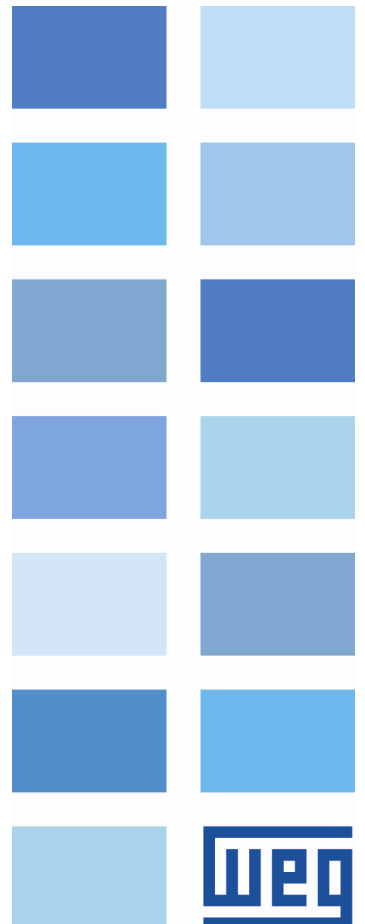


# WEG MVW (ABS DeviceNet) communication with Rockwell RSLogix 5000

## Application Notes

Language: English  
Document: 0





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Language: English

Document number: 00000000/0

Publication Date: 02/2021

## Summary of the Revisions

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Revision	Description	Chapter
0	First Edition	-

# INDEX

<b>ABOUT THE MANUAL</b>	<b>6</b>
ABBREVIATIONS AND DEFINITIONS	6
NUMERICAL REPRESENTATION	6
USED DOCUMENTS AND MANUALS	6
HARDWARE	7
<b>SAFETY INSTRUCTIONS</b>	<b>8</b>
SAFETY WARNINGS IN THE MANUAL	8
PRELIMINARY RECOMMENDATIONS	8
<b>1. HARDWARE CONFIGURATION</b>	<b>9</b>
1. PLC 1 CONFIGURATION	9
1.1.1 Hardware architecture	9
1.2 INVERTER CONFIGURATION	10
1.2.1 Installation of the Fieldbus Kit	10
1.2.3 Inverter user Fieldbus Connector	12
1.2.4 Fieldbus status LED signaling	13
1.2.5 Power-up	14
1.3 DEVICENET NETWORK	15
1.3.1 Architecture of the DeviceNet Network	15
1.3.3 Connections and Terminations	16
1.3.4 Addressing	16
<b>2. INVERTER PARAMETER SETTINGS</b>	<b>16</b>
2.1 SELECTION OF THE INVERTER COMMAND REFERENCES	16
2.1.1 Selection of the Operation Control Mode – Local/Remote	16
2.1.2 Selection of Speed Reference – LOCAL Mode	17
2.1.3 Selection of the Direction of Rotation Control – Remote Mode	18
2.1.4 Selection of the Direction of Rotation – Remote Mode	18
2.1.5 Selection of the JOG Control – Remote Mode	19
2.2 CONFIGURATION OF THE PARAMETERS FIELDBUS SETTINGS	19
2.2.1 Inverter Fieldbus Settings	19
2.2.2 Behavior when Fieldbus is with alarm	19
<b>3. DATA CYCLIC COMMUNICATION</b>	<b>21</b>
3.1 VARIABLES READ FROM THE MVW INVERTER	21
3.1.1 Input - 1 <sup>a</sup> word: Status word	21
3.1.2 Input - 2 <sup>a</sup> word: Motor speed	22
3.1.3 Input - 3 <sup>a</sup> word: Digital input status	22
3.1.4 Input - 4 <sup>a</sup> word: Parameter contents	22
3.1.5 Input - 5 <sup>a</sup> word: Torque current	22
3.1.6 Input - 6 <sup>a</sup> word: Motor current	23
3.2 VARIABLES WRITTEN TO MVW INVERTER	24
3.2.1 Output - 1 <sup>a</sup> word: Control word	24
3.2.2 Output - 2 <sup>a</sup> word: Motor speed reference	25
3.2.3 Output - 3 <sup>a</sup> word: Command for digital outputs	26
3.2.4 Output - 4 <sup>a</sup> word: Number of the parameters to read	26
3.2.5 Output - 5 <sup>a</sup> word: Number of the parameters to be changed	27
3.2.6 Output - 6 <sup>a</sup> word: Content of the parameter to be changed	27
<b>4. FAULT AND ALARM INDICATION MESSAGES</b>	<b>28</b>
4.1 ERROR INDICATIONS	28
<b>5. CLP COMPACT LOGIX L32E</b>	<b>29</b>
5.1 EDS INSTALLATION	29

5.1.1 Import EDS.....	29
5.1.2 Installation EDS.....	30
5.1.3 Addressing anybus devicenet.....	31
<b>6.SE MVW FACEPLATE PROJECT.....</b>	<b>33</b>
6.1 CREATING NEW PROJECT.....	34
6.2 ADD MODULO ETHERNET.....	34
6.3 ADD-ON INSTRUCTION.....	35
6.3.1 Add-On Import.....	35
6.3.2 Configure Add-On.....	36
6.3.2 Insert block.....	36
6.3.4 Configure block.....	37
6.3.5 Create new TAG.....	38
6.3.6 New TAGs.....	39
6.4 ADD-ON STATUS AND COMMANDS.....	39
6.4.1 Table of writing and reading tags.....	39
6.4.2 Add Routine.....	40
6.4.3 Variables transfer.....	41
<b>7.CONFIGURING FACEPLATE ON FTVIEW.....</b>	<b>42</b>
7.1 ADD FACEPLATE TO PROJECT.....	42
7.1.1 Open the project.....	42
7.2 CREATING A COMMUNICATION WITH PLC BLOCK.....	43
7.2.1 Adding new parameter and configuring it.....	44
7.2.2 Open Faceplate.....	45
<b>8.FACEPLATE IN RUNTIME.....</b>	<b>47</b>
8.1 NAVIGATION BUTTONS.....	47
8.2 HOME SCREEN.....	47
8.3 DIGITAL INPUTS AND VFD STATUS.....	48
8.4 TRENDS.....	48
8.5 CONFIGURATION SCREEN.....	49
8.6 ALARM SCREEN.....	49

## ABOUT THE MANUAL

This document provides information about the configuration and programming for the communication of the Rockwell, 1769-L32E CompactLogix5332 E Controller with the MVW01 and MVW3000 Frequency Inverter equipped with ABS DeviceNet module. All presented operations assume the user is familiar with the programming of the Rockwell PLC with the Rockwell RSLogix 5000. The equipment is subject to failures and the user must take safety measures for this condition.

## ABBREVIATIONS AND DEFINITIONS

CIP	Common Industrial Protocol
EDS	Electronic Data Sheet – Data base file of the device.
HMI	KEYPAD (HMI)
MVW01	Medium Voltage Frequency Inverter
MVW3000	Medium Voltage Frequency Inverter
ODVA	Open DeviceNet Vendor Association
OP	Operation Mode
PLC	Programmable Logic Controller
RAM	Random Access Memory
USB	Universal Serial Bus

## NUMERICAL REPRESENTATION

Decimal numbers are represented by means of digits without suffix. Hexadecimal numbers are represented with the letter 'h' after the number.

## USED DOCUMENTS AND MANUALS

For a better understanding of the information provided hereby, the following manuals may be referred to:

### *MANUAL OF THE FREQUENCY INVERTER*

Series: MVW01 and MVW3000

Language: English

Document number: 0899.5247-3.3 / 10004823674/01

### *DeviceNet Drive Profile*

### *Installation Operation and Configuration Guide*

Series: MVW

Language: Portuguese

Document number:

### *RSLogix 5000*

Software Application: V20

Language: English

*FTView SE*

Software Application: V6.0

Language: English

*Software RSNetWorx*

For DeviceNet

Manufacturer: Rockwell Automation/Allen-Bradley

Firmware Version: 21.00

*EDS FILE*

*EDS\_ABS\_DEV\_V\_1\_35*

Manufacturer: WEG

**HARDWARE**

*MVW Frequency Inverter*

Firmware Version: 2.05

Manufacturer: WEG

*FIELDBUS KIT interface module*

Model: ABS DeviceNet (Anybus-S)

Item number: 10413435

Manufacturer: WEG

*CPU CompactLogix*

Model: 1769-L32E CompactLogix5332 E Controller

Manufacturer: Rockwell Automation/Allen-Bradley

Firmware Version: 20.12

*Communications Adpter*

*Ethernet Port (1769-L32E)*

Manufacturer: Rockwell Automation/Allen-Bradley

Firmware Version: 20.12

*Communications Adapter*

*Model: 1769-SDN DeviceNet Module*

Manufacturer: Rockwell Automation/Allen-Bradley

Firmware Version: 4.004

## SAFETY INSTRUCTIONS

This manual was developed to be used by people with proper technical training or qualification to operate this kind of equipment.

### SAFETY WARNINGS IN THE MANUAL

In this manual are used the following safety warnings:



#### **DANGER!**

The not following of the procedures recommended in this warning can lead to death, serious injuries and considerable material damages.



#### **ATTENTION!**

The not following of the procedures recommended in this warning can lead to material damages.



#### **NOTE!**

The text aims at providing important information for the full understanding and proper operation of the product.

## PRELIMINARY RECOMMENDATIONS



#### **DANGER!**

Only duly qualified people must operate the INVERTER. Those people must first read the user manual. Executing unknown commands or not complying with the safety instructions may result in risk of life and/or damages to the machine.



#### **ATTENTION!**

In order to make the commands on the inverter HMI, you must not use pointed tools or instruments. That could damage the keypad screen.

# 1. HARDWARE CONFIGURATION

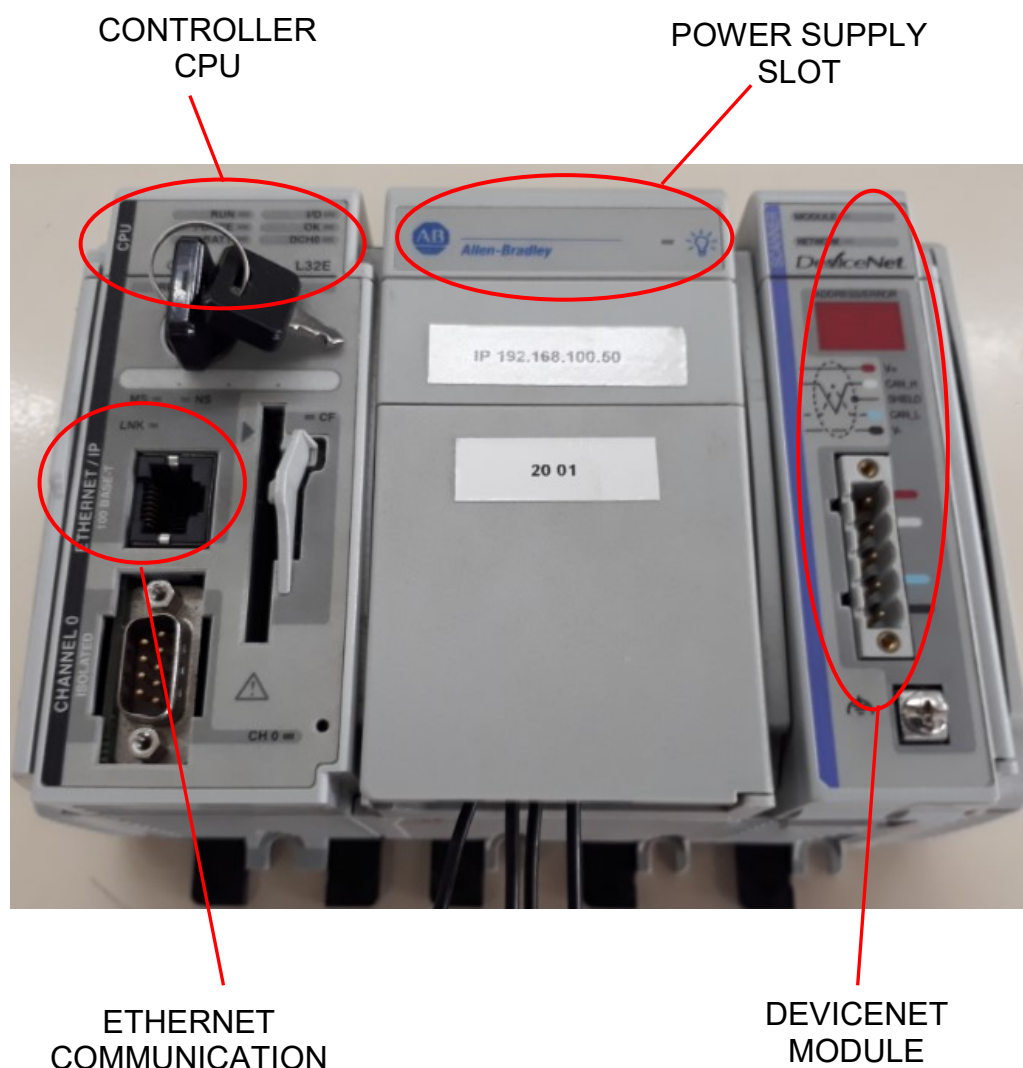
Hardware configuration for communication is described in details below.

## 1. PLC 1 CONFIGURATION

### 1.1.1 Hardware architecture.

The hardware configuration required for communication on DeviceNET is shown in the figure below. It consists of the set formed by the power source, the CPU board (1769-L32E) with the ETHERNET communication port for downloading / monitoring the software and the DeviceNet module (1769-SDN).

The DeviceNET module is connected to the slot located on the right side of the equipment.

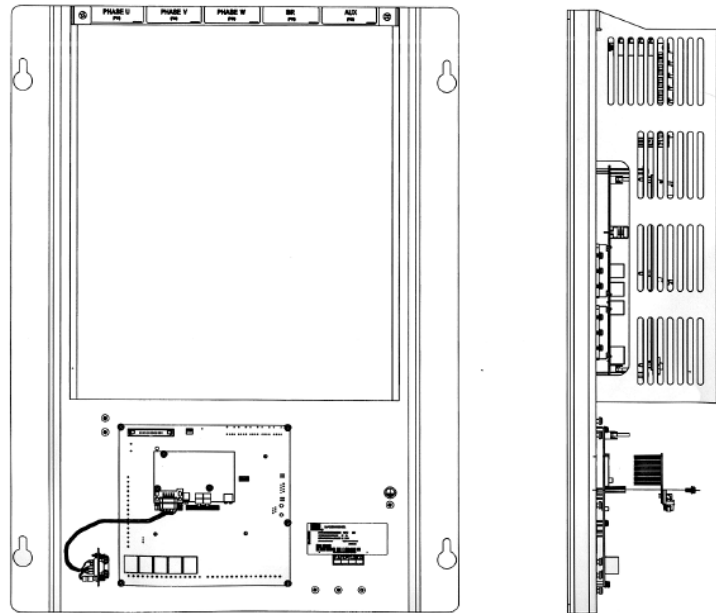


**Figure 1.1.1 – PLC hardware Architecture**

## 1.2 INVERTER CONFIGURATION

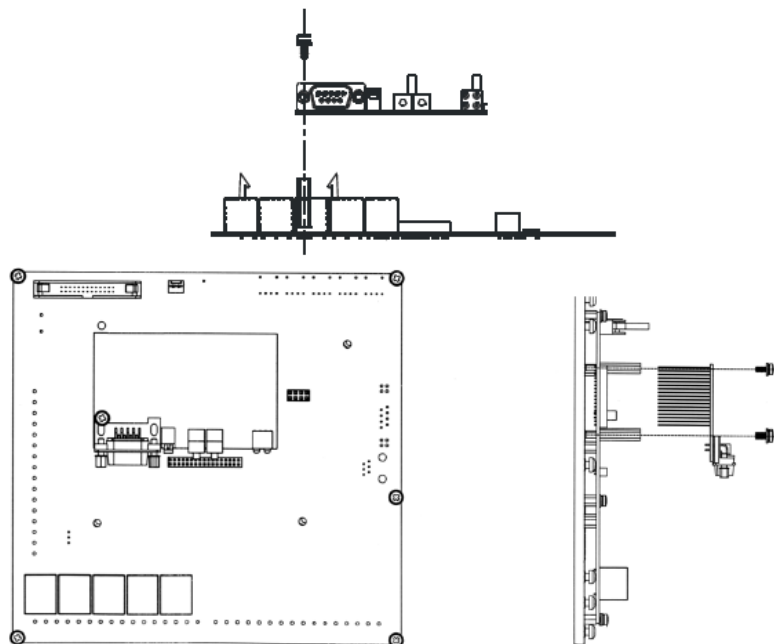
### 1.2.1 Installation of the Fieldbus Kit

The hardware configuration to perform the communication in ABS DeviceNet network is described in the figure below. It is composed of a Frequency Inverter MVW and a DeviceNet interface module.



