapping	No
Default Value	1000
Range	0 4294967295
Units	User unit based on conversion factor

#### 0x2107: Quick Stop Deceleration Axis2

Object description:	
Index	0x2107
Description	Stop Deceleration Axis2 for emergency stop
Object Code	Variable
Data Type	UINT32
Category	Optional

Entry description:	
Access	R/W
PDO mapping	No
Default Value	1000
Range	0 4294967295
Units	User unit based on conversion factor

#### 0x2108: Fault Register Axis1

Object description:	
Index	0x2108
Description	Fault register Axis1 DS401
Object Code	Variable
Data Type	UINT16
Category	Optional

![](_page_51_Picture_11.jpeg)

Entry description:	
Access	R
PDO mapping	No
Default Value	1000
Range	0 65535
Units	

#### Fault register description

Bit number	Fault type	Description	Value (hex)
0	OVER_VOLTAGE	Power supply voltage goes above to the maximum admitted value	0x01
1	UNDER_VOLTAGE	Power supply voltage goes below to the maximum admitted value	0x02
2	PEAK_MOTOR_CURRENT	Motor peak current exceeded	0x04
3	RATED_MOTOR_CURRENT	Motor rated current exceeded	0x08
4	SHORT_CIRCUIT		0x10
8	POSITION_TRACKING_ERROR	Position following error exceeded	0x100
9	VELOCITY_TRACKING_ERROR	Speed following error exceeded	0x200
10	OVERVELOCITY	Maximum motor velocity exceeded	0x400
11	DRIVE_OVERTEMPERATURE	Maximum motor velocity reached	0x800
13	FIELDBUS_CYCLE_TIME	Profinet cyclic messages timeout	0x2000

#### 0x2109: Fault Register Axis2

Object description:	
Index	0x2109
Description	Fault register Axis2 DS401
Object Code	Variable
Data Type	UINT16
Category	Optional

Entry description:	
Access	R
PDO mapping	No
Default Value	0

![](_page_52_Picture_8.jpeg)

Range	0 65535
Units	

#### 0x210A: Profile Velocity Axis1

Object description:	
Index	0x210A
Description	Profile Velocity in Profile Position Mode Axis1
Object Code	Variable
Data Type	UINT32
Category	Optional

Entry description:	
Access	R/W
PDO mapping	No
Default Value	0
Range	0 4294967295
Units	

#### 0x210B: Profile Velocity Axis2

Object description:	
Index	0x210B
Description	Profile Velocity in Profile Position Mode Axis2
Object Code	Variable
Data Type	UINT32
Category	Optional

Entry description:	
Access	R/W
PDO mapping	No
Default Value	0
Range	0 4294967295
Units	

![](_page_53_Picture_9.jpeg)

#### 0x210C: Load Inertia Axis1

Object description:	
Index	0x210C
Description	Load Inertia Axis1
Object Code	Variable
Data Type	UINT16
Category	Optional

Entry description:	
Access	R/W
PDO mapping	No
Default Value	0
Range	0 65535
Units	Kg/cm^2

#### 0x210D: Load Inertia Axis2

Object description:	
Index	0x210D
Description	Load Inertia Axis2
Object Code	Variable
Data Type	UINT16
Category	Optional

Entry description:	
Access	R/W
PDO mapping	No
Default Value	0
Range	0 65535

#### Installing ESI files

The device is connected to the Beckhoff controller with an xml file, the EtherCAT Slave Information (ESI). The device description file must be saved in TwinCAT Studio V3 for the connection. The ESI file for the device is available free of charge for download from <u>www.motorpowerco.it</u>

Storing an xml file in the installation directory: TwinCAT  $\rightarrow$  3.1  $\rightarrow$  Config  $\rightarrow$  Io  $\rightarrow$  EtherCAT.

![](_page_54_Picture_10.jpeg)

![](_page_54_Picture_11.jpeg)

![](_page_55_Picture_1.jpeg)

Updating the device catalog: TwinCAT  $\rightarrow$  EtherCAT Devices  $\rightarrow$  Reload Device Descriptions.

FIGURE 25 TWINCAT-UPDATING THE DEVICE CATALOG

Motor Power Company s.r.l. Via Leonardo Da Vinci, 4 42024 Castelnovo Sotto Reggio Emilia - Italia Tel. +39 0522 682710 - Fax +38 0522 683552 info@motorpowerco.it - motorpowerco.com Cap. Soc. 250.000.00€ i.v. - R.E.A. di RE 175521 Iscr.Reg.Impr. di RE n.01308390358 - N. Mecc. RE 010210 C.F. e P.IVA IT 01308390358

![](_page_55_Picture_5.jpeg)

The device description is loaded.

