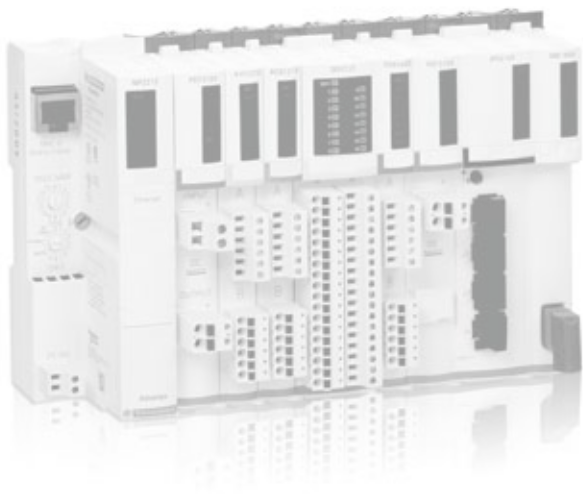


Modicon® STB IP 20 distributed inputs/outputs

Catalog
2010



Schneider
Electric



A full range of catalogs for



Detection



Global Detection Electronic and electromechanical sensors

MKTED208052EN

Photo-electric sensors
Proximity sensors
Capacitive proximity sensors
Ultrasonic sensors
Limit switches
Pressure switches
Rotary encoders
Radio frequency identification
Machine cabling accessories

Automation



Modicon® Quantum™ automation platform Catalog 2009

MKTED208011EN-US

Safety PLCs
Safety CPUs
Unity™ Concept™ and
ProWORX™ software



Modicon® Premium™ automation platform Catalog 2010

MKTED208054EN-US

Unity processors
PL7 processors
Communication software



Modicon® M340™ automation platform Catalog 2010

DIA6ED2081007EN-US

PLCs
Discrete, analog I/O and
application-specific solutions
Communication

Automation



Modicon® Momentum™ distributed I/O and control

MKTED205061EN



Twido® programmable controller and TwidoSuite™ software

DIA3ED2090202EN

Controller base
Discrete, analog I/O
Communication



Automation functions, relays, interfaces and power supplies

MKTED207031EN

Smart relays
Timing relays
Measurement & control relays
Analog interfaces
Counters
Plug-in relays
Interfaces for discrete signals
Power supplies & transformers

Software

PLCs and safety controllers
programming software

Operator dialog



Control and signalling components

MKTED208031EN

Control and signalling units
Control stations & enclosures
Cam switches
Beacons and indicator banks
Pendant control stations
Controllers
Emergency stops
Foot switches



Magelis® Human/Machine Interfaces Catalog 2010

MKTED206071EN-US

Operator interface terminals
Industrial PCs
HMI and SCADA PC-based
software

Software

Vijeo Designer
Operator terminal software

Motion and Drives



Lexium® 32 Servo Drives motion control Catalog 2009/2010

DIA7ED2090405EN-US

Motion controllers
Servo drives and Servo motors
Stepper motors and drives
Integrated drives
Modicon Premium
motion control modules



Soft starters and variable speed drives

MKTED206111EN

Soft starters and variable speed
drives

Software

Software for drives
Motor control programming
software

Not all products shown in this catalog are available in every country. Check individual country's web site or Sales Office for product availability.
See our web site: www.schneider-electric.us/

Schneider
Electric

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.....Automation & Control functions



Motor control



Motor starter solutions Control and protection components

MKTED205103EN

Contactors
Circuit-breakers, fuse carriers
Thermal relays
Combinations, motor controllers
Mounting solutions
Motor starter mounting kits

Machine safety

*This catalog contains
Automation and Control function
products relating to machines
Safety*



Preventa™ Machine Safety Products Catalog 2009

MKTED208051EN-US

Safety PLCs
Safety controllers
Safety monitors
Safety solutions on AS-Interface
cabling system
Safety switches
Safety light curtains
Safety mats
Emergency stops
Control stations
Enabling switches
Foot switches
Beacons & indicator banks
Switch disconnectors
Thermal-magnetic motor circuit
breakers
Enclosed D.O.L. starters

Software

XPSMFWIN configuration
software
XPSMCWIN configuration
software

Interfaces and I/O



Terminal blocks

MKTED207011EN

Terminal blocks
Cable ends



Modicon® STB IP 20 distributed inputs/outputs Catalog 2010

MKTED208053EN-US

Modules for automation station
Network interfaces
Power distribution
Digital I/O, analogs and
application-specific

Software

STB configuration software

Power supplies



Phaseo® power supplies and transformers

DIA3ED2061209EN

Switch mode power supplies
Filtered rectified power supplies
Transformers

Systems & architectures

*This catalog contains
Automation and Control function
products relating to
Communication*



Machine & Installations with industrial communication

MKTED207012EN

Preferred implementations
Ethernet TCP/IP, the universal
communication standard
CANopen for machines and
installations
AS-interface, simple and safe

Products

Human-Machine interface
Controllers and PLCs
Field devices
Infrastructure and wiring
Gateways

Software and tools

Collaborative Automation
Partner Program & Partners

Modicon® STB distributed I/O solution

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Modicon® STB distributed I/O solution

Open and modular system



Introduction

To meet the needs of machine manufacturers and users, automation architectures have been decentralized, while delivering performance comparable to that of centralized systems.

Architectures installed as close to the machine as possible reduce the time and cost of wiring for sensors and actuators, while increasing system availability.

The Modicon® STB distributed I/O solution is an open, modular input/output system and makes it possible to design automation stations managed by a master controller via a bus or communication network. These stations can be used to connect:

- Motor starters
- Variable speed drives
- Magelis® communication terminals HMI
- Approved third-party products via the CANopen bus: Festo®, Parker® valves, FTB IP 67 distributed I/O, ATV variable speed drives, encoders, etc.

Modicon software guides users through the design phase, startup, and maintenance of the system. This single software package covers the Modicon STB, OTB, FTB, and FTM ranges.

These station components are electronic modules mounted on one or more DIN rails. These clusters of modules, known as segments, carry a bus from end to end of each station. The station bus provides power distribution, signal sensing, and power management to compatible modules, in the form of a wiring management system.

The Modicon STB I/O family is divided into 2 groups of modules:

- **Basic modules:** A complete set of low-cost modules and network interfaces, with simplified operating modes.
- **Standard modules:** An extended offer of I/O modules, with additional functions: configurable parameters, extended operating modes.

Both the basic and standard ranges comprise:









- NIM modules: network interfaces
- Power Distribution Modules (PDM) (24 V $\overline{\text{---}}$ and 115/220 V \sim)
- I/O modules:
 - Digital I/O (24 V $\overline{\text{---}}$ and 115/220 V \sim)
 - Analog I/O (10, 12 and 16-bit resolution)
 - Relay outputs (24 V $\overline{\text{---}}$ coil and 24 V $\overline{\text{---}}$ or 115/230 V \sim contact)
- Application-specific I/O module: Counter module
- Dedicated modules:
 - for TeSys® motor starters, model U and TeSys® Quickfit applications
 - for Tego™ power applications
- EOS (end of segment) and BOS (beginning of segment) modules.
- External equipment support module on CANopen extension

Standard and basic modules can be combined on the same station. This combination allows a wide range of functions. See the table on page 15.

The sensors and actuators are connected to the I/O modules via a removable screw or spring-type terminal.

Standard Modicon STB modules are hot-swappable, provided the network interface modules are also standard type.

Modicon STB distributed I/O have a protection rating of IP 20. For installations in production workshops, they must be installed in protective casings with at least an IP 54 rating (in compliance with IEC 60950 or NEMA 250). See page 122.

Color code	Type of module
	NIM network interface EOS/BOS station extension CANopen extension
	24 V $\overline{\text{---}}$ digital inputs
	24 V $\overline{\text{---}}$ power distribution 24 V $\overline{\text{---}}$ digital outputs
	115 V \sim or 230 V \sim digital inputs
	115/230 V \sim power distribution 115/230 V \sim digital outputs
	Digital relay outputs TeSys® U, TeSys® Quickfit and Tego™ Power interface, counter module
	Analog inputs
	Analog outputs

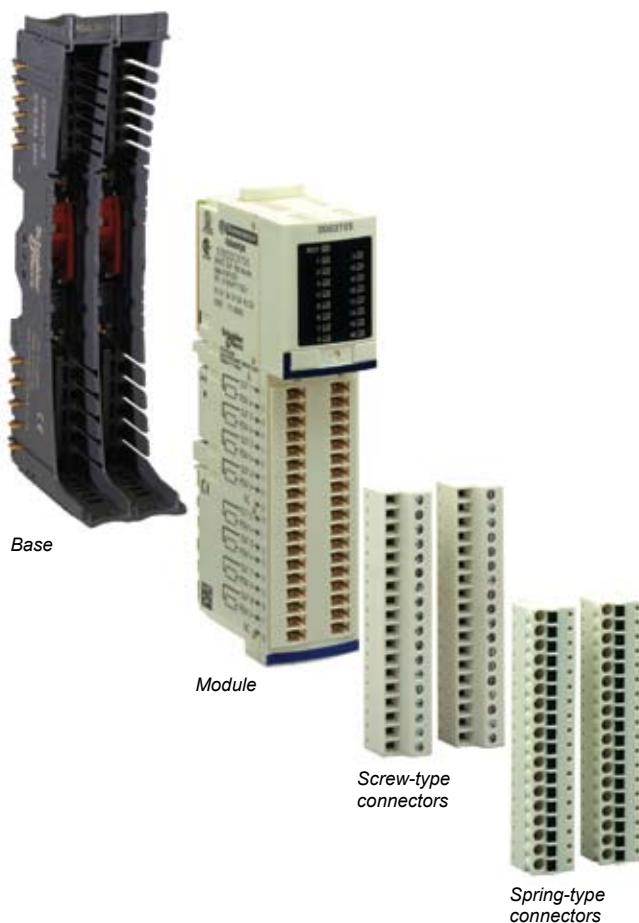
Modicon® STB distributed I/O solution

Open and modular system

Modicon® STB connection kit

The Modicon® STB kit references allow you to acquire the following items under a single reference (1) :

- A module
- Its base
- If necessary, a choice of the appropriate screw-type or spring-type connectors



The references are in the following format:

Content	Typical reference
Base, module, screw-type and spring-type connectors	STB ●●● ●●●● K
Base, module, screw-type connectors for 16-channel modules STB DDI 3725 and STB DDO 3705	STB DD● 37●5 KS
Base, module, spring-type connectors for 16-channel modules STB DDI 3725, STB DDO 370 and STB EHC 3020 counter module	STB ●●● ●●●● KC
NIM network module, base not required, supplied with one connector of each type: screw-type and spring-type	STB N●● ●●●●

Modicon STB I/O modules without a base or connector are also available under the usual references.

These references are used in the descriptions contained in this catalog (functions, specifications, etc).

Details of the kits and their contents are given on the "References" pages.

(1) The STB EPI 1145 module is not available with a connector kit.

Modicon® STB distributed I/O solution

Open and modular system

Composition of a Modicon® STB station

A Modicon® STB station is made up of one or more segments comprising Power Distribution Modules (PDM) and I/O modules.

A Modicon STB station starts with a network interface module and ends with a bus terminator supplied with this module. A station can be made up of a single segment or a primary segment and up to 6 extension segments, chained by End Of Segment (EOS) and Beginning Of Segment (BOS) extension modules.

On each segment:

- The PDMs must be placed immediately to the right of the network interface modules or extension modules.
- The I/O modules are placed to the right of the PDM module supplying them with power.
- Every module, PDM or I/O, is held in a base on the DIN rail (1). Three module and base widths are possible. The overall width needed for a segment on a DIN rail is the combined widths of the network interface module, the bases and any bus termination.

The bases help ensure the continuation of the internal bus, the auto-addressing of the modules, and the separated and isolated distribution of the internal power supplies, actuators and sensors.

The advantages of this arrangement are:

- Unplugging modules:
 - When switched off (*cold swap*), modules can be unplugged very quickly.
 - When switched on (*hot swap*), I/O modules can be unplugged provided the network interface module is the standard type.
- Output power supply independent of inputs: For example, if an output power supply is cut by a Preventa™ safety module, the inputs are still managed.
- Immunity of inputs: For example, the closing of power contactors (controlled by outputs) does not disturb analog input measurements.

The Network Interface Module (NIM)

This module manages communications on the station bus. It acts as a gateway for exchanges with the fieldbus or network master. Eleven NIM models are available for seven fieldbuses or networks: Ethernet TCP/IP (standard only), CANopen, Modbus Plus™ (standard only), Fipio® (standard only), INTERBUS®, Profibus DP™ and DeviceNet™ interface modules.

(1) Each module, with the exception of the NIM network interface module, requires a base and one or more specific connectors.

Modicon® STB distributed I/O solution

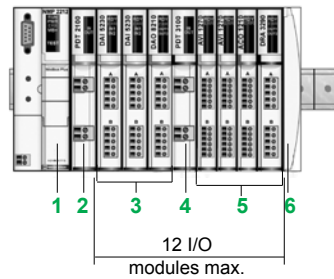
Open and modular system

Description of basic Modicon® STB

Basic Modicon® STB: Single segment

With a basic network interface module it is possible to create a station with only one segment (single segment) with up to 12 I/O modules. This excludes segment power distribution modules, a network interface module and a bus termination.

Single segment basic Modicon STB



In the example above, the single segment contains:

- 1 STB N●● 1010: A Network Interface Module (NIM). It is placed at the beginning of the primary segment. Each station must have only one NIM module.
- 2 STB PDT 2105: A Power Distribution Module (PDM). It is installed immediately to the right of the NIM and distributes the 115/230 V ~ to the AC powered I/O modules.
- 3 STB DA●: Digital I/O modules powered with AC.
- 4 STB PDT 3105: PDM power distribution module. It is installed after the 115/230 V ~ I/O modules. It distributes the 24 V ⎓ to the DC powered I/O modules.
- 5 STB AV● and STB AC●: Analog I/O modules powered with DC are installed after the PDM module.
- 6 STB XMP 1100: Bus termination supplied with the NIM network interface module.

Internal power supply: The NIM network interface module STB N●● provides a 5 V ⎓ logic voltage (1.2 A) from an external 24 V ⎓ power supply.

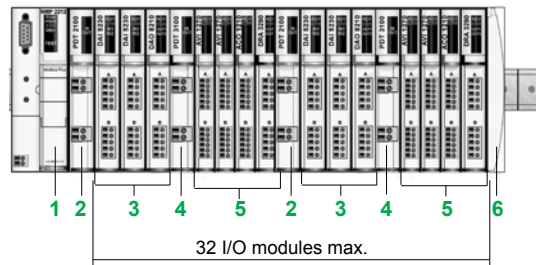
Modicon® STB distributed I/O solution

Open and modular system

Standard Modicon® STB configurations

Standard Modicon® STB: Single segment

With a NIM standard network interface module it is possible to create a station with only one segment (single segment) with up to 32 I/O modules. This excludes segment power distribution modules, a network interface module and a bus termination.



Single segment standard Modicon STB

In the example above, the primary segment contains:

- 1 STB N●● 2212: A standard Network Interface Module (NIM). It is placed at the beginning of the primary segment. Each station must have only one NIM module.
- 2 STB PDT 210●: A Power Distribution Module (PDM). It is installed immediately to the right of the NIM and distributes the 115/230 V ~ to the AC powered I/O modules.
- 3 STB DA●: Digital I/O modules powered with AC.
- 4 STB PDT 310●: PDM power distribution module. It is installed after the 115/230 V ~ I/O modules and distributes the 24 V ⎓ to the DC powered I/O modules.
- 5 STB AV●, STB AC●, STB DD●: Digital or analog I/O modules powered with DC. They are installed after the PDM STB PDT 310● module.
- 6 STB XMP 1100: Bus termination.

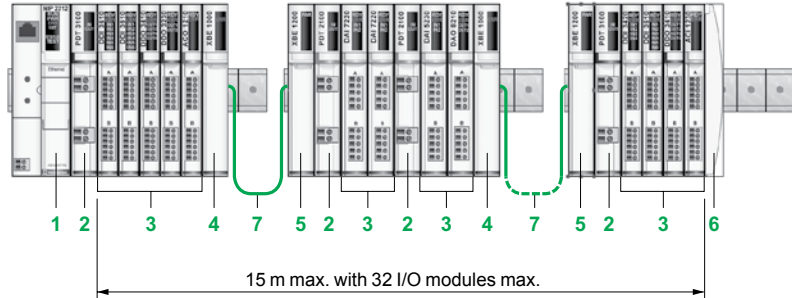
Internal power supply: The auxiliary power supply module STB CPS 2111 supplies a 5 V ⎓ logic voltage (1.2 A) from an external 24 V ⎓ power supply. The STB CPS 2111 should be associated with an STB PDT ●10● power supply module

Modicon® STB distributed I/O solution

Open and modular system

Standard Modicon® STB: Primary segment with extension segments

The station bus can support the primary segment with up to 7 extension segments. A standard NIM network interface module supports up to 32 I/O modules (excluding power distribution modules, network interface module, bus termination, auxiliary power supplies, and EOS/BOS bus extension modules).



Standard Modicon STB with 3 segments

The segments of the above Modicon STB configuration comprise:

- 1 STB N●● 2212: A NIM network interface module. It is placed at the beginning of the primary segment. Each station must have only one NIM module.
- 2 STB PDT ●100: A PDM power distribution module (24 V $\overline{\text{---}}$ or 115/230 V \sim). It is installed immediately to the right of the NIM and distributes 24 V $\overline{\text{---}}$ or 115/230 V \sim depending on the type of I/O modules located on the right.
- 3 STB AV●, STB AC●, STB DD●, STB DA● and STB DR●: I/O modules powered with DC or digital modules powered with AC are placed immediately to the right of the PDM.
- 4 STB XBE 1100: EOS bus extension module is always installed in the rightmost slot in the primary or extension segment and it extends the station bus to another segment.
- 5 STB XBE 1300: BOS bus extension module is installed at the beginning of each extension segment.
- 6 STB XMP 1100: Station bus termination (1).
- 7 STB XCA 100●: Station bus extension cables.

Internal power supply for secondary segments: The BOS bus extension module STB XBE 1300 provides a 5 V $\overline{\text{---}}$ logic voltage from an external 24 V $\overline{\text{---}}$ power supply.

(1) Supplied with the corresponding NIM network interface module.

Modicon® STB distributed I/O solution

Open and modular system

Standard Modicon® STB: CANopen extension module - device integration

The CANopen extension module STB XBE 2100 can be used to connect, at the end of the segment, external CANopen devices such as:

- Modicon® FTB IP67 I/O, in plastic or metal casing
- ATV31/61/71 variable speed drives
- Festo® CPV-CO2 electro-pneumatic valves
- Parker® P2M2HBVC11600 electro-pneumatic valves
- Balluff® Micropulse® BTL5 linear encoders
- Osicoder absolute rotary encoders (1)

The number of CANopen external devices depends on the station's standard network interface module:

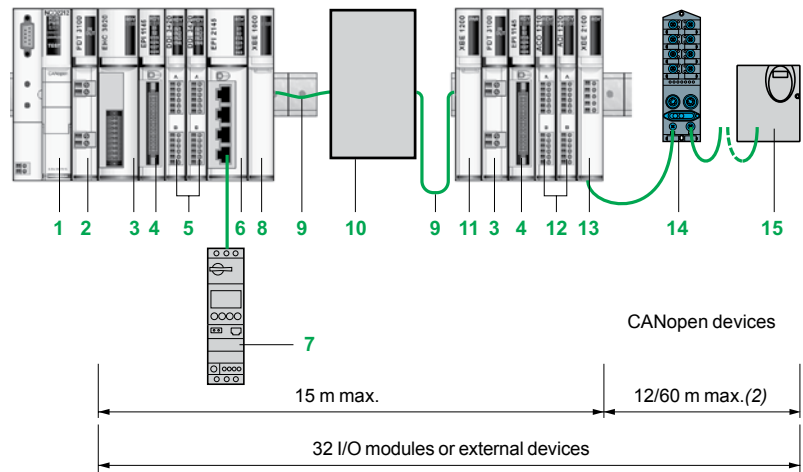
CANopen, DeviceNet™: Up to 7 external devices.

Ethernet TCP/IP Modbus®, Modbus PLUS™, INTERBUS®, Profibus DP™, Fipio® interface modules

Up to 12 external devices.

The data rate of the internal bus is set to 500 Kbps with the Advantys™ STB SPU 1●●● configuration software. This speed applies to Modicon STB modules and external devices.

Standard Modicon STB: Application-specific modules, preferred module and devices



Standard Modicon STB with CANopen devices

A standard network interface module supports up to 32 I/O modules and CANopen devices (excluding power distribution modules, network interface module, bus termination, auxiliary power supplies, EOS/BOS bus extension modules and CANopen STB XBE 2100 extension module).

The station bus can support:

- Preferred modules (available later). This type of preferred module is installed between two segments.
- Standard CANopen devices.

The station bus illustrated above contains:

- 1 STB N●●2212: A Network Interface Module (NIM)
- 2 STB PDT 3100: A 24 V $\bar{\text{---}}$ Power Distribution Module (PDM)
- 3 STB EHC 3020: 1-channel counter module
- 4 STB EPI 1145: Parallel interface module
- 5 STB DDI 3420: Digital input modules
- 6 STB EPI 2145: Module for TeSys® starter-controllers, model U (3)
- 7 TeSys U or TeSys Quickfit starter-controller
- 8 STB XBE 1110: EOS bus extension module
This is always installed in the rightmost slot in the primary or extension segment, and is used to extend the station bus to another segment.
- 9 STB XCA 100●: Station bus extension cables
- 10 Preferred module
- 11 STB XBE 1300: BOS bus extension module placed at the beginning of the segment
- 12 STB AC●: Analog I/O modules
- 13 STB XBE 2100: CANopen extension module (up to 12 devices per station)
- 14 Modicon FTB IP67 I/O
- 15 ATV variable speed drive

(1) To obtain the latest list of approved equipment on the Modicon STB station extension, please consult your Regional Sales Office or visit www.schneider-electric.us. To validate a new product, please consult your Regional Sales Office.

(2) Total length of extension CANopen segment: 12 m as standard, 60 m in accordance with the CAN wiring rules described in the CANopen setup document no. 31010857 (in English) available on www.schneider-electric.us.

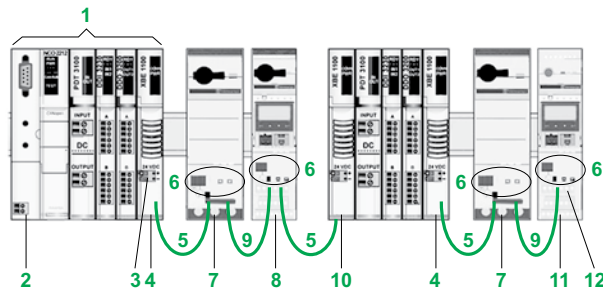
(3) Refer to the "Automation & Control - Motor starter solutions - Control and protection components" catalog.

Modicon® STB distributed I/O solution

Open and modular system

Standard Modicon® STB: TeSys® starter-controller model U, preferred

Modicon® STB provides TeSys® U with additional I/O and acts as a gateway to any upstream fieldbus or communication network connected by Modicon STB.



Modicon STB LULC15 communication modules

- 1 Modicon STB I/O.
- 2 Network interface module (NIM).
- 3 24 V DC power supply for LULC15.
- 4 End of segment (EOS) STB XBE 1100 used to mount the preferred TeSys U modules.
- 5 Angled cable with a station bus extension cable connector at each end, providing the bus signals and the internal power supply (LU9RCD●●).
- 6 Modicon STB LULC15 communication modules.
- 7 TeSys U starter-controller (LUB●●) with an advanced control unit (LUCB/C/D).
- 8 TeSys U starter-controller (LUB●●) with a multifunction control unit (LUCM).
- 9 Angled cable with a station bus extension cable connector at each end, providing the bus signals and the internal power supply (LU9RDD●●).
- 10 STB XBE 1300 beginning of segment.
- 11 TeSys U controller (LUTM) with a multifunction control unit (LUCMT).
- 12 TeSys U termination (LU9RFL15).

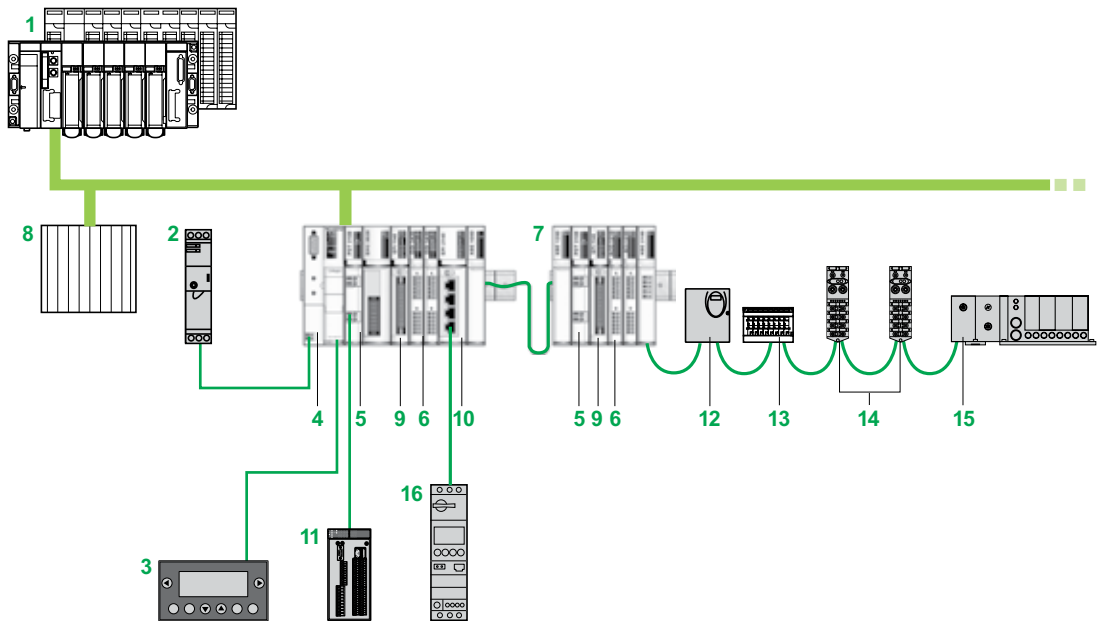
Modicon® STB distributed I/O solution

Open and modular system

Standard Modicon® STB configurations (continued)

NIM network interface modules STB N●● 2212 and STB N●● 1010, located at the beginning of each station, are gateways for exchanging data between the network or bus master PLC and the Modicon® STB automation station.

Standard STB N●● 2212 modules can also be used to configure and address the installation external devices. These settings are stored in the module's internal RAM or Flash memory. Optionally, they can be saved to the 32 Kb removable SIM card STB XMP 4440 – except for the address of the network connection point, to duplicate the configuration from one station to another.



- 1 Bus or network master.
- 2 24 V $\bar{\bar{}}$ external power supply.
- 3 HMI with Magelis® display terminals XBT, XBT G, XBT GT type Modbus link (see link cables on page 109).
- 4 A Network Interface Module (NIM).
- 5 A Power Distribution Module (PDM).
- 6 I/O modules.
- 7 Second STB segment.
- 8 Another control system.
- 9 Parallel interface module for Tego™ Power application.
- 10 Parallel interface module for TeSys® U and TeSys Quickfit starter-controllers.
- 11 Configurable Preventa™ safety controller XPS MC connected on the power supply to the outputs of the power distribution module STB PDT ●100.
- 12 ATV variable speed drive.
- 13 Festo® solenoid valves.
- 14 Modicon FTB IP67 I/O.
- 15 Parker® solenoid valves.
- 16 TeSys U starter-controller.

Modicon® STB distributed I/O solution

Open and modular system

Basic/standard Modicon® STB functions

The table below describes the main functions of the basic and standard Modicon® STB ranges:

Modicon® STB	I/O modules		Network interface modules (NIM)		Power distribution modules (PDM)		See page
	Basic	Standard	Basic	Standard	Basic	Standard	
Max. number of I/O modules			12	32			8 to 11
Removable terminals							–
Mechanical keying pin							41
Cold swapping							12
Hot swapping (1) (3)							12
Separate power supply to sensors and actuators	(2)	(2)					28
Built-in electronic protection of outputs					(3)		–
Electronic protection of power supply provided by Modicon STB for the sensors							–
Protection of power supplies by built-in removable fuse							–
Status LEDs							–
Compatible with all types of network interface module							–
CANopen extension - device integration							12
Compatible with local HMI (Magelis® display terminals)							108
Default configuration							96
Assistance with design, startup, and maintenance using Modicon software (4)							96
Configurable I/O parameters (4)							97
Built-in reflex functions							100
Removable memory card (4) (5)							20
Advanced diagnostics (4)							98
Internal software (firmware) update							22

Function available
 Function not available
 Not applicable

- (1) See page 16.
- (2) Requires the use of standard power distribution modules.
- (3) Fuse protection.
- (4) Requires the use of a standard network interface module.
- (5) For assistance with the station internal settings, simplifies inoperative device replacement (IDR) and copying of the station configuration.