**Figure 1.2.2 – Architecture of the Inverter hardware**

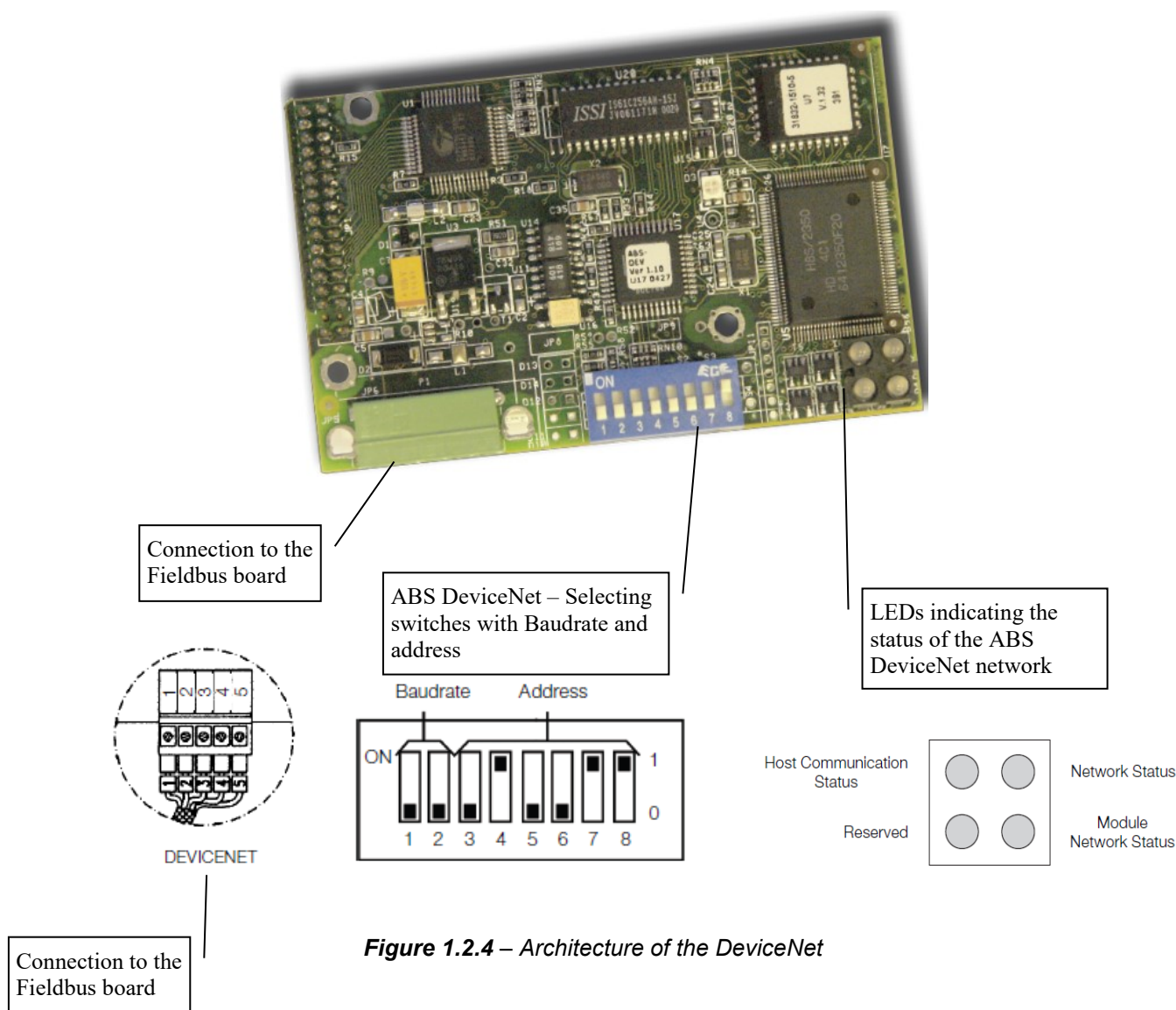
DeviceNet interface module must be installed directly on the MVC4 control board and fixed by spacers.



**Figure 1.2.3 – Inverter hardware control board MVC4 and Fieldbus Kit.**

## 1.2.2 Fieldbus Kit.

The next figure shows the fieldbus card DeviceNet.



### NOTE!

- With the inverter off, install the module on connector XC140.
- Make sure it is properly installed and fastened by the screws.
- Power up the inverter.



### NOTE!

- The node address keys must not be changed while the network is running.
- Red LEDs can indicate network or hardware problems with the electronics board.
- The reset is performed by de-energizing and re-energizing the inverter. If the problem persists, replace the electronic card.

### 1.2.3 Inverter user Fieldbus Connector.

Inverter user Fieldbus connector.

5-way plug-in connector with screw terminal, pin assignment according to Table below

Terminal	Description	Color
1	V-	Black
2	CAN_L	Blue
3	Shield	-
4	CAN_H	White
5	V+	Red

**Figure 1.2.5** – DeviceNet terminal block pinout


### Line Termination

The initial and the end points of the network must present the characteristic impedance, in order to prevent reflections. Thus a 120  $\Omega$ /0.5 W resistor must be connected between the terminals 2 and 4 of the Fieldbus terminal block.

### Baudrate/Node Address

There are three different baudrates for DeviceNet: 125 kbits/s, 250 kbits/s and 500 kbits/s. Choose the baudrate by setting the DIP switches on the electronic board, before the network configuration. The node address is selected through the six DIP switches on the electronic board, permitting addressing from 0 to 63.

Baudrate [bits/s]	DIP Switches 1 and 2	Address	DIP3 to DIP8
125 k	00	0	000000
250 k	01	1	000001
500 k	10	2	000010
Reserved	11	:	:
		61	111101
		62	111110
		63	111111

**Figure 1.2.7** – DeviceNet baudrate and node address configuration.

### Configuration File (EDS File)

Each element of a DeviceNet network is associated to an EDS file, which has all information about the element. This file supplied with the product is used by the network configuration program.

By means of the parameter P0309 it is possible to select 2, 4 or 6 input/output words, when P0309 is programmed 4, 5 or 6, respectively (refer to the Fieldbus Application/MVW Related Parameters

Define in the network configuration program the number of exchanged words, according to the number selected at the parameter P0309. The type of connection used for data exchange must be “Polled I/O”.



### NOTE!

The PLC (master) must be programmed for Polled I/O connection.

## 1.2.4 Fieldbus status LED signaling.





The electronic board has a bicolor LED indicating the status of the Fieldbus according to the Table below.



### NOTE!

The red signalizations may indicate hardware problems on the electronic board. Its reset is performed by cycling the power of the inverter. If the problem persists, replace the electronic board.

The board also has other four LEDs grouped at the right bottom corner, indicating the Fieldbus network status according to Figure below.

<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Host Communication Status</p> <p>Reserved</p> </div> <div style="border: 1px solid black; padding: 5px; display: flex; flex-wrap: wrap;"> <div style="width: 50%; text-align: center;">    </div> <div style="width: 50%; text-align: center;">    </div> </div> <div style="text-align: center;"> <p>Network Status</p> <p>Module Network Status</p> </div> </div>		
LED	Color	Description
Modulo Network Status	Off	Without supply
Modulo Network Status	Red	Nonrecoverable fault
Modulo Network Status	Green	Operational board
Modulo Network Status	Flashing red	Minor fault
Network Status	Off	Without supply/off-line
Network Status	Green	Operative link, connected
Network Status	Red	Link critical fault
Network Status	Flashing green	On-line, not connected
Network Status	Flashing red	Connection timeout

**Figure 1.2.6 – LEDs indicating the status of the DeviceNet network.**



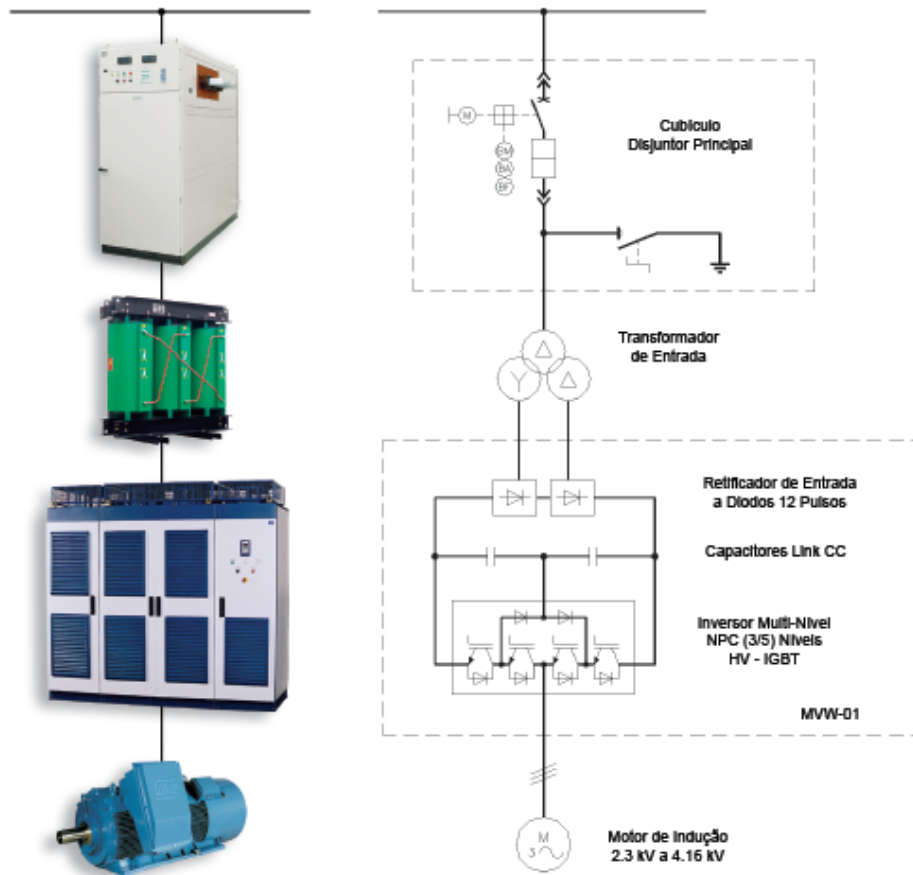
### NOTE!

Refer to the Fieldbus Application/MVW Related Parameters for DeviceNet application/mvw related parameters.

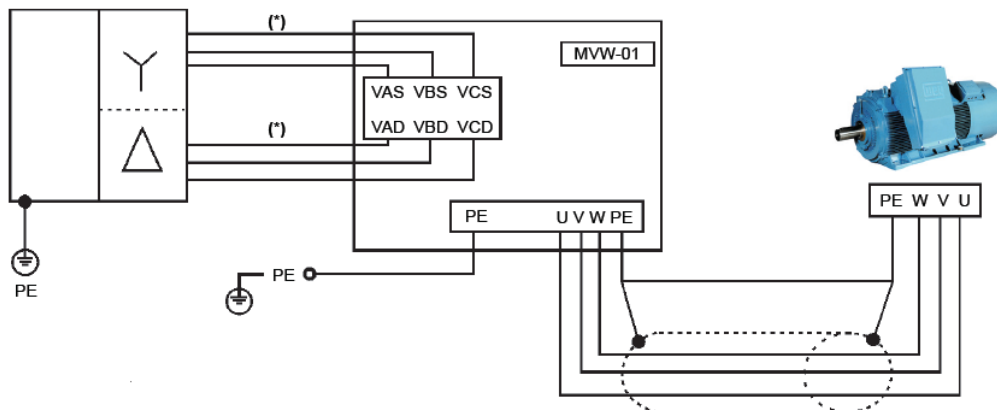
The company HMS Industrial Networks AB has developed the communication board that comes with the product. Therefore, the network configuration software will not recognize the product as MVW frequency inverter, but as the “Anybus DeviceNet” at the “Communications Adapter” category.

### 1.2.5 Power-up.

The figure below shows the proper wiring for the correct power-up of the Frequency Inverter.



**Figure 1.2.5 – Single-line diagram of the MVW inverter energization**



**Figure 1.2.7 – Power-up of Inverter hardware MVW-01**

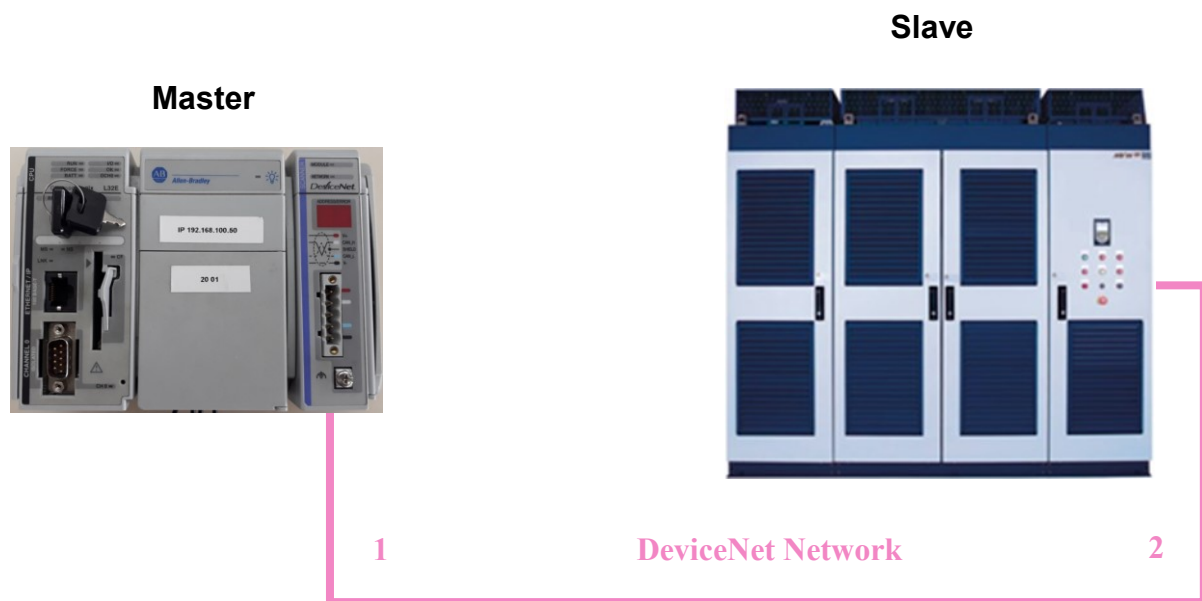
## 1.3 DEVICENET NETWORK

Introduced in 1994, DeviceNet is an implementation of the Common Industrial Protocol (CIP) for industrial communication networks. Originally developed by Allen-Bradley, its technology was transferred for ODVA, which has since maintained, disseminated and promoted DeviceNet and other networks based on the protocol CIP3. In addition, it uses the Controller Area Network (CAN) protocol for data link and medium access, layers 2 and 1 of the OSI / ISO model, respectively.

