

**QUICK  
START  
MANUAL  
FOR**

**IDEC - MODBUS  
Converter**

Thank you for purchasing Idec-Modbus Converter product from **IDEC**. Idec-Modbus Converter Product is versatile protocol converter / Data sharer with Windows based configuration Software.

This manual will help you to **safely** install, configure and operate Idec-Modbus Converter Products.

**All the safety warnings and precautions must be followed to ensure proper unit performance and personal safety.**

Warnings used in this manual:

**DANGER**



Danger Warnings are used to indicate situations, locations and conditions that can cause serious injury or death.

**CAUTION**



Caution Warnings are used to indicate situations and conditions that can cause operator injury and/or unit damage

#### **IMPORTANT**

**Idec-Modbus Converter Series Products are intended to be protocol converters / Data sharer device, to work with PLCs, Inverters or any device having serial port with any protocol. Which actually allows sharing data between different devices with different or similar communication protocols. Also it can take control actions on request of device being connected. It is assumed that the user is well acquainted with the PLCs / Inverters / Controllers being used. Any mechanical or electrical modification to this unit will void all warranties.**

We hope that you find this manual informative. If additional information or technical assistance is needed please contact:

**IDEC Corporation  
1175 Elko Drive,  
Sunnyvale, CA 94089  
Tel : 1-800-262-4332  
Fax :1-800-635-6246  
Web : [www.idec.com](http://www.idec.com)**

**Manual Revisions:**

If you contact us in reference to this manual, please include the following revision number

**Name** : Idec-Modbus Converter Operation Manual

**Revision** : QMAN\GWY\1001\Rev0

## Table of Contents

<b>Preliminary</b> .....	<b>i</b>
<b>Contents</b> .....	<b>ii</b>
<b>1.0 Introduction</b> .....	<b>1-1</b>
1.1 Purpose of this manual.....	1-1
1.2 Introduction to Idec-Modbus Converter.....	1-1
1.3 Idec-Modbus Converter Specifications.....	1-2
<b>2.0 Hardware</b> .....	<b>2-1</b>
2.1 Mounting.....	2-1
2.2 Power Requirements.....	2-2
2.3 Communication Ports.....	2-3
<b>3.0 Getting Started</b> .....	<b>3-1</b>
3.1 Introduction.....	3-1
3.2 Project – Devices, Reg. Address and Blocks.....	3-1
3.3 Device Communications.....	3-2
<b>4.0 Understanding Idec-Modbus Converter Features</b>	
4.1 Repeat Cycle .....	4-1
4.2 Control Word.....	4-3
4.3 Error Indication Bit.....	4-5
4.4 Selectable Baud rate.....	4-7
4.5 LEDs for Communication Status.....	4-8
<b>5.0 Configuration Software</b> .....	<b>5-1</b>
<b>6.0 How Do I Start?</b> .....	<b>6-1</b>

## **Introduction**

In this chapter. . . .

- Purpose of this Manual
- Introduction to Idec-Modbus Converter
- Idec-Modbus Converter Specifications

## 1.1 Purpose of this Manual

**The intention of this Operation Manual is to provide a guide for Safe installation, Configuration and operation of Idec-Modbus Converter series models.**

*Read this operation manual thoroughly before installing and operating Idec-Modbus Converter.*

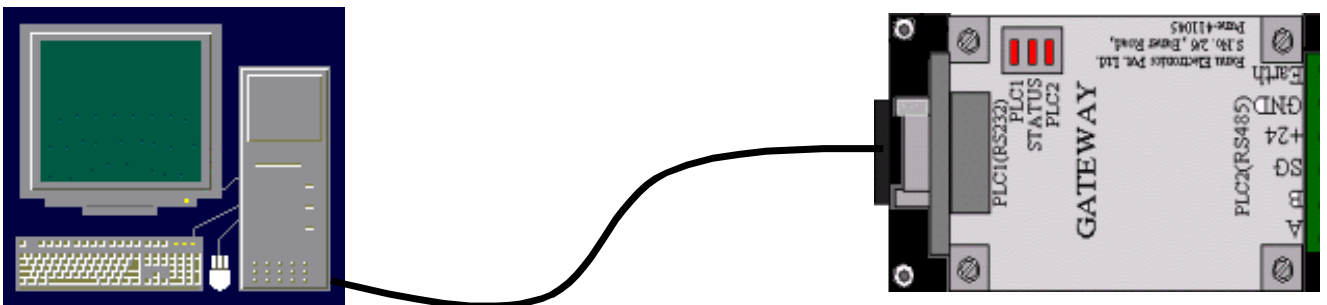
*This document is based on information available at the time of its publication. While efforts have been made to be accurate, the information in this document may not cover all the details or variations in hardware or software. Features described herein may not be present in all hardware. IDEC reserves the right to update information in this publication without prior notice.*