Modicon® STB distributed I/O solution

Open and modular system

Hot swapping

When a module on the Modicon® STB station is unplugged while the power is on, the behavior of the other modules depends on:

- the type of NIM network interface module (basic/standard)
- the parameter settings of standard type I/O modules:
 - mandatory/optional module
 - configured fallback type, per channel

Swapping a module	Type of network interface module	
	Basic NIM	Standard NIM (1)
Basic input	Outputs fall back to 0	The other outputs remain operational
Standard input optional	Outputs fall back to 0	The other outputs remain operational (1)
Standard input mandatory	Outputs fall back to 0	Fallback of other outputs according to configuration (1)(2)
Basic output	Outputs fall back to 0	The other outputs remain operational
Standard output optional	Outputs fall back to 0	The other outputs remain operational (1)
Standard output mandatory	Outputs fall back to 0	Fallback of other outputs according to configuration (1)(2)
Power distribution module (PDM)	Prohibited	Prohibited
Network interface module (NIM)	Prohibited	Prohibited

(1) Fallback level set by the Modicon STB SPU 1●●● software on standard I/O modules with a standard NIM.

The STB SPU 1●●● software cannot be connected on basic NIM modules.

(2) The fallback state is adjustable on standard output modules:

- Fallback to 0 for digital modules
- Fallback to 1 for digital modules
- Fallback to any value on analog outputs
- Hold last value on digital and analog outputs

Modicon® STB distributed I/O solution

Open and modular system

Operating environment

Modicon® STB devices comply with the following certifications (1):

- UL
- CSA
- C-Tick
- GOST
- CE
- FM Class I, division 2, groups A, B, C and D T4A @ 70°C (158°F)
- ATEX is now available : ATEX 3G – II 3 G Ex nA IIC T4 Ta=0 to 60°C (32 to 140°F)

They benefit from merchant navy certifications issued by shipping classification societies:

- ABS (USA)
- BY (France)
- DNV (Norway)
- GL (Germany)
- LR (Great Britain)
- RINA (Italy)
- RMRS (IEC, pending)

They are designed for use in industrial environments of pollution class 2, in applications of over voltage category II (as defined in publication IEC 60664-1) and at altitudes of up to 2000 m, without reduction in load.

General environmental specifications

Parameter		Specifications
Protection		IP 20, Class 1. Ref. EN 61131-2
Operating temperature	Standard	°C (°F) 0 to 60 (32 to 140)
	Extended	-25 to 70 (-13 to 158) (2)
Storage temperature		°C (°F) -40 to 85 (-40 to 185)
Maximum relative humidity		95% relative humidity at 60°C (140°C) (without condensation)
Sinusoidal vibration		Hz 10 to 58 at ± 0.35 mm 58 to 150 at 5 g on a 15 mm DIN rail 58 to 150 at 3 g on a 7.5 mm DIN rail
Shock		g 30 peak for 11 ms, semi-sinusoidal wave for 3 shocks per axis. Ref. IEC 88, reference 2-27

(1) Certifications for all automation products (see page 122).

(2) Temperature range available on certain Modicon STB modules. See the specifications pages.

Note: restrictions on power supply voltage. The power supply voltage of NIM's modules, STB XBE 1100/1300, STB CPS 2111, STB PDT 3100 modules, and any external power supply are limited as follow, depending on the operating temperature range:

- range -25 to 0°C (-13 to 32°F): the power supply voltage range is --- 20.4 to 30 V.

- range 0 to 60°C (32 to 140°F): the power supply voltage range is --- 19.2 to 30 V.

- range 60 to 70°C (140 to 158°F): the power supply voltage range is --- 19.2 to 26.5 V.

Modicon® STB distributed I/O solution

Network interface modules

Applications

Data exchange between master PLC and Modicon® STB I/O modules

Bus or network type

Ethernet TCP/IP network

CANopen bus



Bus or network type

Industrial LAN

CAN fieldbus

Structure	Physical interface
	Data rate

10 BASE-T
10 Mbps

ISO 1198
10 Kbps to 1 Mbps depending on bus length

Medium

Double shielded twisted pair via Ethernet ConneXium™ cabling system

Double shielded twisted pair

Configuration	Number of devices (1)
	Maximum length

256 max. per segment, unlimited with switches

100 m according to 802.3 standard
1000 m with ConneXium cabling system
> 3000 m with fiber optic connection

127 slaves

From 30 m (1 Mbps) to 5000 m (10 Kbps)

Features of NIM modules (Network Interface Modules)	Number of I/O modules per Modicon® STB station (1)
	Supply voltage
	Logic power supply
	CANopen devices supported

Standard NIM: 32 modules max. on 1 primary segment and 6 extension segments max.

24 V $\overline{\text{DC}}$ not isolated (19.2 to 30 V)

Provides 5 V $\overline{\text{DC}}$ logic power to the I/O modules of a station (1200 mA)

12 devices max. (2)

Standard NIM: 32 modules max. on 1 primary segment and 6 extension segments max.
Basic NIM: 12 modules max. on 1 primary segment

Services used

- Embedded Web (configuration, diagnostics and access to variables)
- Modbus TCP/IP
- SNMP agent
- DHCP client service

- Process Data Object (PDO)
- Service Data Object (SDO)
- Network management (NMT)

Operating temperature (3)

0 to 60°C (32 to 140°F) (4)

Type of NIM module	Standard
	Basic (5)

STB NIP 2212

STB NCO 2212

STB NCO 1010

Pages

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(1) One Modicon STB station corresponds to 1 device on the bus or the network.
 (2) Depending on the nature of the CANopen devices, this maximum number may be limited to 7.
 (3) Horizontal mounting.
 (4) STB N●● 2212 standard modules: -25 to 70°C (-13 to 158°F), see specifications on page 22.
 (5) Does not support the CANopen bus extension module, hot swapping, or Modicon software.

Data exchange between master PLC and Modicon® STB I/O modules

Modbus Plus™ network	Fipio® bus	INTERBUS® bus	Profibus DP™ bus	DeviceNet™ network
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Industrial LAN compliant with the Modbus Plus™ standard	Open industrial field bus compliant with the FIP standard	INTERBUS® industrial field bus (generation 4)	Industrial field bus (Profibus DP™ V.0)	Network compliant with v.2.0 of the Open DeviceNet™ Vendor Assoc. (ODVA)
Modbus Plus standard	FIP standard	Isolated RS 485	RS 485	–
1 Mbps	1 Mbps	500 Kbps	9.6 Kbps to 12 Mbps	125, 250 or 500 Kbps
Twisted pair	Shielded twisted pair	Shielded twisted pair	Shielded twisted pair	Twisted pair
32 per segment 64 maximum	32 per segment 128 maximum	512 slaves max. with 254 bus terminal blocks max.	125 slaves	64 slaves
450 m per segment 1800 m with 3 repeaters	1000 m per segment	400 m per segment of the remote bus 12.8 km for the remote bus 50 m for the installation remote bus	1200 m (9.6 Kbps) 4800 m with 3 repeaters 200 m (12 Mbps) 800 m with 3 repeaters	1200 m
Standard NIM: 32 modules max. on 1 primary segment and 6 extension segments max.		Standard NIM: 32 modules max. on 1 primary segment and 6 extension segments max. Basic NIM: 12 modules max. on 1 primary segment		
24 V $\overline{\text{---}}$ not isolated (19.2 to 30 V)				
Provides 5 V $\overline{\text{---}}$ logic power to the I/O modules of a station (1200 mA)				
12 devices max. (2)				
- Global data - Peer-to-peer - Peer Cop	- Periodic I/O exchanges - Point-to-Point message - Use of standard profiles (FRD/FSD/FED)	- Implicit exchange of process data - Logical addressing - Diagnostics	- Slave configuration - Configuration control - Read/write slave I/O data - Diagnostics on Profibus frames	- DeviceNet Object (Class ID3) - Connection Object (Class ID5) - Station Bus Object (Class ID101)
0 to 60°C (32 to 140°F) (4)				

STB NMP 2212	STB NFP 2212	STB NIB 2212	STB NDP 2212	STB NDN 2212
		STB NIB 1010	STB NDP 1010	STB NDN 1010

Modicon® STB

distributed I/O solution

Network interface modules

Introduction

The range of NIM network interface modules comprises 4 basic NIM modules and 7 standard NIM modules.

Each module is dedicated to a specific network or bus:

Network or bus	Basic network interface module	Standard network interface module
Ethernet network	–	STB NIP 2212
CANopen bus	STB NCO 1010	STB NCO 2212
Modbus Plus™ network	–	STB NMP 2212
Fipio® bus	–	STB NFP 2212
INTERBUS® bus	STB NIB 1010	STB NIB 2212
Profibus DP™ bus	STB NDP 1010	STB NDP 2212
DeviceNet™ network	STB NDN 1010	STB NDN 2212

STB N●●●●● references include a power supply connector of each type: one screw-type connector and one spring-type connector.

Power supply for network interface modules

Network interface modules are powered by an external 24 V $\overline{\text{DC}}$ power supply.

This voltage is converted to 5 V $\overline{\text{DC}}$ to provide logic power to the I/O modules of the main Modicon® STB segment.

This built-in 5V logic power supply provides a maximum current of 1.2 A.

For operations in extended temperature ranges, see page 22.

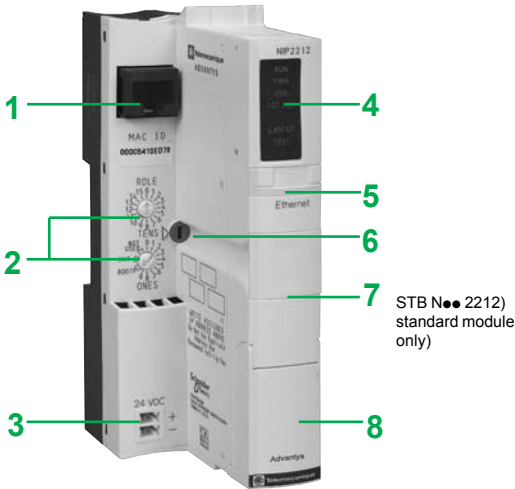
This current can be increased in each segment of an STB CPS 2111 auxiliary power supply that also provides a maximum current of 1.2 A. For operations in extended temperature ranges, see page 26.

The STB CPS 2111 should be associated with an STB PDT ●10● power supply module.

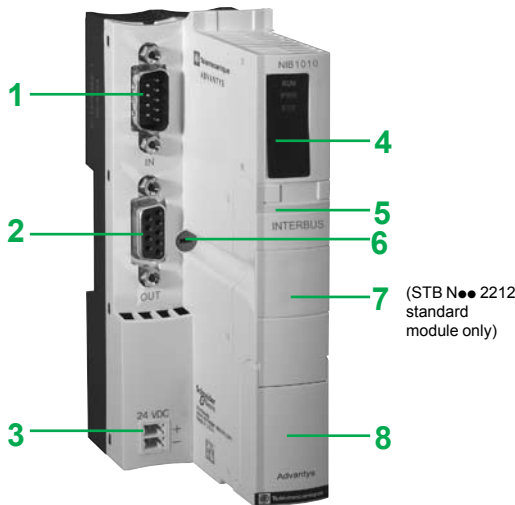
Logic power for the I/O modules in each extension segment is provided by the BOS bus extension module STB XBE 1300 placed at the beginning of these segments. See page 26.

Modicon® STB distributed I/O solution

Network interface modules



Interface modules with network/bus address selectors



INTERBUS® STB NIB 2212/1010 interface modules

Description

Network interface modules STB N●● 2212/1010

The front panel of the STB N●● 2212/1010 network interface modules has the following features:

- 1 A connector to connect the station to the fieldbus. See photos of different connector types on pages 18 and 19 and specifications on page 23.
- 2 - All NIM modules except INTERBUS® network interface modules: Two rotary node addressing selectors on the bus or the network
- INTERBUS® STB NIB 2212/1010 network interface modules: One 9-way female SUB-D connector to connect the outgoing bus cable
- 3 An external 24 V $\overline{\text{DC}}$ power supply connector for the removable screw-type (STB XTS 1120) or spring-type (STB XTS 2120) terminals. External Phaseo® power supplies. See page 6.
- 4 An LED display block indicating the different states of the station on the bus: power, communication, send/receive data, detected errors, etc.

Indication	Basic NIM modules	Standard NIM modules
Station status: auto-configuration, operational, detected error, etc. (1)	Green RUN LED	Green RUN LED
Power supply: NIM powered up, internal 5 V operational	Green PWR LED	Green PWR LED
Module detected error (2)	Red ERR LED	Red ERR LED
1 to 3 LED status indicators	Depending on bus/network	Depending on bus/network
Test mode (3)	-	Yellow Test LED

- 5 A color-coded identification stripe: yellow
- 6 A screw for releasing the STB N●● 2212/1010 module from the DIN rail. The NIM module can be removed from the station even if the product is assembled. Simply remove the PDM and then turn this screw a quarter turn.
- 7 A slot for a removable SIM card STB XMP 4440 (only on STB N●● 2212 standard NIM modules)
- 8 **Standard NIM module:** Access flap for the Reset button (4) and the port used to connect a station setup and configuration PC or HMI terminal (read/write data). Can also be used to update the firmware for the network interface module (5).
Basic NIM module: Access flap for the Reset button (4) and the port used to connect a PC used only for updating the firmware of the network interface module.

The network interface modules are supplied with:

- An English language mini CD-ROM that contains supporting documentation, a label template and one exchange file per network type
- An STB XMP 1100 bus terminator that is mounted directly on the DIN rail.

The STB SUS 8800 CD-ROM contains specific documentation for each of the 11 network interface modules in 5 languages. These documents can also be downloaded from www.schneider-electric.us.

(1) RUN is on permanently if the module is operational and flashes in various ways in the other states.
If RUN flashes on startup, the NIM module is in the auto-configuration phase.
If RUN flashes for a long time, there is a detected fault on the station. For information about status indications for the NIM module and the station, refer to the "Network interface module applications guide" for the specific network, included on the STB SUS 8800 CD-ROM or available on our web site: www.schneider-electric.us.

(2) ERR is off when the station is OK. Otherwise, ERR flashes or is lit.

(3) Test LED off: station OK. Test LED on: backup of parameters to internal memory or SIM card in progress. Test LED flashing: station in Test mode.

(4) Pressing the Reset button for 4 seconds restores the station to the factory configuration or the configuration contained on the SIM card.

(5) Firmware update of NIM modules available at www.schneider-electric.us.

Modicon® STB distributed I/O solution

Network interface modules

Specifications							
Network interface module type		STB	NIP 2212	NCO 2212	NCO 1010	NMP 2212	NFP 2212
Range			Standard	Standard	Basic	Standard	Standard
Network or bus			Ethernet	CANopen		Modbus Plus™ network	Fipio® bus
Compliance with bus or network standards			IEEE 802.3	CIADS-301		modbus.org	EN 50170, Vol 3, Parts 1-3, 2-3, 3-3, 5-3, 6-3 and 7-3
Supply voltage		V $\overline{\text{---}}$	24 V non-isolated (1)				
Operating temperature, horizontal mounting		°C (°F)	-25 to 70 (-13 to 158) (2)		0 to 60 (32 to 140)	-25 to 70 (-13 to 158) (2)	
Input current		mA	700	700	400	700	
Voltage range		V $\overline{\text{---}}$	19.2 to 30 (2)				
Output voltage to the station logic bus		$\overline{\text{---}}$	5.25 V \pm 0.21%				
Nominal output current		A	1.2 (0.575 for STB N●● 2212 standard modules operating in the range 60 to 70°C)				
Isolation			None				
Immunity to electromagnetic interference (EMC)			Yes, according to IEC 61131-2				
Connector type	To bus or network		RJ45 female	9-way male SUB-D		9-way female SUB-D	9-way male SUB-D
	RS 232 port (configuration, dialog with XBT and firmware update)		HE 13, 8-way female	HE 13, 8-way female	(3)	HE 13, 8-way female	
Maximum number of addressable I/O modules	Per station		32	32	12	32	
Number of segments supported	Primary		1				
	Extension		6 max.	6 max.	–	6 max.	

STB network interface module type								
Network interface module type		STB	NIB 2212	NIB 1010	NDP 2212	NDP 1010	NDN 2212	NDN 1010
Range			Standard	Basic	Standard	Basic	Standard	Basic
Network or bus			INTERBUS®		Profibus DP™		DeviceNet™	
Compliance with bus or network standards			INTERBUS Club		DIN 19245, Parts 1 and 3		Open DeviceNet Vendors Association	
Supply voltage		V $\overline{\text{---}}$	24 V non-isolated (1)					
Operating temperature, horizontal mounting		°C (°F)	-25 to 70 (-13 to 158) (2)	0 to 60 (32 to 140)	-25 to 70 (-13 to 158) (2)	0 to 60 (32 to 140)	-25 to 70 (-13 to 158) (2)	0 to 60 (32 to 140)
Input current		mA	700	400	700	400	700	400
Voltage range		V $\overline{\text{---}}$	19.2 to 30 (2)					
Output voltage to the station logic bus		$\overline{\text{---}}$	5.25 V \pm 0.21%					
Nominal output current		A	1.2 (0.575 for STB N●● 2212 standard modules operating in the range 60 to 70°C [148 to 158°F])					
Output impedance		m Ω	< 50 up to 100 kHz	\leq 50	< 50 up to 100 kHz	\leq 50	< 50 up to 100 kHz	\leq 50
Isolation			None					
Immunity to electromagnetic interference (EMC)			Yes, according to IEC 61131-2					
Connector type	To bus or network		Incoming: 9-way male SUB-D Outgoing: 9-way female SUB-D		9-way female SUB-D		5-way male connector	
	RS 232 port (configuration, dialog with XBT and firmware update)		HE 13, 8-way female	(3)	HE 13, 8-way female	(3)	HE 13, 8-way female	(3)
Maximum number of addressable I/O modules	Per station		32	12	32	12	32	12
Number of segments supported	Primary		1					
	Extension		6 max.	–	6 max.	–	6 max.	–

(1) Use a 24 V $\overline{\text{---}}$ SELV (Safety Extra Low Voltage) external power supply.
 (2) STB N●● 2212 standard modules:
 - range -25 to 0°C (-13 to 32°F): the power supply voltage range is $\overline{\text{---}}$ 20.4 to 30 V.
 - range 0 to 60°C (32 to 148°F): the power supply voltage range is $\overline{\text{---}}$ 19.2 to 30 V.
 - range 60 to 70°C (148 to 158°F): the power supply voltage range is $\overline{\text{---}}$ 19.2 to 26.5 V.
 (3) Connection for updating firmware only.

Modicon® STB distributed I/O solution

Network interface modules



STB NIP 2212

STB NCO 2212/1010



STB NMP 2212

STB NFP 2212



STB NIB 2212/1010

STB NDN 2212/1010

Network interface modules (1)

Network or bus	Range	Supply voltage	Reference	Weight kg
Ethernet network	Standard	24 V $\overline{\text{DC}}$	STB NIP 2212	0.130
	Basic	24 V $\overline{\text{DC}}$	STB NIP 1010	0.135
CANopen bus	Standard	24 V $\overline{\text{DC}}$	STB NCO 2212	0.135
	Basic	24 V $\overline{\text{DC}}$	STB NCO 1010	0.135
Modbus Plus™ network	Standard	24 V $\overline{\text{DC}}$	STB NMP 2212	0.145
Fipio® bus	Standard	24 V $\overline{\text{DC}}$	STB NFP 2212	0.145
INTERBUS® bus	Standard	24 V $\overline{\text{DC}}$	STB NIB 2212	0.155
	Basic	24 V $\overline{\text{DC}}$	STB NIB 1010	0.155
Profibus DP™ bus	Standard	24 V $\overline{\text{DC}}$	STB NDP 2212	0.140
	Basic	24 V $\overline{\text{DC}}$	STB NDP 1010	0.140
DeviceNet™ network	Standard	24 V $\overline{\text{DC}}$	STB NDN 2212 (2)	0.140
	Basic	24 V $\overline{\text{DC}}$	STB NDN 1010 (2)	0.140

Separate parts

Description	Type	Reference	Weight kg
DeviceNet removable terminals	Screw-type	STB XTS 1111	–
	5-way Spring-type	STB XTS 2111	–

Replacement and optional parts

Description	Type	Sold in lots of	Reference	Weight kg
Removable terminals for 24 V $\overline{\text{DC}}$	Screw-type	10	STB XTS 1120	0.003
	Spring-type	10	STB XTS 2120	0.003

Description	Use	Reference	Weight kg
32 KB removable SIM card (3)	Station configuration backup	STB XMP 4440	–
External 24 V $\overline{\text{DC}}$ SELV power supply	–	See page 121	–
Configuration software (3)	–	See page 101	–
Magelis® communication terminal XBT connection cable (3)	–	See page 109	–
RS 232C shielded twisted pair	Configuration PC	STB XCA 4002	0.210
8-way HE 13/ 9-way SUB-D (length 2 m) (3) (4)			
USB SUB-D cable	Configuration PC with USB port requires STB XCA 4002 (4)	SR2 CBL 06	0.185
User documentation	Multilingual on CD-ROM (English, French, German, Spanish and Italian)	STB SUS 8800	–
Bus terminator	Also supplied with the NIM network interface module	STB XMP 1100	–

(1) Network interface modules are supplied with:

- A suitable power supply connector
- Documentation in English on mini CD-ROM and bus terminator (STB XMP 1100)

(2) DeviceNet 5-way removable terminals STB XTS ●111, to be ordered separately

(3) Standard modules only

(4) Supplied with STB SPU 1●●● configuration software. See page 101.

Modicon® STB

distributed I/O solution

Network interface modules



TSX CAN TDM4



490 NTW 000 ●●



AS MBKT 085

Bus and network connection accessories

CANopen bus (1)

Description	Fitted at ends	Length	Reference	Weight kg
IP 20 CANopen tap junction	4 SUB-D ports. Screw terminals for connection of trunk cables. Line termination.		TSX CAN TDM4	0.196
CANopen preformed cordsets One 9-way female SUB-D connector at each end	Standard, C€ marking: low smoke emission. Halogen-free. Flame-retardant (IEC 60332-1)	0.3 m	TSX CAN CADD03	0.091
		1 m	TSX CAN CADD1	0.143
		3 m	TSX CAN CADD3	0.295
		5 m	TSX CAN CADD5	0.440
		Standard, UL certification, C€ marking: Flame-retardant (IEC 60332-2)	0.3 m	TSX CAN CBDD03
1 m	TSX CAN CBDD1		0.131	
3 m	TSX CAN CBDD3		0.268	
5 m	TSX CAN CBDD5		0.400	

Ethernet network (1)

Description	Fitted at ends	Length	Reference	Weight kg
Straight shielded twisted pair cables for connecting hubs and switches	2 RJ45 connectors to connect to data terminal equipment (DTE)	2 m	490 NTW 000 02 (2)	–
		5 m	490 NTW 000 05 (2)	–
		12 m	490 NTW 000 12 (2)	–
		40 m	490 NTW 000 40 (2)	–
		80 m	490 NTW 000 80 (2)	–

Modbus Plus™ network

Description	Use	Reference	Weight kg
9-way male SUB-D connector	Connection of the Modbus Plus connector	AS MBKT 085	–
Modbus Plus tap	IP 20 junction box for T-connections	990 NAD 230 00	0.230
	IP 65 junction box for T-connections, supports one RJ45 connector on front panel	990 NAD 230 10	0.650
	IP 20 T-connector with two RJ45 connectors for Modbus Plus cable and one 9-way SUB-D connector for devices connected via T-connection	170 XTS 020 00	0.260

Description	Use From	To	Length	Reference	Weight kg
Modbus Plus drop cables	IP 20 T-connector	IP 20 T-connector	0.25 m	170 MCI 020 10	–
		170 XTS 020 00 T-connector	1 m	170 MCI 020 36	–
		170 XTS 020 00 T-connector	3 m	170 MCI 021 20	–
		170 XTS 020 00 T-connector	10 m	170 MCI 020 80	–
	STB NMP 2212 network interface module	990 NAD 230 00 tap	2.4 m	990 NAD 211 10	0.530
			6 m	990 NAD 211 30	0.530

(1) For the complete range of CANopen and Ethernet cables and connection accessories, please refer to the "Automation & Control. Machines & installations with industrial communications" catalog.

(2) Cable compliant with EIA/TIA-568 Category 5 and IEC 1180/EN 50 173 Class D. For UL- and CSA 22.1-certified cables, add letter U to end of reference.

Modicon® STB

distributed I/O solution

Network interface modules



TSX FP ACC 12



TSX FP ACC 14



TSX FP ACC 4

Bus and network connection accessories (continued)

Fipio® bus

Description	Use	Specifications	Reference	Weight kg
Female connectors (9-way SUB-D)	On STB NFP 2212 network interface module	Black poly carbonate IP 20	TSX FP ACC 12	0.040
		Zamak (1)	TSX FP ACC 2	0.080
Bus connection unit	Trunk cable tap link	Black poly carbonate IP 20	TSX FP ACC 14	0.120
		Zamak IP 65 (1)	TSX FP ACC 4	0.660

Description	Use	Length	Reference	Weight kg
Drop cables	8 mm, 2 shielded twisted pairs 150 W For standard environments	100 m	TSX FP CC 100	5.680
		200 m	TSX FP CC 200	10.920
		500 m	TSX FP CC 500	30.000
Daisy chain cables	8 mm, 2 shielded twisted pairs 150 W For standard environments	100 m	TSX FP CA 100	5.680
		200 m	TSX FP CA 200	10.920
		500 m	TSX FP CA 500	30.000

INTERBUS® bus

Description	Use	Length	Reference	Weight kg
Installation remote bus cables	Pre assembled cables to connect 2 network interface modules	0.110 m	170 MCI 007 00	–
		1 m	170 MCI 100 00	–
Branch interface	Remote bus to installation remote bus branch connection	–	170 BNO 671 00	–
Remote bus cables	–	100 m	TSX IBS CA 100	–
		400 m	TSX IBS CA 400	–

Profibus DP™ bus

Description	Use	Length	Reference	Weight kg
Connectors for STB NDP 2212 network interface module	Line terminator	–	490 NAD 911 03	–
		–	490 NAD 911 04	–
		–	490 NAD 911 05	–
Profibus DP connection cables	–	100 m	TSX PBS CA 100	–
		400 m	TSX PBS CA 400	–

DeviceNet™ network

Description	Use	Type	Reference	Weight kg
Female connectors (5-way)	For STB NDN 2212 network interface module	Screw-type	STB XTS 1111	–
		Spring-type	STB XTS 2111	–

(1) Do not use for applications involving vibrations ≥ 1 g or heavy impacts.

Modicon® STB distributed I/O solution

Internal bus extension modules

Specifications, auxiliary and bus extension power supplies

Type of module		24 V $\overline{\text{---}}$ /5 V $\overline{\text{---}}$ auxiliary power supply	EOS internal bus extension	BOS internal bus extension	Bus extension to external CANopen devices
		STB CPS 2111	STB XBE 1100	STB XBE 1300	STB XBE 2100
Power supply	V	24 $\overline{\text{---}}$ not isolated	–	24 $\overline{\text{---}}$ not isolated	–
Operating temperature, horizontal mounting	°C (°F)	-25 to 70 (-13 to 158) (1)	-25 to 70 (-13 to 158)	-25 to 70 (-13 to 158) (1)	0 to 60 (32 to 140)
Current consumption on 5 V $\overline{\text{---}}$ logic bus	mA	–	25	–	100
Connectors	Power supply	2 removable pins	–	2 removable pins	–
	Interface	–	Firewire	Firewire	5 removable pins
Input current	mA	400	–	400	–
Voltage range	V	19.2 to 30 $\overline{\text{---}}$ (1)	–	19.2 to 30 $\overline{\text{---}}$ (1)	–
Output voltage	V	5.25 $\overline{\text{---}}$ \pm 0.21%	–	5.25 $\overline{\text{---}}$ \pm 0.21%	–
Output current	A	1.2 at 5 V $\overline{\text{---}}$ (2)	–	1.2 at 5 V $\overline{\text{---}}$ (2)	–
Isolation		No			
Immunity to electromagnetic disturbance (EMC)		Yes according to IEC 61131-2			



STB XBE 1100



STB XBE 1300

The STB CPS 2111 should be associated with an STB PDT ●10● power supply module.

References

Description	Use with standard STB	Reference	Weight kg
EOS internal bus extension module	Installed at the end of the segment (except for the last segment on the station)	STB XBE 1100 (3)	–
BOS internal bus extension module	Installed at the beginning of each extension segment	STB XBE 1300 (4)	–
Bus extension module to external CANopen devices	Installed at the end of the last segment to connect standard CANopen devices	STB XBE 2100	–

Auxiliary power supply

Description	Content	Reference	Weight kg
24 V $\overline{\text{---}}$ /5 V $\overline{\text{---}}$ 1.2 A auxiliary power supply (5)	screw-type and spring-type	STB CPS 2111 K	–
	Module only	STB CPS 2111	–



STB XBE 2100



STB CPS 2111

- (1) STB CPS 2111 and STB XBE 1300 modules:
 - range -25 to 0°C (-13 to 32°F): the power supply voltage range is $\overline{\text{---}}$ 20.4 to 30 V.
 - range 0 to 60°C (32 to 148°F): the power supply voltage range is $\overline{\text{---}}$ 19.2 to 30 V.
 - range 60 to 70°C (148 to 158°F): the power supply voltage range is $\overline{\text{---}}$ 19.2 to 26.5 V.
- (2) 900 mA for operating temperatures in the range 60 to 70°C.
- (3) Replaces EOS extension module STB XBE 1000.
- (4) Replaces BOS extension module STB XBE 1200.
- (5) Power supply for the I/O module logic, in addition to the 5 V $\overline{\text{---}}$ 1.2 A power supplies integrated in the NIM network interface module and the BOS bus extension module. Installed in the primary segment or the extension segments.