### 1.3.1 Architecture of the DeviceNet Network

The DeviceNet communication is used for industrial automation, mainly for the control of valves, sensors, input/output units and automation equipment. The DeviceNet communication link is based on a CAN communication protocol (Controller Area Network).

The figure below shows an example of DeviceNet network architecture.



**Figure 1.3.1** – Architecture of the DeviceNet Network

### 1.3.3 Connections and Terminations

The connectors of the DeviceNet network have input and output connections, connection for the cable loop and network termination resistors. An output point of a connector must always be interconnected to an input point of another connector, except at the ends of the network, where the input points are used as active network termination resistor.



#### NOTE!

For the proper operation of the DeviceNet network, it is necessary that its ends have network termination resistors active and energized by the device connected!

### 1.3.4 Addressing

In a DeviceNet network, each device has a unique address which varies from 0 to 63. In this example, the master has address 1 and the slave address 2.

## 2. INVERTER PARAMETER SETTINGS

Below are the parameters that must be verified and configured in order to perform the communication in DeviceNet network.

This parameter setting can be used as a basic example and uploaded directly to the inverter by SuperDrive programming application, which can be downloaded at WEG's website.



#### NOTE!

This parameter setting is available in the "Parameters" folder of this document.

### 2.1 SELECTION OF THE INVERTER COMMAND REFERENCES

The Inverter control references (Local and Remote) must be programmed properly. In this example, the local references are programmed so that the inverter control is done via its own HMI and the remote references are programmed for the inverter to be controlled by the PLC via DeviceNet network.

#### 2.1.1 Selection of the Operation Control Mode – Local/Remote

##### P0220 – LOCAL/REMOTE Source Selection

Adjustable Range:	0 to 14	Value: 8
Properties:	CFG	
Access groups via HMI:		

#### Description:

It defines the command origin source which will select between LOCAL control and REMOTE control.

It also defines which control mode the inverter will adopt when it is powered up.

In this example, the inverter will be programmed for **value 8 “Fieldbus Default Remote”**.



### NOTE!

For further information about the parameter, refer to the MVW01 or MVW3000 manual!

## 2.1.2 Selection of Speed Reference – LOCAL Mode

### P0221 – Selection of the Speed Reference – LOCAL Mode

Adjustable Range:	0 to 13	Value: 0
Properties:	CFG	
Access groups via HMI:		

#### Description:

It defines the source of the inverter speed reference in the LOCAL control mode.

In this example, the inverter will be programmed for **value 0 “HMI”**.



### NOTE!

For further information about the parameter, refer to the MVW01 or MVW3000 manual!

### P0223 – Selection of the Direction of Rotation – LOCAL Mode

Adjustable Range:	0 to 16	Value: 2
Properties:	CFG	
Access groups via HMI:		

#### Description:

It defines the source for the inverter Direction of Rotation command in the LOCAL control mode.

It also defines the direction of rotation the inverter will adopt when it is powered up.

In this example, the inverter will be programmed for **value 2 “Direction of Rotation Key (FWD)”**.



### NOTE!

For further information about the parameter, refer to the MVW01 or MVW3000 manual!

### 2.1.3 Selection of the Direction of Rotation Control – Remote Mode

#### P0222 – Selection of the Speed Reference – REMOTE Mode

Adjustable	0 to 13	Value: 10
Range:		
Properties:	CFG	
Access groups via HMI:		

#### Description:

It defines the source of the inverter speed reference in the REMOTE control mode.

In this example, the inverter will be programmed for **value 10 “Fieldbus”**.



#### NOTE!

For further information about the parameter, refer to the MVW01 or MVW3000 manual!

### 2.1.4 Selection of the Direction of Rotation – Remote Mode

#### P0226 – Selection of the Direction of Rotation – REMOTE Mode

Adjustable	0 to 16	Value: 7
Range:		
Properties:	CFG, V/f, VVW and Vector	
Access groups via HMI:		

#### Description:

It defines the source for the inverter Direction of Rotation command in the REMOTE control mode.

It also defines the direction of rotation the inverter will adopt when it is powered up.

In this example, the inverter will be programmed for **value 7 “Fieldbus (Default FWD)”**.



#### NOTE!

For further information about the parameter, refer to the MVW01 or MVW3000 manual!

## 2.1.5 Selection of the JOG Control – Remote Mode

### P0228 - Selection of JOG – REMOTE Mode

Adjustable	0 to 6	Value: 4
Range:		
Properties:	CFG	

#### Description:

It defines the source for the inverter JOG command in the REMOTE control mode. In this example, the inverter will be programmed for **value 4 “Fieldbus”**.



#### NOTE!

For further information about the parameter, refer to the MVW01 or MVW3000 manual!

## 2.2 CONFIGURATION OF THE PARAMETERS FIELDBUS SETTINGS

### 2.2.1 Inverter Fieldbus Settings

#### P0309 – Fieldbus Identification

Adjustable	0 to 13	Value: 06
Range:		
Properties:	RO, Fieldbus	
Access groups via HMI:		

#### Description:

It identifies the amount of words that will exchange between master and slave. For the communication test, P309 was configured equal to 06 (DeviceNet 6 I/O).



#### NOTE!

For further information about the parameter, refer to the MVW01 or MVW3000 manual!

### 2.2.2 Behavior when Fieldbus is with alarm

#### P0313 – Disabling with Alarm A128, A129 and A130

Adjustable	0 to 3	Value: 03
Range:		
Properties:	CFG, Fieldbus	
Access groups via HMI:		

## Description:

Defines the inverter behavior when the physical connection with the master is interrupted and/or the Fieldbus board is inactive (A128, A129 or A130 indicated on the display).

The parameter P313 has the following options:

- 0 = Run/Stop
- 1 = General Enable
- 2 = Inactive
- 3 = Go to Local
- 4 = No function
- 5 = Fatal Failure



### NOTE!

Restart the drive to validate these changes; otherwise, it keeps working on the previous configuration.

Fault / Alarm	Description:	Possible causes:
A129: Inactive fieldbus connection	Alarm that indicates a DeviceNet communication interruption.	<ul style="list-style-type: none"> <li>- PLC idle.</li> <li>- Programming error. Slave and master with different number of reading/writing words.</li> <li>- Communication lost (terminal disconnected, broken cable).</li> </ul>
A130: Inactive fieldbus card	Alarm that indicates error during DeviceNet communication module access.	<ul style="list-style-type: none"> <li>- Module defective, not recognized by the drive or it not installed correctly.</li> <li>- Conflict with another WEG optional module.</li> </ul>

**Figure 2.1** – Fault and alarm messages description



### NOTE!

The alarms A129 / A130 are presented on the conventional HMI as E29 / E30 and the reset automatically after eliminating the cause.

### 3. DATA CYCLIC COMMUNICATION

The DeviceNet protocol has two basic types of messages, I / O and explicit. Used in the interconnection of industrial controllers and input / output (I / O) devices, the protocol follows the producer-consumer model, supports multiple modes of communication and has priority between messages.

#### 3.1 VARIABLES READ FROM THE MVW INVERTER

Parameter P0309 allows the number of I / O words to be programmed to be exchanged with the master over the network. This item will present the data format for each of the existing options.

Depending on the value selected in parameter P0309, the drive will communicate with the network master 2, 4 or 6 I / O words. The more words exchanged on the network, the more functions will be available for operating the inverter. On the other hand, increasing the number of words, the memory area on fieldbus master and the communication time will increase.

**Input (master => drive):**

Input	Description
1 <sup>a</sup> Word	Inverter logical state
2 <sup>a</sup> Word	Motor speed, for the option P309 = 1 or 4 (2I/O) – read 1 and 2
3 <sup>a</sup> Word	Status of digital inputs DI1 to DI10, (P00120)
4 <sup>a</sup> Word	Content of the parameter read, for the option P309 = 2 or 5 (2I/O) – read 1 and 2
5 <sup>a</sup> Word	Motor torque, for the option (P009)
6 <sup>a</sup> Word	Motor current (P003), for the option P0309 = 3 or 6 (6I/O) – read 1,2,3,4,5, and 6

**Figure 3.1 – I / O - Reading words**

##### 3.1.1 Input - 1<sup>a</sup> word: **Status word**

The status word is composed by a total of 16 bits, 8 high order bits and 8 low order bits. It has the following construction:

High-order bits – they indicate the status of the associated function.

Bit	Function	Description
EL.15	Active error	0 = No, 1 = Yes
EL.14	PID Regulator	0 = Manual, 1 = Automatic
EL.13	Undervoltage of the electronics power supplies	0 = Without, 1 = With
EL.12	Local / Remote Command	0 = Local, 1 = Remote
EL.11	Jog Command	0 = Inactive, 1 = Active
EL.10	Forward / Reverse	0 = Reverse, 1 = Forward
EL.09	General Enabling	0 = Disabled, 1 = Enabled
EL.08 (*)	Start / Stop	0 = Stop, 1 = Start

**Figure 3.2 – Logical State: High-order bits.**

(\*) Bit 08 = 1, means the inverter received the Run/Stop command via networks. This Bit is not intended to signal that the motor is effectively spinning.

Low-order bits – this indicates the error code number, i.e., 03, 07 or 87 (57) This is only valid for MVW01. In MVW3000 these bits are reserved and the fault code is read in parameter P68.

### 3.1.2 Input - 2<sup>a</sup> word: *Motor speed*

This variable is shown by using 13-bit resolution plus signal. Thus, the rated value will be equal to 8191 (1FFFh) (Forward) or -8191 (E001h) (Reverse) when the motor is running at synchronous speed (or base speed, for instance 1800 rpm for a IV-pole, 60Hz).

### 3.1.3 Input - 3<sup>a</sup> word: *Digital input status*

It presents the parameter P0012 contents, where 1 indicate an active input and 0 indicates an inactive input.

The digital inputs of this WORD are distributed as follows:

Bit	Function	Description
9	DI10	0 = Off 1 = On
8	DI09	0 = Off 1 = On
7	DI01	0 = Off 1 = On
6	DI02	0 = Off 1 = On
5	DI03	0 = Off 1 = On
4	DI04	0 = Off 1 = On
3	DI05	0 = Off 1 = On
2	DI06	0 = Off 1 = On
1	DI07	0 = Off 1 = On
0	DI08	0 = Off 1 = On

*Figure 3.3 – Status of digital inputs.*

### 3.1.4 Input - 4<sup>a</sup> word: *Parameter contents*

This position allows reading the contents of inverter parameters, which are selected at the position 4 – Number of the parameters to be read – of the variables written in the inverter. The read values have the same order of magnitude of those described in the product manual or showed on the HMI.

### 3.1.5 Input - 5<sup>a</sup> word: *Torque current*

This position indicates P009 parameter contents, without the decimal point. A low pass filter with a time constant of 0.5 s filters this variable.

### 3.1.6 Input - 6<sup>a</sup> word: *Motor current*

This position indicates P003 parameter contents, without the decimal point. A low pass filter with a time constant of 0.3 s filters this variable.



#### **NOTE!**

For more information on the parameterization of the inverter, refer to the programming manual available for download on:

<https://static.weg.net/medias/downloadcenter/h55/h11/WEG-mvw-01-medium-voltage-frequency-inverter-users-guide-0899.5247-3.3x-manual-english.pdf>

<https://static.weg.net/medias/downloadcenter/hde/h2e/WEG-MVW3000-user-manual-10004823674-en.pdf>

### 3.2 VARIABLES WRITTEN TO MVW INVERTER

The variables are written in the following order:

1. Content of the parameter to be changed, selected in the previous position, for the option P0309 = 3 or 6 (6I/O) – it writes in 1,2,3,4,5, and 6.

**Output (drive => master):**

Output	Description
1 <sup>a</sup> Word	Control Word
2 <sup>a</sup> Word	Motor speed reference, for the option P309 = 1 or 4 (2I/O) – it writes in 1 and 2
3 <sup>a</sup> Word	Status of digital outputs
4 <sup>a</sup> Word	Number of the parameter to be read, for the option P309 = 2 or 5 (2I/O) – it writes in 1,2,3 and 4
5 <sup>a</sup> Word	Parameter number to be changed
6 <sup>a</sup> Word	Content of the parameter to be changed, selected in the previous position, for the option P0309 = 3 or 6 (6I/O) – it writes in 1,2,3,4,5, and 6

**Figure 3.4 – I / O - Writing words**

#### 3.2.1 Output - 1<sup>a</sup> word: **Control word**

The control word is composed by a total of 16 bits, 8 high order bits and 8 low order bits. It has the following construction:

**High-order bits** – they select the functions to be controlled, when the correspondent bits are set to 1.

Bit	Function	Mask(Enable)
15	Reset of inverter failures (*)	0 = OFF 1 = ON
14	No function	-
13	Save changes from parameter P169 / P170 to EEPROM	0 = OFF 1 = ON
12	Local / Remote Command	0 = OFF 1 = ON
11	Jog Command	0 = OFF 1 = ON
10	Forward/ Reverse	0 = OFF 1 = ON
9	General Enabling	0 = OFF 1 = ON
8	Start / Stop	0 = OFF 1 = ON

**Figure 3.5 – Logical Command - High-order bits.**

**Low-order bits** – they determine the activation of the functions selected in the high-order bits,

Bit	Function	Description
7	Inverter fault reset: every time it changes from 0 to 1 it causes an inverter reset, except for the errors (except A0124, A0125, A0126 and A0127	0 = No 0 => 1 = Reset
6	No function	- -
5	To save from parameter P169 / P170 to EEPROM	0 = To save 1 = Not to save
4	Local / Remote Command	0 = Local 1 = Remote
3	Jog Command	0 = Inactive 1 = Active
2	Forward/Reverse	0 = Reverse 1 = Forward
1	General Enabling	0 = Disabled 1 = Enabled
0	Start / Stop	0 = Stop 1 = Start

**Figure 3.6** – Logical Command – Low-order bits.



#### NOTE!

The inverter will only execute the command indicated in the lower bit if the corresponding high bit is set to 1 (one). if the upper bit is set to 0 (zero), the inverter will ignore the corresponding lower bit

value.

### 3.2.2 Output - 2<sup>a</sup> word: **Motor speed reference**

This variable is presented using a 13-bit resolution. therefore, the speed reference value for the motor synchronous speed will be equal to 8191 (1FFFh).

#### Examples:

1. 4- Pole, 60Hz motor, synchronous speed = 1800 rpm and speed reference = 600 rpm.

1800 rpm \_ 8191  
0650 rpm \_ X      X= 2958 = 0B8Eh

This value (0B8Eh) must be written in the second word, which represents the motor speed reference (according to the beginning of this item).

2. 6- Pole, 60Hz motor, synchronous speed = 1200 rpm and speed reference = 1000 rpm.

1200 rpm \_ 8191  
1000 rpm \_ X      X= 6826 = 1AAAh

This value (1AAAh) must be written in the second word, which represents the motor speed reference (according to the beginning of this item).



### NOTE!

Values above 8191 (1FFFh) are allowed when speed references above the motor synchronous speed are required, as long as the maximum programmed speed reference is respected.