## 1.2 Introduction to Idec-Modbus Converter

Idec-Modbus Converter Series protocol converters provide interface between different devices having different or same communication protocol. Idec-Modbus Converter communicates with your PLCs / Inverters / Controllers using RS-232 or RS485 serial communication. This unit takes power from PLC on their PLC port.

### **Configuration of Idec-Modbus Converter :**

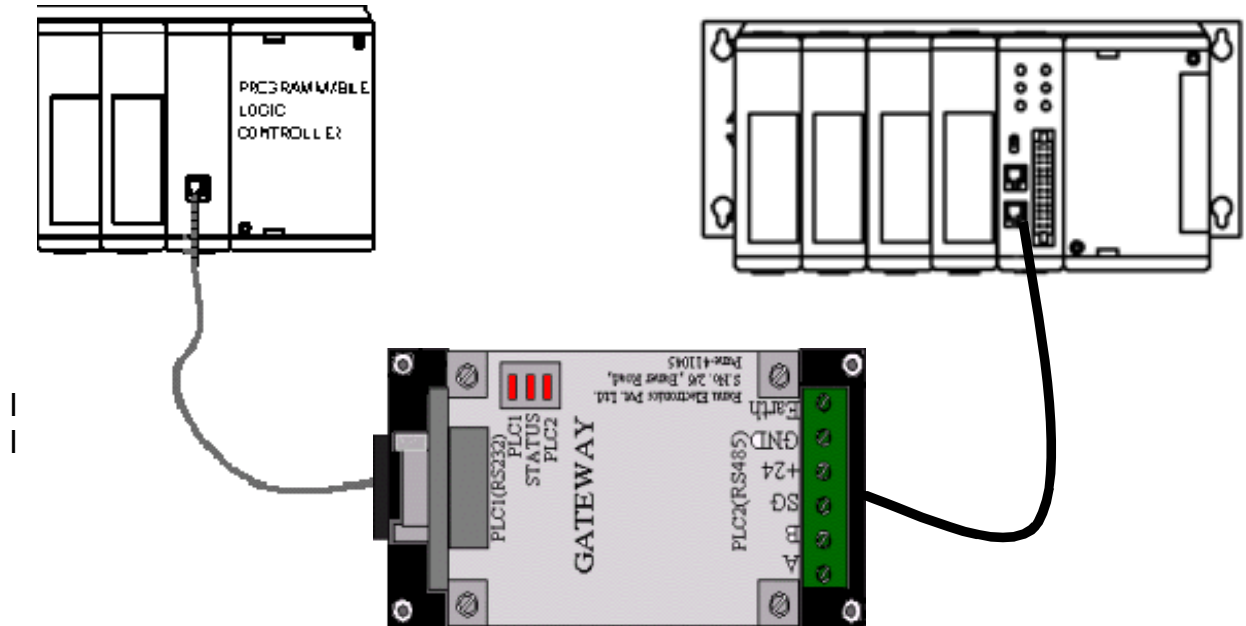
Each Idec-Modbus Converter has to be configured using Windows based configuration Software before connecting it to the PLC.



