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Schneider Electric Industries SAS

Headquarters

89, bd Franklin Roosevelt
F - 92506 Rueil Malmaison Cedex

http://www.schneider-electric.com

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Magelis XBTG

Quick reference guide

a brand of Schneider Electric

Magelis XBTG

Modbus Plus Module

Quick reference guide
Kurzanleitung
Instruction de service
Guía de referencias rápidas
Guida di riferimento rapido

Edition January 2005

Telemecanique

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The hardware products presented in this document are used, for installation and operation, with PL7® software described in the corresponding TLX D• ••• manuals.

Magelis XBTG
Modbus Plus Module
Implementation Manual

english January 2005

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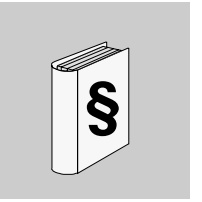
Safety Information



Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation, which, if not avoided, **will result** in death, serious injury, or equipment damage.

⚠ WARNING

WARNING indicates a potentially hazardous situation, which, if not avoided, **can result** in death, serious injury, or equipment damage.

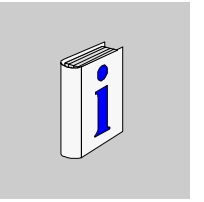
⚠ CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, **can result** in injury or equipment damage.

PLEASE NOTE

Electrical equipment should be serviced only by qualified personnel.
No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material. This document is not intended as an instruction manual for untrained persons.

About the Book



At a Glance

Document Scope

This manual provides information for implementing XBTZGMBP Modbus Plus Modules.
The following table gives the XBTG modules which support the XBTZGMBP Modbus Plus Module:

XBTG2120	XBTG2330	XBTG5230
XBTG2130	XBTG4320	XBTG5330
XBTG2220	XBTG4330	XBTG6330

User Comments

We welcome your comments about this document. You can reach us by e-mail at techpub@schneider-electric.com

Modbus Plus Module Installation

1

At a glance

Subject of this chapter

This chapter includes procedures that must be followed to operate the XBTZGMBP unit correctly and safely. Be sure to read this manual and any related material thoroughly to understand the correct operation and functions of this unit.

What's in this Chapter?

This chapter contains the following topics:

Installation Considerations

Requirements

When installing the module, follow these considerations:

- To protect the unit, to provide accessibility in operation, and to improve ventilation, please ensure that there is adequate space around the unit. The recommended clearance is 10 cm [3.94 in] from other structures.
- Ensure that this unit is located as far away as possible from electromagnetic circuits, circuit breakers, and other equipment that causes arcing (minimum 255 mm [12 in]). Malfunction or communication error can occur.
- The operating temperature range for these modules is 0° to 50°C [32° to 122°F]. If necessary, the enclosure should be heated or cooled to maintain an ambient temperature in this range.
- Route all signal lines in a separate duct, away from power circuits. Use shielded cables and tie the shield to the Frame Ground contact point.
- Please ensure that heat from other equipment does not add heat to this unit.
- Power, Input and Output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods Article 501 4(b) of the National Electrical Code, NFPA 70 and in accordance with the authority having jurisdiction.

Hazardous Location Installations

Responsibility

⚠ DANGER

EXPLOSION HAZARD

Electrical equipment cannot be installed in Division 1 locations unless it is intrinsically safe, installed inside approved explosion-proof enclosures, or installed inside approved purged and pressurized enclosures.

Failure to follow this instruction will result in death, serious injury or equipment damage.

⚠ WARNING

EXPLOSION HAZARD

- Suitable for use in Class I, Division 2, Groups A, B, C, and D hazardous locations or non-hazardous locations only.
- Substitution of components may impair suitability for Class I, Division 2.
- Do not disconnect equipment unless the power has been disconnected or the area is known to be non-hazardous.
- When operating in hazardous locations, disconnect power before replacing or wiring modules.

Failure to follow this instruction can result in death, serious injury or equipment damage.

Schneider Electric designed the Modbus Plus modules to meet Class I, Division 2 Hazardous Location application requirements. Division 2 locations are locations that are normally non-hazardous, but could potentially become hazardous should accidents expose the area to flammable vapors, gases, or combustible dusts.