### 3.2.3 Output - 3<sup>a</sup> word: *Command for digital outputs*

It allows controlling the status of the digital outputs that have been programmed for Fieldbus at the parameters P0275 to P0282. 16 bits, with the following construction, form the word that defines the status of the digital outputs:

**High-order bits:** they define the outputs to be controlled, when set in 1.

Bit	Function	Mask(Enable)
8	DO1 output control	0 = OFF 1 = ON
9	DO2 output control	- -
10	RL01 output control	0 = OFF 1 = ON
11	RL02 output control	0 = OFF 1 = ON
12	RL03 output control	0 = OFF 1 = ON

**Figure 3.7** – Command of digital outputs - High-order bits.

**Low-order bits:** they define the outputs to be controlled, when set in 1.

Bit	Function	Description
0	DO1 Output control	0 = Inactive Output 1 = Active Output
1	DO2 Output control	0 = Inactive Output 1 = Active Output
2	RL1 Output control	0 = Inactive Output 1 = Active Output
3	RL2 Output control	0 = Inactive Output 1 = Active Output
4	RL3 Output control	0 = Inactive Output 1 = Active Output

**Figure 3.8** – Command of digital outputs - Low-order bits.

### 3.2.4 Output - 4<sup>a</sup> word: *Number of the parameters to read*

Through this position, the reading of any inverter parameter can be defined. The number of the parameter to be read must be programmed here, and its contents will be presented at the position 4 of the variables read from the inverter.

### 3.2.5 Output - 5<sup>a</sup> word: *Number of the parameters to be changed*

This position operates together with the position 6, described next.  
When no parameter has to be changed, then fill this position with the code 999.

Changing process sequence:

- Keep 999 in the position 5.
- Replace 999 by the number of the parameter to be changed.
- If no error code (124 to 127) is signaled in the Status Word, then replace the parameter number by 999, in order to conclude the modification.

The modification can be verified via the HMI or by reading the parameter contents.



#### **NOTE!**

1. The command to change from scalar to vector control will not be accepted if parameters P0409 to P0413 are set to zero. That should be done via HMI.
2. Do not program P0204 = 5, because in the factory default settings P0309 = inactive.
3. P0204 and P0408 do not accept modification via network command.
4. The parameter contents must be kept by the master during 15.0 ms.  
Send a new value or write in another parameter only after this time has elapsed.

### 3.2.6 Output - 6<sup>a</sup> word: *Content of the parameter to be changed*

The format of the values adjusted in this position must be the ones described in the manual. The values, however, must be written without the decimal point, if this is the case. When the parameters P409 are modified, small differences in the contents may occur when comparing the value sent via Fieldbus and the value read at the position 4. (Parameter contents) or at the HMI, because of the truncating during the reading process.



#### **NOTE!**

For further information on the parameterization, refer to the programming manual available for download on

<https://static.weg.net/medias/downloadcenter/h55/h11/WEG-mvw-01-medium-voltage-frequency-inverter-users-guide-0899.5247-3.3x-manual-english.pdf>

<https://static.weg.net/medias/downloadcenter/hde/h2e/WEG-MVW3000-user-manual-10004823674-en.pdf>

## 4. FAULT AND ALARM INDICATION MESSAGES

Possible fault and alarm message that may occur during the communication:

### 4.1 ERROR INDICATIONS

During the Fieldbus reading/writing process the following error indications may occur and will be informed at the Status Word variable. Status Word variable inactions:

Fault / Alarm	Description:	Possible causes:
A124: Alarm Indication	Alarm that indicates parameterization error DeviceNet communication	- Parameterization error - An attempt to change a parameter that can be modified only with disabled inverter.
A125: Alarm Indication	Alarm that indicates error a DeviceNet communication	- Reading of non-existent parameter, or - Writing on non-existent parameter, or - Writing on P0408 and P0204.
A126: Alarm Indication	Alarm that indicates error a DeviceNet communication	-An attempt to write a value out of the permitted range.
A127: Alarm Indication	Alarm that indicates error a DeviceNet communication	- A function selected by the Control Word has not been programmed for Fieldbus, or - Command of a digital output that has not been programed for Fieldbus, or - An attempt to write in a read-only parameter.
A129: Inactive fieldbus connection	Alarm that indicates a DeviceNet communication interruption.	- PLC idle. - Programming error. Slave and master with different number of reading/writing words. - Communication lost (terminal disconnected, broken cable).
A130: Inactive fieldbus card	Alarm that indicates error during DeviceNet communication module access.	- Module defective, not recognized by the drive or it not installed correctly. - Conflict with another WEG optional module.

**Figure 4.1 – Fault and alarm messages description**

The indication of the listed errors will be removed from the Status Word when the indented action is sent correctly, except for A127 (case: Command of a digital output that has not been programed for Fieldbus), whose reset is performed writing in the Control Word.



#### NOTE!

The alarms A0124, A0125, A0126 and A127 do not cause any change in the inverter operation status. For further information on the faults and alarms, refer to the programming manual available for

download on

<https://static.weg.net/medias/downloadcenter/h55/h11/WEG-mvw-01-medium-voltage-frequency-inverter-users-guide-0899.5247-3.3x-manual-english.pdf>

<https://static.weg.net/medias/downloadcenter/hde/h2e/WEG-MVW3000-user-manual-10004823674-en.pdf>

## 5. CLP COMPACT LOGIX L32E

### 5.1 EDS INSTALLATION

Each element of a DeviceNet network is associated with an EDS file, which contains all information regarding the element. This file is used by the network configuration during network configuration. Use the file with extension .eds supplied with the Fieldbus kit.



#### NOTE!

For this firmware version in conjunction with the communication card, it is possible to program the master for communication in two different connection types:

- 1) Polled; or
- 2) Change of State or Cyclic.

Access the WEG website and download the MWV inverter EDS.



#### NOTE!

For further information on the faults and alarms, refer to the programming manual available for download on

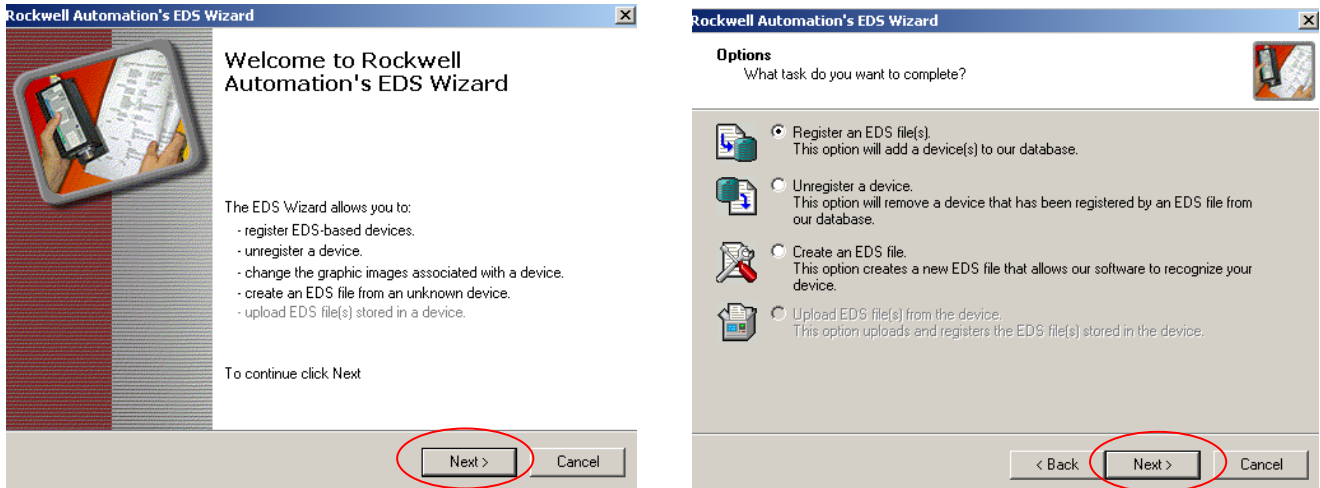
[https://www.weg.net/institutional/BR/en/search/downloadcenter?q=mwv&mediaContainerName=\\*&languageIsoCode=\\*](https://www.weg.net/institutional/BR/en/search/downloadcenter?q=mwv&mediaContainerName=*&languageIsoCode=*)

#### 5.1.1 Import EDS

Open the RSNetWorx for DeviceNet programming software, access the hardware options tool and install the EDS wizard file.



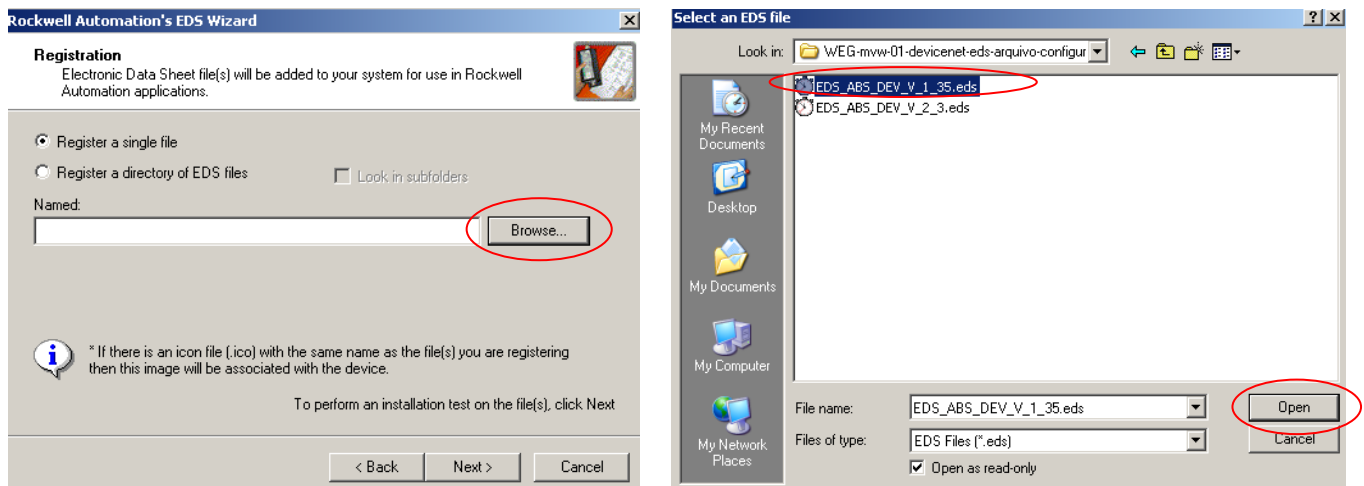
**Figure 5.1 – Accessing the new EDS file**



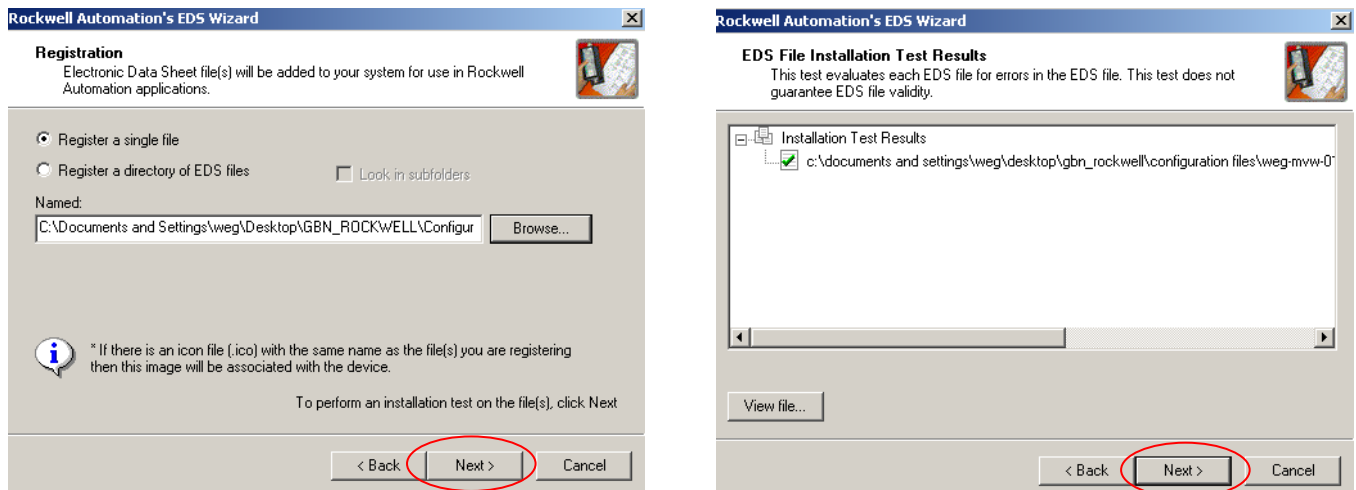
**Figure 5.2 – importing and options EDS file**

### 5.1.2 Installation EDS

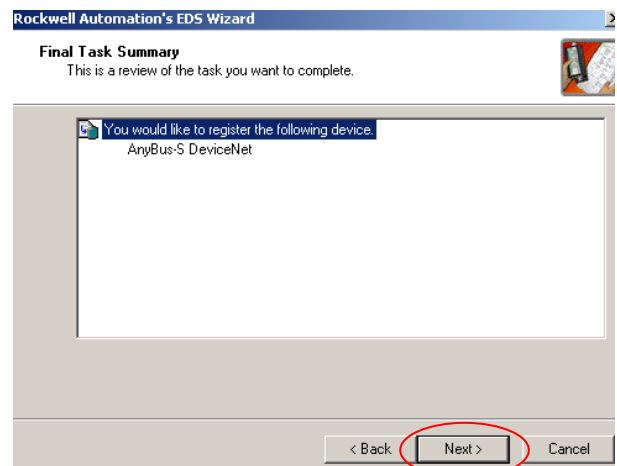
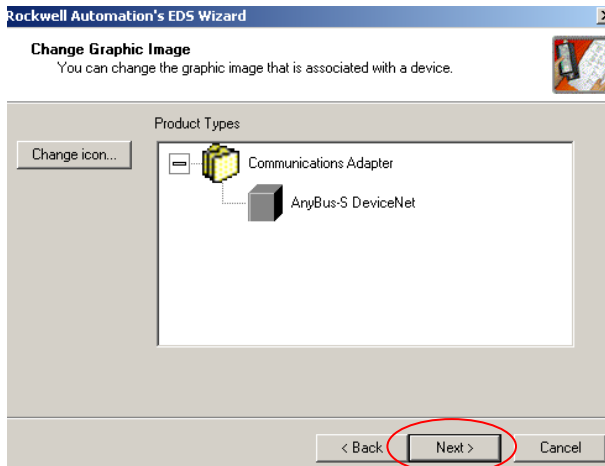
Search the file in the directory and install it.