**Normal Operation:**

IDEC Side

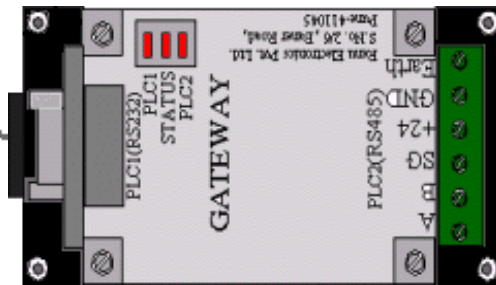
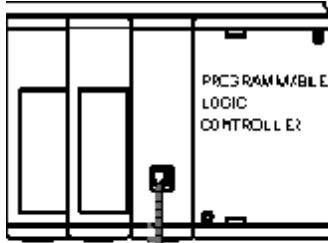
MODBUS Side



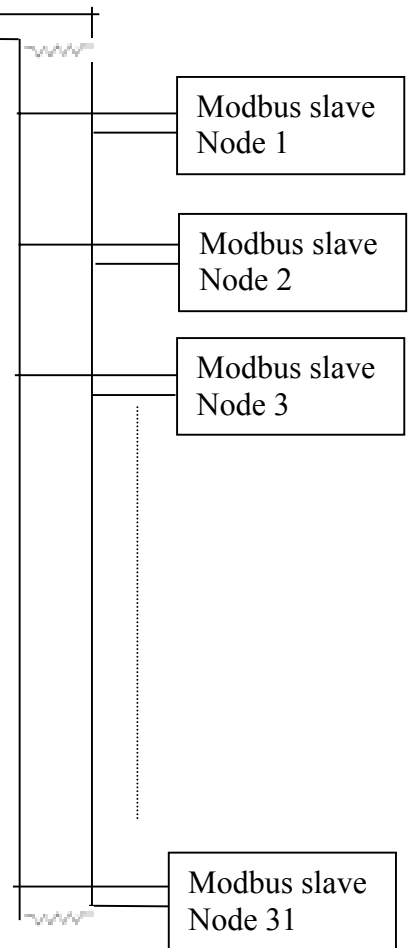
Connect correct Idec-Modbus Converter to PLC cables on both communication ports and your Idec-Modbus Converter is running.

**Application:**

**IDECC PLC**



**Modbus slave Devices  
in multidroping  
mode.**



### **1.3 Idec-Modbus Converter Specifications**

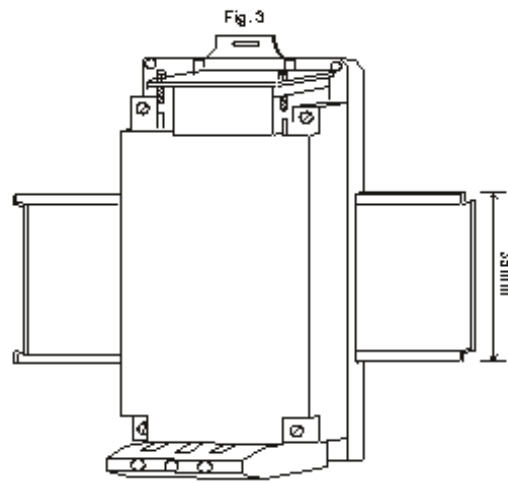
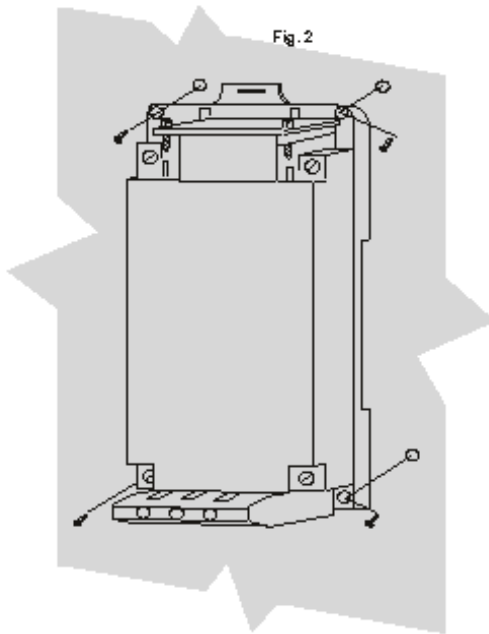
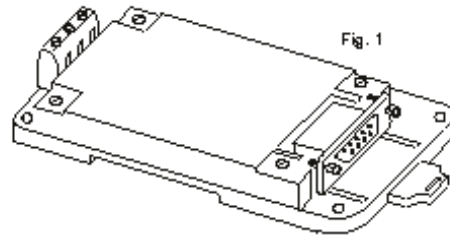
Power Supply	: 24 VDC +/- 5 % (50 ma MAX.) No Fuse inside. 5 VDC +/- 5 % FROM PLC (75 ma MAX.)
Communication	: Two ports as follows: Com 1: RS 232C For configuration and PLC communication Com 2: RS 485 For Modbus PLC communication
Indications	: IDEC STATUS LED MODBUS
Temperature	: Operating: 0 to 60 °C Storage: - 40 to 90 °C
Humidity	: 10% to 90% (Non condensing)
Immunity to ESD	: Level 3 as per IEC1000-4-2
Immunity to Transients	: Level 3 as per IEC1000-4-4
Radiated Susceptibility	: Level 3 as per IEC1000-4-3
Emissions	: EN55011 CISPR A
Dimensions	: 97mm(W) X 15.mm (H) X 42mm(D) (DIN RAIL mounting)