These modules have been designed as non-incendiary devices. They are not intrinsically safe and should never be operated within a Division 1 (normally hazardous) location when installed as described here. Nor should any peripheral interface device attached to the systems be located within Division 1 locations unless approved and/or certified diode barriers are placed in series with each individual signal and DC power line. Any such installations are beyond the bounds of Schneider Electric design intent. Schneider Electric accepts no responsibility for installation of this equipment or any devices attached to the equipment in Division 1 locations.

It is the customer's responsibility to ensure that the product is properly rated for the location. If the intended location does not presently have a Class, Division, and Group rating, then users should consult the appropriate authorities having jurisdiction to determine the correct rating for that hazardous location.

In accordance with federal, state/provincial, and local regulations, all hazardous location installations should be inspected by the authority having jurisdiction, prior to use. Only technically qualified personnel should install, service, and inspect these systems.

Definitions

The following Class and Division explanations are derived from Article 500 (Sections 5 and 6) of the United States National Fire Protection Agency National Electric Code (NFPA 70, 1990). They are not complete and are included here as a general description for those not familiar with generic hazardous location requirements. People responsible for installing this equipment in hazardous locations are responsible for ensuring that all relevant codes and regulations related to location rating, enclosure, and wiring are met.

Class I Locations

Class I locations are those in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

Class II Locations

Class II locations are those that are, or may become, hazardous because of the presence of combustible dust.

Division 1 Locations

Division 1 locations are those in which flammable or ignitable gases, vapors, or combustible dusts and particles can exist due to the following conditions:

- Normal operating conditions.
- Because of repair, maintenance conditions, leakage, or where mechanical failure or abnormal operation of machinery or equipment might release or cause explosive or ignitable mixtures to be released or produced.
- Combustible dusts of an electrically conductive nature may be present in hazardous quantities.

Note: Schneider Electric systems are not suitable for installation within Division 1 locations.

Note: Electrical equipment cannot be installed in Division 1 locations unless it is intrinsically safe, installed inside approved explosion-proof enclosures, or installed inside approved purged and pressurized enclosures.

Division 2 Locations

Division 2 locations are listed below:

- Class I volatile flammable liquids or flammable gasses are handled, processed, or used, but confined within closed containers or closed systems from which they can escape only in cases of accidental rupture or breakdown of such enclosures or systems, or in case of abnormal operation of equipment.
- Ignitable concentrations of Class I vapors or gasses are normally prevented by positive mechanical ventilation, but which may become hazardous due to mechanical failure of those ventilation systems.
- Location is adjacent to a Division 1 location.
- Class II combustible dust is not normally in the air in quantities sufficient to produce explosive or ignitable mixtures. Dust accumulations are normally insufficient to interfere with normal operation of electrical equipment or other apparatus. Combustible dust may be in suspension in the air as a result of the following: infrequent malfunctioning of handling or processing equipment; combustible dust accumulations on, or in the vicinity of electrical equipment; may be ignitable by abnormal operation or failure of electrical equipment.

Group Ratings

All electrical equipment that is approved for use in hazardous locations must include a group rating. Various flammable and combustible substances are divided into these groups as a function of their individual Maximum Experimental Safe Gap (MESG), explosion pressure, and ignition temperature.

Component temperatures and the potential for spark based upon voltage, current, and circuit characteristics, within electrical equipment, will determine what the equipment group rating will be. A device approved for installation within Class I, Group A locations may also be used in Groups B, C, or D.

Note: Approved Class I equipment may not be suitable for Class II installations. Class I includes Groups A, B, C, and D. Class II includes Groups F and G.

Enclosures

⚠ WARNING

HAZARD OF LOSS OF SEAL

Panel flatness and rigidity are important to maintain a proper panel seal. If you are going to use non-metal type enclosures, such as plastic or fiberglass, install a rigid metal stiffener behind the front panel. Failure to do so may result in an inadequate panel seal due to flexure of the front panel material between the stud mounts.

Failure to follow this instruction can result in death, serious injury , or equipment damage.

The systems are designed to be installed within clean and dry enclosures for both ordinary and hazardous locations. The front panel meets the requirements of UL and CSA Type 4, 4X, and 12 enclosures. The enclosure used for Class I hazardous locations should have a minimum rating of Type 12 (NEMA 12, IP 5X). However, Type 4 (IP 6X) enclosures are strongly recommended.
Requirements for enclosure fittings, conduit, and wiring vary according to the specific rating of the location and the type of flammable or combustible material involved. Those requirements are beyond the scope of this document. It is the customer's responsibility to ensure that the installation is compliant with codes and regulations that apply to the specific location. Reference NFPA 70, Article 500 for specific regulations in the United States.