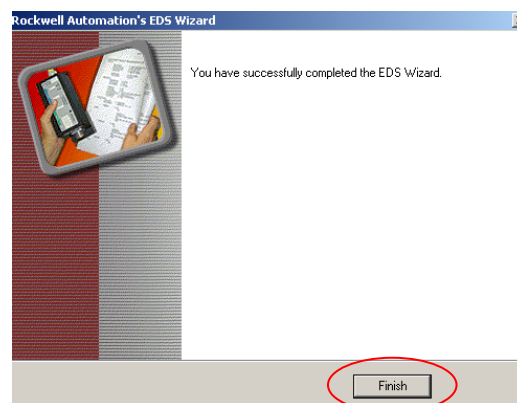
**Figure 5.3 – choosing from EDS file**



**Figure 5.4 – installing the EDS file**



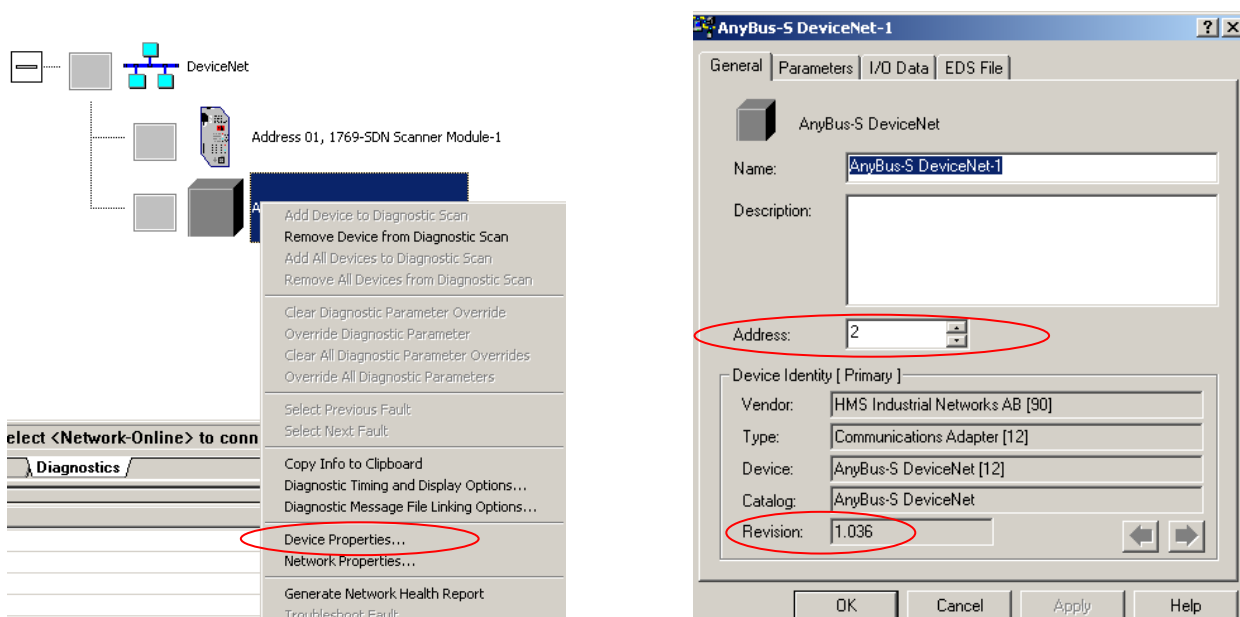
**Figure 5.5 – installing the EDS file**



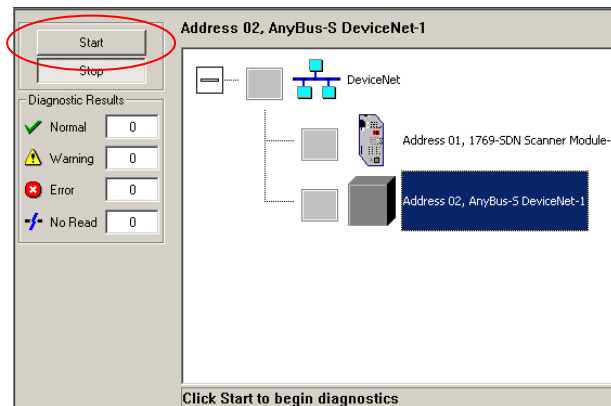
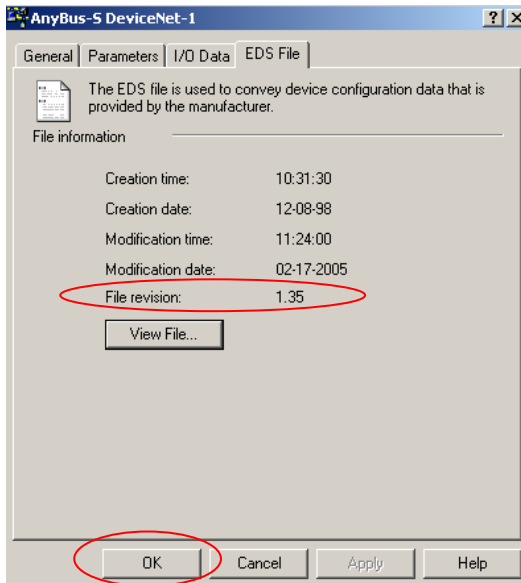
**Figure 5.6 – installing the EDS file**

### 5.1.3 Addressing anybus devicenet

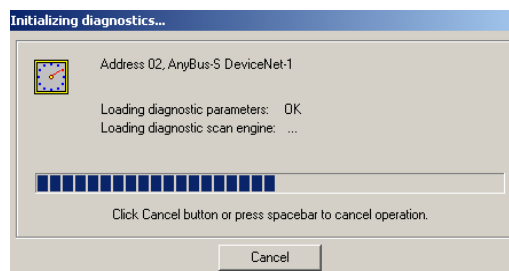
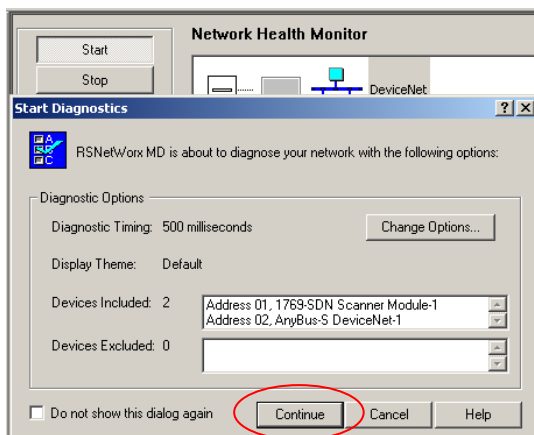
Addressing the anybus deviceNet card installed in the MVW inverter



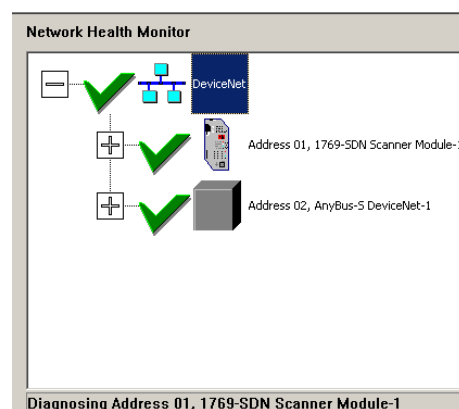
**Figure 5.7 – Addressing anybus devicenet card**



**Figure 5.8 – Anybus devicenet card firmware version**



**Figure 5.9 – Checking network components**



**Figure 5.10 – Checking the components of the DeviceNet network**



### NOTE!

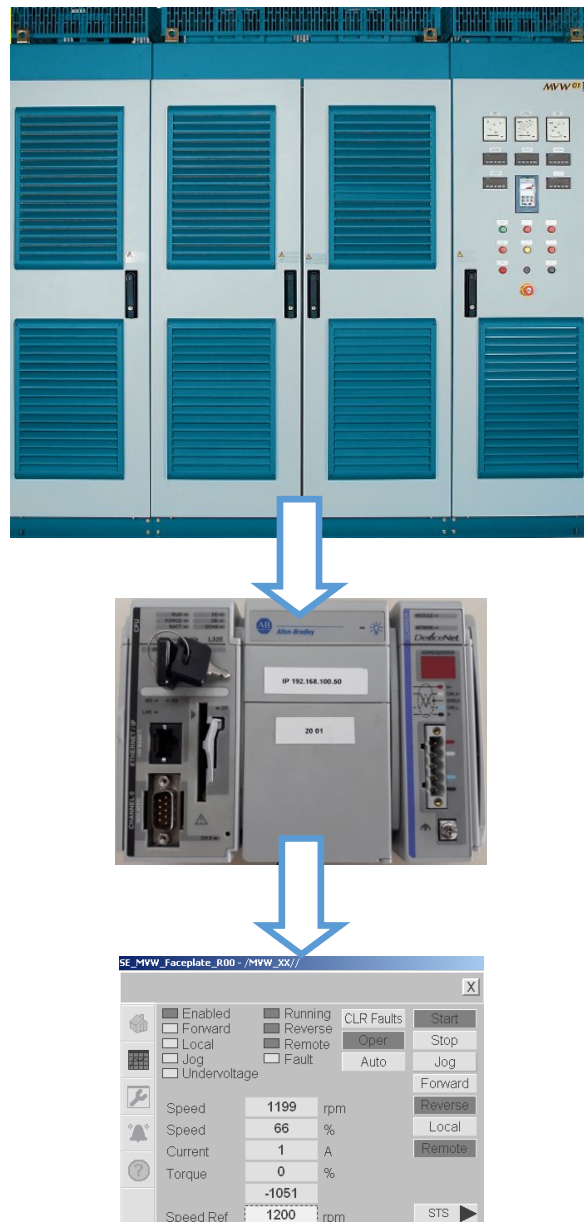
For the communication tests carried out, the DeviceNet board, mat.: 10413435, with the Firmware version was installed in the MVW3000 inverter: EDS\_ABS\_DEV\_V\_1\_35.eds, Anybus-S DeviceNet-1

## 6.SE MVW FACEPLATE PROJECT

Developing the project on the CompactLogix L32E PLC, establishing communication on DeviceNet, controlling and monitoring the Medium Voltage Inverter WEG (MVW).

The "SE MVW Faceplate" files allow you to quickly load, configure, and use preconfigured status, control and diagnostic displays or "faceplates" for the MVW family of drives using RSView Supervisory Edition.

The example below shows an MVW drive faceplate object that may be added to a specific system display. The faceplate object can be configured to launch the on-top display or "faceplate" for the particular MVW drive it represents. The faceplate includes status, control, and diagnostic views controlled by its own toolbar buttons.



**Figure 6.1** – Architecture of the Inverter hardware



## ATTENTION!

Disclaimer: WEG is not responsible for any support over this application and customer must take all responsibility for the use of this content.

### 6.1 Creating new project

Add a new project using RSLogix 5000, you should check and define the model and version of the PLC to be used in the application, also name it.

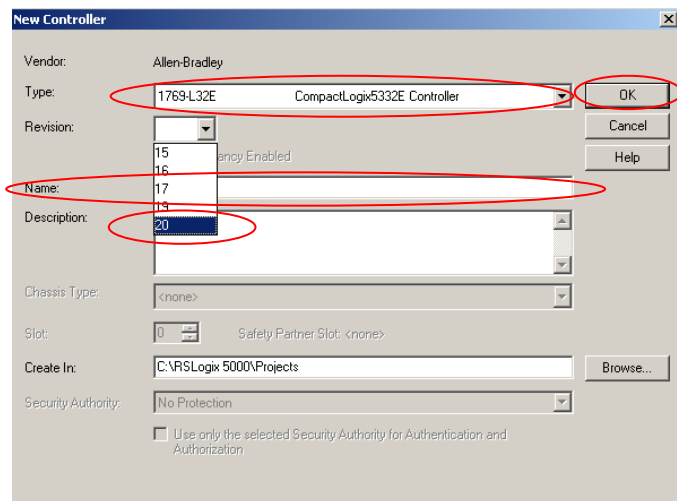
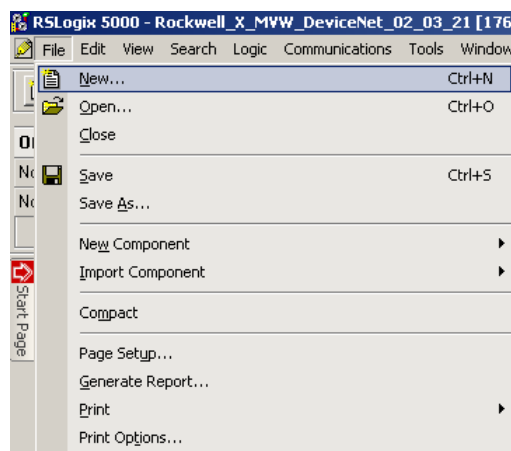


Figure 6.2 – New project

### 6.2 Add Modulo Ethernet

For network communication if MVW the users must be added a Generic Module in the Ethernet IP card, for this follow the steps bellow.

Under I/O Configuration, right click on network communication module for the intended MVW drive and select “New Module”.

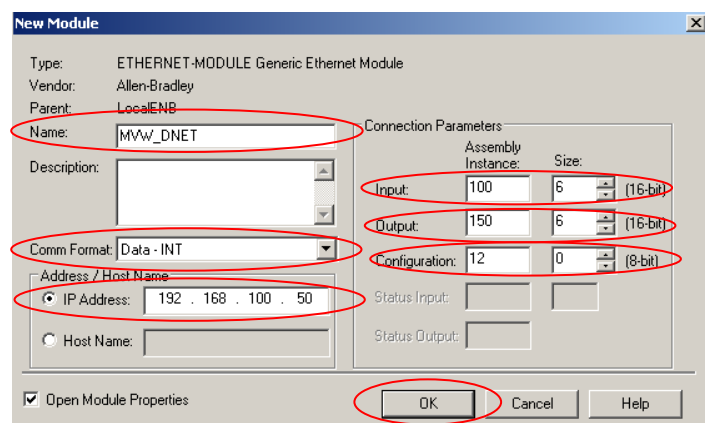
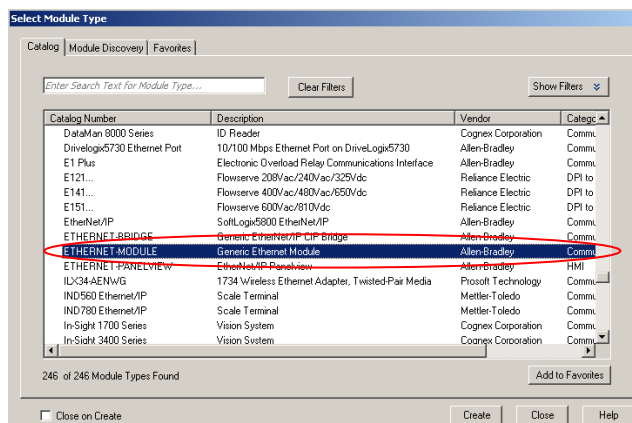
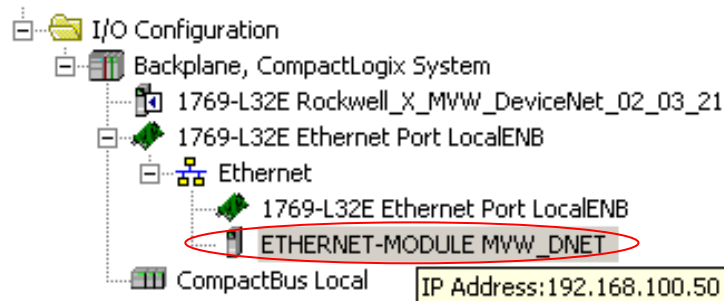


Figure 6.3 – Adding a generic Ethernet module and configuring it

Open the Drives folder, select Generic Ethernet Module and select OK. Enter a distinct module name and IP Address and configure the Connections Parameters as follows.

Generic Module must be shown at the “Controller Organizer”.



**Figure 6.4** – Generic module “Controller Organizer”

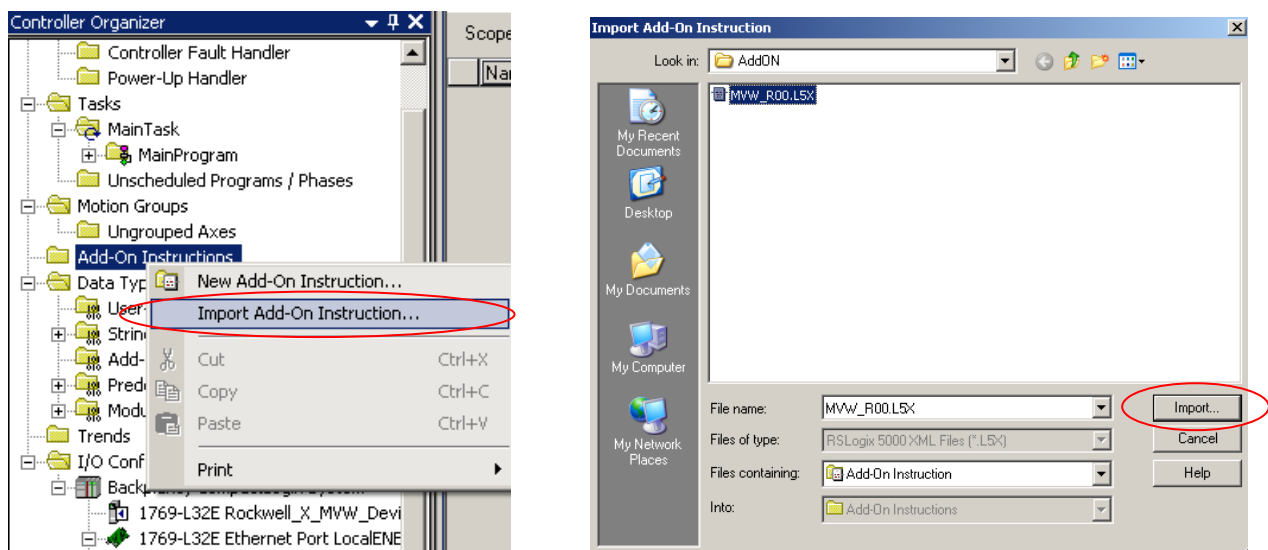
### 6.3 Add-On Instruction

After configure communication between PLC and MVW, this user can be creating and configure MVW Add-On.