## **Hardware**

In This Chapter. . .

- Mounting, Panel Cutouts
- Power Requirements
- Communication ports

## 2.1 Mounting



## 2.2 Power Requirements

Idec-Modbus Converter is DC powered. Power is supplied from the PLC port cable and the supply voltage range is +5VDC + 5%. Make sure to check PLC power before connecting cable to Idec-Modbus Converter.

Please note that, Idec-Modbus Converter is not Fused internally. Fuse should be connected from outside wherever required.



All the Idec-Modbus products are housed in a molded ABS plastic case which eliminates any electrical shock hazard. Hence Safety Earth is not required to be connected to the chassis of the unit.



The DC ground is not directly coupled to Earth ground internally. The unit is designed to operate properly whether or not the DC ground is connected to the Earth ground. We do recommend, however, that if the DC ground has to be connected to the Earth ground, the Earth connection should be made to a central star point as poor site earths can introduce noise into a system.



Do not power Idec-Modbus and inductive loads with the same power supply even though there is enough immunity in the Idec-Modbus to withstand the transients present on these lines. Avoid using power supplies with large capacitive outputs, which may cause problems if power is cycled within a short time period.



If wiring is to be exposed to lightening or surges, use appropriate surge suppression devices.



Keep AC, high energy and rapidly switching DC wiring separate from signal wires.



Connecting high voltages or AC power mains to the DC input will make Idec-Modbus unusable and may create an electrical shock hazard to personnel. Such a failure or shock could result in serious personal injury, loss of life and/or equipment damage. DC voltage sources should provide proper isolation from main AC power and similar hazards.

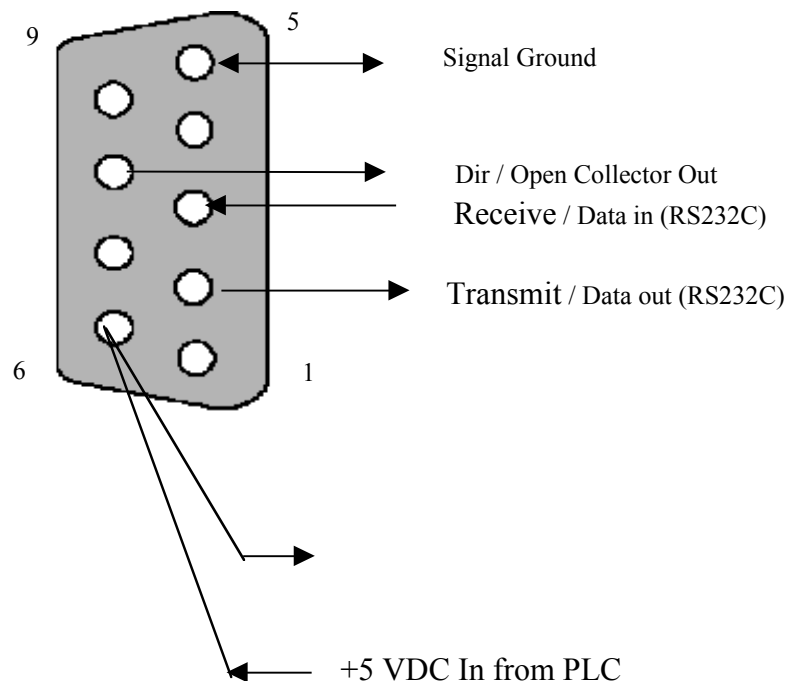
### 2.3 Communication ports

Each Idec-Modbus Converter unit has two communication ports . Description of each is given in following topics.

