

APEX

DNP3 Device

Manual

The APEX DNP3 device is designed to comply with the regulations of PUCs (Public Utility Companies - energy utilities) which require a remote management interface for distributed renewable energy generators.



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1. INTRODUCTION

The APEX DNP3 device is designed to comply with the regulations of PUCs (Public Utility Companies - energy utilities) which require a remote management interface for distributed renewable energy generators.

DNP3 monitoring and control for medium and large commercial applications:

- Monitor and control your PV plant over DNP3 protocol
- Complies with City of Cape Town requirements

1.1 DEVICE DOCUMENTATION

Apex DNP3 Device documentation includes this manual, its datasheet and the warranty terms.

All latest version documents can be downloaded from www.ApexSolar.Tech.

1.2 ABOUT THIS MANUAL

This manual describes the correct use and features of the Apex DNP3 Device. It includes technical data as well as user instructions and specifications to provide information about its correct functioning.

This document is subject to regular updates.

The contents of this manual might change partially or completely, and it is the responsibility of the user to make sure that they are using the latest version which is available at www.ApexSolar.Tech

Apex reserves the right to modify the manual without prior notice.

2. SAFETY WARNINGS

Please read and follow all the below safety instructions and precautions before installation and use of the Apex DNP3 Device.

2.1 SYMBOLS

The following symbols are used in this manual to highlight and emphasize important information.

The general meanings of the symbols used in the manual, and those present on the device, are as follows:



General Caution



Prohibited



General Electrical Hazard



Direct Current



Information



Reinforced Insulation

2.2 PURPOSE

These safety instructions are intended to highlight risks and dangers of improper installation, commissioning and use of the DNP3 Device.

2.3 TRANSPORT DAMAGE CHECK

Immediately after receiving the package, make sure that the packaging and the device have no signs of damage. If the packaging shows any sign of damage or impact, damage of the DNP3 Device should be suspected and it should not be installed. If this occurs, please contact Apex customer service.

2.4 STAFF

This system should be installed, handled and replaced solely by qualified personnel.

Qualification of the staff mentioned herein must meet all the safety-related standards, regulations, and legislation applicable to the installation and operation of this system in the country concerned.

2.5 GENERAL HAZARDS RESULTING FROM NON-COMPLIANCE WITH SAFETY STANDARDS

The technology employed in the manufacturing of the Apex DNP3 Device helps to ensure safe handling and operation.

Nonetheless, the system might pose hazards if it is used by unqualified staff, incorrectly installed or handled in a way that is not specified in this user manual.

Any person in charge of the installation, commissioning, maintenance, or replacement of an Apex DNP3 Device must first read and understand this user manual, especially the safety recommendations and shall be trained to do so.

2.5 SPECIAL HAZARDS

The Apex DNP3 device is designed to form part of a commercial electrical installation. Applicable safety measures must be observed, and any additional safety requirements should be specified by the company who has installed or configured the system.

The responsibility to select qualified staff lies with the company that the staff work for. It is also the responsibility of the company to assess the ability of the worker to carry out any kind of work and ensure their safety. Staff must comply with workplace health and safety regulations. It is the responsibility of the company to provide their staff with the training necessary for handling electrical devices and to make sure that they familiarize themselves with the contents of this user manual.

Dangerous voltages may be present in the system and any physical contact could cause serious injury or death. Please ensure that all covers are securely fastened and that only qualified staff service the Apex DNP3 device. Ensure that the system is switched off and disconnected during handling.

2.7 LEGAL / COMPLIANCE

ALTERATIONS

It is strictly prohibited to carry out any alteration or modification to the Apex DNP3 Device or any of its accessories.

OPERATION

The person in charge of handling the electrical device is responsible for the safety of persons and property.

Insulate all the system's power conducting components which could cause injuries while carrying out any work. Confirm that dangerous areas are clearly marked and access is restricted.

Avoid accidental re-connection of the system using signs, isolating locks and closing or blocking the work site. Accidental reconnection may cause serious injuries or death.

Determine conclusively, using a voltmeter, that there is no voltage in the system before commencing work. Check all the terminals to make sure that there is no voltage in the system.