#### Connecting the device with the controller

Select used EtherCAT master as target system.

Scan the network for EtherCAT stations: Right-click  $I/O \rightarrow Devices$ .  $\blacktriangleright$  Click Scan.

![](_page_56_Picture_5.jpeg)

FIGURE 26-SCAN FOR NEW DEVICES

The EtherCAT stations are read in and automatically added to the I/O configuration. The module appears in the Solution Explorer as **Box n**.

![](_page_56_Picture_9.jpeg)

![](_page_57_Picture_1.jpeg)

#### FIGURE 27-DEVICE AS BOX 2 IN THE SOLUTION EXPLORER

NOTE: it is needed to link a variable to the device before activate the configuration. Click the **Activate configuration** button.

![](_page_57_Picture_4.jpeg)

FIGURE 28 ACTIVATING THE CONFIGURATION

The device configuration is activated.

Click the **Run mode** button.

![](_page_57_Picture_8.jpeg)

![](_page_57_Picture_9.jpeg)

<u>F</u> ile	<u>E</u> dit	View	<u>P</u> roject	<u>B</u> uild	De	ebug 1
G	- 0	問・	* 🛀		1 26	00
🕴 Bu	ild 4022	.32 (Loa	ded) 🔹	<b>,</b> ∛ <b>I</b> .∕		2

FIGURE 29 RUN MODE

The device is connected online with the EtherCAT master.

Double-click Box 2 (DMR PC 6/50).

The current status (here: OP) as well as the data points and the link are shown on the Online tab.

Solution Explorer 👻 🕂 🗙	TwinCAT Project8 😔 🗙 Output Error	List						
	General EtherCAT Process Data Startup Co	E - Online Online						
Search Solution Explorer (Ctrl+ è)	State Machine							
Solution 'TwinCAT Project8' (1 project)  Solution 'TwinCAT Project8  SVSTEM  License  Real-Time	Init         Bootstrap           Pre-Op         Safe-Op           Op         Clear Error	urrent State: OP equested State: OP						
Ivo Idle Task     Imask     Task     Task     Routes     Type System     TcCOM Objects     MOTION     MOTION     MOTION     MOC-Task 1 SAF     Image     Tables     Image     Tables     Image     Image	DLL Status       Port A:     No Camter / Closed       Port B:     Canter / Open       Port C:     No Camter / Closed       Port D:     No Camter / Closed   File Access over EtherCAT       Download     Upload							
66 C++	Name	Online	Туре	Size	>Addr	In/Out	User ID	Linked to
	🔁 Sensors In	0x00	BYTE	1.0	39.0	Input	0	
	🔁 Digital IO In	0x00	BYTE	1.0	40.0	Input	0	
▲ Te Devices	🔁 Mode Of Op Dis	3	SINT	1.0	41.0	Input	0	
Device 2 (EtherCAI)	🔁 Mode Of Op Dis	3	SINT	1.0	42.0	Input	0	
i Timage	🝠 Status Word 1 🛛 X	1843	UINT	2.0	43.0	Input	0	nDatain1[0] . nDatain1 . l
image-info	😕 Status Word 2	5728	UINT	2.0	45.0	Input	0	
P Syncurits	Actual Velocity 1	495	DINT	4.0	47.0	Input	0	
P inputs	Actual Velocity 2	0	DINT	4.0	51.0	Input	0	
Durfu Units	Actual Position 1	25201	DINT	4.0	55.0	Input	0	
P infoData	Actual Position 2	0	DINT	4.0	59.0	Input	0	
	Z Actual Torque 1	42	INT	2.0	63.0	Innut	0	
BOX 2 (DIMK PC 3-30/ECS)	Actual Torque 2	0	INT	2.0	65.0	Input	0	
	WeState	0	DIT	0.1	1522.1	Input	0	
		1	DIT	0.1	1524.1	Input	0	
V w InfoData	E Input loggie	15369	LINT	2.0	1549.0	Input	0	
V 🔤 modula		103 160 56 1 2 1 1001		2.0	1048.0	input	0	
Interprings Montary 1 SAE - Device 2 (EtherCAT) 1	AdsAddr	192.108.30.1.3.1:1001	ANISADUK	0.0	10000	input	0	
INCHASK I SAF - DEVICE 2 (EFFERCAT) I		UXUU	BYIE	1.0	59.0	Output	0	
Solution Explorer Team Explorer	Spare	UXUU	BY IE CINIT	1.0	40.0	Output	0	

FIGURE 30 DEVICE – ONLINE TAB: STATUS DISPLAY (HERE: OPERATIONAL), DATA POINTS, LINK

#### Setting startup parameters

Device parameters which should be permanently written at startup are set in the Startup tab.