Modicon® STB distributed I/O solution

Internal bus extension modules



STB XBA 2000

Bus extensions: mandatory separate parts			
Description	Used for	Reference	Weight kg
Module bases (width 18.4 mm)	STB XBE 1100	STB XBA 2400	0.028
	STB XBE 1300	STB XBA 2300	0.033
	STB XBE 2100	STB XBA 2000	0.028
	STB CPS 2111	STB XBA 2100	0.033

Description	Used for	Type	Sold in lots of	Reference	Weight kg
2-way removable terminals for 24 V ~ supply (1)	STB XBE 1200	Screw-type	10	STB XTS 1120	–
		Spring-type	10	STB XTS 2120	–
5-way removable terminals (1)	STB XBE 2100	Screw-type	20	STB XTS 1110	0.006
		Spring-type	20	STB XTS 2110	0.006

Description	Length	Reference	Weight kg
Station bus extension cables	0.3 m	STB XCA 1001	–
	1.0 m	STB XCA 1002	–
	4.5 m	STB XCA 1003	–
	10.0 m	STB XCA 1004	–
	14.0 m	STB XCA 1006	–

Bus extensions: optional separate parts					
Description	Used for	Type	Reference	Weight kg	
Keying pin	Modules	–	60	STB XMP 7700	–
	Removable terminals	–	96	STB XMP 7800	–
User-customizable labels (2)	I/O modules and bases	–	25 sheets	STB XMP 6700	–
2.5 mm insulated screwdriver	Removable screw terminals	Chrome vanadium steel	–	STB XTT 0220	–

CANopen extension connection

STB XBE 2100: schematic connection diagram (3)

The CANopen interface fieldbus is located on the front of the STB XBE 2100 extension module.

The pinout should be as indicated in the table below:

Pin	Signal
1	CAN earth ground (0 V)
2	CAN low bus signal
3	Optional CAN shielding
4	CAN high bus signal
5	No connection (4)

(1) The STB XTS ●●●● connectors can accommodate a flexible wire with a maximum cross-section of 1.5 mm², including the cable end. Max. tightening torque = 0.25 Nm for screw-type connectors.

(2) Template for user-customizable labels:

- Supplied with the documentation mini-CD-ROM provided with the NIM network interface modules

- Available on www.schneider-electric.us.

(3) Observe the recommendations in the "Modicon STB System Hardware Components Reference Guide", included on the STB SUS 8800 CD-ROM and available on www.schneider-electric.us.

(4) This spare pin can be used to distribute the 24 V of external devices.

Modicon® STB distributed I/O solution

Power distribution modules

Introduction

Basic power distribution modules (PDM) (STB PDT ●105) provide power for the I/O module sensors and actuators (1) via the same bus 3. See page 29.

Two basic PDMs are available:

- The STB PDT 3105 module is dedicated to providing power to the I/O module sensors and actuators requiring a 24 V $\overline{\text{---}}$ power supply.
 - The STB PDT 2105 module is dedicated to providing power to the I/O module sensors and actuators requiring a 115/230 V \sim power supply.
- Each module has 1 removable fuse.

Standard power distribution modules (STB PDT ●100) provide power separately for the I/O module sensors and actuators (1) via the sensor bus 1 and the actuator bus 2. See page 29.

Two standard PDMs are available:

- The STB PDT 3100 module is dedicated to providing power separately to the I/O module sensors and actuators requiring a 24 V $\overline{\text{---}}$ power supply.
 - The STB PDT 2100 module is dedicated to providing power separately to the I/O module sensors and actuators requiring a 115/230 V \sim power supply.
- Each module has 2 removable fuses.

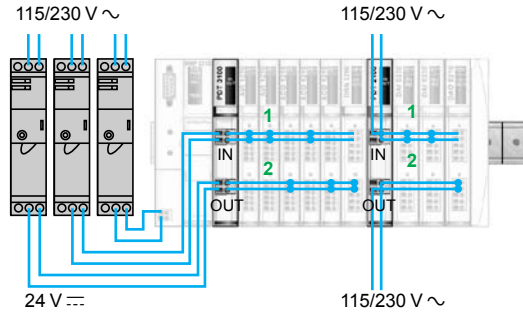
(1) *One power distribution module can supply power to both digital and analog I/O modules simultaneously.*

Modicon® STB distributed I/O solution

Power distribution modules

Connecting the power supplies

Three separate power supplies

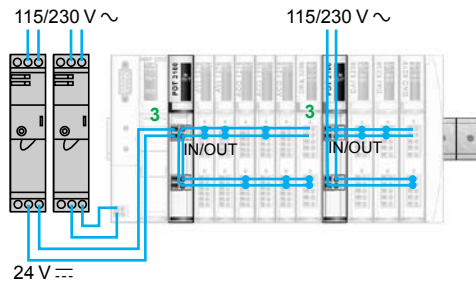


Configuration with standard PDM

This configuration allows:

- Disconnection of the I/O power supply while maintaining the power supply to the network interface module (NIM) and thus to the machine bus (for example, in a NIM INTERBUS® configuration).
- Isolation of the output power from the inputs to increase immunity to electromagnetic interference.
- Power supply independent of the outputs, enabling connection of a Preventa™ safety module. If these outputs are disconnected, the inputs continue to be managed.

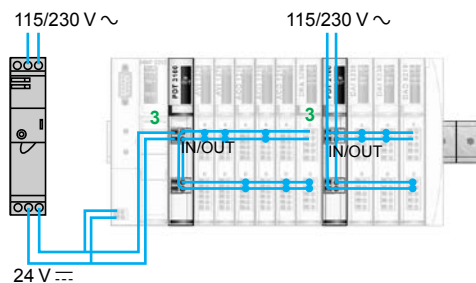
Separate NIM module and I/O power supplies



Configuration with basic PDM

This configuration allows disconnection of the I/O power supply while maintaining the power supply to the NIM module and thus to the machine bus (for example, in a NIM INTERBUS configuration).

One single power supply



Configuration with basic PDM

Low-cost configuration with a single power supply for the NIM module, sensor bus, and actuator bus.

Modicon® STB distributed I/O solution

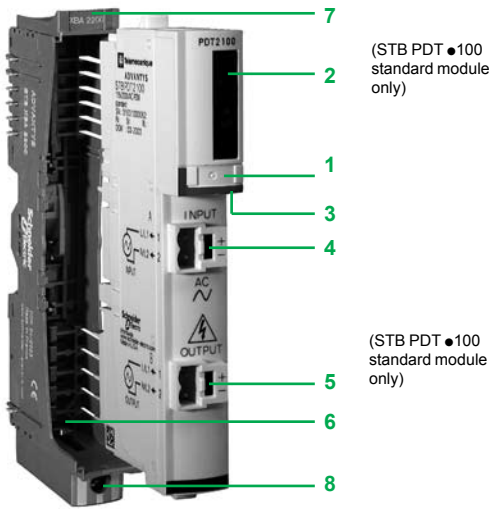
Power distribution modules

Choice of PDM based on I/O modules								
Power distribution module	Voltage	STB I/O modules					App. specific	STB bus extension modules (1)
		Digital (discrete)			Analog			
		Inputs	Outputs Solid state	Relay	Inputs	Outputs		
STB PDT 3100	24 V $\overline{\text{---}}$	DDI 3230	DDO 3200	DRC 3210	AVI 1255	AVO 1255	EPI 1145	XBE 1100
		DDI 3420	DDO 3230	DRA 3290	AVI 1275	AVO 1265	EPI 2145	XBE 1300
		DDI 3610	DDO 3410		AVI 1270	AVO 1250	EHC 3020	XBE 2100
		DDI 3425	DDO 3600		AVI 0300	AVO 0200		XBE 1000
		DDI 3615	DDO 3415		AVI 1400	AVO 0120		XBE 1200
		DDI 3725	DDO 3605		ACI 1225	ACO 1225		
			DDO 3705		ACI 1230	ACO 1210		
					ACI 0320	ACO 0220		
					ACI 8320			
					ACI 1400			
					ART 0200			
STB PDT 2100	115 V \sim	DAI 5230	DAO 8210	–	–	–	–	
		DAI 5260	DAO 5260					
	230 V \sim	DAI 7220	DAO 8210	–	–	–	–	
STB PDT 3105	24 V $\overline{\text{---}}$	DDI 3230	DDO 3200	DRC 3210	AVI 1255	AVO 1255	EPI 1145	
		DDI 3420	DDO 3230	DRA 3290	AVI 1275	AVO 1265	EPI 2145	
		DDI 3610	DDO 3410		AVI 1270	AVO 1250	EHC 3020	
		DDI 3425	DDO 3600		AVI 0300	AVO 0200		
		DDI 3615	DDO 3415		AVI 1400	AVO 0120		
			DDO 3605		ACI 1225	ACO 1225		
					ACI 1230	ACO 1210		
					ACI 0320	ACO 0220		
					ACI 8320			
					ACI 1400			
					ART 0200			
STB PDT 2105	115 V \sim	DAI 5230	DAO 8210	–	–	–	–	
		DAI 5260	DAO 5260					
	230 V \sim	DAI 7220	DAO 8210	–	–	–	–	

(1) STB bus extension modules can be connected to any PDM.

Modicon® STB distributed I/O solution

Power distribution modules



(STB PDT ●100 standard module only)

(STB PDT ●100 standard module only)

Description

The front panel of the STB PDT ●10● power distribution modules features:

- 1 A slot for a user-customizable label
- 2 A status block with 2 display LEDs (STB PDT 2100/3100 standard modules only):

Indication	Basic PDM modules	Standard PDM modules
Sensor bus power supply (1)	–	Green IN LED
Actuator bus power supply (1)	–	Green OUT LED

- 3 A color-coded module identification stripe (red for 115/230 V ~, blue for 24 V ---)
- 4 A connector for removable screw-type terminals (STB XTS 1130) or spring-type terminals (STB XTS 2130) used to connect:
 - The sensor power supply for STB PDT 2100/3100 standard modules
 - The sensor/actuator power supply for STB PDT 2105/3105 basic modules
- 5 A connector for removable screw-type terminals (STB XTS 1130) or spring-type terminals (STB XTS 2130) used to connect the actuator power supply (STB PDT 2100/3100 standard module only)
- 6 An STB XBA 2200 mounting base, width 18.4 mm, featuring:
 - A slot for a user-customizable label 7
 - A captive grounding screw 8

The STB SUS 8800 CD-ROM contains two documentation sets for the power distribution modules in 5 languages:

- *System Hardware Components Reference Guide*
- *System Planning and Installation Guide*

These documents can also be downloaded from www.schneider-electric.us.

(1) IN/OUT LED on: Power supply present on digital I/O modules.

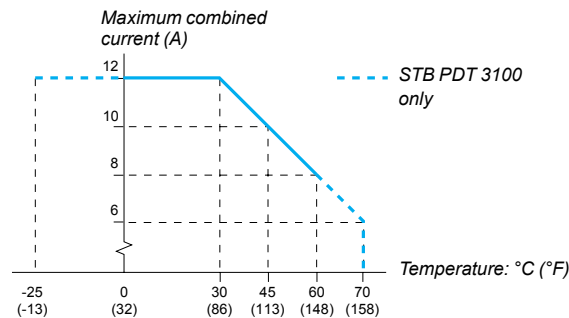
IN/OUT LED off: No external power supply or removable fuse inside the PDM has blown. Refer to the "System Hardware Components Reference Guide" included on the STB SUS 8800 CD-ROM or available from our web site: www.schneider-electric.us.

Modicon® STB distributed I/O solution

Power distribution modules

Power distribution modules, specifications					
Module type		STB PDT 3100	STB PDT 2100	STB PDT 3105	STB PDT 2105
Range		Standard		Basic	
Supply voltage	V	24 $\overline{\text{---}}$ (1)	115/230 \sim	24 $\overline{\text{---}}$	115/230 \sim
Operating temperature, horizontal mounting	°C (°F)	-25 to 70 (-13 to 158) (1)	-25 to 60 (-13 to 148)		
Maximum current	For inputs	A	4 (3)	5 to 30°C (41 to 86°F) 2.5 to 60°C (36.5 to 148°F)	–
	For outputs	A	8 (3)	10 to 30°C (50 to 86°F) 5 to 60°C (41 to 148°F)	–
	For inputs/outputs	A	6 to 12 according to derating (3)	–	4 to 30°C 2.5 to 60°C
Sensor/actuator bus voltage range	V	19.2 to 30 $\overline{\text{---}}$ (2) (3)	85 to 265 \sim (4)	19.2 to 30 $\overline{\text{---}}$	85 to 265 \sim
Hot swapping		No			
Nominal consumption	mA	0 on 5 V $\overline{\text{---}}$ logic power supply			
Reverse polarity protection		Yes, on the actuator bus	–	Yes, on the actuator bus	–
Built-in overcurrent protection	For inputs	By a 5 A time-lag fuse (6)			
	For outputs	By a 10 A time-lag fuse (6)		By a 5 A time-lag fuse (6)	
Maximum current on the grounding terminal	A	30 for 2 minutes			
Voltage-detection thresholds	IN/OUT LED on	$\geq 15 \text{ V} \pm 1 \text{ V} \overline{\text{---}}$	$> 70 \text{ V} \pm 5 \text{ V} \sim$	–	
	IN/OUT LED off	$< 15 \text{ V} \pm 1 \text{ V} \overline{\text{---}}$	$< 50 \text{ V} \pm 5 \text{ V} \sim$	–	
Mounting base (included in kits)		STB XBA 2200 width 18.4 mm			

- (1) Use 24 V $\overline{\text{---}}$ safety extra low voltage (SELV) external power supplies.
- (2) STB PDT 3100 module only:
 - range -25 to 0°C (-13 to 32°F): the power supply voltage range is $\overline{\text{---}}$ 20.4 to 30 V.
 - range 0 to 60°C (32 to 148°F): the power supply voltage range is $\overline{\text{---}}$ 19.2 to 30 V.
 - range 60 to 70°C (148 to 158°F): the power supply voltage range is $\overline{\text{---}}$ 19.2 to 26.5 V.
- (3) Take into account the total input and output currents: combined current.



- (4) DC power supplies can be shared or separate, or shared with the 24 V $\overline{\text{---}}$ power supply of the network interface module.
- (5) AC power supplies for a given distribution module from a 3-phase transformer must be connected at the same phase.
- (6) Built-in fuse on the power distribution module. Can be replaced with the STB XMP 5600 fuse kit.

Modicon® STB distributed I/O solution

Power distribution modules



STB XBA 2200



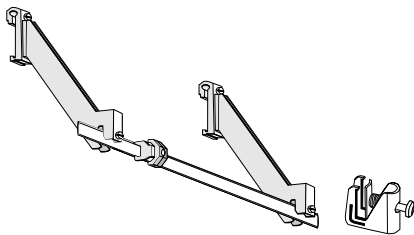
STB PDT 3100



STB XTS 1130



STB XTS 2130



STB XSP 3000

STB XSP 3010/3020

References

The **STB PDT●10●K** reference kit includes: screw-type connectors, spring-type connectors and mounting base.

Power distribution modules: connector kits

Power supply type	Voltage	Type	Reference	Weight kg
☰	24 V	Standard	STB PDT 3100 K	0.130
		Basic	STB PDT 3105 K	0.130
~	115/230 V	Standard	STB PDT 2100 K	0.129
		Basic	STB PDT 2105 K	0.129

Power distribution modules: modules only

Power supply type	Voltage	Type	Reference	Weight kg
☰	24 V	Standard	STB PDT 3100	0.130
		Basic	STB PDT 3105	0.130
~	115/230 V	Standard	STB PDT 2100	0.129
		Basic	STB PDT 2105	0.129

Replacement and optional parts

Description	Used for	Sold in lots of	Reference	Weight kg
Mounting base (width 18.4 mm)	Mounting of STB PDT ●10● power distribution modules on DIN rails	1	STB XBA 2200	0.035
Removable terminals (2-pin) (1)	Screw-type	10	STB XTS 1130	0.006
	Spring-type	10	STB XTS 2130	0.006
Keying pins	Keying between the power distribution module and its base (sold in lots of 60)	–	STB XMP 7700	–
	Keying between the power distribution module and removable terminals (sold in lots of 24) (2)	–	STB XMP 7810	–
User-customizable label sheets (3)	Bases and modules	25	STB XMP 6700	–
Grounding kit	Grounding for shielded cables. Kit comprises 1 bar (1 m) and 2 lateral supports	1	STB XSP 3000	–
Terminals for grounding kit	Cables with a cross-section of 1.5 to 6 mm ²	10	STB XSP 3010	–
	Cables with a cross-section of 5 to 11 mm ²	10	STB XSP 3020	–
Insulated screwdriver, 2.5 mm	Screw-type removable terminals	–	STB XTT 0220	–

Phaseo® regulator supplies - single phase switching

Output voltage	Line input voltage 47 to 63 Hz	Nominal power	Nominal current	Reference	Weight kg
24 V ☰	100 to 240 V	48 to 240 W	2 to 10 A	See page 121	–

Replacement parts

Designation	Description	Reference	Weight kg
Fuses	5 A (lot of 5) and 10 A (lot of 5)	STB XMP 5600	–

(1) All STB XTS ●●● connectors can accommodate a flexible wire with a maximum cross-section of 1.5 mm², including the cable end. For screw-type connectors, the maximum tightening torque is 0.25 Nm.

(2) Supplied with STB XTS 1130/2130 removable terminals.

(3) The template for the user-customizable labels is supplied on the documentation mini-CD-ROM.

Modicon® STB distributed I/O solution

Digital I/O modules

Applications

Digital (discrete) input modules

Direct current



Voltage

24 V $\overline{\text{DC}}$

Number of channels

2	4
---	---

Sensor type

2 or 3-wire + earth ground	2 or 3-wire
----------------------------	-------------

Inputs	Default logic
	Configurable logic
	Type (IEC/EN 61131-2)
	Internal power supply for 3-wire sensors

Positive		
Yes (1)	No	Yes (1)
Type 2	Type 1+	
Yes (2 outputs)	Yes (4 outputs)	

Response time	Off-to-on
	On-to-off

610 μs at 0.2 ms input filter time	3.5 ms	925 μs at 0.5 ms input filter time
625 μs at 0.2 ms input filter time	3.8 ms	1.35 μs at 0.5 ms input filter time

Filter time

0.2...16 ms	3 ms	0.5...16 ms
-------------	------	-------------

Connection (connectors included in kits)

Two connectors (6-way):
STB XTS 1100 (screw-type) or STB XTS 2100 (spring-type)

Base (included in kits)

STB XBA 1000

Power Distribution Modules (PDM) (2)	Voltage
	Reference

24 V $\overline{\text{DC}}$
STB PDT 3100/3105

Isolation	Channel-to-bus
	Channel-to-channel

1500 V $\overline{\text{DC}}$ for 1 minute
–

Protection against	Reverse polarity
	Short circuit and overload
	Electronic protection of sensor power supply

Yes
Yes, time-lag fuse on the Power Distribution Module (PDM)
Yes No Yes

Operating temperature (3)

-25 to 70°C (-13 to 158°F)	0 to 60°C (32 to 148°F)	-25 to 70°C (-13 to 158°F)
----------------------------	-------------------------	----------------------------

Module range

Standard	Basic	Standard
----------	-------	----------

Type of module

STB DDI 3230 K	STB DDI 3425 K	STB DDI 3420 K
-----------------------	-----------------------	-----------------------

Page

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(1) Adjustable with STB SPU 1 configuration software.
(2) One Power Distribution Module (PDM) is required per voltage type.
(3) Horizontal mounting.

Digital (discrete) input modules

Direct current



24 V $\overline{\text{DC}}$		
6		16
2-wire		2 or 3-wire
Positive		
No	Yes (1)	No
Type 1		Type 3
Non		Yes (4 outputs)
5.25 ms	1.21 ms	2 ms
5.75 ms	1.74 ms	2 ms
5 ms	1 ms	
Two connectors (6-way): STB XTS 1100 (screw-type) or STB XTS 2100 (spring-type)		Two connectors (18-way): STB XTS 1180 (screw-type) or STB XTS 2180 (spring-type)
STB XBA 1000		STB XBA 3000
24 V $\overline{\text{DC}}$		
STB PDT 3100/3105		
1500 V $\overline{\text{DC}}$ for 1 minute		
-		
Yes		
Yes, time-lag fuse on the Power Distribution Module (PDM)		
No		
0 to 60°C (32 to 148°F)	-25 to 70°C (-13 to 158°F)	-25 to 70°C (-13 to 158°F)
Basic	Standard	Basic
STB DDI 3615 K	STB DDI 3610 K	STB DDI 3725 KS, KC
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Modicon® STB distributed I/O solution

Digital I/O modules

Applications

Digital (discrete) output modules

Direct current (transistor)



Voltage

24 V $\overline{\text{DC}}$

Number of channels

2 4

Outputs

Default logic
Configurable logic
Internal power supply for 3-wire actuators

Positive			
Yes	No		Yes
Yes	No		

Load current

0.5 A 2 A 0.25 A 0.5 A

Response time

Off-to-on
On-to-off

620 μs at 0.5 A load	520 μs	560 μs at 0.25 A load	560 μs at 0.5 A load
575 μs at 0.5 A load	720 μs	870 μs at 0.25 A load	870 μs at 0.5 A load

Detected fault recovery response

User-configurable (1) Manual reset User-configurable (1)

Fall back modes

User-configurable (1) Fallback to 0 User-configurable (1)

Connection (connectors included in kits)

Two connectors (6-way): STB XTS 1100 (screw-type) or STB XTS 2100 (spring-type)

Base (included in kits)

STB XBA 1000

Power Distribution Modules (PDM) (2)

Voltage
Reference

24 V $\overline{\text{DC}}$
STB PDT 3100/3105

Isolation

Channel-to-bus
Channel-to-channel

1500 V $\overline{\text{DC}}$ for 1 minute		
–	500 V $\overline{\text{DC}}$ for 1 minute	–

Protection against

Reverse polarity
Short circuit and overload
Electronic protection of actuator power supply

Yes			
Yes (3)	(4)	Yes (3)	
Yes	Yes, with internal power supply	No	No

Operating temperature (5)

-25 to 70°C (-13 to 158°F) -25 to 70°C (-13 to 158°F) 0 to 60°C (32 to 148°F) -25 to 70°C (-13 to 158°F)

Module range

Standard Basic Standard

Type of module

STB DDO 3200 K **STB DDO 3230 K** **STB DDO 3415 K** **STB DDO 3410 K**

Page

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(1) Requires the STB SPU 1●●● configuration software.
 (2) One Power Distribution Module (PDM) is required per voltage type.
 (3) Built-in time-lag fuses on the Power Distribution Module (PDM).
 (4) If an external power supply is used, 2.5 A time-lag fuses are recommended on each channel. (Fuses are to be supplied by the user.)
 (5) Horizontal mounting.

Digital (discrete) output modules

Direct current (transistor)



24 V $\overline{\text{DC}}$

6	16
---	----

Positive

No	Yes	No
No		No

0.25 A	0.5 A	0.5 max. per channel
--------	-------	----------------------

550 μs at 250 mA resistive load	715 μs at 0.5 A load	2 ms at 0.5 A load
--	---------------------------------	--------------------

900 μs at 250 mA resistive load	955 μs at 0.5 A load	2 ms at 0.5 A load
--	---------------------------------	--------------------

Manual reset	User-configurable (1)	Manual reset
--------------	-----------------------	--------------

Fallback to 0	User-configurable (1)	Fallback to 0
---------------	-----------------------	---------------

Two connectors (6-way): STB XTS 1100 (screw-type) or STB XTS 2100 (spring-type) STB XBA 1000	Two connectors (18-way): STB XTS 1180 (screw-type) or STB XTS 2180 (spring-type) STB XBA 3000
---	--

24 V $\overline{\text{DC}}$

STB PDT 3100/3105

1500 V $\overline{\text{DC}}$ for 1 minute

–

Yes

Yes (3)

No

0 to 60°C (32 to 148°F)	-25 to 70°C (-13 to 158°F)	-25 to 70°C (-13 to 158°F)
-------------------------	----------------------------	----------------------------


Basic	Standard	Basic
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STB DDO 3605 K	STB DDO 3600 K	STB DDO 3705 KS, KC
-----------------------	-----------------------	----------------------------

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Modicon® STB distributed I/O solution

Digital I/O modules

Applications		Digital (discrete) output modules			
		Direct/alternating current (relay)		Alternating current (triac)	
					
Voltage		24 V $\overline{\text{DC}}$ (relay contact) 115/230 V \sim (relay contact)		115 V \sim	115/230 V \sim
Number of channels		2 C/O relays	2 relays (N/C + N/O)	2	
Outputs		Default logic Configurable logic Internal power supply for 3-wire actuators		Positive	–
		–		Yes (1)	–
		No		Yes	
Load current		2 A per contact	7 A per contact	2 A at 30°C (86°F) 1 A at 60°C (148°F)	
Response time		Off-to-on		5.25 ms	10 ms
		On-to-off		6.75 ms	10 ms
Detected fault recovery response		Manual reset		Automatic reset	User-configurable (1)
Fall back modes		User-configurable (1)			
Connection (connectors included in kits)		Two connectors (5-way): STB XTS 1100 (screw-type) or STB XTS 2110 (spring-type)			
Base (included in kits)		STB XBA 2000	STB XBA 3000	STB XBA 2000	
Power Distribution Modules (PDM) (2)		Voltage Reference		24 V $\overline{\text{DC}}$ (relay coil) STB PDT 3100/3105	– 115/230 V \sim – STB PDT 2100/2105
Isolation		Channel-to-bus Channel-to-channel		1780 V \sim for 1 minute 500 V \sim for 1 minute	1780 V \sim for 1 minute 1780 V \sim for 1 minute –
Protection against		Reverse polarity Short circuit and overload Electronic protection of actuator power supply		– Yes (3) No	Yes (4) No Yes (3)
Operating temperature (5)		–25 to 70°C (–13 to 158°F) (6)		0 to 60°C (32 to 148°F)	
Module range		Standard			
Type of module		STB DRC 3210 K	STB DRA 3290 K	STB DAO 5260 K	STB DAO 8210 K
Page		48			

(1) Requires the STB SPU 1●●● configuration software.

(2) One Power Distribution Module (PDM) is required per voltage type.

(3) Built-in time-lag fuses on the Power Distribution Module (PDM).

(4) 2.5 A time-lag fuses are recommended on each channel. (Fuses are to be supplied by the user.)

(5) Horizontal mounting.

(6) With limiting between 60°C and 70°C (148 and 158°F) (see page 47).

Modicon® STB distributed I/O solution

Digital I/O modules

Introduction

Modicon® STB digital input/output modules include:

- Input modules
- Solid state output modules
- Relay output modules

The basic digital I/O module offer includes:

- 3 digital input modules:
 - 4, 6, and 16 x 24 V $\overline{\text{DC}}$ input channels
- 3 digital output modules:
 - 4, 6, and 16 x 24 V $\overline{\text{DC}}$ output channels

The standard digital I/O module offer includes:

- 6 digital input modules:
 - 2, 4, and 6 x 24 V $\overline{\text{DC}}$ input channels
 - 2 x 115 V \sim input channels (2 modules)
 - 2 x 230 V \sim input channels
- 6 solid state digital output modules:
 - 2 x 24 V $\overline{\text{DC}}$ output channels (2 modules)
 - 4 and 6 x 24 V $\overline{\text{DC}}$ output channels
 - 2 x 115 V \sim output channels
 - 2 x 115/230 V \sim output channels
- 2 relay output modules:
 - 2 relays with 1 N/C contact and 1 N/O contact
 - 2 relays with 1 C/O contact

Description

The front panel of digital I/O modules include:

1 A display block providing the following indication:

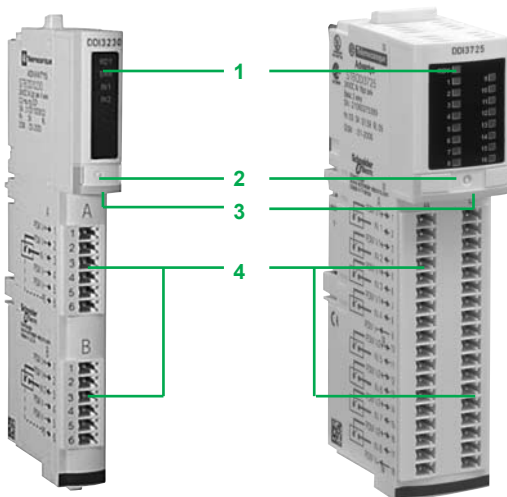
Indication	Basic I/O modules	Standard I/O modules
Module status: ready, pre-operational, operational	Green RDY LED	Green RDY LED
Module detected error (1)	– (2)	Red ERR LED
Status of each channel	Green LEDs IN1 to IN16 or OUT1 to OUT16 depending on module	Green LEDs IN1 to IN16 or OUT1 to OUT16 depending on module

- 2 A slot for a user-customizable label STB XMP 6700
- 3 A color-coded module identification stripe (See color codes on page 6.)
- 4 Two connectors for screw- or spring-type terminals

(1) RDY is on permanently if the module is operational and flashes differently in the other states. If ERR is on or flashing, the module is inoperative.

For information about module and channel status indication, refer to the "System Hardware Components Reference Guide" included on the STB SUS 8800 CD-ROM or available on our web site: www.schneider-electric.us.

(2) Basic I/O modules: A module detected error is indicated by the ERR LED on the station's Network Interface Module (NIM).



Modicon® STB distributed I/O solution

Digital I/O modules

Description (continued)

Mandatory parts to be ordered separately or included in kits

I/O module bases in 3 widths depending on the module:

Module size	Width	Base reference
1	13.9 mm	STB XBA 1000
2	18.4 mm	STB XBA 2000
3	28.1 mm	STB XBA 3000

These bases have:

- A slot for a user-customizable label STB XMP 6700 (1)
- 4 locations for placing the module/base keying pins (1).