➤ Com port1:

This port is RS232C port and is used for configuration of Idec-Modbus Converter. Same port can be used for PLC communication after proper configuration.

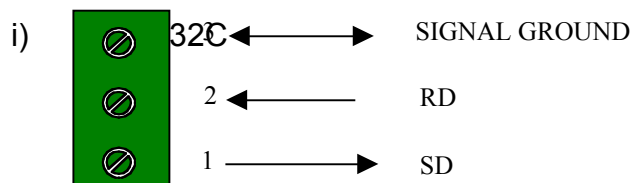
This port is used to download the firmware, Drivers and / or Project in to the Idec-Modbus Converter unit. As the same port is used for PLC communication, when Idec-Modbus Converter is communicating with a PC for programming, PLC operations are suspended. Pin description of this Port is given below:



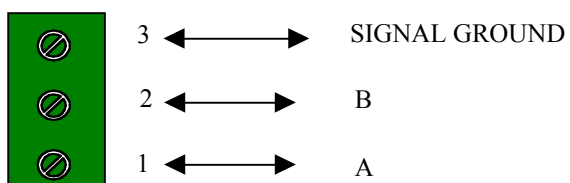
➤ Com port2:

This port is RS232C or RS485 (2 wire) depending upon ordering information and is used for PLC communication.

[II] For Idec-Modbus Converter



ii) RS485



## **Getting Started**

In this chapter....

- Introduction
- Project – Devices, Register Address and Blocks,
- Device communication

### **3.1 Introduction**

Idec-Modbus Converter is a Protocol Converter / Data sharer for devices like PLCs, inverters, Controllers. Idec-Modbus Converter has two serial ports that connect with two different devices. These devices share data between themselves through Idec-Modbus Converter. Idec-Modbus Converter communicates with a device to get the information required by the device connected on the other port. The device that requires data is called Destination Device and the device that provides data is call Source Device. Information could be the value of a PLC register or the status of a PLC coil or Command from Source Device to Destination Device. Data flow through Idec-Modbus Converter, which is controlled by the project, can be unidirectional as well as bi-directional.

### **3.2 Project – PLCs, Register Address, Blocks,**

Microsoft Windows based configuration software, Idec-Modbus Converter Setup, helps user to configure Idec-Modbus Converter unit. `Configuration' means making the Idec-Modbus Converter unit work as per the system requirements. For example, Idec-Modbus Converter can be configured to transfer data between two devices by execution of blocks. The complete configuration for a unit is termed as `Project'. Project comprises of device names, Register addresses, Conditions for block execution etc.

Each register in a device memory has a unique address and this address can be directly used in Idec-Modbus Converter project.

Each action to be taken by Idec-Modbus Converter, which is configured in a Project, is known as a Block. Block may contain information like, copy number of Words, Bits etc from Source device to Destination device.

After the Project is defined, Drivers for defined devices and Project should be downloaded. Idec-Modbus Converter now communicates with the connected devices and transfers data between them.

### **3.3 Device communication**

Idec-Modbus Converter can communicate with any device without any change in the Idec-Modbus Converter hardware. To communicate with a device, Idec-Modbus Converter needs:

1. Communication Drivers for the devices

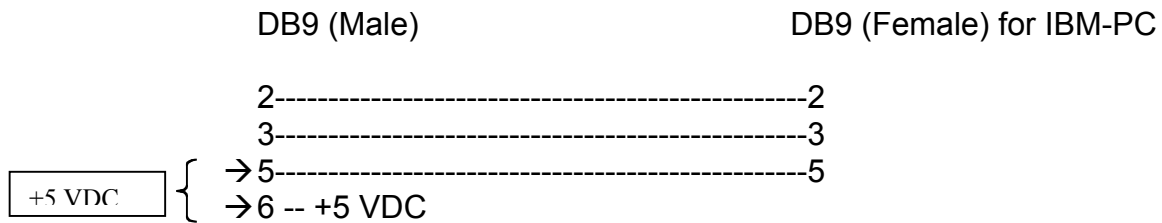
- 2. Idec-Modbus Converter – IBM PC communication cable for Configuration
- 3. Idec-Modbus Converter - device communication cables