2.8 LOCAL REQUIREMENTS

In all cases, local regulations shall be followed and take preference over this manual or other documents related to the Apex DNP3 device. No part of this manual shall supersede any local laws, bylaws or other regulations. These include but are not limited to: earthing, installation rules, local electrical isolation requirements and so on.

2.9 OTHER CONSIDERATIONS

This device is exclusively designed to manage power flow between energy sources such as the grid, a solar array or a generator and storage via appropriate, approved PCSs and is to be installed in a commercial setting.

The Apex DNP3 device should only be used for this purpose. Apex is not liable for any damages caused by inappropriate installation, use or maintenance of the system.

To ensure safe use, the Apex DNP3 device must only be used in compliance with the instructions in this manual.

Legal and safety regulations must also be adhered to, to ensure correct use

3. DEVICE DESCRIPTION

3.1 TECHNICAL SPECIFICATIONS

Parameter	Value
Dimensions	60mm (l) x 60mm (w) x 30mm (h)
Mounting Method	Surface Mounted
Ingress Protection	IP20
Power Supply	230Vac 50Hz
Comms	TCIP over Ethernet/wifi
	Modbus over RS485/UART-TTL
Remote Monitoring and Control	Via MLT Portal

3.2 COMPATIBLE EQUIPMENT:

Equipment Types	Compatible Products
PV Inverters*	Huawei
	Goodwe
	Solis
	SMA
	Sungrow
	Ingeteam
	Schneider
	Deye
	Sunsynk
3rd Party Controllers*	Meteocontrol Bluelog
	Solar-Log

*Other Types On Request

Power Meters*	Lovato DMG110
	Schneider PM3255
	Socomec Diris A10
	Janitza UMG104

*Other Types On Request

3.3 OVERVIEW AND DESCRIPTION

The front of the Apex DNP3 device has a connector for RS485, labelled as follows:

Terminal Label	Function
G	Ground
B	RS485 "B"
A	RS485 "A"
T	Termination - bridge to "A" to terminate the bus

Next to the terminals is a barrel socket for the 5V power supply required to run the device.



On the rear side, there is an ethernet connector for the internet connection as well as connectivity to Modbus TCP field / slave devices.

There is also a USB port which is not used.



FUNCTIONALITY

The DNP3 device is designed for management and control of hardware at site level. It provides the required reporting and control required by your PUC.

The following table describes some of the primary features and functions:

Site Type	Available Logic
Grid and PV only	DNP3 communication to PUC

4. INSTALLATION

4.1 CONTENTS OF THE BOX

Inside the box you should find:

- 1 x Apex DNP3 device.
- 1 x 230V AC - 5V DC power supply.

4.2 TOOLS REQUIRED

- Appropriate tool for your choice for fastener to secure the DNP3 device to the selected surface.
- Flat screwdriver no wider than 2mm.
- Laptop and network cable for troubleshooting.

4.3 PLANNING THE INSTALLATION

LOCATION

The Apex DNP3 device may only be installed indoors and must be protected from moisture, excessive dust, corrosion and humidity. It should never be installed in any location where a potential water leak could occur.

MOUNTING THE DNP3 DEVICE

The DNP3 device enclosure provides four mounting tabs with holes of 4mm diameter for your choice of mounting screws or bolts. The DNP3 device should be fixed onto a firm surface.

WIRING OF THE DNP3 DEVICE

Each side of the DNP3 device has a row of connectors. These are used for connecting both the measurement signals and the communications, as follows:



Device power:

The DNP3 device is powered from 230V via the included power supply.



Network:

The device can connect to a standard 100 base-T Ethernet network for communication with MODBUS TCP equipped slave devices and for remote system monitoring, using a standard RJ45 connector. For remote monitoring and DNP3 control, the network requires transparent internet connectivity and a DHCP server.