Removable terminals

Connector type (2 connectors per module)	5-way	6-way	18-way
Screw terminals	STB XTS 1110 (pack of 20)	STB XTS 1100 (pack of 20)	STB XTS 1180 (pack of 2)
Spring terminals	STB XTS 2110 (pack of 20)	STB XTS 2100 (pack of 20)	STB XTS 2180 (pack of 2)

These removable terminals have between 5 and 18 different ways of coding the module/connector keying pins (1).

Optional parts to be ordered separately

Mechanical keying pins and identifiers

These devices help ensure that each I/O module, base and wiring connectors are properly matched after dismantling or replacement.

Keying of module and base (1)	Keying of module and connectors (1)	Module identification (2)	Base identification (2)
STB XMP 7700	STB XMP 7800	STB XMP 6700	STB XMP 6700

The user-customizable labels STB XMP 6700 make it much easier to recognize I/O modules and their bases.

External cable shielding connector

This optional device allows quick and easy connection of the external cable shielding (1).

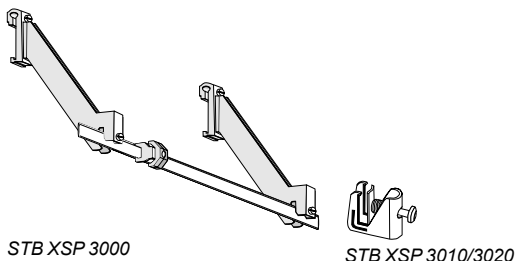
Connection and shielding kit Lateral supports and metal bar, length 1 m	STB XSP 3000
Cable clamp size 1 (pack of 10) for shielded cable with external diameter 1.5 to 6 mm ²	STB XSP 3010
Cable clamp size 2 (pack of 10) for shielded cable with external diameter 5 to 11 mm ²	STB XSP 3020

Digital input modules and digital output modules (24 V $\overline{\text{DC}}$, 115/220 V \sim and 2 A relay) include an optional ground connecting accessory.

For analog modules, it is advisable to use this device as it allows quick and easy connection of the external cable shielding (1).

(1) To find out how to code the keying pins and how to use the EMC kit, refer to the System Planning and Installation Guide included on the STB SUS 8800 CD-ROM or available on our web site: www.schneider-electric.us.

(2) Template file for printing labels on a laser printer (color or black and white) or manual marking with indelible felt pen: included on the mini CD-ROM supplied with each NIM network interface module or available on our web site: www.schneider-electric.us.



STB XSP 3000

STB XSP 3010/3020

Modicon® STB distributed I/O solution

Digital I/O modules

Digital output module operating modes

Output protection and reset following overload or short-circuit

Modicon® STB digital output module	Short-circuit and thermal overload protection	Actuator power supply protection	Reset	Diagnostics
Basic modules STB DDO 3415, 3605, 3705	Internal electronic	Via PDM fuse	On elimination of the detected fault	Per group of 2 channels
Standard modules STB DDO 3200, 3230 Actuator powered by the module	Internal electronic	Internal electronic	User-configurable (1)	Per channel
Standard modules STB DDO 3200, 3230 Actuator powered externally	Internal electronic	Via external fuse	User-configurable (1)	Per channel
Standard modules STB DDO 3410, 3600	Internal electronic	–	–	Per group of 2 channels
Standard modules STB DRC 3210, STB DRA 3290	External fuse	–	User-configurable (1)	–
Standard modules STB DAO 8210	External fuse	Via external fuse	User-configurable (1)	–
Standard modules STB DAO 5260	External fuse	–	User-configurable (1)	–

Behavior of digital output modules upon detected internal communication fault on the station or between PLC and NIM

Digital output STB module	Output fallback
Basic modules STB DDO 3415, 3605, 3705	0 (open output)
Standard modules STB DDO 3200, 3230, 3410, 3600 STB DRC 3210, STB DRA 3290 STB DAO 8210, STB DAO 5260	User-configurable (2)

(1) Reset is user-configurable: automatic on elimination of the detected fault (default factory configuration) or intentional by the PLC. Each model is independently configurable. This operation requires the Advantys™ STB SPU 1●●● configuration software. The tripping data is transmitted to the PLC via the NIM network interface module.

(2) Fallback is user-configurable: to 0 (default factory configuration), to 1, or to "hold last value" for warm standby and hot standby applications. Each output channel of each module is independently configurable. This operation requires the Advantys STB SPU 1●●● configuration software.

Modicon® STB distributed I/O solution

Digital I/O modules

Hot swapping and cold swapping of output modules			
Swapping a module	Hot swap		Cold swap
	Basic NIM	Standard NIM (3)	Any type of NIM
Basic digital output module	The other I/O modules fall back to level 0 (1)	The other I/O modules remain operational (2)	I/O modules and Power Distribution Modules (PDM) can be removed from the station. The removable connectors make it easier to do this.
Standard digital output module not configured "mandatory"	Not applicable (1)	The other I/O modules remain operational (1) (2)	
Standard digital output module configured "mandatory"	Not applicable (1)	Output fallback according to configuration (2) (3) Station in pre-operational mode. The inputs are no longer updated on the network/fieldbus.	
Power Distribution Module (PDM)	Illegal	Illegal	

(1) The STB SPU 1●●● configuration software cannot be connected to a basic NIM. Any basic or standard I/O module is reconfigured according to the default factory configuration.

(2) The STB SPU 1●●● configuration software can be connected via a standard NIM. Standard I/O modules can be configured. Basic modules are not configurable (default factory configuration only).

(3) For standard digital output modules, the fallback state is configurable:

- Fallback to level 0
- Fallback to level 1
- Fallback to predefined level of the output range for analog modules
- Hold last value

Modicon® STB distributed I/O solution

Direct current digital input modules

Specifications of DC digital input modules									
Type of module		STB	DDI 3230	DDI 3425	DDI 3420	DDI 3615	DDI 3610	DDI 3725	
Range			Standard	Basic	Standard	Basic	Standard	Basic	
Number of channels			2	4		6		16	
Nominal input values	Voltage	V	24 ---						
Type (IEC/EN 61131-2)			Type 2	Type 1+		Type 1		Type 3	
Input limit values	Frequency	Hz	-						
	At state 1	Voltage	V			11 to 30 ---		15 to 30 ---	11 to 30 ---
		Min. current	mA		6	2.5	2		
	At state 0	Voltage	V						-3 to +5 ---
		Max. current	mA		2	1.2	0.5		1.5
Input voltage values	Permanent voltage	V		30 ---					
	Absolute maximum voltage	V		56 --- for 1.3 ms, decaying pulse					
Typical input current (at 24 V ---)		mA		7.5	8	4.5			
Input logic	Default	Positive on each channel							
	User-configurable (1)		Positive or negative, selection by channel	-	Positive or negative, selection by channel	-	Positive or negative, selection by channel	-	
Input response time	Off-to-on	ms		0.610 with 0.2 input filter time	3.5	0.925 with 0.5 input filter time	5.25	1.21	2.0
	On-to-off	ms		0.625 with 0.2 input filter time	3.8	1.35 with 0.5 input filter time	5.75	1.74	2.0
Swapping	Cold swap	Yes							
	Hot swap	Yes, depending on NIM and whether module is mandatory. See table on page 43							
Protection against reverse polarity		Yes							
Isolation	Between channels and logic bus	V		2000 --- for 1 minute	1500 --- for 1 minute				
	Channel-to-channel	V		-					
Input protection		Resistor-limited							
Current supplied by the sensor		mA		100 per channel	50 per channel	100 per channel	-		
Electronic short-circuit protection (SCP)									
Input filter	Default	ms		1	3	1	5	1	
	User-configurable (1)	ms		0.20	-	0.50	-		
				0.50		1			
				1		2			
				2		4			
		4		8					
		8		16					
		16							
Tolerance	ms		± 0.1	-	± 0.25		-		
I/O base (included in kits)		STB XBA 1000						XBT XBA 3000	
Power Distribution Module (PDM)	Voltage	V		24 ---					
	Model	STB PDT 3100/3105							
	Power supply protection	Integrated time-lag fuse on the PDM module (2)							
Operating temperature, horizontal mounting		°C (°F)		-25 to 70°C (-13 to 158°F)	0 to 60°C (32 to 148°F)	-25 to 70°C (-13 to 158°F)	0 to 60°C (32 to 148°F)	-25 to 70°C (-13 to 158°F)	
Current consumption on 5 V --- logic bus		mA		55	45	45	55	100	

(1) Requires the Advantys™ STB SPU 1●●● configuration software

(2) Basic module: 5 A fuse
Standard module: 10 A fuse

Modicon® STB distributed I/O solution

Direct current digital output modules

Specifications of DC digital output modules										
Type of module		STB	DDO 3200	DDO 3230	DDO 3415	DDO 3410	DDO 3605	DDO 3600	DDO 3705	
Range			Standard		Basic	Standard	Basic	Standard	Basic	
Number of channels			2		4	6		16		
Nominal output values	Voltage	V	24 ---							
	Current per channel	A	0.5	2	0.25	0.5	0.25	0.5		
Output logic	Default		Positive for each channel							
	User-configurable (1)		(2)		–	(2)	–	(2)	–	
Output voltage values	Permanent voltage	V	19.2 to 30 ---							
	Absolute maximum voltage	V	56 --- for 1.3 ms, decaying voltage pulse							35 --- for 1.3 ms, decaying voltage pulse
Response time	Off-to-on		620 µs at 0.5 A load	520 µs	560 µs at 0.25 A load	560 µs at 0.5 A load	550 µs at 0.25 A load	715 µs at 0.5 A load	2 ms at 0.5 A load	
	On-to-off		575 µs at 0.5 A load	720 µs	870 µs at 0.25 A load	870 µs at 0.5 A load	900 µs at 0.25 A load	955 µs at 0.5 A load	2 ms at 0.5 A load	
Swapping	Cold swap		Yes							
	Hot swap		Yes, depending on NIM and whether module is mandatory. See table on page 43							
Protection against reverse polarity			Yes							
Isolation	Between channels and logic bus	V	1500 --- for 1 minute							
	Channel-to-channel	V	–	1500 --- for 1 minute	–					
Electronic protection of outputs against short-circuits and thermal overloads			Per group of 2 channels							Per group of 8 channels
	Feedback		Per channel	2 per channel, 4 or 6 per group (2 channels per group)					Per group of 8 channels	
	Reset		User-configurable reset with standard output modules and tripping data transmitted to NIM network interface module. Automatic reset on elimination of the detected fault with basic output modules (4)							
Leakage current (at state 0)	mA		0.4 at 30 V --- max.	1 at 30 V --- max.	0.4 at 30 V --- max.					
Maximum peak current	A		5 at 500 µs (up to 6 per minute)	10 at 500 µs (up to 6 per minute)	2.5 at 500 µs (up to 6 per minute)	5 at 500 µs (up to 6 per minute)	2.5 at 500 µs (up to 6 per minute)	5 at 500 µs (up to 6 per minute)	Automatic limit per channel	
Maximum load	Capacity	µF	50							
	Inductance		0.5 H at 4 Hz switching frequency $L = 0.5/I^2 \times F$ (5)							1.0 at 4 Hz
Minimum load current	mA		0.5	2	–	0.5	–	0.5	–	
Fallback on detected COM fault	Default state		Fallback to 0							
	User-configurable (1)		Yes (6)			–	Yes (6)		–	
Reset on detected COM fault	Default state		Manual reset by user required							
	User-configurable (1)		Yes (7)			–	Yes (7)		–	
I/O base (included in kits)			STB XBA 1000							STB XBA 3000
Power Distribution Module (PDM)	Voltage	V	24 ---							
	Model		STB PDT 3100/3105							
	Power supply protection		Integrated time-lag fuse on the PDM module (8)	(9)	Integrated time-lag fuse on the PDM module (8)					
Operating temperature, horizontal mounting	°C (°F)		-25 to 70°C (-13 to 158°F)		0 to 60°C (32 to 148°F)	-25 to 70°C (-13 to 158°F)	0 to 60°C (32 to 148°F)	-25 to 70°C (-13 to 158°F)		
Current consumption on 5 V --- logic bus	mA		50	45	70	90		135		

(1) Requires the Advantys™ STB SPU 1●●● configuration software
 (2) Positive or negative, selection by channel
 (3) With standard NIM module only
 (4) For basic module STB DDO 3705: automatic reset per groups of 8 channels, 1 to 8 and 9 to 16
 (5) L = load inductance (H), I = load current (A), F = switching frequency (Hz)
 (6) Fallback state: hold last value, set to predefined value (0 or 1) on each channel individually
 (7) Manual or automatic reset, configurable for standard output modules on a station equipped with a standard NIM module
 (8) Standard modules: 10 A fuse; basic modules: 5 A fuse
 (9) 2.5 A time-lag fuses recommended on each channel, supplied by the user

Modicon® STB distributed I/O solution

Alternating current digital input modules

Specifications of AC digital input modules					
Type of module	STB	DAI 5230	DAI 5260	DAI 7220	
Range		Standard			
Number of channels		2			
Nominal input values	Voltage	V	115 ~ (50/60 Hz)	230 ~ (50/60 Hz)	
Type (IEC/EN 61131-2)		Type 1			
Input logic	Default		Positive	–	
	User-configurable (1)		Yes, per channel (1)	–	
Input response time	Off-to-on	ms	1.5 network period		
	On-to-off	ms	1.5 network period		
Input limit values	Frequency	Hz	47 to 63		
	At state 1	Voltage	V	74 to 132 ~	159 to 256 ~
		Min. current	mA	4	
	At state 0	Voltage	V	0 to 20 ~	0 to 40 ~
Max. current		mA	2		
Input voltage values	Permanent voltage	V	132 ~	265 ~	
	SFib	V	200 ~ for 1 cycle	400 ~ for 1 cycle	
Swapping	Cold swap		Yes		
	Hot swap		Yes, depending on NIM and whether module is mandatory. See table on page 43		
Protection against reverse polarity		–			
Isolation	Between channels and logic bus	V	1780 ~ for 1 minute		
	Channel-to-channel	V	–	1780 ~ for 1 minute	–
Input protection			Resistor-limited	Metal oxide varistor-limited	Resistor-limited
Current supplied by the sensor	Electronic short-circuit protection (SCP)	mA	60 max.	–	
Input filter	Default	ms	–		
	User-configurable (1)	ms	–		
	Tolerance	ms	–		
I/O base (included in kits)		STB XBA 2000			
Power Distribution Module (PDM)	Voltage	V	115/230 ~		
	Model		STB PDT 2100/2105		
	Power supply protection	A	Time-lag fuse on the PDM module (3)	External 0.5 A fuse required	Time-lag fuse on the PDM module (3)
Operating temperature, horizontal mounting		°C (°F)	0 to 60°C (32 to 148°F)		
Current consumption on 5 V ∴ logic bus		mA	40	45	40

(1) Requires the Advantys™ STB SPU 1●●● configuration software
 (2) Basic NIM modules do not support hot swapping of input/output modules.
 (3) Basic module: 5 A fuse
 Standard module: 10 A fuse

Modicon® STB distributed I/O solution

Alternating current and relay digital output modules

Specifications of AC and relay output modules						
Type of module		STB	DRC 3210	DRA 3290	DAO 5260	DAO 8210
Range			Standard			
Number of channels			2 C/O	2 N/C and N/O	2	
Output nominal values	Voltage	V	24 $\bar{\bar{\bar{\cdot}}}$, 115/230 \sim		115 \sim	115/230 \sim
	Current per channel/contact	A	2 at 24 V $\bar{\bar{\bar{\cdot}}}$	7 at 24 V $\bar{\bar{\bar{\cdot}}}$	2 at 30°C (86°F)	
			2 at 230 V \sim	7 at 230 V \sim	1 at 60°C (148°F)	
Output logic	Default		Positive on both channels			
	User-configurable (2)		Positive or negative by channel			
Limit voltage	Permanent	V	5 to 30 $\bar{\bar{\bar{\cdot}}}$, 20 to 250 \sim		74 to 132 \sim	20 to 265 \sim
	Absolute maximum	V	–		132 \sim	300 \sim for 10 s 400 \sim for 1 cycle
Response time	Off-to-on		5.25 ms	10 ms	0.5 \sim period	10 ms
	On-to-off		6.75 ms	10 ms	0.5 \sim period	10.5 ms
Switching capability		VA	600 (resistive load)	2100 (resistive load)	–	
Relay contact life	Mechanical		10 ⁶ operations			
	Electrical		10 ⁵ operations (resistive load at max. voltage and current)			
Swapping	Cold swap		Yes			
	Hot swap		Yes, depending on NIM and whether module is mandatory. See table on page 43			
Isolation	Between channels and logic bus	V	1780 \sim for 1 minute			
	Channel-to-channel	V	500 \sim for 1 minute		1780 \sim for 1 minute	–
	Logic bus to actuator bus	V	1500 $\bar{\bar{\bar{\cdot}}}$ for 1 minute			
Output surge protection (internal)			Yes, by GMOV (300 V rms, 385 V $\bar{\bar{\bar{\cdot}}}$, 400 Joules max. for 20 μ s, 0.1 W max.) (1)		External 5 A fuse required	Transient voltage by varistance and RC
Leakage current (at state 0)		mA	–		2 at 132 V \sim max.	2.5 at 230 V \sim 2 at 115 V \sim
Maximum peak current per relay/channel		A	Capacitive load of 20 at t = 10 ms			
Minimum load current		mA	50		1	5
Fallback on detected COM fault	Default state		2 relays de-energized		Both channels to 0	
	User-configurable (2)		Fallback state: hold last value or set to predefined value (0 or 1) on each channel individually			
Reset on detected COM fault	Default state		Manual: Reset by user required			
	User-configurable (2)		–		Manual or automatic reset	
I/O base (included in kits)			STB XBA 2000	STB XBA 3000	STB XBA 2000	
Power Distribution Module (PDM)	Coil voltage	V	24 $\bar{\bar{\bar{\cdot}}}$		–	
	Model		STB PDT 3100/3105		STB PDT 2100/2105	
	Coil protection		10 A time-lag fuse on PDM module			
Operating temperature, horizontal mounting		°C (°F)	-25 to 60°C (-13 to 148°F) (3)		0 to 60°C (32 to 148°F)	
Current consumption on 5 V $\bar{\bar{\bar{\cdot}}}$ logic bus		mA	55	55	70	45

(1) For greater protection, an RC circuit, a freewheel diode or a GMOV peak limiter appropriate to the voltage should be mounted in parallel across the terminals of each actuator.

(2) Requires the Advantys™ STP SPU 1●●● configuration software.

(3) -25 to 70°C (-13 to 158°F) in the following conditions:

- Only one N/O channel at any time, to be managed by the application. Example: control of both directions of motor travel
- Maximum load: 2 A for STB DRC 3210, 4 A for STB DRA 3290
- Maximum supply voltage 24.5 V $\bar{\bar{\bar{\cdot}}}$

Modicon® STB distributed I/O solution

Digital I/O modules
Connection kits

References

The references for input or output modules with connection kit include the following items:

- Suitable base for the module
- "K" references: screw-type connectors and spring-type connectors
- "KS" references: screw-type connectors
- "KC" references: spring-type connectors

Basic digital input modules: connection kits

Input voltage	Connectors	Number of channels	Compliance with IEC/EN 61131-2	Reference	Weight kg
24 V $\overline{\text{DC}}$	screw-type and spring-type	4	Type 1+	STB DDI 3425 K	0.111
		6	Type 1	STB DDI 3615 K	0.112
	screw-type spring-type	16	Type 3	STB DDI 3725 KS STB DDI 3725 KC	0.086

Standard digital input modules: connection kits

Input voltage	Connectors	Number of channels	Compliance with IEC/EN 61131-2	Reference	Weight kg
24 V $\overline{\text{DC}}$	screw-type and spring-type	2	Type 2	STB DDI 3230 K	0.110
		4	Type 1+	STB DDI 3420 K	0.111
		6	Type 1	STB DDI 3610 K	0.112
115 V \sim		2	Type 1	STB DAI 5230 K	0.120
115 V \sim (external supply)		2 (isolated)	Type 1	STB DAI 5260 K	0.065
230 V \sim		2	Type 1	STB DAI 7220 K	0.122

Modicon® STB distributed I/O solution

Digital I/O modules
Connection kits

References (continued)

Basic digital output modules: connection kits

Output voltage	Connectors	Output current	Number of channels	Compliance with IEC/EN 61131-2	Reference	Weight kg
24 V $\overline{\text{DC}}$	screw-type and spring-type	0.25 A	4	Yes	STB DDO 3415 K	0.110
			6	Yes	STB DDO 3605 K	0.114
	screw-type and spring-type	0.5 A	16	Yes	STB DDO 3705 KS STB DDO 3705 KC	0.086

Standard digital output modules: connection kits

Output voltage	Connectors	Output current	Number of channels	Compliance with IEC/EN 61131-2	Reference	Weight kg
24 V $\overline{\text{DC}}$	screw-type and spring-type	0.5 A	2	Yes	STB DDO 3200 K	0.112
		2 A	2	Yes	STB DDO 3230 K	0.116
	0.5 A	4	Yes	STB DDO 3410 K	0.110	
		6	Yes	STB DDO 3600 K	0.114	

Standard relay output modules: connection kits

Output voltage	Connectors	Output current	Number of channels	Compliance with IEC/EN 61131-2	Reference	Weight kg
24 V $\overline{\text{DC}}$ or 115/230 V \sim (relay)	screw-type and spring-type	2 A	2	Yes	STB DRC 3210 K	0.130
		7 A	2	Yes	STB DRA 3290 K	0.130

Standard triac output modules: connection kits

Output voltage	Connectors	Output current	Number of channels	Compliance with IEC/EN 61131-2	Reference	Weight kg
115 V \sim	screw-type and spring-type	2 A	2 (isolated)	Yes	STB DAO 5260 K	0.067
115/230 V \sim			2	Yes	STB DAO 8210 K	0.125

Modicon® STB distributed I/O solution

Digital I/O modules
Modules only



STB DDI 3230



STB DDO 3200



STB DRC 3210



STB DRA 3290

References (continued)

Basic digital input modules: modules only

Input voltage	Number of channels	Compliance with IEC/EN 61131-2	Reference	Weight kg
24 V $\overline{\text{DC}}$	4	Type 1+	STB DDI 3425	0.111
	6	Type 1	STB DDI 3615	0.112
	16	Type 3	STB DDI 3725	0.086

Standard digital input modules: modules only

Input voltage	Number of channels	Compliance with IEC/EN 61131-2	Reference	Weight kg
24 V $\overline{\text{DC}}$	2	Type 2	STB DDI 3230	0.110
	4	Type 1+	STB DDI 3420	0.111
	6	Type 1	STB DDI 3610	0.112
115 V \sim	2	Type 1	STB DAI 5230	0.120
115 V \sim (external supply)	2 (isolated)	Type 1	STB DAI 5260	0.065
230 V \sim	2	Type 1	STB DAI 7220	0.122

Basic digital output modules: modules only

Output voltage	Output current	Number of channels	Compliance with IEC/EN 61131-2	Reference	Weight kg
24 V $\overline{\text{DC}}$	0.25 A	4	Yes	STB DDO 3415	0.110
		6	Yes	STB DDO 3605	0.114
	0.5 A	16	Yes	STB DDO 3705	0.086

Standard digital output modules: modules only

Output voltage	Output current	Number of channels	Compliance with IEC/EN 61131-2	Reference	Weight kg
24 V $\overline{\text{DC}}$	0.5 A	2	Yes	STB DDO 3200	0.112
		2	Yes	STB DDO 3230	0.116
	0.5 A	4	Yes	STB DDO 3410	0.110
		6	Yes	STB DDO 3600	0.114

Standard relay output modules: modules only

Output voltage	Output current	Number of channels	Compliance with IEC/EN 61131-2	Reference	Weight kg
24 V $\overline{\text{DC}}$ or 115/230 V \sim (relay)	2 A	2	Yes	STB DRC 3210	0.130
	7 A	2	Yes	STB DRA 3290	0.130

Standard triac output modules: modules only

Output voltage	Output current	Number of channels	Compliance with IEC/EN 61131-2	Reference	Weight kg
115 V \sim	2 A	2 (isolated)	Yes	STB DAO 5260	0.067
115/230 V \sim	2 A	2	Yes	STB DAO 8210	0.125

Modicon® STB distributed I/O solution

Digital I/O modules
Separate parts



STB XBA 1000



STB DDI 3230



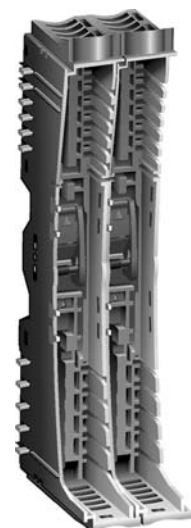
STB DDO 3200



STB XBA 2000



STB DRC 3210



STB XBA 3000



STB DRA 3290

References (continued)

Mandatory separate parts (1)

Description	Base width	For I/O modules	Reference	Weight kg
I/O bases	13.9 mm	STB DDI STB DDO	STB XBA 1000	0.024
	18.4 mm	STB DAI STB DAO STB DRC	STB XBA 2000	0.028
	28.1 mm	STB DRA	STB XBA 3000	0.048

Description	Specifications	Connection type	For I/O modules	Reference	Weight kg
Removable terminals Sold in lots of 20 (2)	6-way	Screw-type	STB DDI STB DDO	STB XTS 1100	0.006
		Spring-type	STB DDI STB DDO	STB XTS 2100	0.006
	5-way	Screw-type	STB DAI STB DAO STB DRC STB DRA	STB XTS 1110	0.006
		Spring-type	STB DAI STB DAO STB DRC STB DRA	STB XTS 2110	0.006

Removable terminals Sold in lots of 2 (2)	18-way	Screw-type	STB DDI 3725 STB DDO 3705	XBT XTS 1180	0.047
		Spring-type	STB DDI 3725 STB DDO 3705	STB XTS 2180	0.034

Optional separate parts

Description	Used for	Sold in lots of	Reference	Weight kg
Keying pins	Modules	60	STB XMP 7700	–
	Removable terminals	96	STB XMP 7800	–
User-customizable label sheets (3)	I/O bases and modules	25	STB XMP 6700	–

(1) Except for module/base/connector kits STB D●●●●● K/KS/KC

(2) Connectors can accommodate a flexible wire with a maximum cross-section of 1.5 mm², including the cable end. For screw connectors, max. tightening torque = 0.25 Nm.

(3) The template for the user-customizable labels is supplied on the documentation mini-CD-ROM.