1. Communication Drivers for the devices:

Each device has a pre-defined protocol for communication. Communication driver varies from device to device. Idec-Modbus Converter requires two drivers for communication, as two devices are connected for data sharing. These Communication Drivers are downloaded in to Idec-Modbus Converter. These drivers enable Idec-Modbus Converter to talk with devices.

2. Idec-Modbus Converter – IBM PC communication cable for Configuration:

For Idec-Modbus Converter to communicate properly with external Device, It should be configure for that device as per system requirement. For downloading Configuration/project, drivers, etc., Idec-Modbus Converter needs on Configuration cable (IBM Cable). Pin-outs for that cable are as follows.



3. Idec-Modbus Converter - device Communication Cable:

Proper Idec-Modbus Converter - device cable is required for error free communication with any device.

## **Idec-Modbus Converter Features**

In this chapter....

- Repeat Cycle
- Control Word
- Error Indication Bit
- Selectable Baud rate
- LEDs for Communication Status

## 4.1 Repeat Cycle

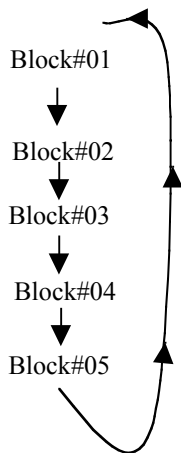
User can control Block execution by using Repeat Cycle. Priority of Block execution is decided by means of Repeat Cycle. Range for Repeat Cycle is 1-99.

Repeat Cycle = 1 ..... Highest priority

Repeat Cycle =99 .....Lowest priority

Normally, Blocks are executed in step by step fashion. Eg. If 5 Blocks are defined in a project with Repeat cycle = 1, then Idec-Modbus Converter executes blocks in following fashion.

Block execution starts with Block#01, then Block#02, ... Block#5 and again Block#01



Execution of all the Blocks from Block#01 to Block#05 is treated as one cycle.

In above example

1. If Repeat Cycle =1 for every block except Block#04 which has Repeat Cycle =03  
All the Blocks will be executed once after power-up.  
Block#04 will be skipped for next 2 cycles.

Repeat Cycle 1 means Block will be skipped for 0 cycle means No skipping.

Repeat Cycle 2 means Block will be skipped for 1 cycles.

Repeat Cycle 3 means Block will be skipped for 2 cycles.

This is explained below.

1. In first cycle all blocks will be executed ....  
Block#01,02,03,04,05
2. *In 2nd cycle only 4 blocks will be executed* ....  
*....Block#01,02,03,05*
3. *In 3rd cycle only 4 blocks will be executed* ....  
*Block#01,02,03,,05*
4. In 4th cycle all blocks will be executed ....  
Block#01,02,03,04,05
5. *In 5 th cycle only 4 blocks will be executed* ....  
*....Block#01,02,03,05*
6. *In 6th cycle only 4 blocks will be executed* ....  
*Block#01,02,03,,05*
7. In 7th cycle all blocks will be executed ....  
Block#01,02,03,04,05

## 4.2 Control Word

Another way of controlling Block execution is use of Control Word. This feature is extremely useful for small applications where less than 17 blocks are required. Control Word can be enable or disable while configuration of Idec-Modbus Converter using Configuration Software. Normally Control Word is disable. It can enable just by clicking on check box in setup software. Control Word can be chosen from any of the Device connected.

When Control Word is disable Block execution is totally control by Repeat Cycle. But Repeat Cycle can only decides priority. Blocks, which are more important for process has to be, assigned high priority and those, which are less important for process has to be, assigned low priority.

When Control Word is enable Block execution is controlled using discrete bits of that word,

Bit0 in control word controls execution of Block 1  
Bit1 in control word controls execution of Block 2  
Bit2 in control word controls execution of Block 3  
Bit3 in control word controls execution of Block 4  
Bit4 in control word controls execution of Block 5

.  
. .  
. .  
. .