EMI / EMC Compliance

EMI Compliance

United States FCC Part 15, Subpart B, Class A EMI Compliance Statement: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at the user's expense.

⚠ CAUTION

UNDESIRED RADIO FREQUENCY INTERFERENCE

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Failure to follow this instruction can result in equipment damage.

Electromagnetic Compatibility

⚠ CAUTION

ELECTROMAGNETIC INTERFERENCE

Follow instructions in the Electromagnetic Compatibility section to reduce the possibility of electromagnetic interference from the use of this device.

Failure to follow this instruction can result in equipment damage.

The connection of non-shielded equipment interface cables to this equipment will invalidate FCC EMI and European Union EMC compliance and may result in electromagnetic interference and/or susceptibility levels which are in violation of regulations which apply to the legal operation of this device. It is the responsibility of the system integrator and/or user to apply the following directions that relate to installation and configuration:

All interface cables must include shielded cables. Braid/foil type shields are recommended. Communication cable connectors must be metal, ideally zinc die-cast backshell types, and provide 360-degree protection about the interface wires. The cable shield braid must be terminated directly to the metal connector shell; ground drain wires alone are not adequate.

Protective measures for power and interface cables as described within this manual must be applied. Do not leave cables connected to unused interfaces or disconnected at one end. Changes or modifications to this device not expressly approved by the manufacturer could void the user's authority to operate the equipment.

EMC compliance is, in part, a function of PCB design. Third party add-on AT/XT peripheral PCB assemblies installed within this apparatus may void EMC compliance. FCC/CE compliant PCB assemblies should always be used where possible. Schneider Electric can accept no responsibility for the EMC performance of this apparatus after system integrator/user installation of PCB assemblies not manufactured and/or expressly tested and approved for compliance by Schneider Electric. It is the responsibility of the system integrator/user to ensure that installation and operation of such devices does not void EMC compliance.

XBTZGMBP Module installation

Introduction

The XBTZGMBP module takes mounts to the rear of the XBTG Module.

DANGER

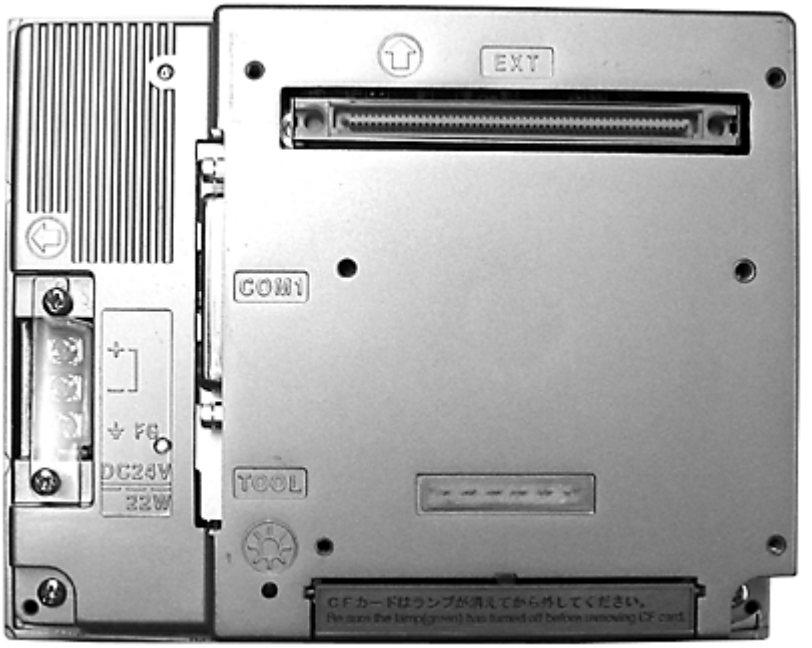
RISK OF ELECTRIC SHOCK OR SHORT CIRCUIT

- Make sure the equipment are powered off.
- Disconnect all power connections.

Failure to follow this instruction will result in death, serious injury or equipment damage.

Illustration

The following illustration (XBTG2230) shows the the connector (EXT) used to connect a XBTZGMBP Module.