First of all, import Add-On instruction, to do this right click in “Add-On Instructions” and select the “Import Add-On Instruction...” option.

#### 6.3.1 Add-On Import

Select the file “MVW\_R00” provided by WEG and click in “Import...”



**Figure 6.5** – Adding the Add-On Instruction

### 6.3.2 Configure Add-On

In import configuration screen is no need change anything so just presses “OK” button in import configuration screen. After this process the file must be shown as bellow.

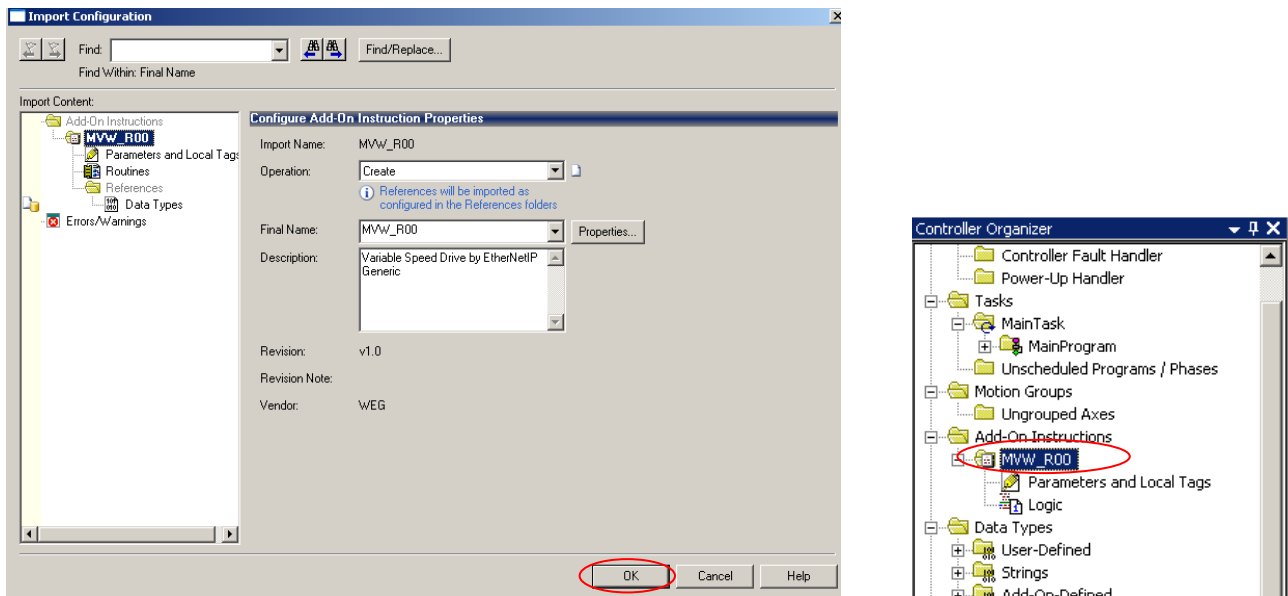


Figure 6.6 – Adding the Add-On Instruction

### 6.3.2 Insert block

Insert the MVW\_R00 block in the MainProgram.

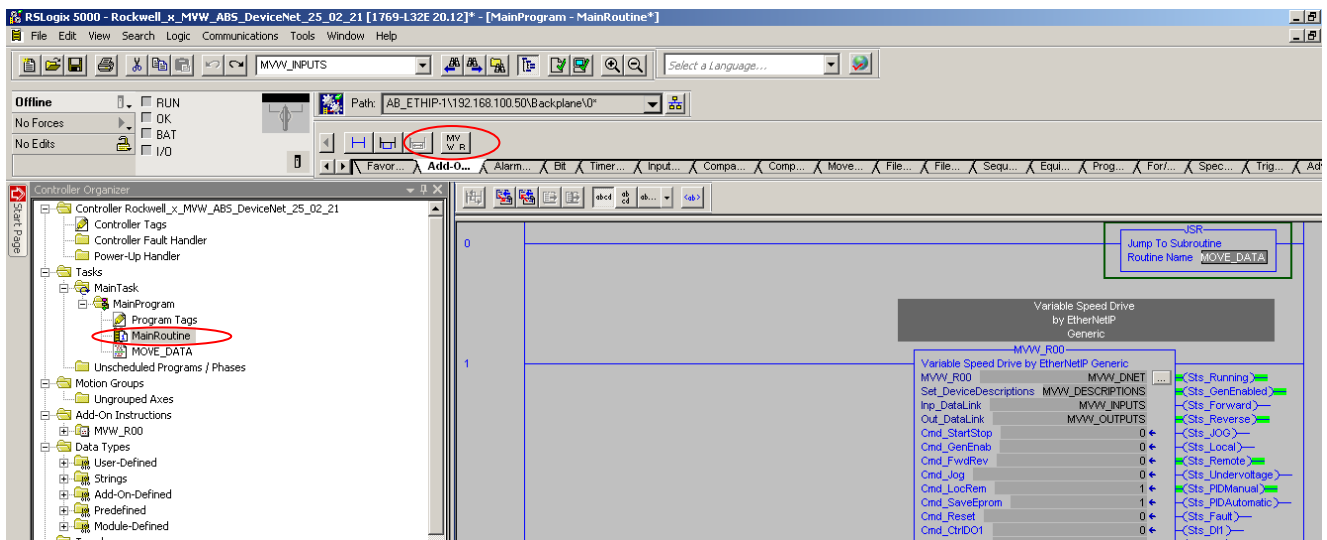


Figure 6.7 – Adding new MainProgram

### 6.3.4 Configure block

Right click on the first parameter and create a new TAG with the name of the block. Configure the TAG of the block parameters as shown in the image below, note that this scope of this TAG is global, it is necessary to establish the communication between the PLC and Factory Talk.

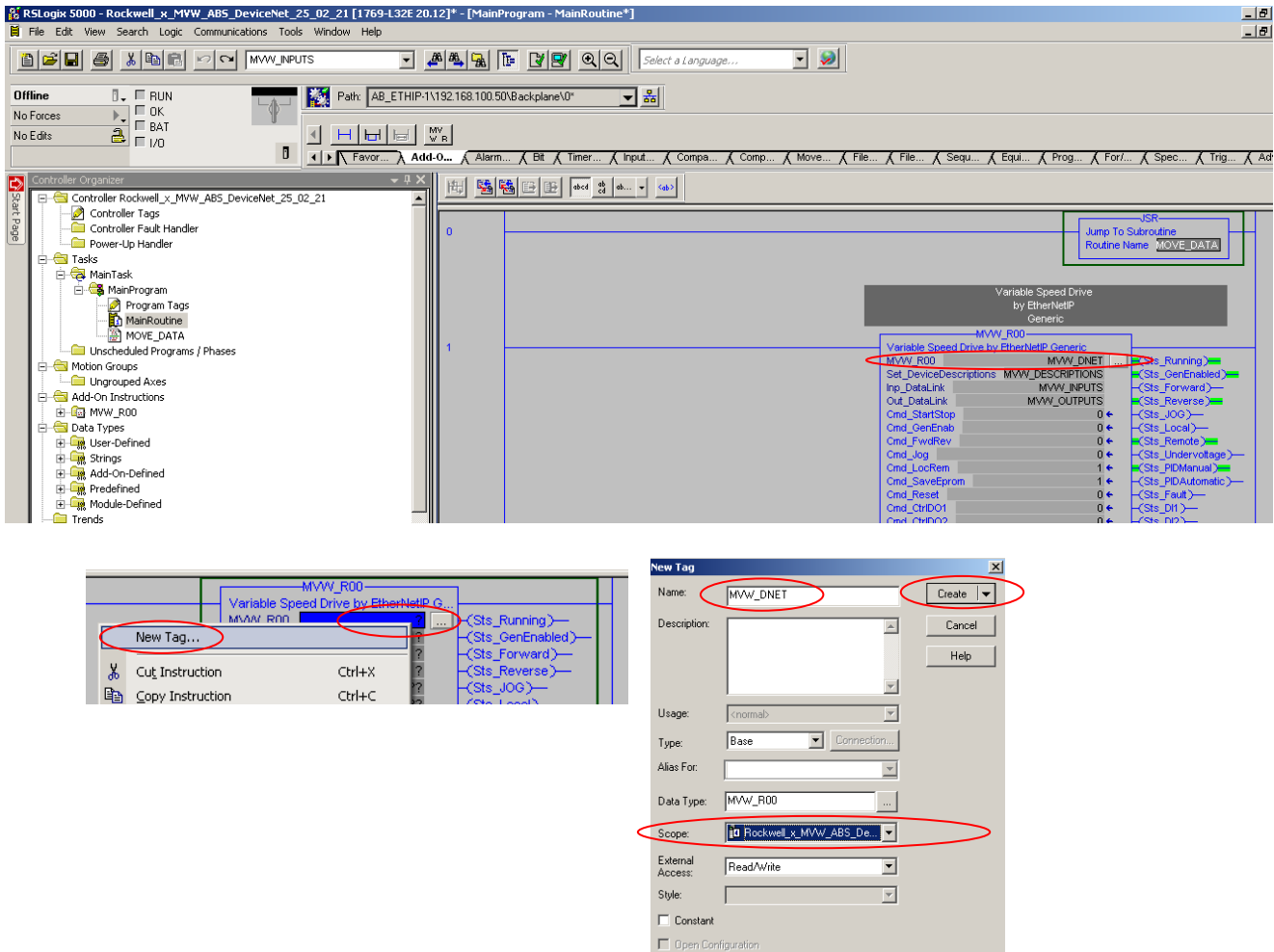
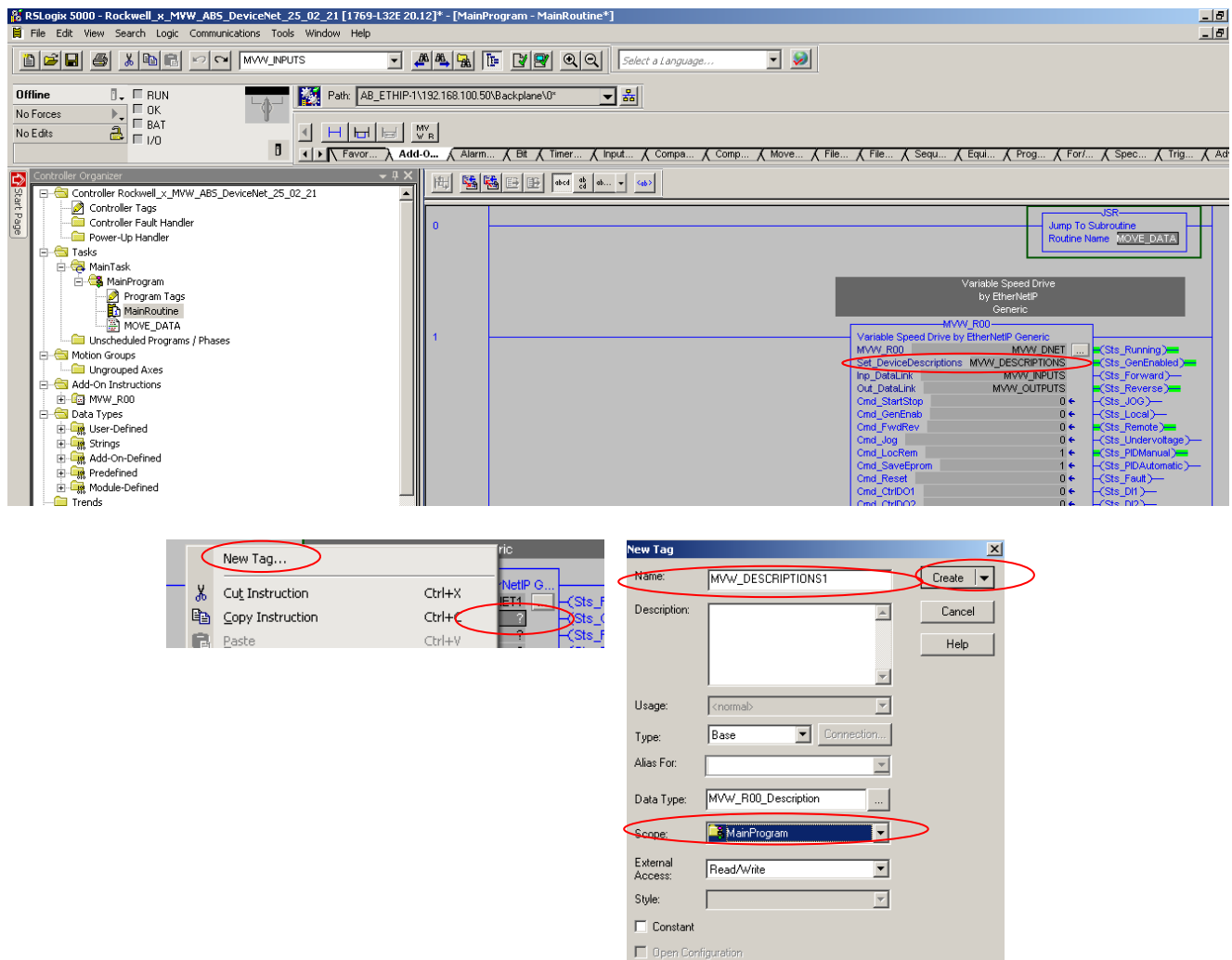


Figure 6.8 – Adding new STs Running.

### 6.3.5 Create new TAG

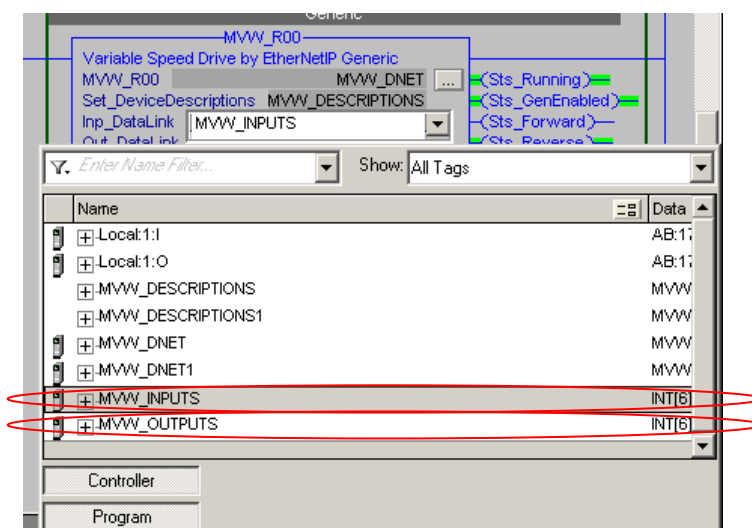
Create a new TAG with the descriptive texts presented in the template, such as the motor name and the functions of the digital inputs, more information about the descriptions is shown in the following chapters. Configure the description TAG as follows, in this case the Scope can be local because the Factory Talk front panel only communicates with the block parameters that the TAG created before.