Motor Power Company s.r.l. Via Leonardo Da Vinci, 4 42024 Castelnovo Sotto Reggio Emilia - Italia Tel. +39 0522 682710 - Fax +39 0522 683552 info@motorpowerco.it - motorpowerco.com Cap. Soc. 250.000.00 (.v. - R.E.A. di RE 175521 Iscr.Reg.Impr. di RE n.01308390358 - N. Mecc. RE 010210 C.F. e P.IVA IT 01308390358

![](_page_58_Picture_11.jpeg)

TwinCAT Project8 🕫 🗙 Output	Error List					
General EtherCAT Process Data Start	UP CoE - Online Onli	ine				
	-					
Transition Protocol Index	Data	Comment				
(						
	Edit CANoper	n Startup Entry				×
	Transition					01/
			Index (hex):	0		UK
			0.1.1.1.4.	, <u> </u>		Cancel
	P→5	5->P	Sub-Index (dec	;; U		
	□ S -> O	□ 0 -> S	Validate	Comp	plete Access	
	Data (kaukin)					U. Tab
	Data (nexbin):					Hex Eait
	Validate Mask:	:				
	Comment:					Edit Entry
	Index	Name		Flags	Value	
	2100	Profile Acceleratio	n Axis1	BW	0x00000000 (0)	
	2101	Profile Acceleratio	n Axis2	RW	0x00000000 (0)	
	2102	Profile Decleration	Axis1	RW DW	0x00000000 (0)	
Move Up Move Down	2103	Max Motor Velocit	U Axis1	BW	0x000000000000000000000000000000000000	
	2104	Max Motor Velocit	y Axis2	BW	0x00000000 (0)	
	2106	Quick Stop Decel	eration Axis1	RW	0x00000000 (0)	
ame	2107	Quick Stop Decel	eration Axis2	RW	0x00000000 (0)	
Sensors In	210A	Profile Velocity Axi	is1	RW DW	0x00000000 (0)	
Digital IO In	2108	Profile Velocity Axi	182	HW BW	0x0000000000000000000000000000000000000	
Mode Of Op Dis	2100 210D	Load Inertia Axis2		BW	0x0000 (0)	
Mode Of Op Dis						
Status Word 1 X						
Actual Velocity 1		475	DINT	40 4	17.0 Ipput 0	
Actual Velocity 2		0	DINT	4.0 4	51.0 Input 0	
Actual Position 1		34723	DINT	4.0 5	5.0 Input 0	
Actual Position 2		0	DINT	4.0 5	59.0 Input 0	
Actual Torque 1		73	INT	2.0 6	53.0 Input 0	
Actual Torque 2		0	INT	2.0 6	55.0 Input 0	
■ WcState		0	BIT	0.1 1	1522.1 Input 0	
InputToggle		0	BIT	0.1 1	1524.1 Input 0	
State		15368	UINT	2.0 1	1548.0 Input 0	
AdsAddr		192.168.56.1.3.1:1001	AMSADDR	8.0 1	1550.0 Input 0	
Digital IO Out		0x00	BYTE	1.0 3	39.0 Output 0	
Spare Spare		0x00	BYTE	1.0 4	40.0 Output 0	

FIGURE 31 PARAMETERS TO BE SET AT STARTUP TABLE

#### Firmware upgrade over FoE with EtherCAT

FoE (File Access Over EtherCAT) is a simple protocol similar to TFTP (Trivial File Transfer Protocol) enables file access in a device and a uniform firmware upload to devices across a network. The protocol has been deliberately specified in a lean manner, so that it can be supported by boot loader programs – a TCP/IP stack isn't required.