RS485:

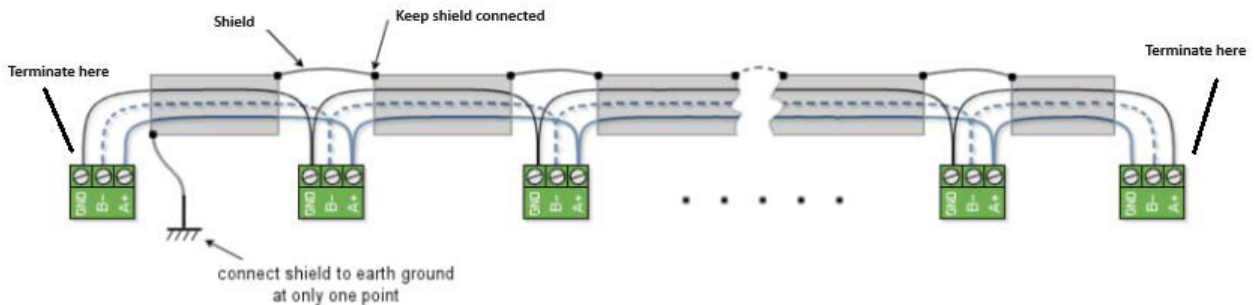
For field equipment requiring Modbus RS485 communications, the DNP3 device is equipped with 1 RS485 interface and becomes the master on the bus. This port is optionally terminated using an onboard resistor, so the device may be installed either at the end of the bus or not. To enable the termination, connect a small jumper between the T and A terminals.

Terminal Label	Function
G	Ground
B	RS485 "B"
A	RS485 "A"
T	Termination - bridge to "A" to terminate the bus

Communications wiring:

RS485 connections must be done with a high quality shielded twisted pair communications cable.

Please follow this diagram to ensure that your RS485 bus is correctly laid out and terminated.



5. COMMISSIONING AND OPERATION

5.1 POWERING UP FOR THE FIRST TIME

Check your work.

Ensure the device is connected to internet via ethernet.

Apply power.

5.2 STARTUP SEQUENCE

On first start-up with the LAN connected, you should see the link lights indicating connection and activity on the LAN port LEDs.

The Apex DNP3 device requires our engineers to configure the device for you once it has been connected into your site and has a transparent internet connection. With this in place, you may now proceed to commissioning with remote support from Rubicon. When ready, please contact the Rubicon engineer assigned to your project.

6. CLEANING AND MAINTENANCE

Cleaning and maintenance should only be carried out with the Apex DNP3 device disconnected from any supplies. Before taking any action, make sure that the system has been correctly isolated by opening the electrical isolators. To clean the DNP3 device, wipe the exterior surface with a damp (not wet) soft, non-abrasive cloth. Pay attention to the cooling slots and any dust build-up thereon which may affect the ability of the DNP3 device to dissipate heat generated.

Do not try to repair the device yourself in case of any malfunction. If the need arises, contact Apex customer service. The system does not require any special maintenance, except for standard physical cleaning to ensure good air flow and the maintenance required by any electrical device connected with terminals that need to be tightened.

7. ORDERING INFORMATION

Part Number	Description
FG-ED-OO	APEX Edge Monitoring and Control Device
FG-ED-LT	APEX LTE add-on module
FG-MG-AA	APEX MCS Diesel / PV controller – any size
FG-MG-xx	APEX DNP3 add-on license for MCS
FG-MG-AB	APEX Diesel / PV / Battery – up to 250kw AC
FG-MG-AE	APEX Diesel / PV / Battery – 251kw AC and up
FG-MG-AC	APEX Standard DNP3 controller
FG-MG-AF	APEX Diesel / PV controller “LITE” up to 250kw

8. WARRANTY

The Apex DNP3 device is warranted to be free from defects for a period of 2 years from purchase, subject to Apex's Warranty terms and conditions, a copy of which is available at www.apexsolar.tech

9. SUPPORT

You can contact our support centre for technical assistance with this product or the associated services.

9.1 PRODUCT SUPPORT

When contacting Product Support via telephone or email please provide the following information for the fastest possible service:

- Type of Inverters connected
- Serial numbers
- Communications type used
- Single line diagram of the installation
- A description of the event or problem
- DNP3 device serial number (available on product label)

9.2 CONTACT DETAILS

Telephone: +27 (0) 80 782 4266
Online: <https://www.rubiconsa.com/pages/support>
Email: support@rubiconsa.com
Address: Rubicon SA
1B Hansen Close,
Richmond Park,
Cape Town,
South Africa

You can reach technical support by telephone directly Monday to Friday between 08h00 and 17h00 (GMT +2 hours). Queries outside of these hours should be directed to support@rubiconsa.com and will be answered at the earliest opportunity. When contacting technical support, please ensure that you have the above listed information available.