Modicon® STB distributed I/O solution

Digital I/O modules

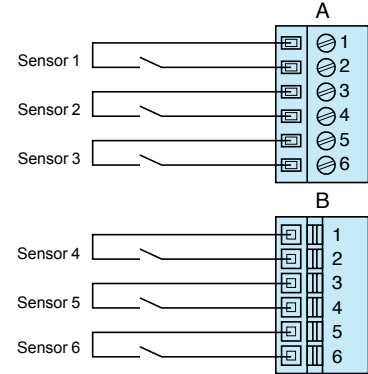
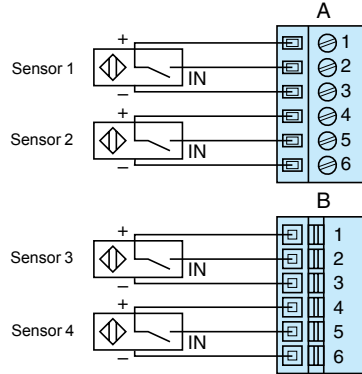
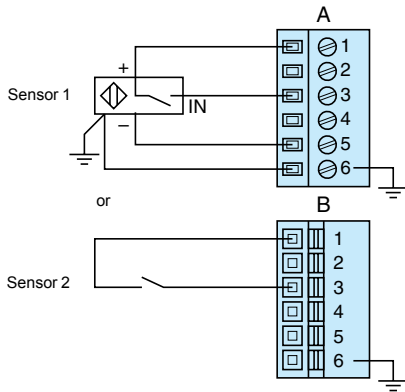
Connections

DC digital input modules

STB DDI 3230

STB DDI 3420/3425

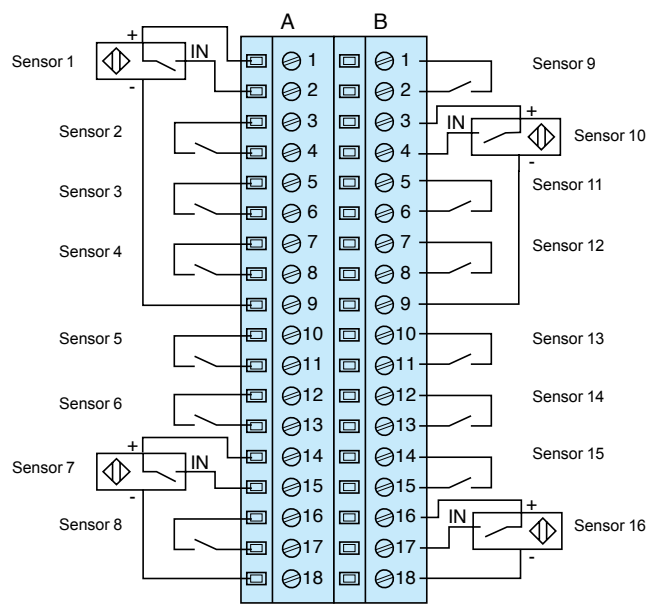
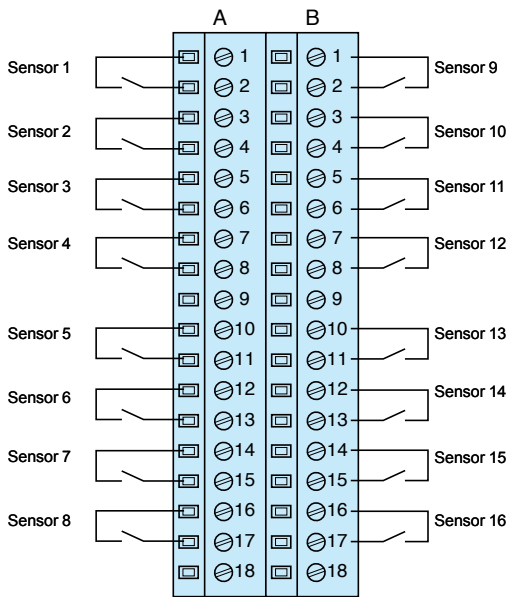
STB DDI 3610/3615



STB DDI 3725

16 two-wire sensors

1 three-wire sensor per input group (1)



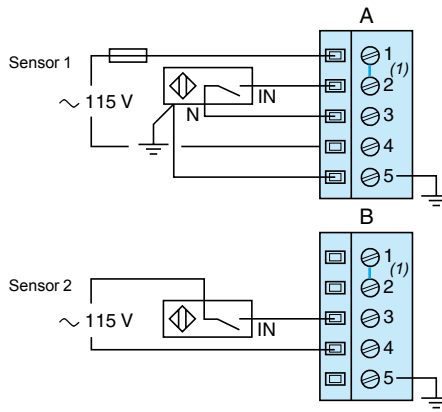
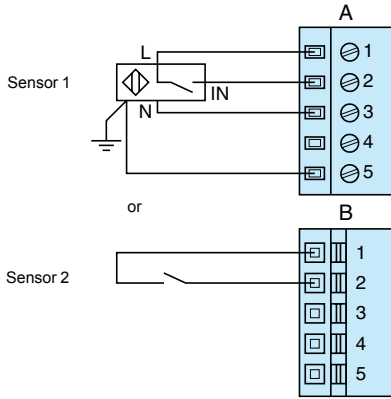
(1) Group 1: Contacts 1 to 9 on connector A
 Group 2: Contacts 10 to 18 on connector A
 Group 3: Contacts 1 to 9 on connector B
 Group 4: Contacts 10 to 18 on connector B

Connections (continued)

AC digital input modules

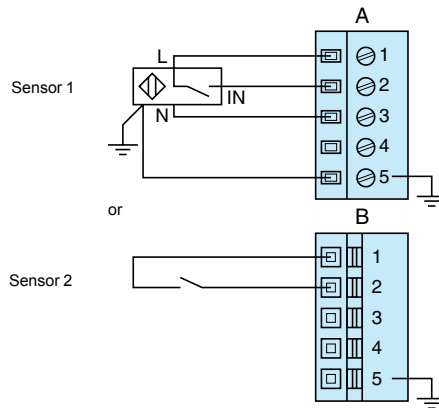
STB DAI 5230

STB DAI 5260



(1) Link internal to module

STB DAI 7220



Modicon® STB distributed I/O solution

Digital I/O modules

Connections (continued)

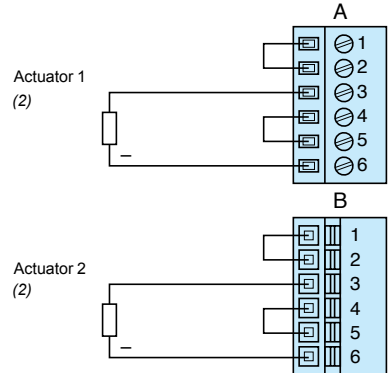
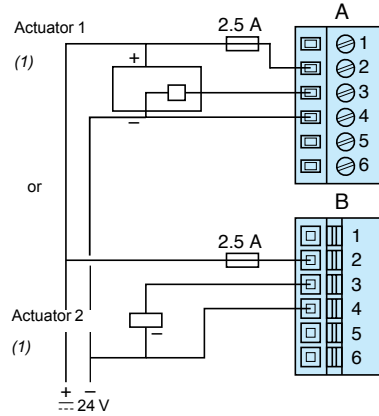
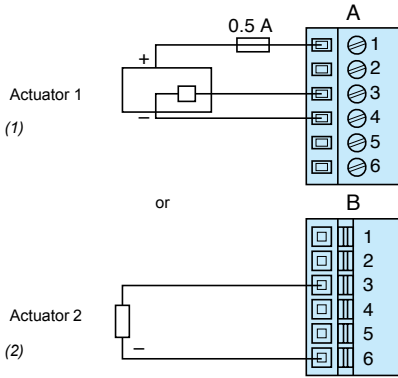
DC digital output modules

STB DDO 3200

STB DDO 3230

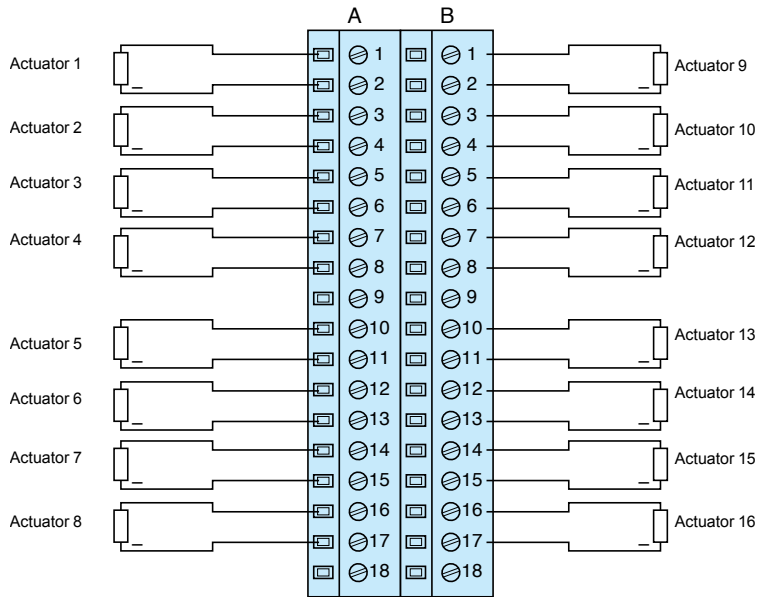
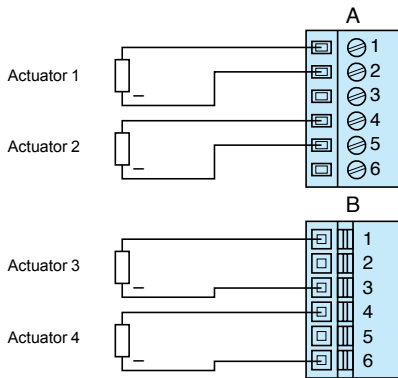
1 three-wire actuator and 1 two-wire actuator with external 24 V $\overline{\text{AC}}$ power supply

2 two-wire actuators powered via the PDM module

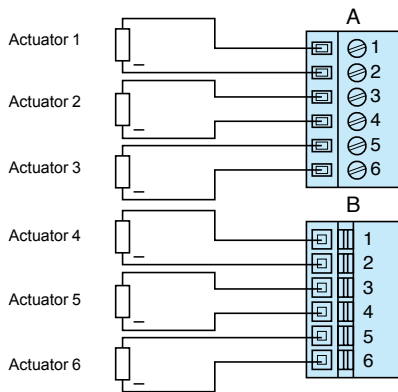


STB DDO 3410/3415

STB DDO 3705



STB DDO 3600/3605



(1) Actuator is protected by external fuse (depending on use).

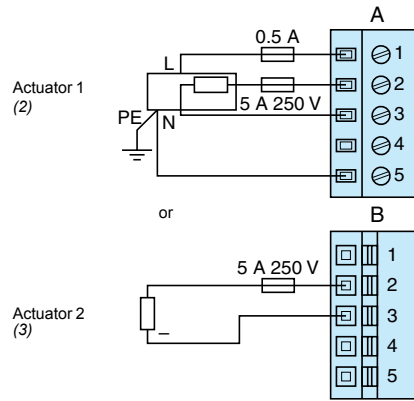
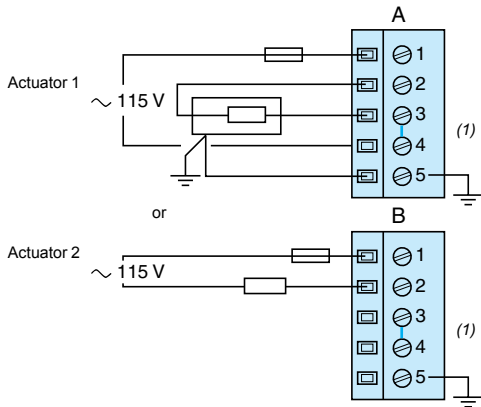
(2) Actuator is protected by fuse integrated in Power Distribution Module (10 A fuse with STB PDT 3100/2100 or 5 A fuse with STB PDT 3105/2105).

Connections (continued)

AC digital output modules

STB DAO 5260

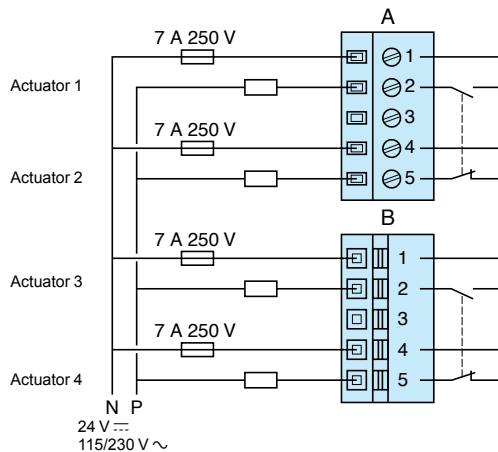
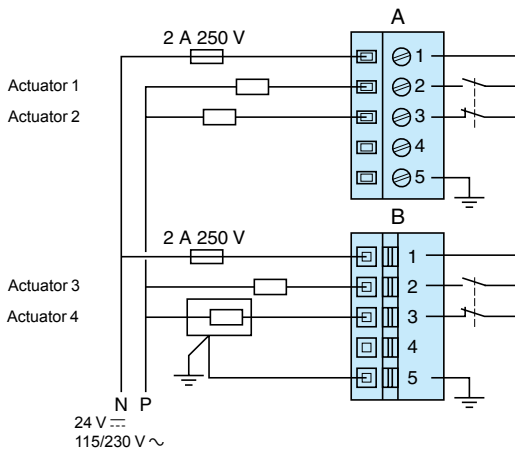
STB DAO 8210



DC/AC (relay) digital output modules

STB DRC 3210

STB DRA 3290



(1) Link is internal to module.

(2) Actuator is protected by external fuse (depending on use).

(3) Actuator is protected by fuse integrated in Power Distribution Module (10 A fuse with STB PDT 3100/2100 or 5 A fuse with STB PDT 3105/2105).

Modicon® STB distributed I/O solution

Analog input modules

Applications

Analog input modules

Voltage



Number of channels			
Range			
Resolution			
Isolation	Channel-to-channel		
Response time			
Acquisition period			
Acquisition or update time			
Internal power supply for 3-wire inputs	Yes		
Connection (connectors included in kits)	2 x STB XTS 1100 screw-type or STB XTS 2100 spring-type 6-way connectors		
Base (included in kits)	STB XBA 1000		
Power Distribution Modules (PDM) (1)	Voltage	24 V $\bar{\text{---}}$	
	Reference	STB PDT 3100/3105	
Fallback states	–		
Protection against	Reverse polarity	Yes	
	Short circuit and overload	Yes, time-lag fuse on the Power Distribution Module (PDM)	
	Electronic protection of sensor power supply	No	Yes
	Cut sensor wire detection	No	Yes (2)
Operating temperature (3)	0 to 60°C (32 to 148°F)		
Range	Basic	Standard	

	2		
	0 to 10 V	-10...+10 V	
	10 bits	9 bits + sign	11 bits + sign
	30 V $\bar{\text{---}}$ (when sensor voltage is separate from logic bus voltage)		
	5 ms for both channels		
	–		
	10 ms for both channels		
	Yes		
	2 x STB XTS 1100 screw-type or STB XTS 2100 spring-type 6-way connectors		
	STB XBA 1000		
	24 V $\bar{\text{---}}$		
	STB PDT 3100/3105		
	–		
	Yes		
	Yes, time-lag fuse on the Power Distribution Module (PDM)		
	No	Yes	
	No	Yes (2)	
	0 to 60°C (32 to 148°F)		
	Basic	Standard	

Type of module

STB AVI 1255 K	STB AVI 1275 K	STB AVI 1270 K
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(1) One Power Distribution Module (PDM) is required per voltage group.
 (2) Requires Advantys™ STB SPU 1●●● configuration software.
 (3) Horizontal mounting.



4	8
1 to 5 V 0 to 5 V 0 to 10 V -5 V to +5 V -10 V to +10 V	
15 bits + sign	
30 V --- (when sensor voltage is separate from logic bus voltage)	
-	
-	
13 ms	22 ms for 8 channels
-	
2 x STB XTS 1100 screw-type or STB XTS 2100 spring-type 6-way connectors	
STB XBA 1000	
24 V ---	
STB PDT 3100/3105	
-	
Yes	
No	
Yes	
Yes (2)	
-25 to 70°C (-13 to 158°F)	
Standard	

STB AVI 0300	STB AVI 1400
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Modicon® STB distributed I/O solution

Analog input modules

Applications

Analog input modules

Current



Number of channels	2	
Range	4 to 20 mA	0...20 mA
Resolution	10 bits	12 bits
Isolation Channel-to-channel	30 V --- (when sensor voltage is separate from logic bus voltage)	
Response time	5 ms for both channels	
Acquisition period	-	
Acquisition or update time	10 ms for both channels	
Internal power supply for 3-wire inputs	Yes	
Connection (connectors included in kits)	2 x STB XTS 1100 screw-type or STB XTS 2100 spring-type 6-way connectors	
Base (included in kits)	STB XBA 1000	
Power Distribution Modules (PDM) (1) Voltage	24 V ---	
Reference	STB PDT 3100/3105	
Fallback states	-	
Protection against Reverse polarity	Yes, time-lag fuse on the Power Distribution Module (PDM)	
Short circuit and overload	-	
Electronic protection of sensor power supply	No	Yes
Cut sensor wire detection	No	Yes (2)
Operating temperature (3)	0 to 60°C (32 to 148°F)	-25 to 70°C (-13 to 158°F)
Range	Basic	Standard

Type of module

STB ACI 1225 K	STB ACI 1230 K
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(1) One Power Distribution Module (PDM) is required per voltage group.
 (2) Requires Advantys™ STB SPU 1●●● configuration software.
 (3) Horizontal mounting.

Multi range



4		8		2	
4 to 20 mA and 0...20 mA		4 to 20 mA, 0...20 mA and HART protocol tolerant		4 to 20 mA and 0...20 mA	
15 bits + sign				Thermocouples B, E, J, K, R, S and T Temperature probe Pt 100, Pt 1000, Ni 100, Ni 1000, Cu 10 ± 80 mV	
200 V ~		30 V ~ (when sensor voltage is separate from logic bus voltage)		-	
8 ms for 4 channels		80 ms for 4 channels		-	
10 ms for 4 channels		85 ms for 4 channels		22 ms for 8 channels	
No		Yes		150... 360 ms (depending on the range) 10 ms for both channels	
2 x STB XTS 1100 screw-type or STB XTS 2100 spring-type 6-way connectors					
STB XBA 2000				STB XBA 1000	
24 V ~					
STB PDT 3100/3105					
-					
Yes, time-lag fuse on the Power Distribution Module (PDM)					
-				Yes, time-lag fuse on the Power Distribution Module (PDM)	
No					
Yes (2)		Yes (4 to 20 mA only)		Yes (2)	
-25 to 70°C (-13 to 158°F)				0 to 70°C (32 to 158°F)	
Standard					

STB ACI 0320 K

STB ACI 8320 K

STB ACI 1400 K

STB ART 0200 K

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Modicon® STB distributed I/O solution

Analog output modules

Applications

Analog output modules

Voltage



Number of channels			
Range			
Resolution			
Isolation	Channel-to-channel		
Load current/channel (outputs)			
Response time			
Acquisition period			
Acquisition or update time			
Internal power supply for 3-wire inputs			
Connection (connectors included in kits)			
Base (included in kits)			
Power Distribution Modules (PDM) (1)	Voltage	Reference	
Detected COM fault fallback positions			
Protection against	Reverse polarity	Yes	
	Short circuit and overload	2.5 A time-lag fuses recommended on each channel. To be supplied by the user	
	Electronic protection of sensor power supply	No	Yes
Operating temperature (4)	0 to 60°C (32 to 148°F)		-25 to 70°C (-13 to 158°F)
Range	Basic		Standard

	2		
	0...10 V	-10 to +10 V	0...+10 V, -10...+10 V
			1...5 V 0...5 V 0...10 V -5...+5 V -10...+10 V
	10 bits	9 bits + sign	11 bits + sign or 12 bits
	30 V --- (when actuator voltage is separate from logic bus voltage)		200 V ---
	5 mA		150 mA
	3 ms for both channels		4 ms
	-		Adjustable up to 255 ms
	25 ms for both channels		8 ms
	Yes		-
	2 x STB XTS 1100 screw-type or STB XTS 2100 spring-type 6-way connectors		
	STB XBA 1000		STB XBA 2000
	24 V ---		
	STB PDT 3100/3105		
	0 V on both channels		(2)
	Yes		
	2.5 A time-lag fuses recommended on each channel. To be supplied by the user		
	No		Yes
	0 to 60°C (32 to 148°F)		-25 to 70°C (-13 to 158°F)
	Basic		Standard

Type of module

STB AVO 1255 K	STB AVO 1265 K	STB AVO 1250 K	STB AVO 0200 K
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(1) One Power Distribution Module (PDM) is required per voltage group.
 (2) Hold last value: reset to 0 V on both channels; go to a predefined value (between 0 V and full scale) on each channel.
 (3) By default, reset to zero on both channels. Each channel individually adjustable: hold the value, go to a predefined value between 0 and 100% of the output range.
 (4) Horizontal mounting.

Current



1	2		
4...20 mA		0...20 mA	4...20 mA 0...20 mA
15 bits + sign	10 bits	12 bits	15 bits + sign
–	30 V $\overline{\text{---}}$ (when actuator voltage is separate from logic bus voltage)		–
4...20 mA			
12 ms	3 ms for both channels		4 ms for both channels
–	–		
8 ms	25 ms for both channels		–
Yes	No		
1 x STB XTS 1100 screw-type or STB XTS 2100 spring-type 6-way connector	2 x STB XTS 1100 screw-type or STB XTS 2100 spring-type 6-way connectors		
STB XBA 2000	STB XBA 1000		STB XBA 2000
24 V $\overline{\text{---}}$			
STB PDT 3100/3105			
(2)	4 mA on both channels	(2)	(3)
–	Yes		
Yes, time-lag fuse on the Power Distribution Module (PDM)			
–	No		
-25 to 70°C (-13 to 158°F)	0 to 60°C (32 to 148°F)		-25 to 70°C (-13 to 158°F)
Standard	Basic	Standard	

STB ACO 0120 K	STB ACO 1225 K	STB ACO 1210 K	STB ACO 0220 K
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Modicon® STB

distributed I/O solution

Analog input/output modules

Introduction

The STB analog inputs allow the acquisition of various analog values encountered in industrial applications.

The STB analog outputs are used to control analog-controlled actuators such as variable speed drives, proportional control valves, etc.

The basic analog I/O module offer includes:

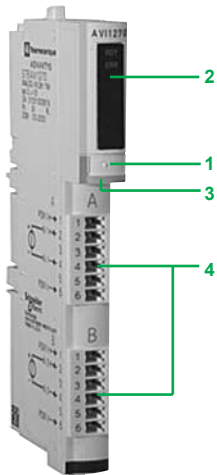
- 3 analog input modules:
 - 2 analog voltage input channels 0 to 10 V
 - 2 analog current input channels ± 10 V
 - 2 analog current input channels 4...20 mA
- 3 analog output modules:
 - 2 analog channels, current output 0...10 V
 - 2 analog channels, current output ± 10 V
 - 2 analog channels, voltage output 4...20 mA

The standard analog I/O module offer includes:

- 8 analog input modules:
 - 2 analog voltage input channels ± 10 V
 - 2 analog current input channels 0...20 mA
 - 2 channels for thermocouple, temperature probe or voltage (mV)
 - 4 analog input channels 15 bits + sign, current 4...20 mA and 0...20 mA
 - 4 analog input channels 15 bits + sign, current 4...20 mA and 0...20 mA, HART protocol tolerant
 - 4 analog input channels 15 bits + sign, voltage 1..5 V, 0...5 V, 0 to 10 V, -5 V to +5 V, -10 V to +10 V
 - 8 analog input channels 15 bits + sign, voltage 1..5 V, 0...5 V, 0 to 10 V, -5 V to +5 V, -10 V to +10 V
 - 8 analog input channels 15 bits + sign, current 4 to 20 mA and 0 to 20 mA
- 5 analog output modules:
 - 1 analog channel, current output 4 to 20 mA, 15 bits + sign
 - 2 analog channels, current output 0...10 V or ± 10 V
 - 2 analog channels, current output 0...20 mA
 - 2 analog channels, current output 4...20 mA and 0...20 mA, 15 bits + sign
 - 2 analog channels, voltage output 1..5 V, 0...5 V, 0 to 10 V, -5 V to +5 V, -10 V to +10 V, 15 bits + sign

Modicon® STB distributed I/O solution

Analog input/output modules



Description

Analog I/O modules have the following on the front panel:

- 1 A slot for a user-customizable label
- 2 A display block showing the state of the module (RDY, ERR)

Indication	Basic analog I/O modules	Standard analog I/O modules
Module status (1)	Green RDY LED	Green RDY LED
Module detected error (2)	–	Red ERR LED

- 3 A color-coded module identification stripe (See color codes on page 6.)
- 4 Two connectors for screw- or spring-type terminals

The module kits comprise:

- An STB XBA 1000 mounting base, width 13.9 mm or STB XBA 2000, width 18.4 mm.
- Removable terminals (6-way), screw-type STB XTS 1100 or spring-type STB XTS 2100.

To be ordered separately:

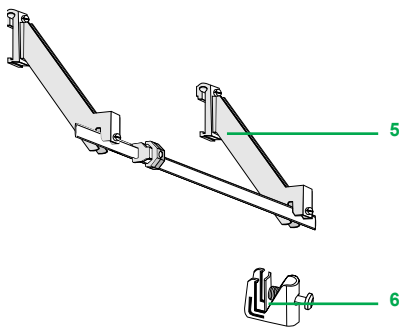
- Grounding of the cable shielding is mandatory. The optional grounding kit STB XSP 3000 can also be used to secure cables in installations subject to severe vibration.

- 5 Optional grounding kit STB XSP 3000
- 6 Terminals STB XSP 3010 for cables with cross-section 1.5 to 6 mm² or STB XSP 3020 for cables with cross-section 5 to 11 mm².

Optional mechanical keying pins:

- Between I/O module and I/O base: STB XMP 7700
 - Between wiring connectors and I/O module: STB XMP 7800
- These devices help ensure that the I/O modules, bases and wiring connectors are properly matched after dismantling or replacement.

- User-customizable label sheets: STB XMP 7600



(1) RDY LED on: Module OK. RDY LED off: No power from PDM. RDY LED flashing: Detected fault present.

(2) ERR LED on: Internal detected error. ERR LED off: Module OK. ERR LED flashing: Module detected error. Refer to the "System Hardware Components Reference Guide" included on the STB SUS 8800 CD-ROM or available on our web site: www.schneider-electric.us.

Modicon® STB distributed I/O solution

Analog input modules

Specifications of analog input modules						
Type of module	STB	AVI 1255	AVI 1270	AVI 1275	AVI 0300	AVI 1400
Type		Basic	Standard	Basic	Standard	
Number of channels		2			4	8
Range		0 to 10 V	± 10 V		1 to 5 V 0 to 5 V 0 to 10 V -5 V to +5 V -10 V to +10 V	
Resolution		bits	10	11 + sign	9 + sign	15 bits + sign
Isolation	Between channels and sensor bus	V	30 --- (sensor bus power supply separate from sensor power supply)			
	Between channels and logic bus	V	1500 --- for 1 minute			
Maximum input values		50 V ---				
Response time		ms	5 for both channels			–
Swapping	Cold swap		Yes			
	Hot swap		Yes, depending on NIM and whether module is mandatory. See table on page 43			
Data format		Compliance with IEC/EN 61131-2				
Update time		ms	10 for both channels			–
Input filter		Single low-pass filter at 25 Hz cut-off frequency				
Integral linearity		% of full scale	± 0.2			
Differential linearity		Monotonic				
Input impedance		Ω	400 K			
Current supplied to sensors, per channel		mA	100			
Electronic short-circuit protection			No	Yes	No	
Power supply impedance		kΩ	1 max.			
Absolute accuracy			± 0.5% of full scale at 25°C (77°F)		± 0.75% of full scale at 25°C (77°F)	
Temperature drift			± 0.01% of full scale per °C			
Addressing			2 words (1 data word per channel)	4 words (2 words per channel)	2 words (1 data word per channel)	
I/O base (included in kits)			STB XBA 1000			
Power Distribution Module (PDM)	Voltage	V	24 ---			
	Model		STB PDT 3100/3105			
Operating temperature, horizontal mounting		°C (°F)	0 to 60 (32 to 148)			-25 to 70 (-13 to 158)
Current consumption on 5 V --- logic bus		mA	30			90

(1) Basic NIM modules do not support hot swapping of input/output modules.

Modicon® STB distributed I/O solution

Analog input modules

Specifications of analog input modules (continued)						
Type of module	STB	ACI 1225	ACI 1230	ACI 0320	ACI 8320	ACI1400
Type		Basic	Standard			
Number of channels		2		4		8
Range		4 to 20 mA	0 to 20 mA (1)	4 to 20 mA and 0 to 20 mA		
Resolution	bits	10	12	15 + sign		
Isolation	Between channels and sensor bus	V	30 --- (3)	200 ---		30 --- (3)
	Between channels and logic bus	V	1500 --- for 1 minute	1780 ~ for 1 minute		1500 --- for 1 minute
Maximum input values		25 mA at 50 V ---				25 mA
Response time	ms	5 for both channels		–		
Swapping	Cold swap	Yes				
	Hot swap	Yes, depending on NIM and whether module is mandatory. See table on page 43				
Data format		Compliance with IEC/EN 61131-2				
Update time	ms	10 for both channels		10 for all 4 channels	80 for all 4 channels	22 ms for all 8 channels
Cut-off frequency of low-pass input filter	Hz	25		985		
Integral linearity	% of full scale	± 0.2	± 0.1	± 0.05		± 0.08
Differential linearity		Monotonic		–	Monotonic	
Input impedance	Ω	≤ 300		250	≤ 250	
Current supplied to sensors, per channel	mA	100		25	100	
Electronic short-circuit protection		No	Yes			No
Power supply impedance	kΩ	–				
Absolute accuracy		± 0.5% of full scale at 25°C (77°F)		± 0.4% at 25°C (77°F)		± 0.4% of full scale per °C
Temperature drift		± 0.01% of full scale per °C		± 0.005% per °C		± 0.005% of full scale per °C
Addressing		2 words (1 word per channel)	4 words (2 words per channel)	8 words (2 words per channel)		16 words (8 data words, 8 status words)
I/O base (included in kits)		STB XBA 1000		STB XBA 2000		
Power Distribution Module (PDM)	Voltage	V				
	Model	24 ---				
		STB PDT 3100/3105				
Operating temperature, horizontal mounting	°C (°F)	0 to 60 (32 to 148)	-25 to 70 (-13 to 158)			
Current consumption on 5 V --- logic bus	mA	30		95	90	

(1) If the STB ACI 1230 module is configured with the STB SPU 1000 software, a zero offset can be set, e.g. 4 to 20 mA.

(2) Basic NIM modules do not support hot swapping of input/output modules.

(3) Sensor bus power supply separate from sensor power supply.

Modicon® STB distributed I/O solution

Analog input modules

Specifications of analog input modules (continued)			
Type of module	STB	ART 0200	
Type	Standard		
Number of channels		2 multi ranges in any configuration	
Range		2, 3 or 4-wire temperature probes: Pt 100, Pt 1000, Ni 100, Ni 1000 and Cu 10	
		B, E, J, K, R, S, T thermocouples	
		Voltage ± 80 mV	
Resolution	bits		
Isolation	Between channels and sensor bus	V	–
	Between channels and logic bus	V	1500 ~ for 1 minute
Maximum input values		±7.5 V ∓	
Response time	ms	See details on page 67.	
Swapping	Cold swap		
	Hot swap		
Data format			
Update time	ms	See details on page 67.	
Cut-off frequency of low-pass input filter	Hz	25	
Integral linearity	% of full scale	See details on page 67.	
Differential linearity			
Input impedance	Ω	–	
Current supplied to sensors, per channel	mA	100	
Electronic short-circuit protection			
Power supply impedance	kΩ		
Absolute accuracy		See details on page 67.	
Temperature drift		See details on page 67.	
Addressing		2 words (2 words per channel + 1 word for cold-junction compensation)	
I/O base (included in kits)		STB XBA 1000	
Power Distribution Module (PDM)	Voltage	V	
	Model		
Operating temperature, horizontal mounting	°C (°F)	0 to 70 (32 to 158)	
Current consumption on 5 V ∓ logic bus	mA	30	

(1) If the STB ACI 1230 module is configured with the STB SPU 1000 software, a zero offset can be set; for example, 4 to 20 mA.
 (2) Basic NIM modules do not support hot swapping of input/output modules.
 (3) Sensor bus power supply separate from sensor power supply.