Procedure

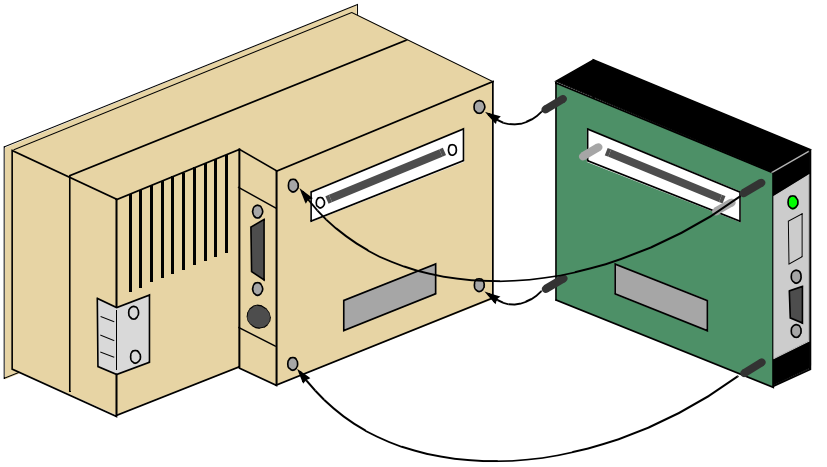
The following procedure describes the different steps to connect a XBTZGMBP Module.

Step	Action
1	Disconnect all power connections.
2	To avoid ESD damage to the modules, make sure that you are grounded.
3	Remove the protective cover from the unit connector port. Note: The above figure shows the unit with the protective cover already removed.
4	If necessary, change the setting on the DIP switch to correctly specify the host unit (see*Configuring XBTZGMBP for XBTG Screen Size, p. 24*).
5	Remove the module from the anti-static bag.
6	Carefully seat the module on the connector of the operator interface (see following illustrations).
7	Secure the module to the operator interface by tightening the four screws (the necessary torque is 0.5 Nm to 0.6 Nm (4.4lb-in to 5.28lb-in).

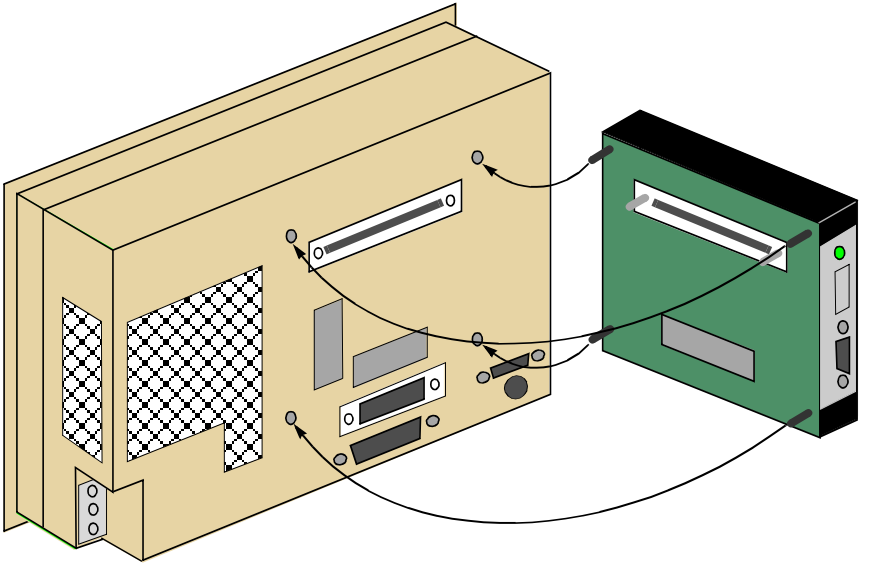
Illustrations

The following illustrations show the XBTZGMBP Module in position on the different XBTG models.