**Figure 6.9 – Adding new Set\_DeviceDescriptions**

### 6.3.6 New TAGs

Add the incoming and outgoing data from the network, these TAGs are created automatically during the previous steps, so you only need to select the data tags from the list of options.



**Figure 6.10** – TAGs are created automatically

## 6.4 Add-On status and commands

In addition to facilitating the control and monitoring of the MVW01 by Factory Talk, the Add-On WEG MVW01 also provides the user with all control and monitoring of the drive by programming logic, in table bellow is shown all block TAGs and their function.

### 6.4.1 Table of writing and reading tags

TAG name	Type	Access	Function
Cmd_StartStop	BOOL	RW	0-Stop VFD   1-Start VFD
Cmd_GenEnable	BOOL	RW	0-Disable VFD to start   1-Enable VFD to start
Cmd_FwdRev	BOOL	RW	0-Forward rot. direction   1-Reverse rot. direction
Cmd_Jog	BOOL	RW	-   1-JOG command
Cmd_LocRem	BOOL	RW	0-Local   1-Remote
Cmd_SaveEprom	BOOL	RW	-   1-Save parameters value in EPROM memory
Cmd_Reset	BOOL	RW	-   1-Reset VFD faults
Cmd_CtrlDO1	BOOL	RW	0-Disable DO1   1-Active DO1
Cmd_CtrlDO2	BOOL	RW	0-Disable DO2   1-Active DO2
Cmd_CtrlRL1	BOOL	RW	0-Open RL1   1-Close RL1
Cmd_CtrlRL2	BOOL	RW	0-Open RL2   1-Close RL2
Cmd_CtrlRL3	BOOL	RW	0-Open RL3   1-Close RL3
Set_SpeedRef	REAL	RW	Set speed reference to VFD in rpm
Set_SynchSpeed	REAL	RW	Inform motor synchronous speed to system, need to calculations
Set_ParNumRead	INT	RW	Number of drive parameter that will be read in Val_ParContent
Set_NumParChanged	INT	RW	Number of drive parameter to change in VFD
Set_ContenParChanged	INT	RW	New value to parameter selected in Set_NumParChanged
Sts_Running	BOOL	RO	0-VFD stopped   1-VFD running

TAG name	Type	Access	Function	TAG name
Sts_GenEnabled	BOOL	RO	0-VFD disabled	1-VFD enabled
Sts_Forward	BOOL	RO	-	1-Forward motor rotation
Sts_Reverse	BOOL	RO	-	1-Reverse motor rotation
Sts_JOG	BOOL	RO	-	1-Motor running by JOG
Sts_Local	BOOL	RO	-	1-VFD in local mode
Sts_Remote	BOOL	RO	-	1-VFD in remote mode
Sts_Undervoltage	BOOL	RO	-	1-VFD in undervoltage
Sts_PIDManual	BOOL	RO	-	1-VFD PID in manual mode
Sts_PIDAutomatic	BOOL	RO	-	1-VFD PID in automatic mode
Sts_Fault	BOOL	RO	-	1-VFD fault active
Sts_DI1	BOOL	RO	0-DI1 off	1-DI1 on
Sts_DI2	BOOL	RO	0-DI2 off	1-DI2 on
Sts_DI3	BOOL	RO	0-DI3 off	1-DI3 on
Sts_DI4	BOOL	RO	0-DI4 off	1-DI4 on
Sts_DI5	BOOL	RO	0-DI5 off	1-DI5 on
Sts_DI6	BOOL	RO	0-DI6 off	1-DI6 on
Sts_DI7	BOOL	RO	0-DI7 off	1-DI7 on
Sts_DI8	BOOL	RO	0-DI8 off	1-DI8 on
Sts_DI9	BOOL	RO	0-DI9 off	1-DI9 on
Sts_DI10	BOOL	RO	0-DI10 off	1-DI10 on
Val_FaultCode	INT	RO	VFD fault code (consult all fault descriptions in MVW-01 manual)	
Val_SpeedRpm	REAL	RO	Motor speed in rpm	
Val_SpeedPorcent	REAL	RO	Motor speed in percentage	
Val_Torque	REAL	RO	Motor torque	
Val_Current	REAL	RO	Motor current	
Val_ParContent	REAL	RO	Current value of VFD parameter selected in Set_ParNumRead	

### 6.4.2 Add Routine

The JSR instruction jumps execution to a different routine. The SBR instruction passes data to and executes a routine. The RET instruction returns the results.

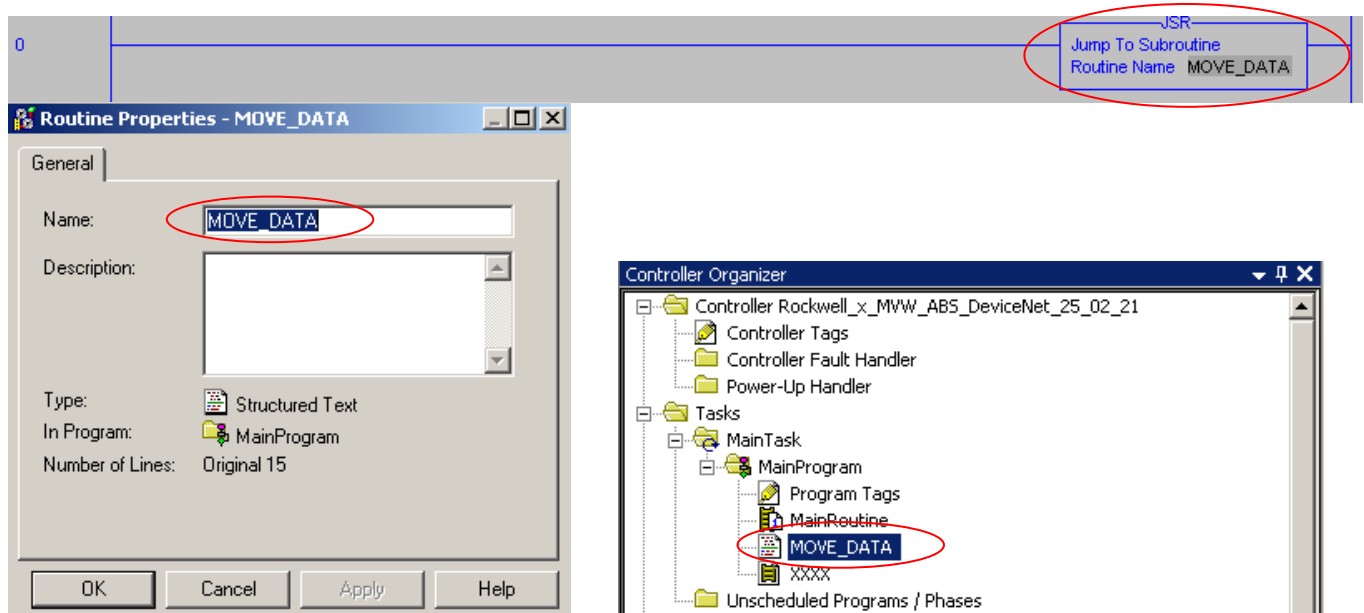


Figure 6.11 – execution to a different routine



## 7.CONFIGURING FACEPLATE ON FTVIEW

### 7.1 Add faceplate to project

For creat a MVW01 faceplate first of the all add a componet into the application.



Figure 7.1 – Opening application MVW.

#### 7.1.1 Open the project

For create a MVW01 faceplate first of all add a component into the application and Choose the file “SE\_MVW\_FACEPLATE\_R00” provided by WEG.

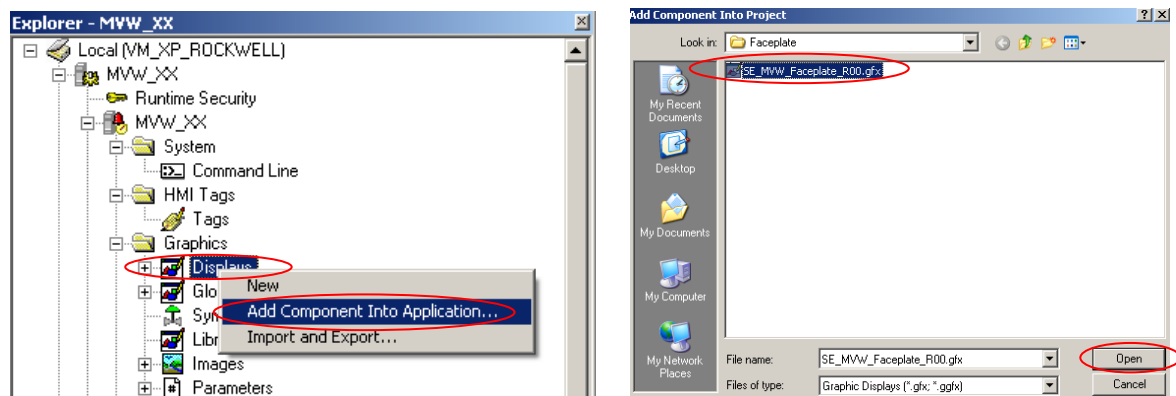


Figure 7.2 – Opening the project provided by WEG.

Faceplate will be added to the project as shown bellow.



Figure 7.3 – Project added.

## 7.2 Creating a Communication with PLC block

Adding a PLC communication server, after adding a communication server, go to Communication Setup, in Communication Setup click on Add and create the communication device.



### NOTE!

If you already have the communication configuration between PLC and Factory Talk, you do not need to perform steps presents in this chapter.

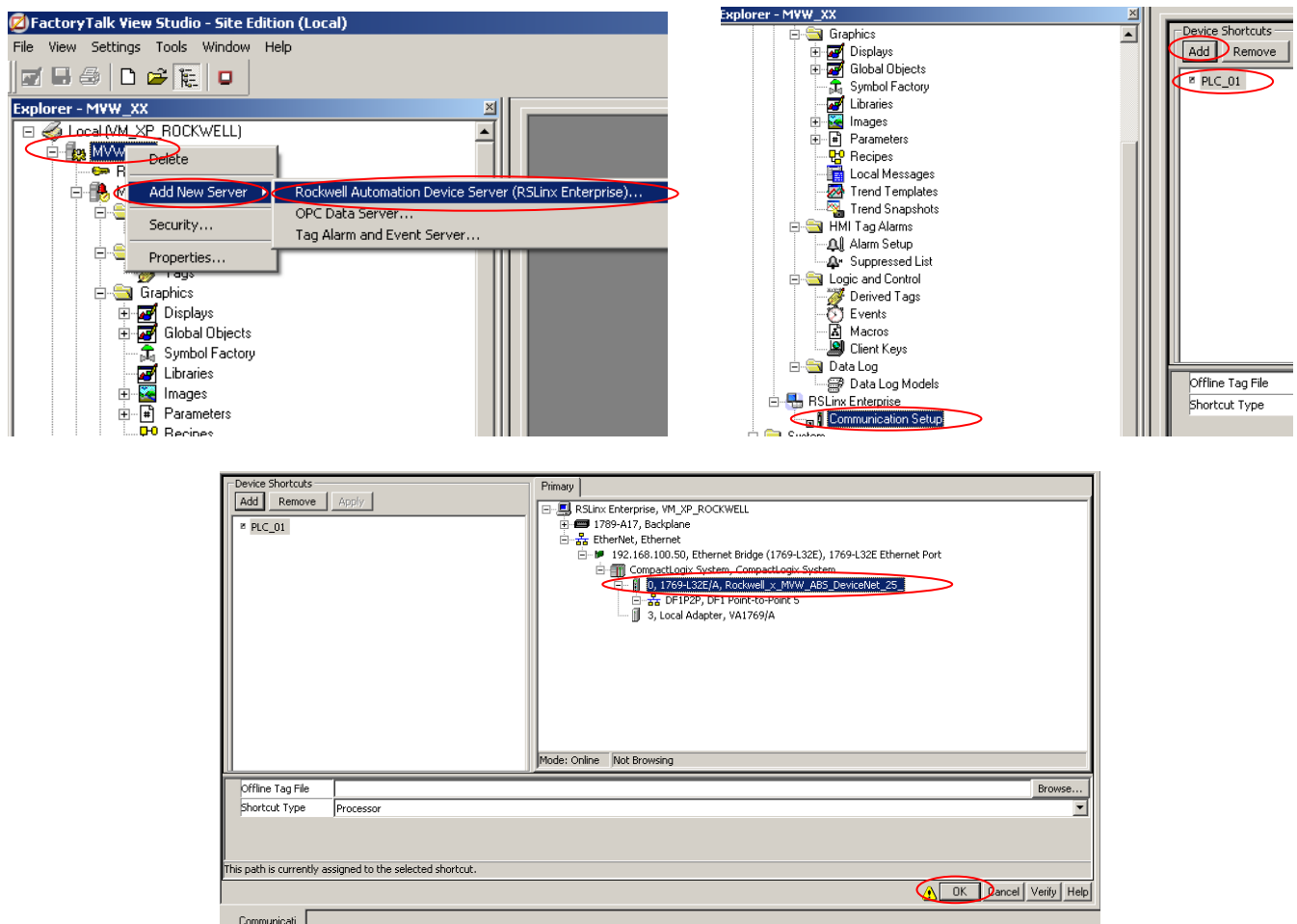


Figure 7.4 – Communication Setup.

If the PLC is connected in computer, select it and press Ok to create link between Factory Talk and PLC program.



## NOTE!

The connection between Factory Talk and PLC don't's necessary to configure template.

### 7.2.1 Adding new parameter and configuring it

For MVW01 faceplate access the block parameters is need create a "Parameters" object, for this right click in "Parameters" and select "New".

Configure parameters object, according example bellow.

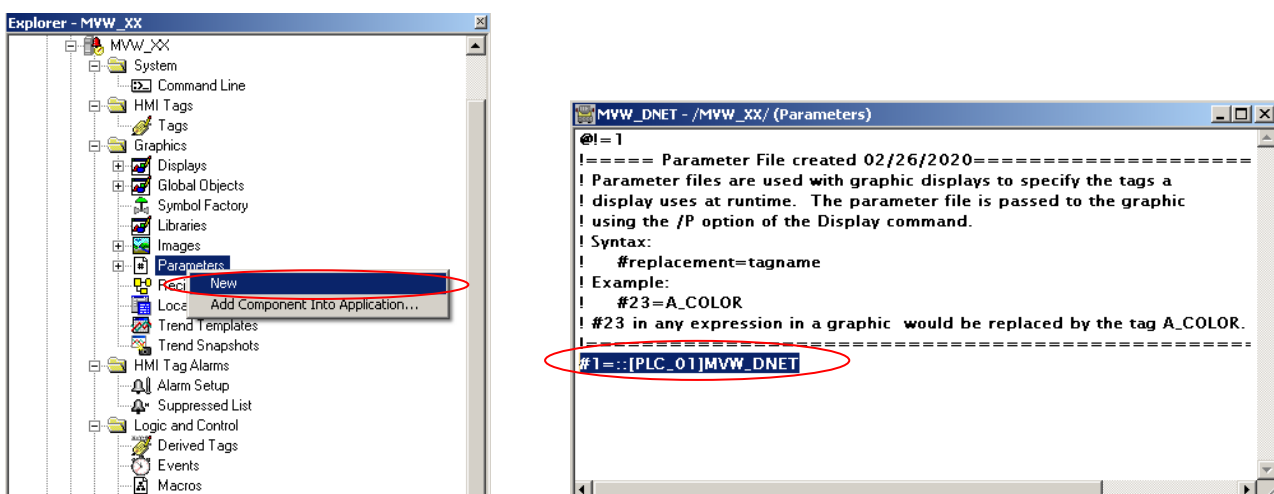


Figure 7.5 – New parameters.