Modicon® STB distributed I/O solution

Analog input modules

Detailed specifications of STB ART 0200 analog input module				B	E	J	K	R	S	T	
Thermocouple range											
Temperature unit				°C (by default) or °F							
Nominal values		°C (°F)	130 to 1820 (266 to 3308)	-270 to 1000 (-454 to 1832)	-210 to 1200 (-346 to 2192)	-270 to 1370 (-454 to 2498)	-50 to 1768 (-58 to 3214)	-50 to 1726 (-50 to 3139)	-270 to 400 (-454 to 752)		
Resolution				0.1°C or °F							
Broken wire detection				Monitored independently on each channel							
Conversion time	With internal cold-junction compensation	ms	230 at 50 Hz 210 at 60 Hz								
	With external cold-junction compensation	ms	400 at 50 Hz 360 at 60 Hz								
Accuracy (thermocouple detected errors not included)	With internal cold-junction compensation	at 25°C (77°F)	°C (°F)	± 4.6	± 4.6	± 5.1	± 4	± 3.6	± 4.1	± 4.4	
		at 60°C (140°F)	°C (°F)	± 6.8	± 6.8	± 7.0	± 5.5	± 4.2	± 5.0	± 6.4	
	With external cold-junction compensation	at 25°C (77°F)	°C (°F)	± 1.75							
		at 60°C (140°F)	°C (°F)	± 2.85							
Temperature probe range				Pt 100		Pt 1000		Ni 100	Ni 1000	Cu 10	
Type				2, 3 or 4-wire (3-wire by default)							
Temperature unit				°C (by default) or °F							
Nominal values	IEC	°C (°F)	-200 to +850 (-328 to 1562) (by default)					-60 to +180 (-76 to 356)		-100 to +260 (-148 to 500)	
	US/JIS	°C (°F)	-100 to +450 (-148 to 842)					-			
Resolution				0.1°C or °F							
Broken wire detection				Monitored independently on each channel							
Max. wiring resistance	4-wire	Ω	50 (IEC/US/JIS)		500 (IEC/US/JIS)		50	500	50		
	2 or 3-wire	Ω	20 (IEC/US/JIS)		200 (IEC/US/JIS)		20	200	20		
Conversion time	3-wire	ms	340 at 50 Hz 300 at 60 Hz								
	2 or 4-wire	ms	200 at 50 Hz 180 at 60 Hz								
Accuracy (temperature probe tolerances are not included)	25°C (77°F) internal	°C (°F)	± 1					± 1		± 4	
	25°C (77°F) external	°C (°F)	± 2					± 1		± 4	
Voltage											
Range		mV	± 80 (± 81.92)								
Resolution				Increments of 0.01 mV							
Conversion time		ms	170 at 50 Hz 150 at 60 Hz								
Input impedance		MΩ	10 (standard)								
Accuracy	25°C (77°F) internal	% of full scale	± 0.1								
	25°C (77°F) external	% of full scale	± 0.15 at ambient temperature								

Modicon® STB distributed I/O solution

Analog output modules

Specifications of analog output modules								
Type of module		STB	AVO 1255	AVO 1265	AVO 1250	AVO 0200		
Type			Basic		Standard			
Number of channels			2					
Range			0... 10 V	± 10 V	0... 10 V ± 10 V	1... 5 V 0... 5 V	0... 10 V ± 5 V	± 10 V
Resolution		bits	10	9 + sign	11 + sign or 12	15 + sign		
Isolation	Between channels and actuator bus	V	30 --- (actuator bus power supply separate from actuator power supply)				200 ---	
	Between channels and logic bus	V	1500 --- for 1 minute					
Output current per channel		mA	5		Up to 5		150	
Response time		ms	3				4	
Swapping	Cold swap		Yes					
	Hot swap		Yes, depending on NIM and whether module is mandatory. See table on page 43					
Data format			Compliance with IEC/EN 61131-2					
Update time		ms	25 for both channels				8	
Conversion time		µs	–					
Short-circuit protection on the outputs			Yes					
Integral linearity			± 0.1% of full scale, typical				± 0.05% of full scale, typical	
Differential linearity			Monotonic					
Absolute accuracy			± 0.5% of full scale at 25°C (77°F)				± 0.3% of full scale at 25°C	
Temperature drift			± 0.01% of full scale per °C					
Fallback states	Default	V	0 V on 2 channels					
	User-configurable (1)		–		Hold last value; assign a predefined value			
Fallback mode			Predefined		User configurable			
Addressing			2 output data words		2 output data words and 2 non-adjacent input data bytes (module and channel status diagnostics)		4 words (2 output data words, 2 input status words)	
I/O base (included in kits)			STB XBA 1000				STB XBA 2000	
Power Distribution Module (PDM)	Voltage	V	24 ---					
	Model		STB PDT 3100/3105					
Operating temperature, horizontal mounting		°C (°F)	0 to 60 (32 to 148)				-25 to 70 (-13 to 158)	
Current consumption on 5 V --- logic bus		mA	45				265	

(1) Requires Advantys™ configuration software.

Modicon® STB distributed I/O solution

Analog output modules

Specifications of analog output modules						
Type of module	STB	ACO 0120	ACO 1225	ACO 1210	ACO 0220	
Type		Standard	Basic	Standard		
Number of channels		1	2			
Range		4... 20 mA		0... 20 mA (1)	4... 20 mA and 0... 20 mA	
Resolution	bits	15 + sign	10	12	15 + sign	
Isolation	Between channels and logic bus	V	1500 V $\overline{\text{---}}$ for 1 minute			
	Between channels and actuator bus	V	500	30 V $\overline{\text{---}}$ (2)	200 V $\overline{\text{---}}$	
Output current per channel	mA	3.5...20, 38	20			
Response time	ms	4 plus update time	3		–	
Swapping	Cold swap	Yes				
	Hot swap	Yes, depending on NIM and whether module is mandatory. See table on page 43				
Data format		Compliance with IEC/EN 61131-2				
Update time	ms	8 at $\pm 0.1\%$ of final value	25 for both channels		–	
Conversion time		–	900 ms at $\pm 0.1\%$ of final value		4 ms for both channels	
Short-circuit protection on the outputs		Yes			–	
Integral linearity		$\pm 0.05\%$ of full scale	$\pm 0.1\%$ of full scale, typical		$\pm 0.5\%$ of full scale, typical	
Differential linearity		Monotonic				
Absolute accuracy		0.3% of full scale at 25°C	$\pm 0.5\%$ of full scale per °C		$\pm 0.3\%$ at 25°C	
Temperature drift		$\pm 0.01\%$ of full scale per °C			$\pm 0.005\%$ of full scale per °C	
Fallback states	Default	V	Minimum output (4 mA)	4 mA on 2 channels	Minimum output (0 mA)	
	User-configurable (3)		Hold last value, assign a predefined value	–	Hold last value, assign a predefined value	
Fallback mode			User configurable	Predefined	User configurable	
Addressing			2 words: 1 output data word and 1 input status word	2 output data words	2 output data words plus 1 word for configuring the fallback state	–
I/O base (included in kits)			STB XBA 2000	STB XBA 1000	STB XBA 2000	
Power Distribution Module (PDM)	Voltage	V	24 V $\overline{\text{---}}$			
	Model		STB PDT 3100/3105			
Operating temperature, horizontal mounting	°C (°F)	-25 to 70 (-13 to 158)	0 to 60 (32 to 148)		-25 to 70 (-13 to 158)	
Current consumption on 5 V $\overline{\text{---}}$ logic bus	mA	155	40	40	210	

(1) If the STB ACI 1230 module is configured with the STB SPU 1000 software, a zero offset can be set; for example, 4 to 20 mA.

(2) Actuator bus power supply separate from actuator power supply.

(3) Requires Advantys™ configuration software.

Modicon® STB distributed I/O solution

Analog input/output modules

Connection kits

References

The Modicon® STB analog input or output modules are available in "K" kit version, which includes the appropriate base for the module, two screw-type connectors and two spring-type connectors.

Standard analog input modules: connection kits

Input signal	Connectors	Number of channels	Isolation between channels	Resolution (bits)	Reference	Weight kg
± 10 V	Screw-type and spring-type	2	No	11 + sign	STB AVI 1270 K	0.115
		4	Yes	15 + sign	STB AVI 0300 K	–
		8	No	15 + sign	STB AVI 1400 K	–
0...20 mA		2	No	12	STB ACI 1230 K	0.116
4...20 mA and 0...20 mA		4	Yes	15 + sign	STB ACI 0320 K	–
4...20 mA and 0...20 mA, HART tolerant		4	Yes	15 + sign	STB ACI 8320 K	–
Thermocouples ± 80 mV		2	No	15 + sign	STB ART 0200 K	–

Basic analog input modules: connection kits

Input signal	Connectors	Number of channels	Isolation between channels	Resolution (bits)	Reference	Weight kg
-10 to +10 V	Screw-type and spring-type	2	No	9 + sign	STB AVI 1275 K	0.115
0...10 V		2	No	10	STB AVI 1255 K	0.116
4 to 20 mA		2		10	STB ACI 1225 K	–
		8	No	15 + sign	STB ACI 1400 K	–

Modicon® STB distributed I/O solution

Analog input/output modules

Connection kits

References (continued)

Standard analog output modules: connection kits

Output signal	Connectors	Number of channels	Isolation between channels	Resolution (bits)	Reference	Weight kg
0... 10 V or ± 10 V	Screw-type and spring-type	2	No	12	STB AVO 1250 K	0.116
		2	Yes	15 + sign	STB AVO 0200 K	–
		1	–	15 + sign	STB ACO 0120 K	–
0... 20 mA		2	Yes	12	STB ACO 1210 K	0.117
4...20 mA and 0...20 mA		2	Yes	15 + sign	STB ACO 0220 K	–

Basic analog output modules: connection kits

Output signal	Connectors	Number of channels	Isolation between channels	Resolution (bits)	Reference	Weight kg
-10 to +10 V	Screw-type and spring-type	2	No	9 + sign	STB AVO 1265 K	0.115
0...10 V		2	No	10	STB AVO 1255 K	0.116
4 to 20 mA		2	No	10	STB ACO 1225 K	–

Modicon® STB distributed I/O solution

Analog input/output modules
Modules only



STB AVI 1270



STB AVO 1250

References (continued)

Standard analog input modules: modules only					
Input signal	Number of channels	Isolation between channels	Resolution (bits)	Reference	Weight kg
± 10 V	2	No	11 + sign	STB AVI 1270	0.115
	4	Yes	15 + sign	STB AVI 0300	–
	8	No	15 + sign	STB AVI 1400	–
0...20 mA	2	No	12	STB ACI 1230	0.116
4...20 mA and 0...20 mA	4	Yes	15 + sign	STB ACI 0320	–
4...20 mA and 0...20 mA, HART tolerant	4	Yes	15 + sign	STB ACI 8320	–
Thermocouples ± 80 mV	2	No	15 + sign	STB ART 0200	–

Basic analog input modules: modules only					
Input signal	Number of channels	Isolation between channels	Resolution (bits)	Reference	Weight kg
-10 to +10 V	2	No	9 + sign	STB AVI 1275	0.115
0...10 V	2	No	10	STB AVI 1255	0.116
4 to 20 mA	2		10	STB ACI 1225	–
	8	No	15 + sign	STB ACI 1400	–

Standard analog output modules: modules only					
Output signal	Number of channels	Isolation between channels	Resolution (bits)	Reference	Weight kg
0... 10 V or ± 10 V	2	No	12	STB AVO 1250	0.116
	2	Yes	15 + sign	STB AVO 0200	–
	1	–	15 + sign	STB ACO 0120	–
0... 20 mA	2	Yes	12	STB ACO 1210	0.117
4...20 mA and 0...20 mA	2	Yes	15 + sign	STB ACO 0220	–

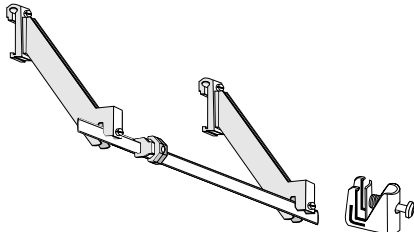
Basic analog output modules: modules only					
Output signal	Number of channels	Isolation between channels	Resolution (bits)	Reference	Weight kg
-10 to +10 V	2	No	9 + sign	STB AVO 1265	0.115
0...10 V	2	No	10	STB AVO 1255	0.116
4 to 20 mA	2	No	10	STB ACO 1225	–

Modicon® STB distributed I/O solution

Analog input/output modules
Separate parts



STB XBA 1000



STB XSP 3000



STB XSP 3010/3020

References (continued)

Separate parts (1)

Description	Base width	For I/O modules	Reference	Weight kg
I/O base	13.9 mm	STB AVI STB ACI 1230/1225 STB ART STB AVO STB ACO	STB XBA 1000	0.024
	18.4 mm	STB ACI 0320/8320	STB XBA 2000	—

Description	Connection type	For I/O modules	Sold in lots of	Reference	Weight kg
Removable terminals (6 contacts) (2)	Screw-type	STB AVI STB ACI STB ART STB AVO STB ACO	20	STB XTS 1100	0.006
	Spring-type	STB AVI STB ACI STB ART STB AVO STB ACO	20	STB XTS 2100	0.006

Description	Used for	Sold in lots of	Reference	Weight kg
2.5 mm insulated screwdriver	Removable screw terminals	—	STB XTT 0220	—
Grounding kit	Grounding for shielded cables Consisting of 1 bar (length 1 m) and 2 lateral supports	—	STB XSP 3000	—
Terminals for grounding kit	Cables with cross-section 1.5...6 mm ²	10	STB XSP 3010	—
	Cables with cross-section 5...11 mm ²	10	STB XSP 3020	—
Keying pins	Modules	60	STB XMP 7700	—
	Removable terminals	96	STB XMP 7800	—
User-customizable labels (3)	I/O bases and modules	25 sheets	STB XMP 6700	—

(1) Except for module/base/connector kits STB A●●●●● K.

(2) Connectors can accommodate a flexible wire with a maximum cross-section of 1.5 mm², including the cable end. For screw-type connectors, max. tightening torque: 0.25 Nm.

(3) The template for the user-customizable labels is supplied on the documentation mini CD-ROM.

Modicon® STB distributed I/O solution

Analog input/output modules

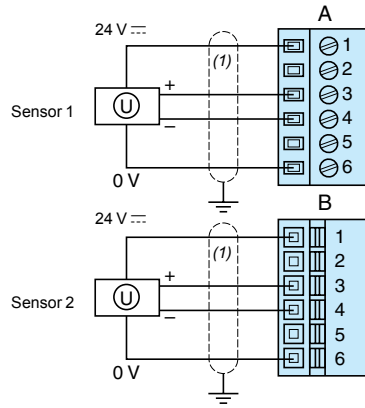
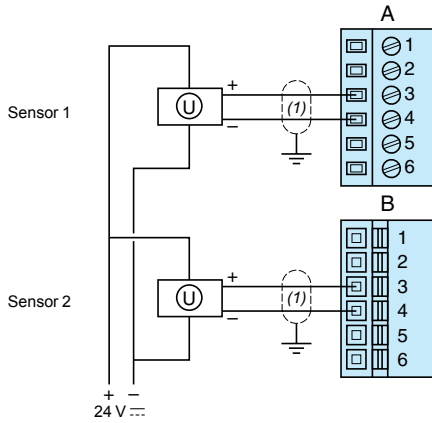
Connections

Analog input modules

STB AVI 1255/1270/1275

2 isolated analog sensors, external 24 V $\overline{\text{DC}}$ power supply

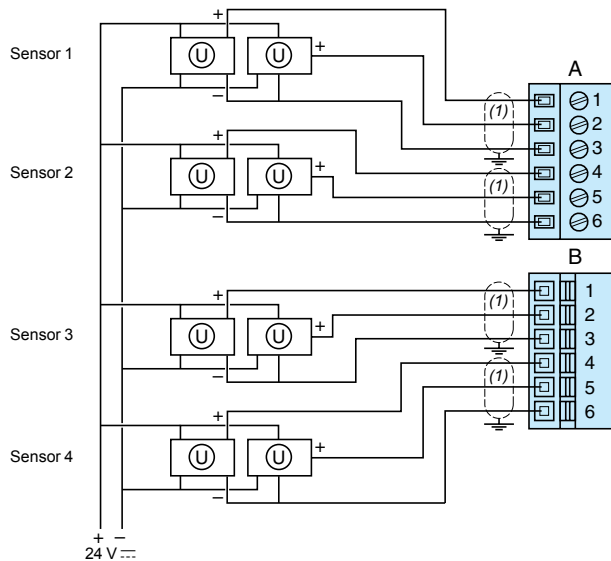
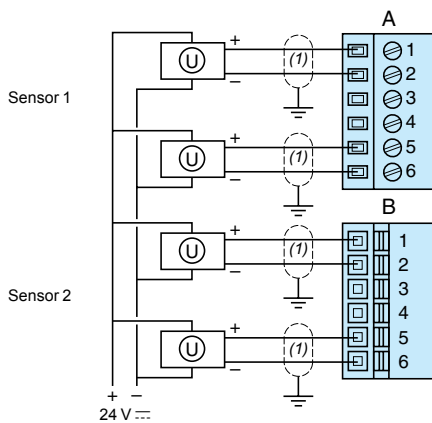
2 analog sensors, 24 V $\overline{\text{DC}}$ supplied by PDM module



STB AVI 0300

2 isolated analog sensors, external 24 V $\overline{\text{DC}}$ power supply

STB AVI 1400



(1) STB XSP 3000 grounding kit with STB XSP 3010/3020 terminals mandatory.

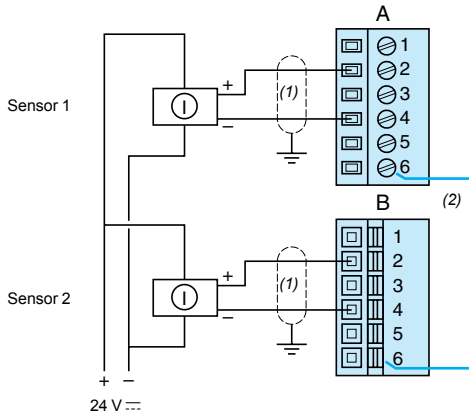


Connections (continued)

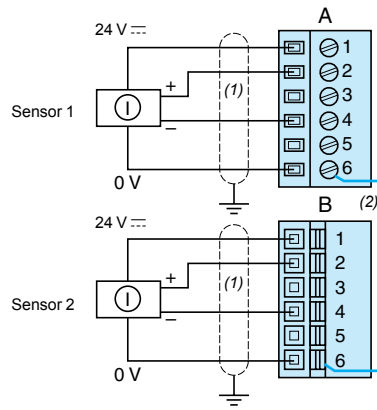
Analog input modules

STB ACI 1225/1230

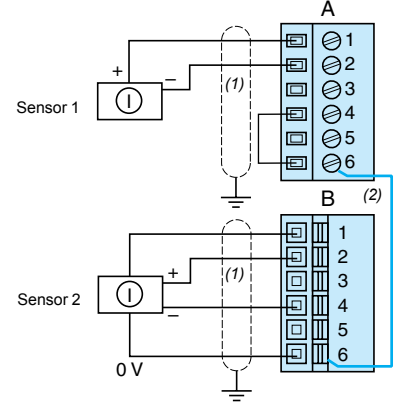
2 isolated analog sensors, external 24 V $\overline{\text{DC}}$ power supply



2 analog sensors, 24 V $\overline{\text{DC}}$ supplied by PDM module

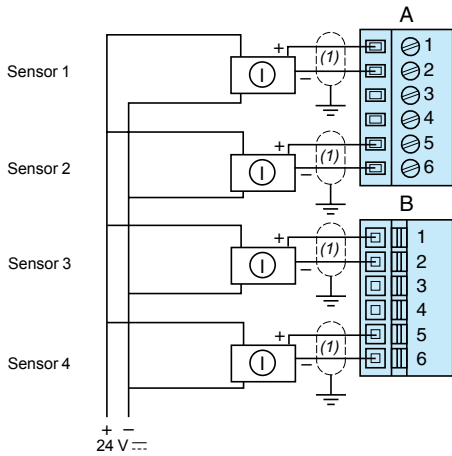


2 analog sensors requiring a power loop

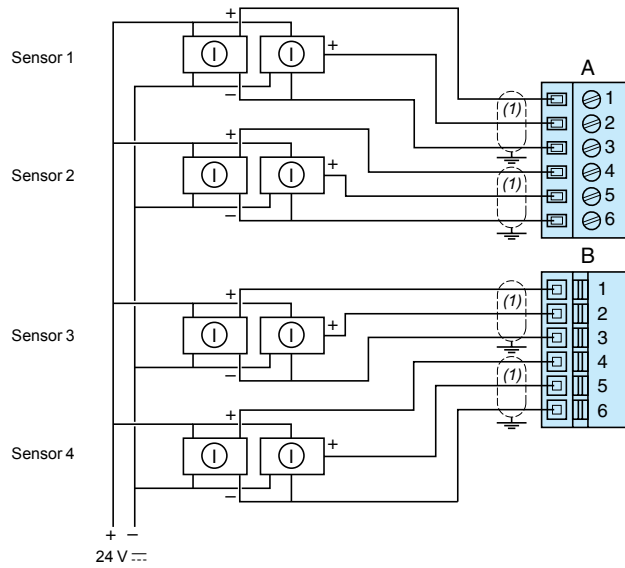


STB ACI 0320/8320

4 isolated analog sensors, external 24 V $\overline{\text{DC}}$ power supply



STB ACI 1400



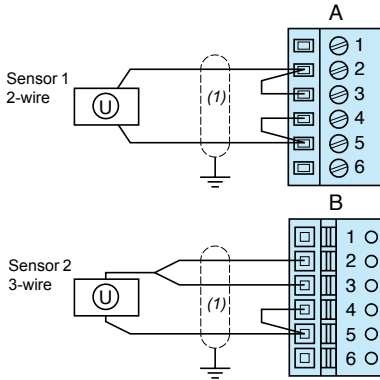
(1) STB XSP 3000 grounding kit with STB XSP 3010/3020 terminals mandatory.
 (2) Internal connection.

Connections (continued)

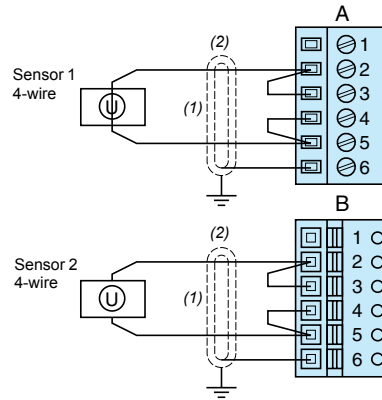
Analog input modules

STB ART 0200

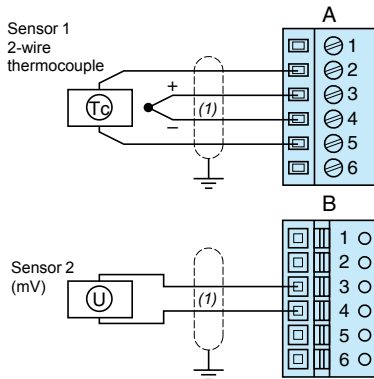
2 and 3-wire temperature probes



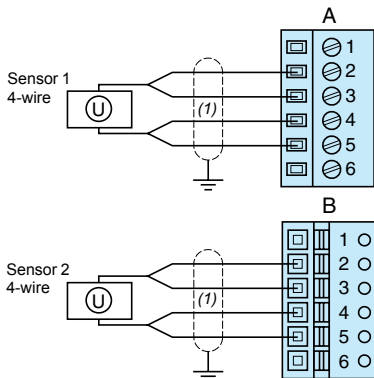
2-wire temperature probes in highly disturbed operating environments



2-wire thermocouple and voltage sensor (mV)



4-wire temperature probes



(1) STB XSP 3000 grounding kit with STB XSP 3010/3020 terminals mandatory.

(2) Double-shielded cable.

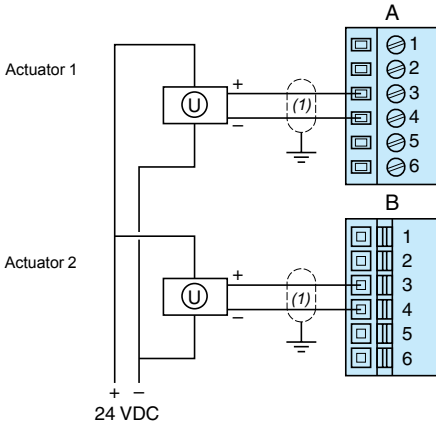


Connections (continued)

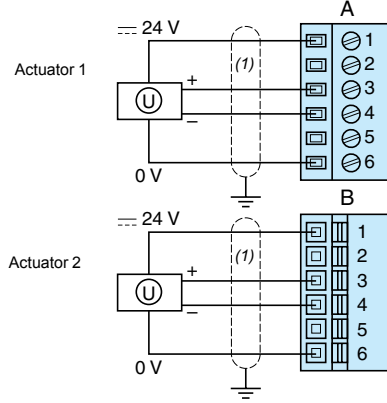
Analog output modules

STB AVO 1255/1265/1250

2 isolated analog actuators

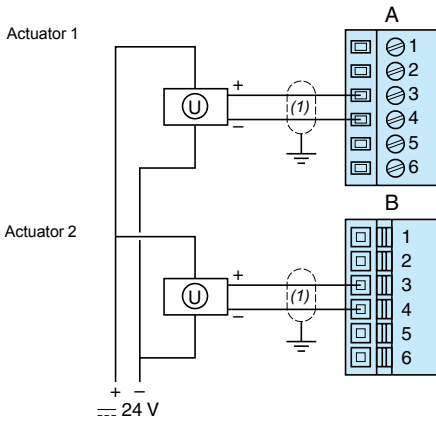


2 analog actuators, 24 V AC supplied by the PDM

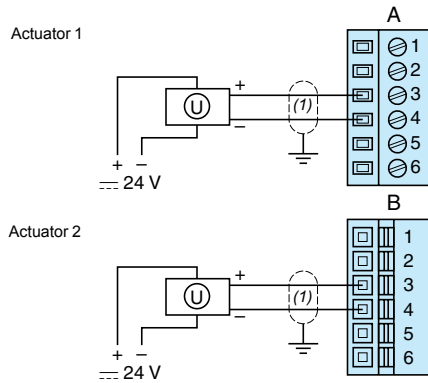


STB AVO 0200

2 non isolated analog actuators, external 24 V AC power supply



2 non isolated analog actuators, external 24 V AC power supply



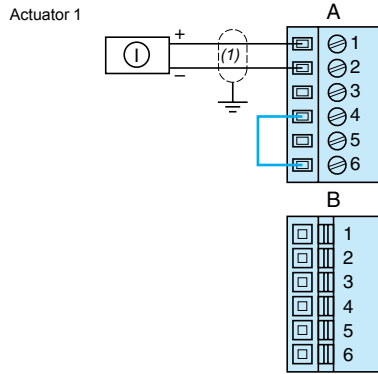
(1) STB XSP 3000 grounding kit with STB XSP 3010/3020 terminals mandatory.

Connections (continued)

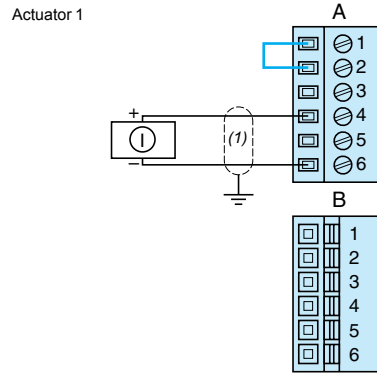
Analog output modules

STB ACO 0120

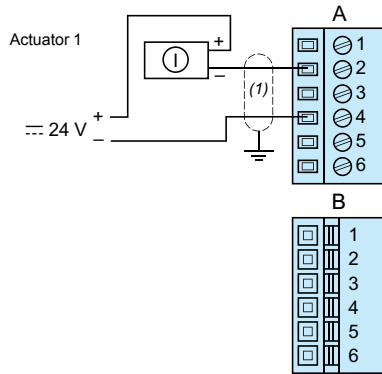
1 sink actuator



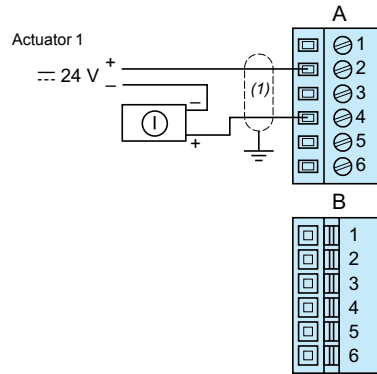
1 source actuator



1 source actuator, external 24 V DC power supply



1 sink actuator, external 24 V DC power supply



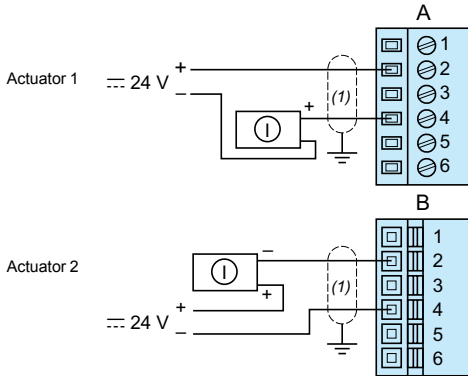
(1) STB XSP 3000 grounding kit with STB XSP 3010/3020 terminals mandatory.