DMR supports FoE for upload firmwares in an easy and fast way. Two types of files are supported:

- FWUPDATE.ZIP is a specific compressed set of files given by Motor Power Company for update the EtherCAT stack firmware
- FW\_DuetDownload.bin is a binary file that contains the drive section of the DMR

![](_page_59_Picture_9.jpeg)

#### EtherCAT Stack FW Update

1. Start TwinCat. Change the device state to PREOP and select "Download...":

Explorer – 👎 🗙	TwinCAT Project	:40 ≄ ×		
Ĝ <sup>™</sup> o - ₫ <i>▶</i> -	General Ether	CAT Process Data Startup	CoE - Online Online	
olution Explorer (Ctrl+ü)	State Machin	ne		
ution 'TwinCAT Project40' (1 project)	Init	Bootstrap		
TwinCAT Project40	Pre-Op	Safe-Op	Current State:	PREOP
SYSTEM		Olars Error	Requested State:	PREOP
	Op	Clear Error		
	-DLL Status-			
64 C++	Port A:	Carrier / Open		
ANALYTICS	Port B:	No Carrier / Closed		
<b>Z</b> I/O	Poitb.	No Carries / Classed		
Devices	Port C:	No Camer / Closed		
<ul> <li>Device 1 (EtherCAT)</li> </ul>	Port D:	No Carrier / Closed		
Image				
i Image-Info	File Access	over EtherCAT		
SyncUnits	Downloa	ad Upload		
Inputs				
Outputs				
BOX T (INETX 90-RE/ECS)				

FIGURA 1

2. Select the zip folder given by Motor Power Company. The name must be FWUPDATE.ZIP. Do not forget to add .ZIP:

Port A:	Carrier / Open			
Port B:	No Carrier / Closed	Edit FoE Name		×
Port C:	No Carrier / Closed	Otria eu		011
Port D:	No Carrier / Closed	String:		UK
	and a second second	Hex:	46 57 55 50 44 41 54 45 2E 5A 49 50	Cancel
ile Access	s over EtherCAT	Length:	12	
Downio	opioat	Password (hex):	0000000	

FIGURA 2

![](_page_60_Picture_9.jpeg)

3. Click OK and wait for download process to be finished. You can see the progress status at the right bottom of Twincat. It can takes several seconds to finish.

![](_page_61_Picture_2.jpeg)

4 After the download finished successfully, go to CoE-Online. Try to write TRUE to object 2FF0, the update reset command will be trigged.

winCAT F	Project8 🕒	× Output Error List							
General	EtherCAT	DC Process Data Plc Start	up CoE - Onlin	e Online NC: Online	NC: Functions				
	Update List 🗌 Auto Update 🖂 Single Update 🗌 Show Offline Data								
	Advanced.								
A	Add to Startu	p Online Data M	odule OD (AoE	Port): 0					
Index	c	Name	Flags	Value	Unit				
	A00:0	Transmit PDO Mapping Parameter 1		>3<					
÷. 1/	A01:0	Transmit PDO Mapping Parameter 2		>1<					
	C00:0	Sync Manager Communication Type		> 4 <					
÷ 10	C10:0	Sync Manager 0 PDO Assignment		> 0 <					
÷ 10	C11:0	Sync Manager 1 PDO Assignment		> 0 <					
÷ 10	C12:0	Sync Manager 2 PDO Assignment		> 4 <					
	C13:0	Sync Manager 3 PDO Assignment		> 4 <					
2	001	EtherCAT FW App Version	RO	0x000001F4 (500)					
20	002	Drive FW App Version	RO	0x000001F4 (500)					
2	100	Velocity Error Radius	RW	0x000003E8 (1000)					
2	101	Velocity Error Radius Time	RW	0x01F4 (500)					
2	201	DC Bus Nominal Voltage	RW	0x0030 (48)					
2	220	Drive Temperature	RO	0					
÷ 2	300:0	User Programs	RW						
2	F82	Switch To Index	RW	0x00000000 (0)					
2	F83	12t Protectio Type	RW	0x0000 (0)					
2	FF0	FW Upgrade Start	RW	FALSE					
2	FF1	FW Drive Upgrade Start	RW	FALSE					
6	03F	Error Code	RO	0x0000 (0)					
6	040	ControlWord	RW P	0x0000 (0)					
6	041	StatusWord	RO P	0x0000 (0)					
6	060	Modes of operation	RW P	8					

FIGURA 4

![](_page_61_Picture_7.jpeg)

5 Wait until the procedure will end. If procedure was successful the node will restart automatically.

#### Drive FW Update via FoE

1 Start TwinCat. Change the device state to PREOP:

nCAT Pr	oject8 👳	× Ou	tput E	rror List						
eneral	EtherCAT	DC	Process Data	Plc	Startup	CoE	- Online	Online	NC: Online	NC: Functions
State I	Machine									
Init		Boo	tstrap				00500			
Pre-0	Ор	Safe	e-Op	Curren	t State:		PREOP			
Ор		Clea	ar Error	Reque	ested State	e:	PREOP			
DLL S	tatus									
Port A	: Car	rier / Op	en							
Port B	B: No	Carrier /	Closed							
Port C	C: No	Carrier /	Closed							
Port D	): No	Carrier /	Closed							
File Ac	cess over E	therCAT	·							
Dov	wnload		Jpload							

FIGURA 5

![](_page_62_Picture_7.jpeg)

2 Now the Drive FW part has to be put in set in Bootloader Mode. This will be done by putting TRUE to object 0x2FF1. Wait at least 3 seconds for the following steps. Ignore node errors if they occurs in this part.