## NOTE!

Note that the first term [PLC\_01] is the name of connection between Factory Talk and PLC, mode in item 7.2 and the second term "MVW\_DNET" is the name of structure made in item 6.3.4

After configuring the "Parameters", close and save the changes with any desired component name and note that the "Parameter" object is created.

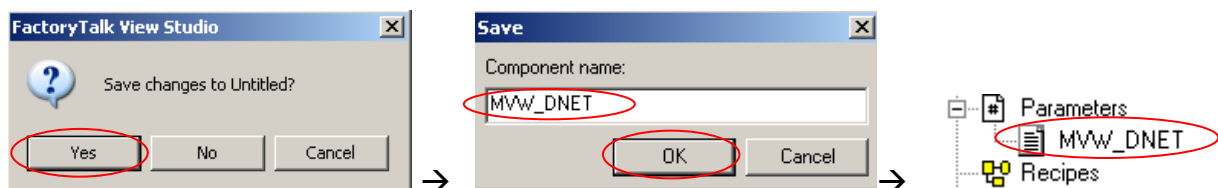



Figure 7.6 – The "Parameter" object was created.

## 7.2.2 Open Faceplate

For open the faceplate is possible use a button object, for this insert a button object  in the screen. In button properties go to action sheet and edit Press action. This command indicates how to call the faceplate when in runtime. Select the file (SE\_MVW\_Faceplate\_R00), after click on the checkbox /P – Parameter File and select the Parameter file created previously

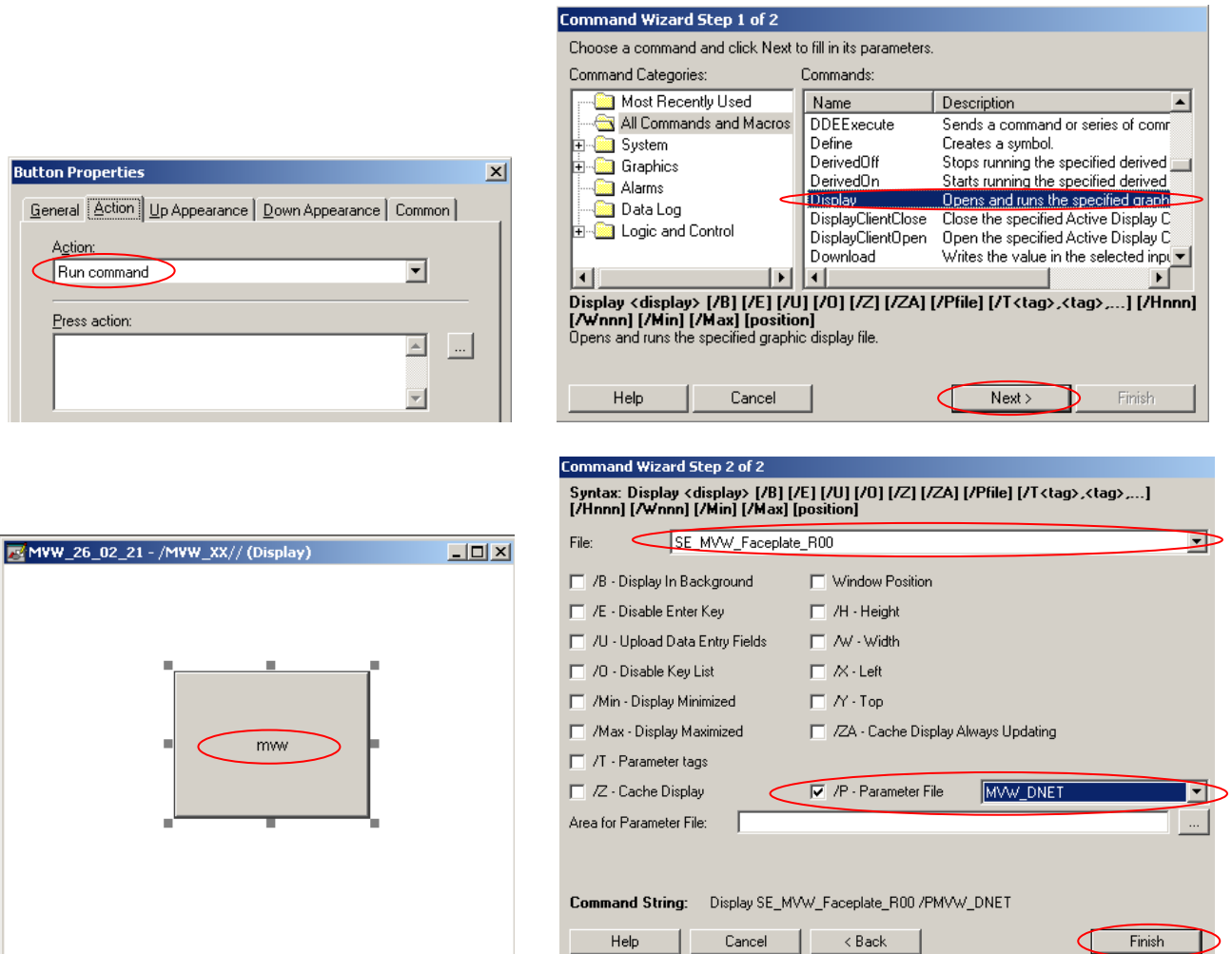
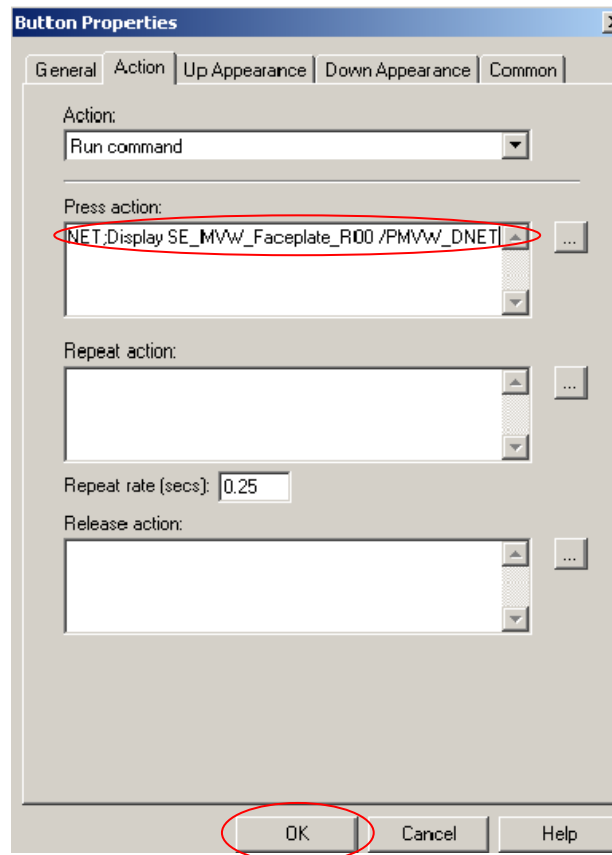


Figure 7.7 – Command Wizard Step.

Figure below indicates how the command to open faceplate in runtime should be.



**Figure 7.8 – The Button Properties.**

## 8. FACEPLATE IN RUNTIME

This chapter discuss about the faceplates in runtime mode.

### 8.1 Navigation buttons

On the left bar navigation buttons can be accessed.



Button Home



Button Trends



Button Config



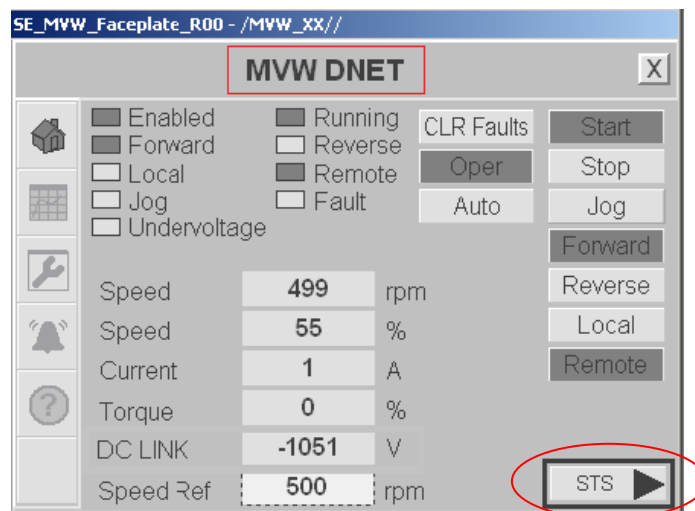
Button Alarms



Button Help

### 8.2 Home screen

Main VFDs information are shown in this screen.



**Figure 8.1** – Commands and indications screen.



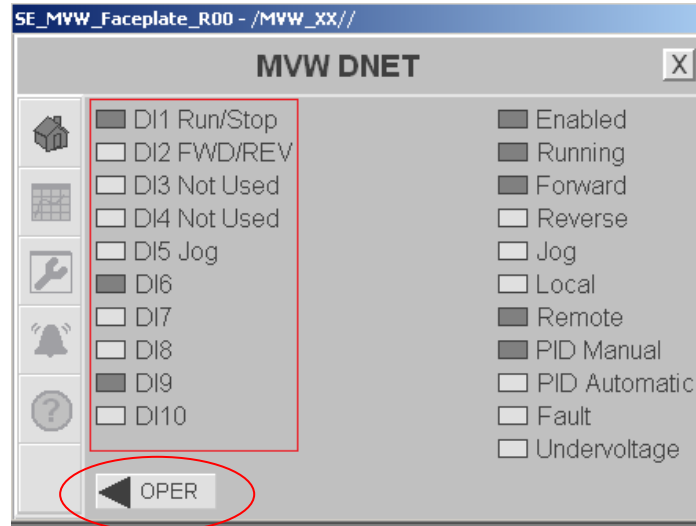
#### NOTE!

The template title name is configured in [MVW\_DNET\_Descriptions.DeviceName] within the PLC program.

The value displayed in highlighted box is configured in [MVW\_DNET.Set\_ParNumRead] and the parameter name and unit are configured in [MVW\_DNET\_Descriptions.ParContentName] and [MVW\_DNET\_Descriptions.ParContentUnit] within the PLC program.

### 8.3 Digital Inputs and VFD status

In this screen, Digital Inputs as well as VFD status can also be ready



**Figure 8.2** – DI status indication screen.

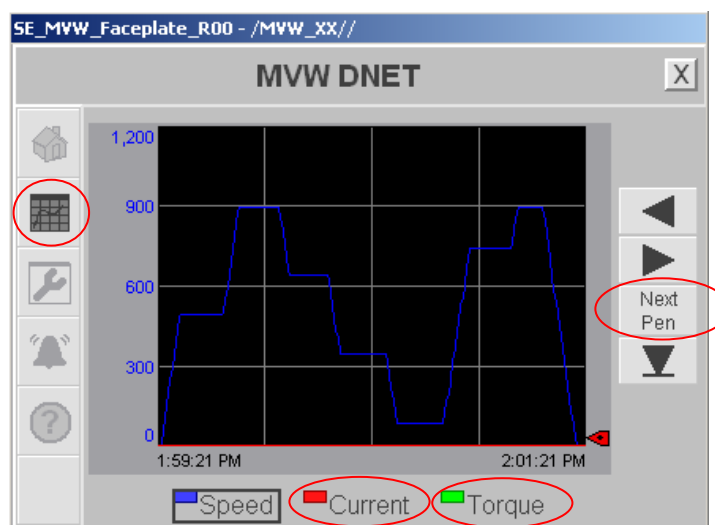


#### NOTE!

The name of digital inputs is configured in [BoosterPump\_Descriptions.DIsName] within the PLC program.

### 8.4 Trends

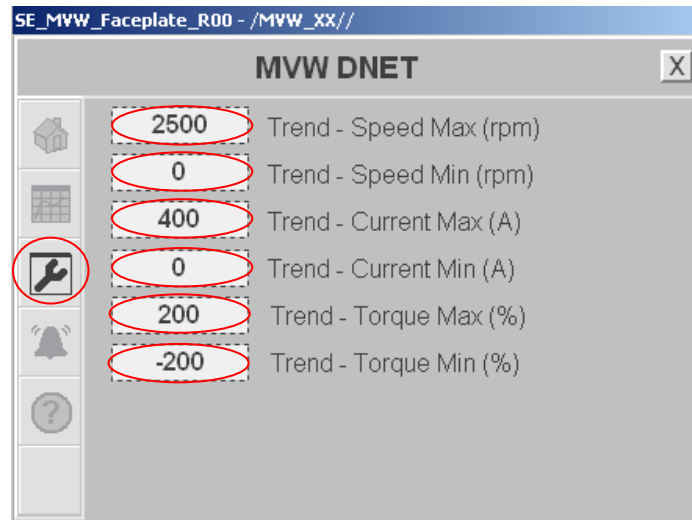
This screen is used to ready analog values as speed, current and torque



**Figure 8.3** – Screen of trends of the variable

## 8.5 Configuration screen

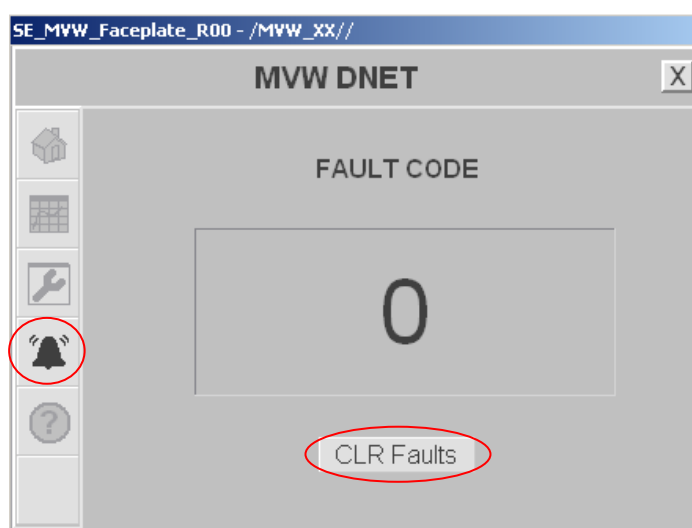
At the configuration screen the maximum and minimum values for the trends can be adjusted



**Figure 8.4** – Minimum and maximum limits

## 8.6 Alarm screen

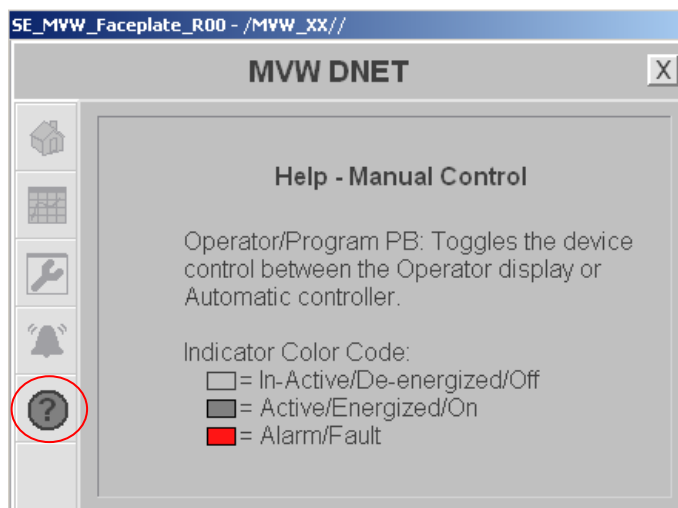
At the Alarm screen is possible to ready the VFD fault code as well as send the command to reset fault



**Figure 8.5** – Alarm indication screen and reset.

## 8.7 Help screen

In the help screen, it is possible to check the manual control and color coding information



**Figure 8.5 – Help screen.**



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