Connections (continued)

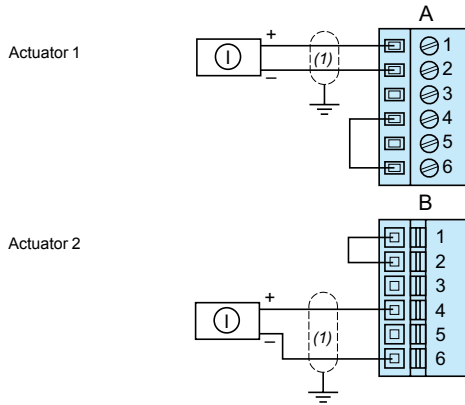
Analog output modules

STB ACO 0220

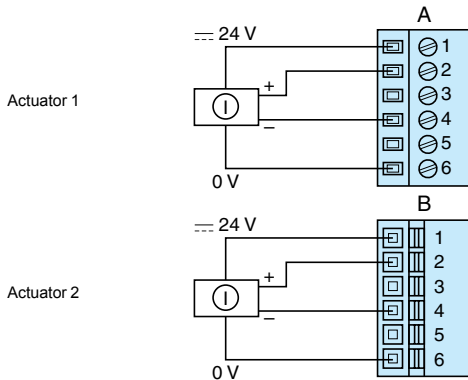
2 isolated analog actuators, external 24 V AC power supply



2 analog actuators, 24 V AC supplied by the PDM

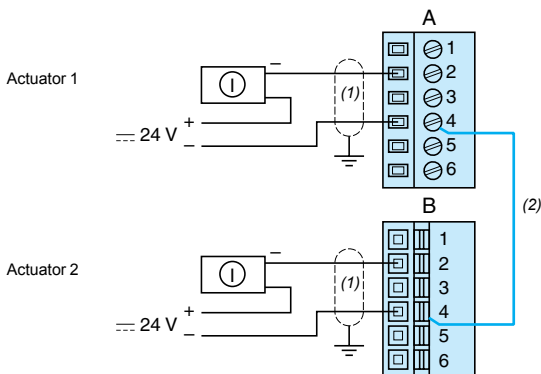


2 analog actuators, 24 V AC supplied by the PDM

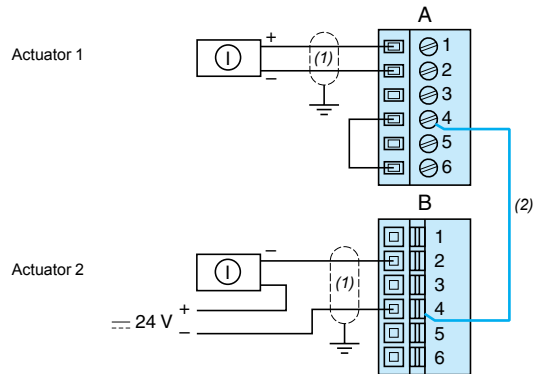


STB ACO 1225/1210

2 isolated analog actuators, external 24 V AC power supply



2 analog actuators, 24 V AC supplied by the PDM

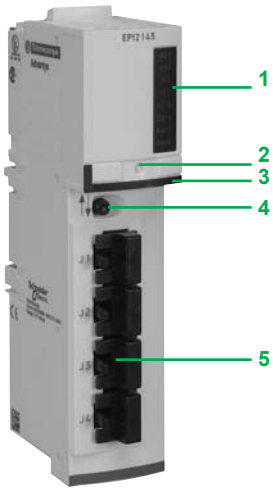


(1) STB XSP 3000 grounding kit with STB XSP 3010/3020 terminals mandatory.
 (2) Internal connection.

Modicon® STB distributed I/O solution

Parallel interface module STB EPI 2145

TeSys® U controller and TeSys® Quickfit applications



Description

The STB EPI 2145 application-specific parallel interface module is a component of the Modicon® STB station designed for the remote connection of TeSys® U starter-controllers and TeSys® Quickfit prewired motor starters.

The STB EPI 2145 application-specific parallel interface module includes:

- 1 An LED display block indicating the various states of the starter-controllers or TeSys Quickfit prewired motor starters

Indication	Standard STB EPI 2145 module
Module status (1)	Green RDY LED
Module detected error (2)	Red ERR LED
Selector switch position 4 (3)	Green LEDs S1 and S2
State of outputs	Green LEDs O1/5, O2/6, O3/7, O4/8

- 2 Slot for a user-customizable label
- 3 A color-coded identification stripe (black)
- 4 A selector switch used to view each motor starter state
- 5 4 RJ45 connectors for connection of:
 - 4 TeSys model U starter-controllers
 - 4 direct motor starters with TeSys Quickfit components
 - 2 reversing motor starters with TeSys Quickfit components; for example, 12 inputs and 8 outputs in each of these configurations

The STB EPI 2145 K module kit comprises:

- STB XBA 3000 base, width 28.1 mm. This base includes a slot for a user-customizable label.

To be ordered separately:

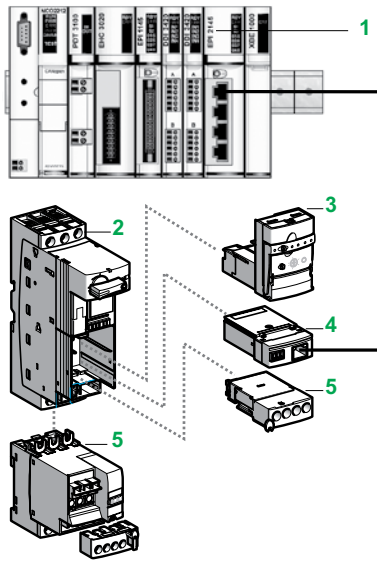
- Optional mechanical keying pins between the module and the I/O base: STB XMP 7700. This device helps to ensure that the module and its base are properly matched if disassembled or replaced.
- Sheets of user-customizable labels: STB XMP 7600
- RJ45 cables between the STB EPI 2145 module and each TeSys U

(1) RDY is permanently on if the module is operational. If RDY is off, the PDM is not supplying power. If RDY is flashing, the module is not functional.
 (2) If ERR is on or flashing, the module has an internal detected error.
 For information about module and channel status indication, refer to the "System Hardware Components Reference Guide" included on the STB SUS 8800 CD-ROM or available on our web site: www.schneider-electric.us.
 (3) S1: Output bank 1 (outputs 1 to 4)
 S2: Output bank 2 (outputs 5 to 8)

Modicon® STB distributed I/O solution

Parallel interface module STB EPI 2145

TeSys® U controller and TeSys® Quickfit applications



TeSys® U starter control application

Introduction of the TeSys® U starter-controller

The TeSys® U starter-controller is a direct motor starter that performs the following functions:

- Protection and control of single-phase or three-phase motors:
 - Disconnects power
 - Protects against overcurrent and short circuits
 - Protects against thermal overload
 - Performs power switching
- Application control:
 - Provides protection alarms and application monitoring: duration of use, number of detected faults, motor current values, etc.
 - Provides a logging function

Structure of a TeSys U starter with an STB EPI 2145 module (1)

The starter-controller functions are implemented with a click-lock adjustment, thus eliminating wiring of:

- A power base **2** (LU2B + LU9 BN11)
- A 24 V $\overline{\text{AC}}$ **3** control unit (LUC B/D/C/M ●●BL) for 0.09 to 15 kW motors
- A parallel communication module (LUF C00) **4**
- Options (additional contacts, reverser blocks) **5**, including LU9 M1●

Combined with a TeSys U starter, each of the 4 channels of the STB EPI 2145 application-specific module features:

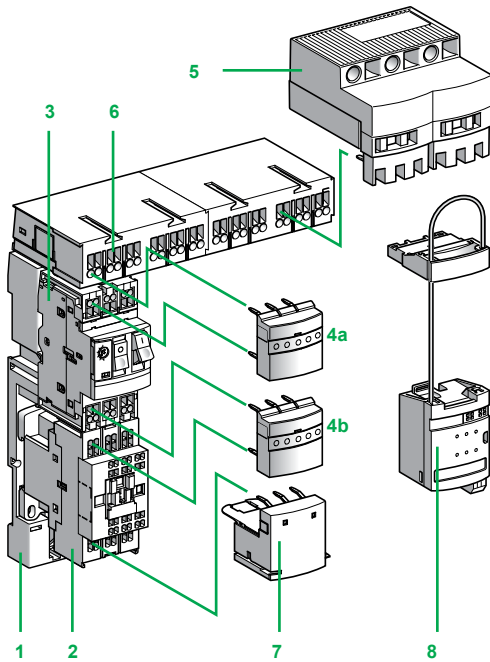
- 2 outputs:
 - Starter control
 - Reversal control
- 3 inputs:
 - State of circuit breaker (position of lever)
 - Presence of detected faults (short circuit, thermal)
 - State of main contactor (closed/open)

(1) TeSys® U components: refer to the Starters and Basic TeSys U Equipment catalog

Modicon® STB

distributed I/O solution

Parallel interface module STB EPI 2145
TeSys® Quickfit components for motor starters



TeSys® Quickfit components for motor starters

TeSys® Quickfit is a modular system that standardizes and simplifies the installation of motor starters. Combined with GV2 ME circuit breakers and model d (LC1) contactors from 9 to 25 A, TeSys Quickfit facilitates the installation of motor starters with spring-type terminals up to 11 kW/400V.

TeSys Quickfit offers elements for prewiring of:

- Power circuits
- Control circuits

TeSys Quickfit makes the installation of motor starters a fast, easy, reliable, and open-ended process. It also:

- Allows for later customization of the motor starter
- Reduces maintenance time
- Saves space inside the equipment by reducing the number of terminals, cable ducts, and intermediary interfaces

Elements for prewiring the power section

The TeSys Quickfit system provides the following components for prewiring the power section:

- A power kit comprising, for each output, a mounting plate **1** for the contactor **2** and circuit breaker **3**, as well as two power connection modules, **4a** and **4b**
- A power splitter box **5** for 2 or 4 outputs
- An upstream terminal block **6** for connecting a power supply up to 60 A (16 mm²)
- A downstream terminal block **7** for connecting motor power supply cables and earth ground cables (6 mm²)

Elements for prewiring the control section

For prewiring the control section, the TeSys Quickfit system provides the **LAD 9 AP3●●** control connection module **8** that allows you to connect the motor starters to the processing unit (PLC) via the Modicon **STB EPI 2145** parallel interface module **9** quickly and without the use of tools.

The **LAD 9 AP3●●** control connection module is mounted directly on the contactor and the circuit breaker of each motor starter. It integrates the status and control information of this motor starter.

A mechanical locking device **2** for the system on the head of the contactor helps to ensure a correct connection regardless of the conditions of use (vibrations, shock, etc.). Four versions are available: direct or reversing start, and with or without contactor coil interface relay.

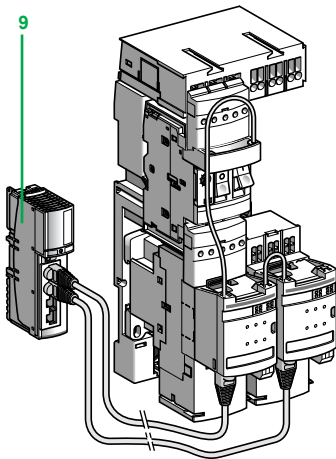
The lower part of the **LAD9 AP3 ●●** module features several external connectors, including an RJ45 socket, for connection to the Modicon **STB EPI 2145** parallel interface module via **LU9R●●** RJ45 cables **10** available in different lengths.

The following information is available for each motor starter:

- 2 inputs: status of circuit breaker and status of contactor
- 1 output: contactor coil control

A direct motor starter uses 1 RJ45 channel.

A reversing motor starter uses 2 RJ45 channels.



(1) Refer to the Motor Starter Solutions - Control and Protection Components catalog.

Modicon® STB distributed I/O solution

Parallel interface module STB EPI 2145

TeSys® U controller and TeSys® Quickfit applications

Specifications			
Module type		STB EPI 2145	
Cold swapping		Yes	
Hot swapping		Yes, depending on NIM and mandatory specification of module. See table on page 43.	
Connection		Via 4 RJ45 connectors	
Power supply		Via STB PDT 3100/3105 24 V ~ power distribution module	
Protection		Via fuse of STB PDT 3100/3105 power distribution module	
Operating temperature, horizontal mounting		°C (°F)	-25 to 70 (-13 to 158)
Consumption	On 5 V ~ logic bus	mA	110
	On 24 V ~ sensor bus	mA	100 max.
	On 24 V ~ actuator bus	mA	50 min. (with 8 outputs at state 0); 80 mA per output at state 1 (220 mA max., for 150 ms)
Input specifications			
Number		12	
Nominal values	Voltage	V ~	24
Limit values	At state 1	Voltage	V 15 to 30
		Current	mA 2 min.
	At state 0	Voltage	V -3 to +5
		Current	mA 0.5 max.
Protection		Resistor-limited	
Output specifications			
Number		8	
Nominal voltage		V ~	24
Starter-controller compatibility		TeSys® U 12 A (LUB 12 base) and 32 A (LUB 32 base) TeSys bases can be equipped with one of the following 24 V ~ control units: - Standard LUCA●●BL - Advanced LUCB●●BL, LUCC●●BL and LUCD●●BL - Multifunction LUCM●●BL	
Motor starter compatibility		With TeSys® Quickfit prewiring components, components with spring-type terminals. Systems for motor starters, from 0 to 25 A, up to 11 kW/400 V. The relevant motor starters are realized by combining: - GV2 ME circuit breakers, with a use limit of 80% of the maximum intensity at an ambient temperature of 60°C, up to 690 V standard LUCA●●BL - With model d (LC1) contactors from 9 to 25 A - With TeSys Quickfit LAD9 AP3●● control connection module and LU9R●● cables	
Short circuit and overload protection		Yes, per channel	

Modicon® STB distributed I/O solution

Parallel interface module STB EPI 2145

TeSys® starter-controller model U and

TeSys® Quickfit applications

References

The STB EPI 2145 module is available in the STB EPI 2145 K kit version with a custom base and four RJ45 connectors.

Module for TeSys® U starter-controllers: connector kit

Power supply type	Voltage	Reference	Weight kg
---	24 V	STB EPI 2145 K	0.165

Module for TeSys U starter-controllers: module only

Power supply type	Voltage	Reference	Weight kg
---	24 V	STB EPI 2145	0.165

Mandatory separate parts

Description	Use	Length	Reference	Weight kg
Connection cables An RJ45 connector at each end	For connection of the STB EPI 2145 module to the TeSys U starter controller ⁽¹⁾ and TeSys® Quickfit ⁽²⁾	0.3 m	LU9 R03	0.045
		1 m	LU9 R10	0.065
		2 m	490 NTW 000 02	–
		3 m	LU9 R30	0.125
		5 m	490 NTW 000 05	–
		12 m	490 NTW 000 12	–

Optional separate parts

Description	Use	Sold in lots of	Reference	Weight kg
Base 28.1 mm	Application-specific module mounted on DIN rail	–	STB XBA 3000	0.048
Keying pin	For application-specific module	60	STB XMP 7700	–
Sheets of user-customizable labels⁽³⁾	Bases and I/O modules	25	STB XMP 6700	–

(1) TeSys U forward only and forward/reverse require only 1 cable.

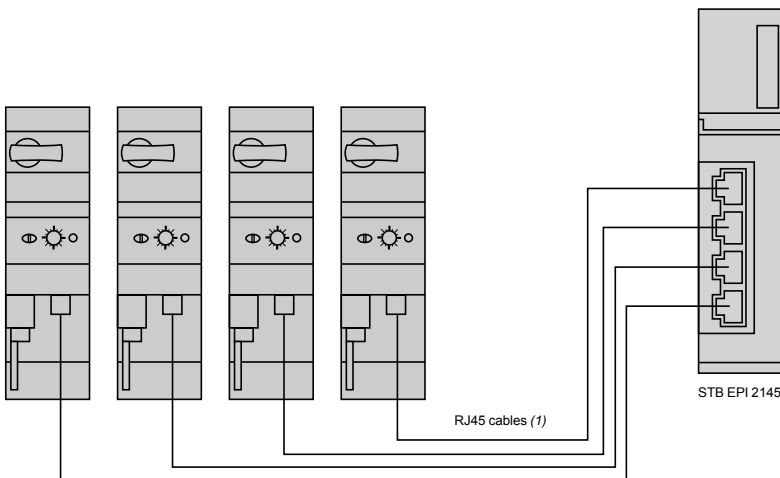
(2) TeSys Quickfit forward only requires 1 cable, TeSys Quickfit forward/reverse requires 2 cables.

(3) The template for the user-customizable labels is supplied on the documentation mini CD-ROM.

Modicon® STB distributed I/O solution

Parallel interface module STB EPI 2145
TeSys® starter-controller model U applications

TeSys® U starter-controllers: Remote control



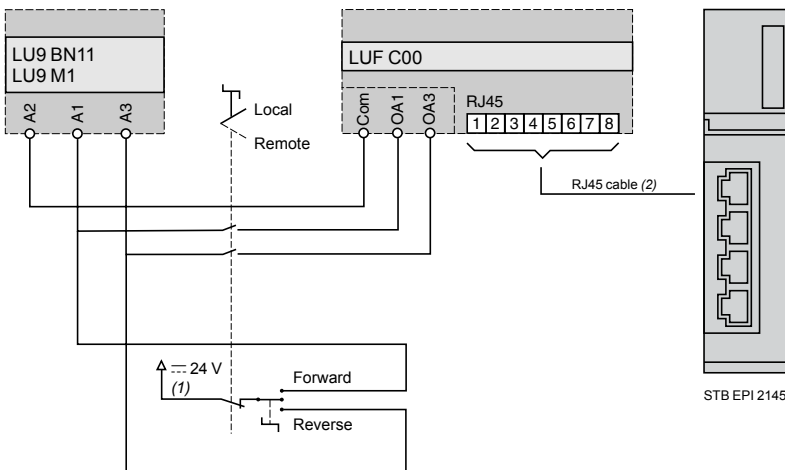
Simple connection of an STB EPI 2145 parallel interface module to 4 TeSys U starter-controllers for remote control via PLC.

For each TeSys U starter-controller:

- LU 9BN11 or LU 9BM1: supplied with TeSys U base
- LUF C00, parallel communication module: to be ordered separately
- 1 RJ45 cable (1)

(1) Cables: See references on page 84.

TeSys™ U local and remote control



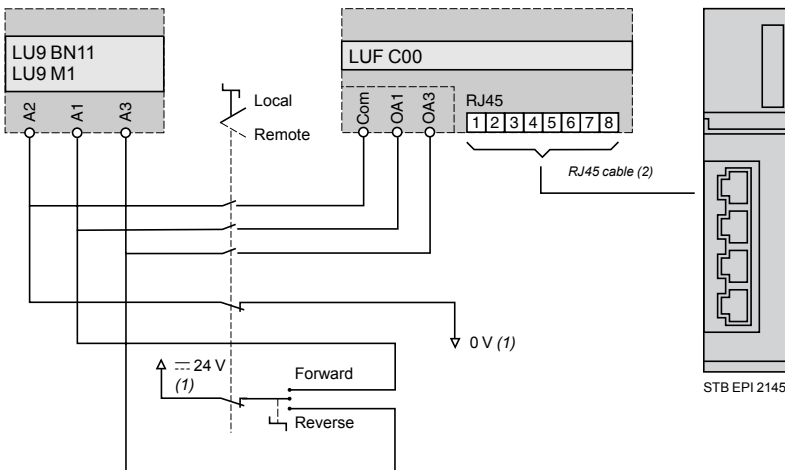
Schematic diagram of simple switching between remote control via Modicon® STB EPI 2145 and local control by operator: scheme for one TeSys U starter-controller.

The reference 0 V is supplied by the STB EPI 2145 parallel interface module via the cable to LUF C00. (1)

(1) 24 V AC power supply of the Modicon STB automation station common to the STB PDT 310 power distribution module.

(2) Cables: See references on page 84.

TeSys™ U local control, remote control, and maintenance



Schematic diagram of switching between remote control via Modicon STB EPI 2145 and local control by operator: scheme for one TeSys U starter-controller.

The 24 V AC power supply is local to the TeSys U starter-controller. (1)

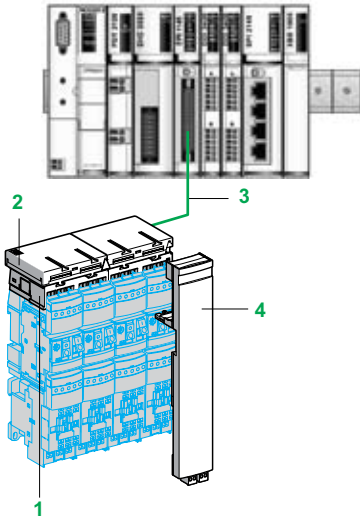
In the absence of remote control, with the Modicon STB automation station is switched off or disconnected, the operator can control the running of the motor.

(1) 24 V AC power supply local to the TeSys U starter-controller and common to the STB PDT 310 power distribution module.

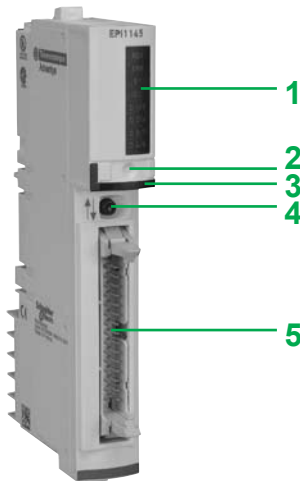
(2) Cables: See references on page 84.

Modicon® STB distributed I/O solution

Parallel interface module STB EPI 1145
Tego™ Power applications



- 1 63 A power splitter box
- 2 Control splitter box
- 3 Connection cable
- 4 Connection control module



Introduction

The STB EPI 1145 parallel interface module is a component of the Modicon® STB station designed for the remote connection of 8 motor starters (or 4 motor starters in each direction). TeSys® motor starters, model D use the Tego™ Power installation assistance system.

The Tego™ Power System

Tego Power is a modular system to help install TeSys model d motor starters by providing prewired control and power circuits. This Quickfit technology enables cable-free connections to spring terminals for model d contactors (9 to 32 A) and GV2 M2 motor circuit breakers.

Tego Power with Quickfit technology enables you to create motor starter assemblies up to 15 kW/400 V.

Structure of the Tego Power system

The Tego Power system differentiates the power section from the control section.

- The power kit comprises:
 - One specific mounting plate for 2 to 8 motor starters
 - Two connection modules
 - One power splitter box with a power supply terminal
 - The control kit comprises:
 - One control splitter box for the 2 to 8 motor starters
 - One connection module
- The 2 return outputs of each motor starter (contactor status, circuit breaker status) are connected to 2 of the 16 inputs to the STB EPI 1145 parallel interface.

Description

The STB EPI 1145 parallel interface comprises:

- 1 An LED display block indicating the various states of the motor starters.

Indication	Standard STB EPI 1145 module
Module status (1)	Green RDY LED
Module detected error (2)	Red ERR LED
Selector switch position 4 (3)	Green LEDs S1 and S2
State of outputs	Green LEDs O1/5, O2/6, O3/7, O4/8

- 2 Slot for user-customizable label
- 3 A color-coded identification stripe (black)
- 4 A selector switch used to view each motor starter state
- 5 An HE 10 connector (30-way) to connect to a Tego Power system via STB XCA 3002/3003 cables (1 m/2 m)

To be ordered separately:

- STB XBA 2000 base, width 18.4 mm. Includes a slot for a user-customizable label.
- Optional mechanical keying pin between the module and the STB XMP 7700 base. This device helps to ensure that the module and its base are properly matched if disassembled or replaced.
- Sheets of customizing labels: STB XMP 7600
- A cable between the STB EPI 1145 module and the Tego Power block.

(1) RDY is permanently on if the module is operational. If RDY is off, the PDM is not supplying power. If RDY is flashing, the module is not functional.

(2) If ERR is on or flashing, the module has an internal detected error.

For information about module and channel status indication, refer to the System Hardware Components Reference Guide included on the STB SUS 8800 CD-ROM or available on our web site: www.schneider-electric.us.

(3) S1: Output bank 1 (outputs 1 to 4)

S2: Output bank 2 (outputs 5 to 8)

Modicon® STB distributed I/O solution

Parallel interface module STB EPI 1145
Tego™ Power applications

Specifications

Electrical specifications

Module type		STB EPI 1145	
Swapping	Cold swap		Yes
	Hot swap		Yes, depending on NIM and mandatory specification of module. See table on page 43.
Connection		Via 1 HE 10 connector (30-way)	
Power supply		Via STB PDT 3100/3105 24 V $\overline{\text{---}}$ power distribution module	
Protection		Via STB PDT 3100/3105 power distribution module fuse	
Consumption	On 5 V $\overline{\text{---}}$ logic bus	mA	110 max.
	On 24 V $\overline{\text{---}}$ sensor bus	mA	100 max.
	On 24 V $\overline{\text{---}}$ actuator bus	mA	50 min. (with 8 outputs at state 0); 1,000 max. (with 8 outputs at state 1)

Input specifications

Number		16 (8 for the status of each contactor/8 for the status of each circuit breaker)	
Nominal values	Voltage	V $\overline{\text{---}}$	24
	Limit values	At state 1	Voltage V 15 to 30 Current mA 2 min.
	At state 0	Voltage V	-3 to +5
		Current mA	0.5 max.
Protection		Resistor-limited	

Output specifications

Number		8 (to control each contactor)	
Nominal values	Voltage	V $\overline{\text{---}}$	24
	Current	mA	100 per channel, 850 per module
Limit values	Permanent voltage	V	19.2 to 30
	Absolute voltage	V	36
	Peak current	A	1 for 100 ms per channel
Maximum loads	Capacity	μF	50
	Inductance		0.5 Henry at 4 Hz
Short circuit and overload protection		Yes, per channel	

References

Parallel interface for TeSys® motor starters with Tego™ Power system

Power supply type	Voltage	Reference	Weight kg
$\overline{\text{---}}$	24 V	STB EPI 1145	0.120

Mandatory separate parts

Description	Use	Length	Reference	Weight kg
Base 18.4 mm	Application-specific module mounted on DIN rail	–	STB XBA 2000	0.024
Connection cables (30-way at each end)	From the power and control splitter box APP 2R•E to the STB EPI 1145 module	1 m	STB XCA 3002	–
		2 m	STB XCA 3003	–

Mandatory separate Tego Power parts (1)

Description	Use	Reference	Weight kg
Power and control splitter boxes	2 outputs	APP 2R2E	–
	4 outputs (2)	APP 2R4E	–

Optional separate parts

Description	Use	Sold in lots of	Reference	Weight kg
Keying pin	For application-specific module	60	STB XMP 7700	–
User-customizable label sheets (3)	Bases and I/O modules	25	STB XMP 6700	–

(1) For other Tego Power components, refer to the Motor Starter Solutions - Control and Protection Components catalog.

(2) For a set of 8 motor starters, use 2 APP2R4E splitter boxes.

(3) The template for the user-customizable labels is supplied on the documentation mini CD-ROM.



STB XBA 2000



STB EPI 1145

Modicon® STB distributed I/O solution

STB EHC 3020 counter module

Introduction

Counting parts or events, grouping objects, controlling incoming and outgoing data streams, and measuring lengths or positions all require counting functions. The STB EHC 3020 counter module performs these functions for a Modicon® STB automation station (controlled by a master connected to the station) with a maximum counting frequency of 40 kHz. The STB EHC 3020 module, with 1 counter channel, accepts as input typical 24 V $\overline{\text{---}}$ sensors (proximity sensors, photoelectric sensors, incremental encoders or mechanical contacts) (1). As output, the module features 2 solid-state 24 V $\overline{\text{---}}$ 0.5 A outputs. The Advantys™ configuration software is used to select one of the six functions the module can perform.

Description

The front panel of the STB EHC 3020 counter module features:

- 1 A display block with 8 display LEDs:

Indication	Standard STB EHC 3020 module
Module status (2)	Green RDY LED
Module detected error (3)	Red FLT LED
State of the 2 outputs	Green OUT1 and OUT2 LEDs
State of the 2 counter inputs	Green INA and INB LEDs
State of the reset input	Green RST LED
State of the EN enable input	Green EN LED

- 2 Slot for user-customizable labels
- 3 Color-coded module identification stripe (black)
- 4 A connector for an STB XTS 2150 18-pin removable spring-type terminal block (to be ordered separately)

The STB EHC 3020 KC module kit includes:

- STB XBA 3000 base, width 28.1 mm. Includes a slot for user-customizable labels
- STB XTS 2150 18 removable spring-type terminals

To be ordered separately:

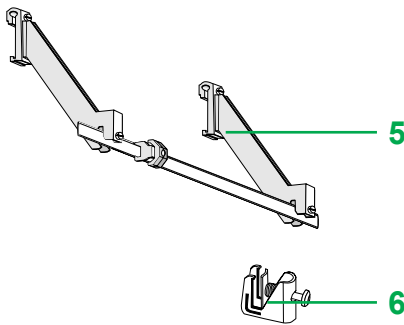
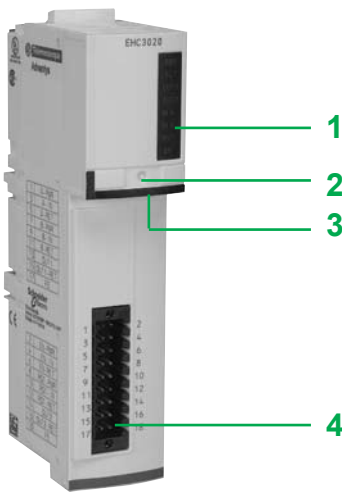
- A grounding kit, recommended for connecting the cable shielding
- 5 STB XSP 3000 grounding kit
- 6 STB XSP 3010 terminal for cables with a cross-section of 1.5 to 6 mm² or STB XSP 3020 terminal for cables with a cross-section of 5 to 11 mm²
- Optional mechanical keying pin between the module and the STB XMP 7700 base. This device helps to ensure that the module and its base are properly matched if disassembled or replaced.
- Sheets of user-customizable labels: STB XMP 7600

(1) The counting frequency is limited to 400 Hz with mechanical contacts.