TwinCAT Project8	⇒ × Output Error List							
General EtherCA	T DC Process Data Plc Start	up CoE - Or	nline Online NC: Online	NC: Functions				
Update L	Update List Auto Update Single Update Show Offline Data							
Advance	4							
		Andula OD (An	E Port): 0					
Add to Star	tup Online Data							
Index	Name	Flags	Value	Unit				
	Transmit PDO Mapping Parameter 1		> 3 <					
	Transmit PDO Mapping Parameter 2		>1<					
	Sync Manager Communication Type		> 4 <					
	Sync Manager 0 PDO Assignment		> 0 <					
	Sync Manager 1 PDO Assignment		> 0 <					
	Sync Manager 2 PDO Assignment		> 4 <					
	Sync Manager 3 PDO Assignment		> 4 <					
2001	EtherCAT FW App Version	RO	0x000001F4 (500)					
2002	Drive FW App Version	RO	0x000001F4 (500)					
2100	Velocity Error Radius	RW	0x000003E8 (1000)					
2101	Velocity Error Radius Time	RW	0x01F4 (500)					
2201	DC Bus Nominal Voltage	RW	0x0030 (48)					
2220	Drive Temperature	RO	0					
. <b></b> 2300:0	User Programs	RW						
2F82	Switch To Index	RW	0x0000000 (0)					
2F83	12t Protectio Type	RW	0x0000 (0)					
2FF0	FW Upgrade Start	RW	FALSE					
2FF1	FW Drive Upgrade Start	RW	TRUE					
603F	Error Code	RO	0x0000 (0)					
6040	ControlWord	RW P	0x0000 (0)					
6041	StatusWord	RO P	0x0000 (0)					
6060	Modes of operation	RW P	8					

FIGURA 6

3 Now select the bin file given by Motor Power Company. The name must be FW\_DuetDownload.bin. Then download it. Do not forget to add .bin

![](_page_63_Picture_6.jpeg)

TwinCAT Project8 + × Output	Error List	
General EtherCAT DC Process Data	Plc Startup CoE - Online Online NC: Online NC: Functions	
State Machine Init Bootstrap Pre-Op Safe-Op Op Clear Error	Current State: PREOP Requested State: PREOP	
DLL Status         Port A:       Carrier / Open         Port B:       No Carrier / Closed         Port C:       No Carrier / Closed         Port D:       No Carrier / Closed		
File Access over EtherCAT	Edit FoE Name	
	Hex:         46 57 5F 44 75 65 74 44 6F 77 6E 6C 6F 61 64         Cancel           Length:         19           Password (hex):         00000000	

#### FIGURA 7

4 Click OK and wait for download process to be finished. You can see the progress status at the right bottom of Twincat. It can takes several seconds to finish.

![](_page_64_Picture_4.jpeg)

5 Wait untill the procedure will end. If procedure was successful the node will restart automatically.

![](_page_64_Picture_7.jpeg)

Motor Power Company s.r.I. Via Leonardo Da Vinci, 4 42024 Castelnovo Sotto Reggio Emilia - Italia Tel. +39 0522 682710 - Fax +39 0522 683552 info®motorpowerco.com Cap. Soc. 250.000.00€ I.v. - R.E.A. di RE 175521 Iscr.Reg.Impr. di RE n.01308390358 - N. Mecc. RE 010210 C.F. e P.IVA IT 01308390358

![](_page_65_Picture_2.jpeg)

Motor Power Company s.r.I. Via Leonardo Da Vinci, 4 42024 Castelnovo Sotto Reggio Emilia - Italia Tel. +39 0522 682710 - Fax +39 0522 683552 info®motorpowerco.com Cap. Soc. 250.000.00€ I.v. - R.E.A. di RE 175521 Iscr.Reg.Impr. di RE n.01308390358 - N. Mecc. RE 010210 C.F. e P.IVA IT 01308390358

![](_page_66_Picture_2.jpeg)