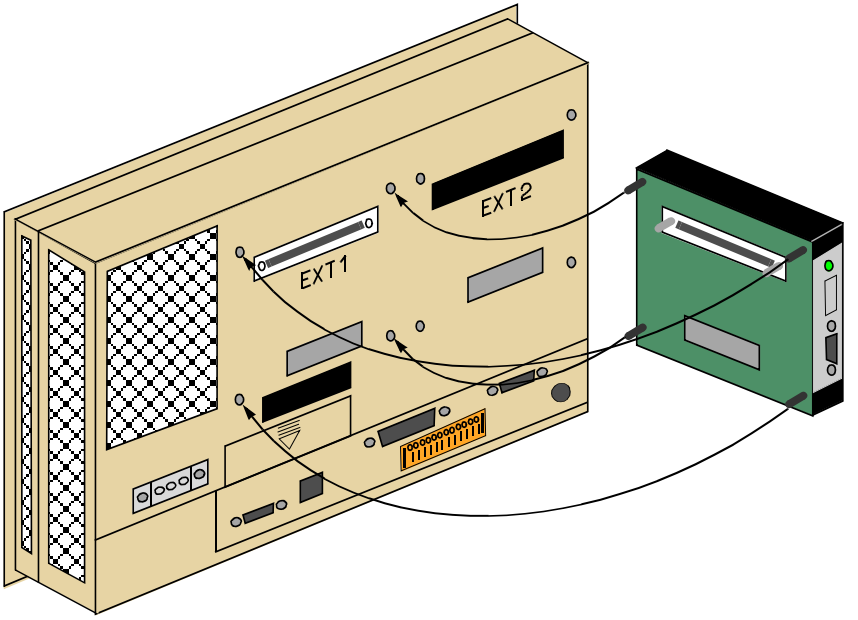
Module in position on XBTG2120, XBTG2130, XBTG2220 and XBTG2330.



Module in position on XBTG4320 and XBTG4330.



Module in position on XBTG5230, XBTG5330 and XBTG6330.



Module Configuration

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At a glance

What's in this Chapter?

This chapter contains the following topics:

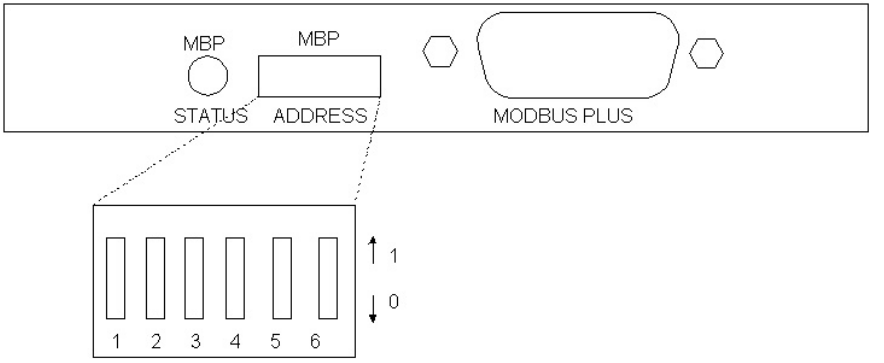
Diagnostic LED

Introduction

The LED is controlled by the on-board processor and displays node status by flashing repetitive patterns.

Illustration

Side View of Module



Description

Diagnostic LED Patterns

Flash Pattern	Diagnosis
6 flashes per second	This node is working normally by receiving and passing the token. All nodes should be flashing this pattern.
1 flash each second	Monitor Link Operation. This node is in the MONITOR_OFFLINE state, where it must monitor the link for 5 seconds, and it is not allowed to transmit any packets out onto the link.
2 flashes every 2 seconds	Never Getting Token. This node is permanently in the MAC_IDLE state. This node hears other nodes on the link pass the token to themselves, but the token is never passed to this node. This node may have a bad transmitter.
3 flashes every 1.7 seconds	Sole Station. This node is not hearing any other nodes, so it is periodically claiming and winning the token, and then finds there is no other node to pass it to. This node may have a bad receiver.
4 flashes every 1.4 seconds	Duplicate Station. This node has heard a valid packet that was duplicate-node-address sent from another node on the link that is using the same link address as this node. This node is now in the DUPLICATE_OFFLINE state where it will remain passively monitoring the link, until the duplicate node is not heard from for 5 seconds.