Bit15 in control word controls execution of Block 16

Bit = OFF will stop execution of block

Bit = ON will enable execution of block

This feature allows user to execute block in Idec-Modbus Converter whenever required, from outside. This avoids unnecessary execution of block and results in improvement of speed.

### **4.3 Error Indication Bit**

This feature enables user to detect communication break, wire faults, Device power fail etc. at both ends of Idec-Modbus Converter. This is physical bit present in external device connected to Idec-Modbus Converter. Fault at com1 end is reported to com2 Device and fault at com2 end is reported to com1 Device by setting the bit in external device (Idec-Modbus Converter sets this bit when error occurs).

Error indication bit can be enable or disable while configuration of Idec-Modbus Converter using Configuration Software. Normally Error indication bit is disable. It can enable just by clicking on check box in setup software. Error indication bit can be enabled or disable in any of the Device connected to Idec-Modbus Converter.

Normally this bit is “OFF”, in case of abnormality in communication. This bit is set to “ON” by Idec-Modbus Converter, so that external device can know the problem. This useful to operator to take necessary action and avoid production losses.

### **4.4 Selectable Communication Parameters**

Normally Idec-Modbus Converter communicates with external devices with there default Communication Parameters. Selectable Communication Parameters for Communication Ports is very useful feature in Idec-Modbus Converter, which allows user to change Baud rate, no. of stop bits, Parity etc. at any time without downloading Driver for that particular Device. Once you downloaded the driver for the external Device, you can change Communication Parameter, just by selecting new communication parameters and downloading the same project.

### **4.5 LEDs for Communication Status**

Idec-Modbus Converter has 3 LEDs on topside, which are useful for user to see communication status and Idec-Modbus Converter mode.

**IDEC LED**

Blinking of this LED indicates Communication is happening with IDEC Device.

If IDEC LED is not blinking then it indicates that, IDEC Device is not responding, no power to IDEC Device or Communication Cable Fault. This may also happen in case of invalid baud rate or Communication Parameters.

**OK LED**

When Configuration Cable is connected, and power is applied to Idec-Modbus Converter, this led will blink at fast rate, indicates that Idec-Modbus Converter is ready for configuration.

When proper PLC-Idec-Modbus Converter Cable is connected and power is applied to Idec-Modbus Converter, and if external Device is not responding or power is not applied to external Device or Communication cable is faulty, then this LED will blink at slow rate.

This LED will light on steady, when proper communication happens between Idec-Modbus Converter and external Device.

**MODBUS LED**

Slow blinking of this LED indicates Idec-Modbus Converter is trying to Communicate with MODBUS Device and device is not responding, no power to MODBUS Device or Communication Cable Fault. This may also happen in case of invalid baud rate or Communication Parameters.

Fast blinking indicates that, Communication is happening with MODBUS Device.

## Configuration Software

Each Idec-Modbus Converter has to be configured using Windows based configuration Software before connecting it to the PLC.

Configuration includes.

1. Create a new project
  - Select protocols both communication ports of Idec-Modbus Converter.
  - Create a blocks for data to be shared.
  - Set Communication Parameters.
  - Set Control Word.
  - Set Error Indication Bit, etc.
2. Downloading.
  - Download Project
  - Download new firmware if required (For upgradation )
  - Download new drivers (For different protocols)

If Devices to be connected to IDEC-MODBUS CONVERTER are specified while ordering, Downloading firmware and drivers is not needed. Firmware & drivers are already downloaded while shipment.

3. Upload Project.  
Existing project in the Idec-Modbus Converter module can be seen.
4. Upload System Data.  
This option enable user to see versions and status of firmware, drivers, and boot block.

### How Do I Start?

User should follow the given sequence to configure and use any Idec-Modbus Converter unit.

1. Install IDEC-MODBUS CONVERTER Setup Software.
2. Create Idec-Modbus Converter Project.
3. Connect IBM cable and power.
4. Download project in Idec-Modbus Converter unit.
5. Now connect correct cables between external devices(PLCs, inverters etc.) and Idec-Modbus Converter.