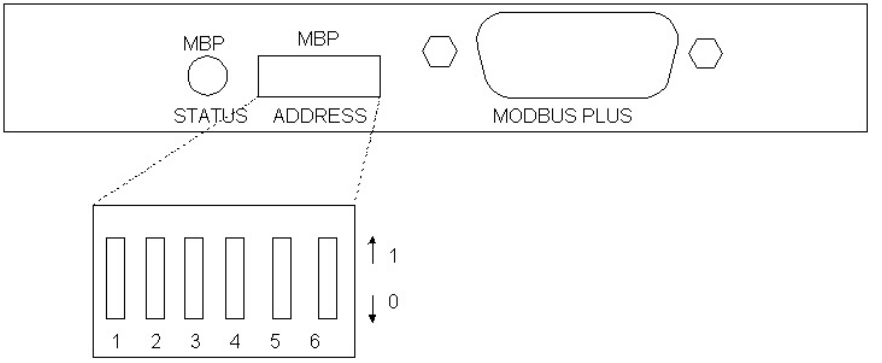
Address Switches

Principle

Each module on a Modbus Plus network must have a unique address in the range from 1 to 64. Use the 6-position switch bank on the side of the module to set the address for your node (see figure below). Refer to the first table and the examples in the second table to set the addresses for your module. To set an address, turn on the combination of switches whose values add up to 1 less than the desired address.

Illustration

Side View of Module



Station Address Switch Values

Switch Number	1	2	3	4	5	6
Switch Value	1	2	4	8	16	32

Examples

Module Address Examples

Switch Settings 1 2 3 4 5 6	**Module Address**
1 0 0 1 1 0	26 (= 1 + 8 + 16 **plus** 1)
0 1 0 1 1 1	59 (= 2 + 8 + 16 + 32 **plus** 1)
1 0 1 0 0 0	6 (= 1 + 4 **plus** 1)

(note that the address is equal to the value set on the switches **plus** 1):

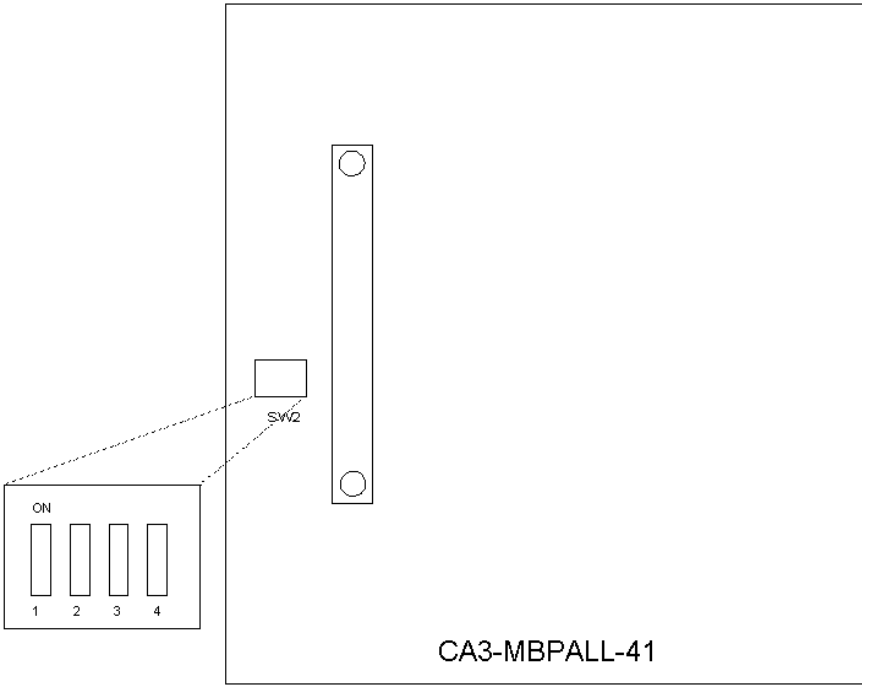
Configuring XBTZGMBP for XBTG Screen Size

Introduction

The XBTZGMBP will work with all XBTG series units, but must be configured to the screen size of the host unit.

Illustration

View of Underside of XBTZGMBP Module, Showing SW2



Procedure

To configure the module for the screen size of the unit to which it will be attached, adjust the switch (SW2) on the underside of the board according to the settings in the following table.

Configuring Screen Size

Switch (Jumpers)	Position/Setting 1	2	3	4	Module	Possible Unit Types
SW2 (1-4)	Off	Off	Off	Off	XBTZGMBP	XBTG4320/4330 XBTG5230/5330 XBTG6330
	Off	On	Off	Off	XBTZGMBP	XBTG2120/2130 XBTG2220/2330