(2) RDY is permanently on if the module is operational. If RDY is off, the PDM is not supplying power. If RDY is flashing, the module is not functional.

(3) If FLT is on or flashing, the module has a detected internal fault.

For information about module and channel status indication, refer to the System Hardware Components Reference Guide included on the STB SUS 8800 CD-ROM or available on our web site: www.schneider-electric.us.

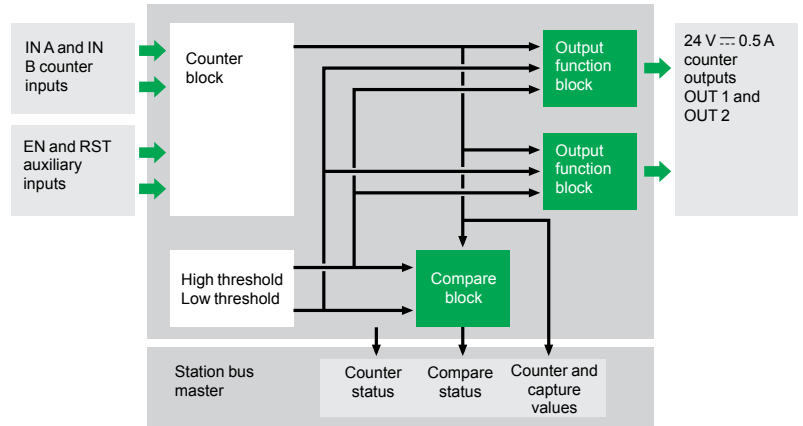


Modicon® STB distributed I/O solution

STB EHC 3020 counter module

Operation

Counter channel block diagram



Depending on the counting function used (see functional specifications on page 90), the I/O for the STB EHC 3020 module are assigned to:

- Input IN A, connected to a sensor
- Inputs IN B, EN, and RST, connected to a sensor or activated by the Modicon® STB master via the fieldbus

The 16-bit counter value is compared to the two threshold values (configured with the configuration software) and is used to activate the OUT 1 and OUT 2 outputs without requiring processing by the bus master controller. Reports such as the counting value or the two status bits (counter status, compare status) are sent to the bus master controller.

Modicon® STB

distributed I/O solution

STB EHC 3020 counter module

Functional specifications

Configurable functions	Number	1 of the 6 configurable functions (using the Advantys™ configuration software)
	Frequency meter	This basic function measures the frequency received on the IN A input. This frequency is always expressed in hertz (number of pulses per second), with a precision of 1 Hz. Also measures the speed in units per second. The number of points to be received on the IN A input, corresponding to one unit, must be defined from 1 to 255. The maximum frequency on the IN A input is 40 kHz in both cases (without filtering). Response time: < 0.2 s (frequency 2/40 kHz), < 1 s (frequency 0.2 kHz)
	Count events	This function provides the value of the number of pulses received on the IN A input per unit of time. The unit of time is configurable: 0.1 s, 1 s, 10 s, or 1 minute. The IN B input can be used to reset the internal time basis that provides the unit of time. The maximum number of pulses counted during a unit of time is up to 65,535. The minimum pulse duration on the IN A input is 10 µs (without filtering). Response time: < 0.5 ms
	Measure time periods	Measures the elapsed time during an event or between two events (on the IN A input) according to the selectable time base of 10 µs, 100 µs, or 1 ms. The maximum event duration is 0.655 s, 6.55 s, or 65.5 s, respectively. The maximum frequency on the IN A input is 200 Hz. Response time: < 0.5 ms
	Down counting	The IN B input starts or restarts the counter by resetting it to the setpoint value defined by the high threshold value. When the counter is running, any pulse received on the IN A input decreases the counter. The counter stops when it reaches 0. The maximum setpoint value is 65,535. The maximum frequency on the IN A input is 40 kHz (without filtering). Response time: < 0.5 ms
	Loop (modulo) counting	The IN B input starts or restarts the counter by resetting it to 0. The IN B input also captures the previous counting value before the counter is reset to 0. When the counter is running, any pulse received on the IN A input increases the counter. The counter turns back to zero automatically when the pulse number received equals the modulo defined by the high threshold value. The maximum modulo value is 65,535. The maximum frequency on the IN A input is 40 kHz (without filtering). Response time: < 0.5 ms
	Up/down counting	The RST input starts or restarts the counter by resetting it to the preset value. When the counter is running, counting increases or decreases according to the pulses received on the IN A and IN B inputs (by default, IN A increases the counter and IN B decreases the counter). By configuration: <ul style="list-style-type: none"> <input type="checkbox"/> Input IN B can define the counting direction of the pulses received on IN A. <input type="checkbox"/> Inputs IN A and IN B can receive signals from an incremental encoder. The counter value is limited to a low limit of 0 and a high limit of 65,535. Response time: < 5 ms
	OUT1 and OUT2 output functions	According to the requirements, each of the counter module's two outputs can be configured for one of the following operating modes: <ul style="list-style-type: none"> <input type="checkbox"/> No direct action <input type="checkbox"/> The output is activated when the counter value is less than the low threshold. <input type="checkbox"/> The output is activated when the counter value is between the low threshold and the high threshold. <input type="checkbox"/> The output is activated when the counter value is greater than the high threshold. <input type="checkbox"/> A pulse is generated on the output when the down-counter passes the low threshold. <input type="checkbox"/> A pulse is generated on the output when the up-counter passes the low threshold. <input type="checkbox"/> A pulse is generated on the output when the down-counter passes the high threshold. <input type="checkbox"/> A pulse is generated on the output when the up-counter passes the high threshold. <input type="checkbox"/> The output is activated when the counter is placed in RUN mode. This option is only available for the down-counter function. <input type="checkbox"/> The output is activated when the counter is placed in STOP mode. <input type="checkbox"/> The output is activated when the captured value is less than the low threshold. This option is only available for the modulo function. <input type="checkbox"/> The output is activated when the captured value is between the low threshold and the high threshold. This option is only available for the modulo function.

Modicon® STB distributed I/O solution

STB EHC 3020 counter module

Specifications

Electrical specifications

Module type		STB EHC 3020	
Frequency on counter inputs	kHz	1 channel, 40 max. (1)	
Swapping	Cold swap	Yes	
	Hot swap	Yes, depending on NIM and mandatory specification of module. See table on page 43.	
Mounting base		STB XBA 3000	
Power Distribution Module (PDM) required	Voltage provided	V	24
	Reference	STB PDT 3100/3105	
Operating temperature, horizontal mounting		°C (°F)	-25 to 70 (-13 to 158)
Consumption on the logic 5 V --- bus		mA	100
Isolation	Between station bus and I/O	V ---	500

Input specifications

Input type		Counter inputs (IN A and IN B)		Auxiliary inputs (RST and EN)	
Nominal values	Voltage	V ---	24 (range 19.2 to 30 V)		
	Current	mA	6		
Limit values	At state 1	11 to 30 V ---, current 2 mA, minimum (at 11 V ---)			
	At state 0	-3 to 5 V ---, current 1.5 mA, maximum			
Logic		Positive			
Filter time	Analog	µs	2.5	25	
	Digital	ms	None (max. count 40 kHz) 0.40 (max. count 1 kHz) 1.20 (max. count 400 Hz)		-

Output specifications

Output type		Outputs OUT 1 and OUT 2			
Nominal voltage		V ---	24 (range 19.2 to 30 V)		
Nominal current		A	0.5 (1 A per module)		
Logic		Positive (by default), positive on 1 or 2 channels, negative on 1 or 2 channels (configurable)			
Response time		See functional specifications on page 90.			
Leakage current	At state 0	mA	0.1 maximum		
Voltage drop	At state 1	V	3 maximum		
Maximum load inductance		Henry	0.5 at 4 Hz or $L = 0.5/I^2 \times F$ where L: load inductance, I: load-in current, and F: switching frequency		
Short-circuit and overload protection		Type per channel By current limiter (1.1 A, typical/1.5 A, maximum) and electronic tripping (manual or automatic reset)			
Default fallback positions		Default		Set to state 0 for both channels	
		Configured		Hold last value, set to state 0 or 1 for each channel	

(1) Use of grounding kit is mandatory for counting at 40 kHz.

Modicon® STB distributed I/O solution

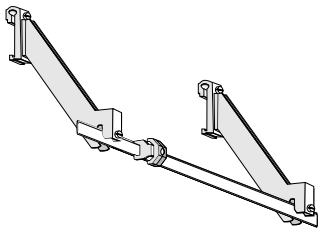
STB EHC 3020 counter module



STB XBA 3000



STB EHC 3020



STB XSP 3000



STB XSP 3010/3020

References

Description	Input type	Reference	Weight kg
Counter module 1 x 40 kHz channel 28.1 mm base Spring-type connector	2/3 wire detectors 24 V $\overline{\text{---}}$ Incremental encoder 24 V $\overline{\text{---}}$ Mechanical contacts	STB EHC 3020 KC	–
Counter module 1 x 40 kHz channel		STB EHC 3020	–

Mandatory separate parts (1)

Description	Use	Reference	Weight kg
Removable terminals(1)	18 spring-type	STB XTS 2150	–

Optional separate parts

Description	Use	Sold in lots of	Reference	Weight kg
28.1 mm base	Module mounted on DIN rail		STB XBA 3000	–
Grounding kit (2)	Grounding for shielded cables Consisting of 1 bar (length: 1 m) and 2 lateral supports	–	STB XSP 3000	–
Terminals for grounding kit	Cable cross-sections 1.5 to 6 mm ²	10	STB XSP 3010	–
	Cable cross-sections 5 to 11 mm ²	10	STB XSP 3020	–
Keying pin	Counter module	60	STB XMP 7700	–
Sheets of user-customizable labels (3) SFIb	Bases and I/O modules	25	STB XMP 6700	–

(1) Connectors can accommodate a flexible wire with a maximum cross-section of 1.5 mm², including the cable end.

(2) Grounding kit recommended (mandatory for high-frequency counting).

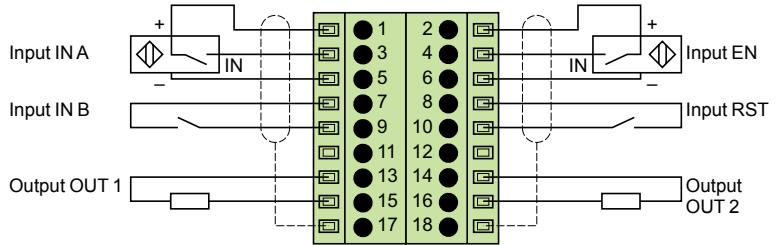
(3) The template for the user-customizable labels is supplied on the documentation mini-CD-ROM.

Modicon® STB distributed I/O solution


STB EHC 3020 counter module

Connections

Connection to STB XTS 2150 removable spring terminals

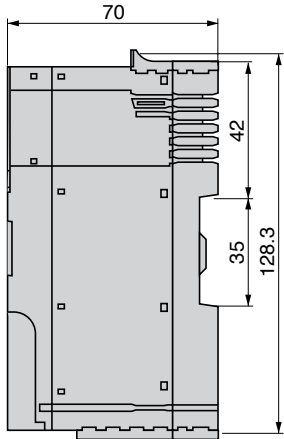


Note: The 24 V \overline{DC} power supply of the sensors and actuators is provided to the module by the STB PDT 3100 power distribution module via the Modicon® STB station's sensor and actuator buses.

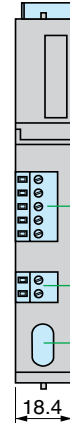
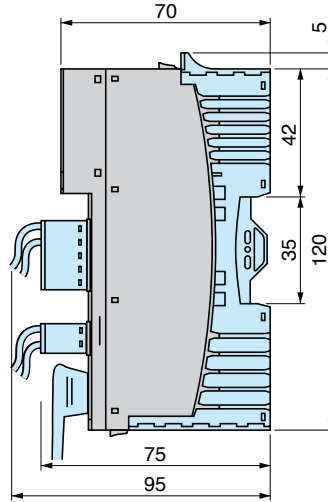
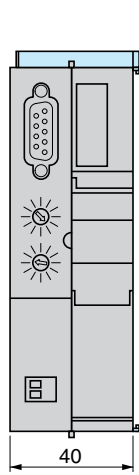
 *Grounding kit recommended.*

Modicon® STB distributed I/O solution

STB N●● 2212/1010



STB XBE 1100/1300/2100 and STB CPS 2111

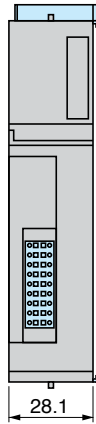
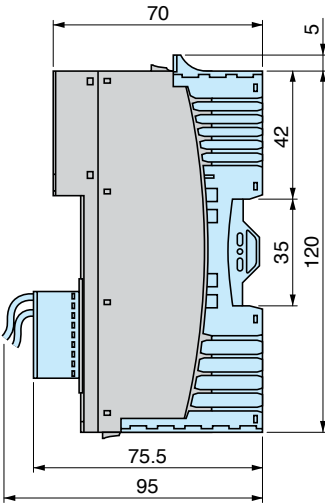


With STB XBE 2100 only

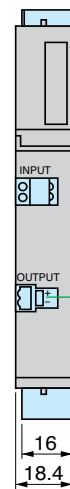
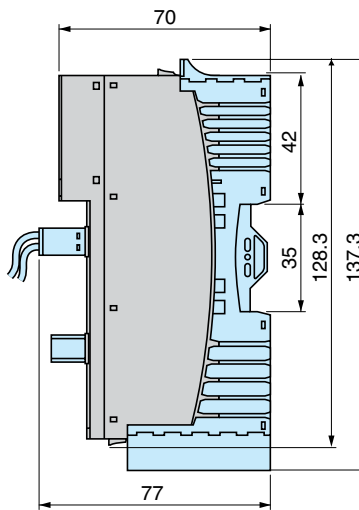
With STB XBE 1300 and STB CPS 2111

With STB XBE 1300 only

STB EHC 3020



STB PDT 3100/2100 and 3105/2105



With STB PDT 3100 and STB PDT 2100 only

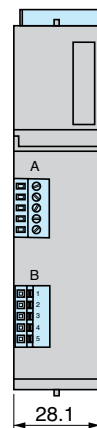
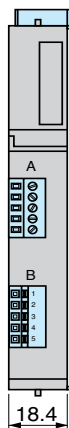
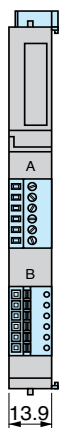
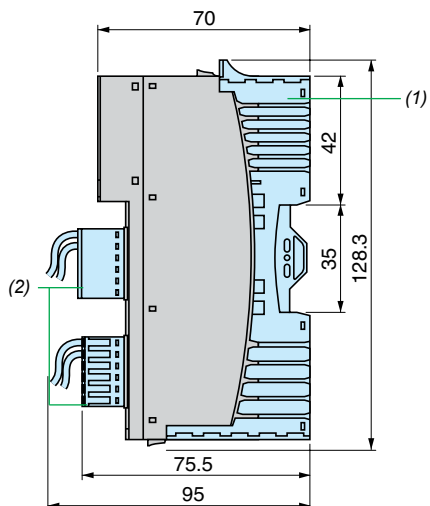
STB DDI/DDO/DAI/DAO/AVI/ACI/ART/AVO/ACO/DRC/DRA

Side view

STB DDI/DDO 3●●0
STB DDI/DDO 3●●5
STB AVI/ART/AVO
STB ACI 1230/1225
STB ACO 1210/1225

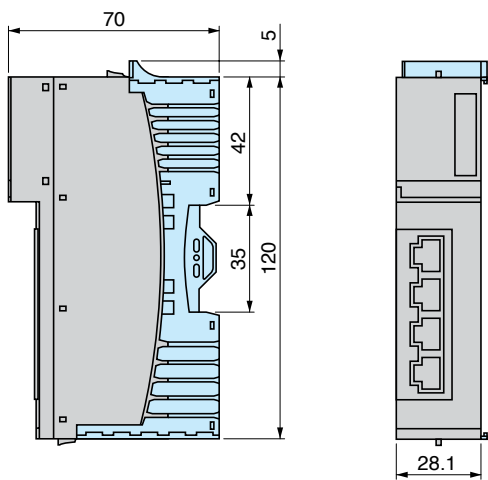
STB DAI ●●●0/DAO 8210
STB DRC 3210
STB ACI 0320/1400/8320
STB ACO 0120/0220
STB AVI 0300/1400
STB AVO 0220

STB DRA 3290

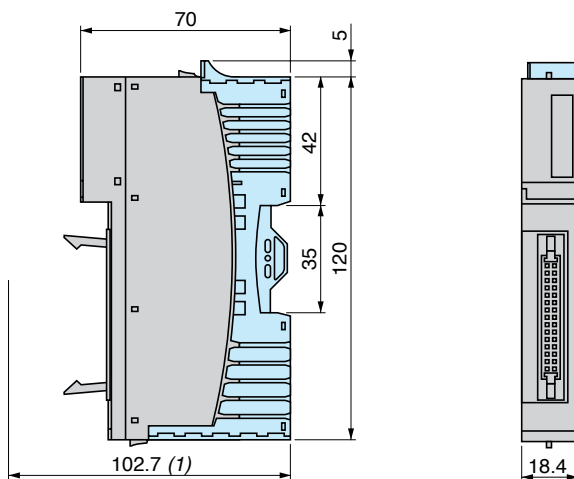


(1) STB XBA 1000/2000/3000 bases
(2) STB XTS 11●0/21●0 connectors

STB EPI 2145



STB EPI 1145



(1) With HE10 connector (30-way)

Modicon® STB distributed I/O solution

Configuration and debugging software

Introduction

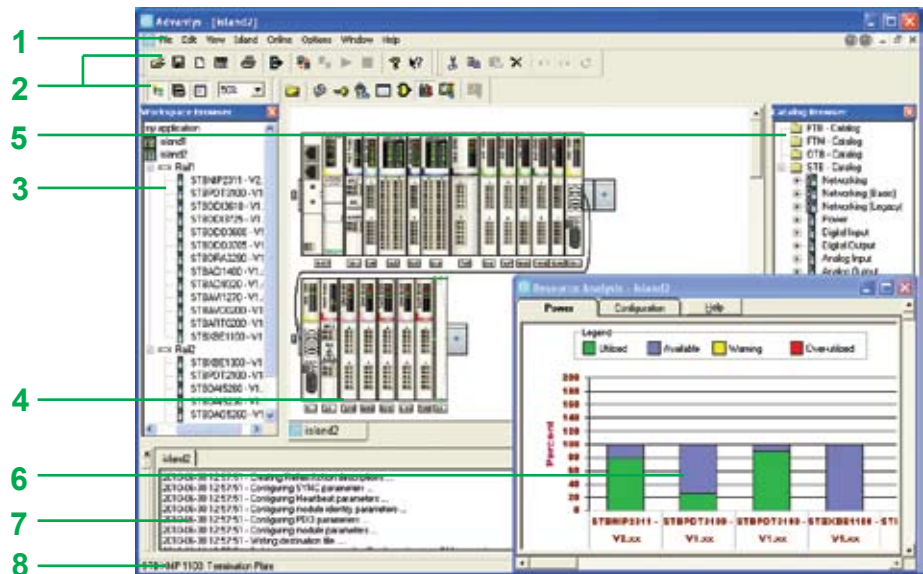
Advantys™ STB SPU 1●●● software is the configuration and debugging tool for the Modicon STB, OTB (IP20 protection) and FTB/FTM (IP67 protection) range of distributed I/O solutions. It also enables debugging and diagnostics of distributed I/O stations during operation.

With respect to the Modicon STB range, the Advantys STB SPU 1●●● software can be used to:

- Define I/O modules making up a Modicon STB automation station
- Configure standard modules (Basic modules have a permanent default configuration.)
- Configure the reflex functions handled at the station level
- Optimize station performance by assigning priorities for the processing of certain modules
- Designate mandatory modules; for example, modules that must be present and functioning correctly for the station to operate correctly
- Declare external CANopen devices in the station. These include Modicon FTB IP67 monobloc I/O splitter boxes; electropneumatic valves by Festo®, Parker®, and Bosch; ATV 31/312/61/71 variable speed drives; Balluff® linear encoders; Osicoder absolute rotary encoders; other CANopen V4.0 devices.
- Check the configuration for compliance and power consumption (also available for basic network interface modules)

User interface

The main screen of the Advantys configuration and debugging software provides easy, intuitive access to available tools.



This main screen is a general view of several windows and toolbars that can be moved about the screen:

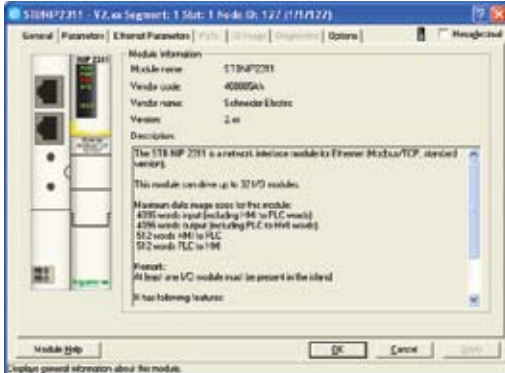
- 1 Menu bar, providing access to functions
- 2 Toolbar, containing icons for direct access to editors and the most frequently used functions
- 3 Application browser, for navigating to the various stations and segments of each station
- 4 Main window, for viewing stations and segments
 - By selecting a module, you can access the appropriate editors:
 - Module editor
 - Reflex action editor
 - User defined label editor
 - Field power supply, logic power supply and I/O & HMI image area resource analysis
 - Overview of the I/O image
 - I/O image animation
 - Diagnostics

The last two items are available only if the station is in online mode.

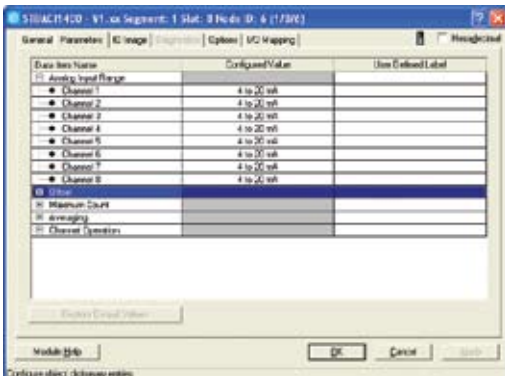
- 5 Catalog browser for Modicon STB components, sorted by category (networks, power supply, digital I/O, etc.)
- 6 Field power supply, logic power supply and I/O & HMI image area resource analysis window
- 7 Log window displaying the results of operations performed by the configuration software during a work session on a station
- 8 Status bar

Modicon® STB distributed I/O solution

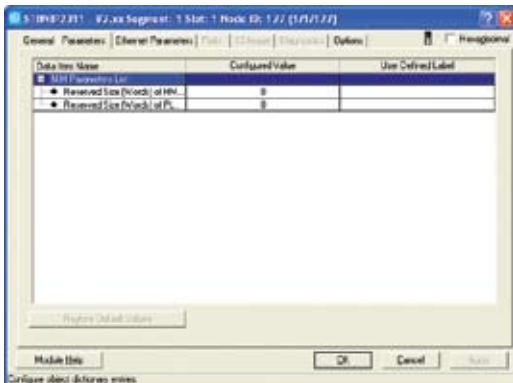
Configuration and debugging software



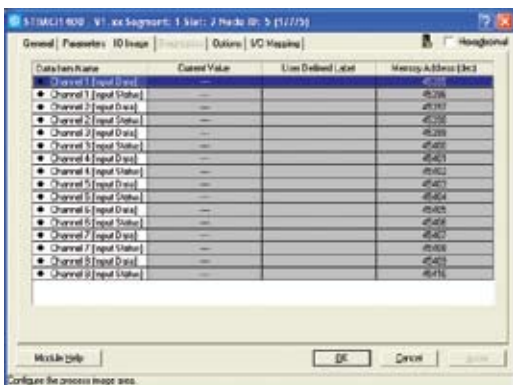
Dual-port Ethernet Modbus/TCP NIM



STB ACI 1400 module with 8 analog input channels



Dual-port Ethernet Modbus/TCP NIM



"I/O Image" tab

Functions

Module editor

The editor provides access to between 5 and 7 tabs, depending on the module types and whether the station is connected to the network or fieldbus. The basic tabs are: General, Parameters, I/O Image, Diagnostics and Options.

"General" tab

This read-only tab (station online or offline) provides general information and displays the main technical specifications of the selected module.

"Parameters" tab

This tab, accessible when the station is offline, contains the operating parameters for the selected module. Some parameters can be changed by the user. Among other things, you can:

- Select the display format for parameters: decimal or hexadecimal.
 - Assign user label: free text field for up to 50 characters (1)
 - Configure modules: the type of I/O module determines which items can be configured (items in cells with white backgrounds). Depending on the type of module, the main parameters are:
 - Digital input modules: filter time and choice of positive or negative logic for each channel
 - Digital output modules: the behavior upon short circuit or overload (manual or automatic reset), the choice of positive or negative logic for each channel, the default fallback position for each channel (0 or 1 state)
 - Analog input modules: with the operating range, the offset, the maximum count, the filtering average and the channel operation (Enable/Disable) for each channel
 - Analog output modules: with the data format, the output range, the channel operation (Enable/Disable), and the default fallback value (hold last value or assume a predefined value) for each channel
 - Application-specific modules: for TeSys® motor starters, model U or TeSys Quickfit, the choice of positive or negative logic for each channel, the behavior upon output short circuit or overload (manual or automatic reset), and the default fallback position for each channel (0 or 1 state)
 - Counter module: the definition of the counting function and its operation (see page 89)
 - Network interface modules: the amount of memory reserved for data exchanges with the HMI terminal (directly connected to the network interface module). This data can also be accessed by the station master: If a Modicon STB station has a CANopen extension, a parameter allows you to define the address of the last standard CANopen device connected to the station.
- You can access the online help for the selected module to learn about the limit values and the operation of these parameters.

"I/O Image" tab

This tab allows you to read and modify the I/O data of a module when the island is online. You can also write a customize label for any of the data items listed on the I/O Image tab. This feature allows you to pre-symbolize important memory locations in the Island before the application is written.

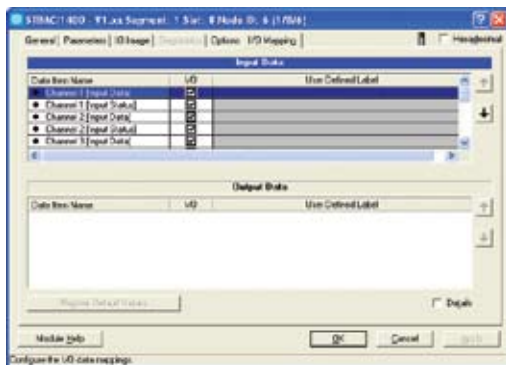
(1) A utility is available to enable the export of user labels (under CANopen) to the memory of Premium™ PLCs (under Unity Pro™ or PL7™ software). Please consult your Regional Sales Office.

Modicon® STB distributed I/O solution

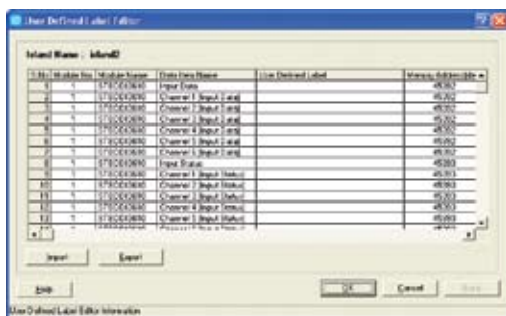
Configuration and debugging software



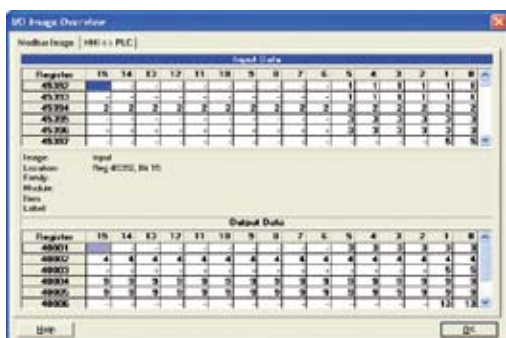
Options tab



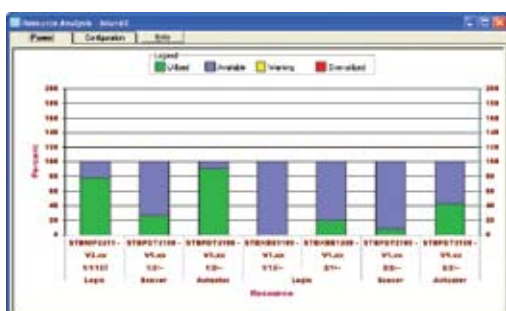
I/O Mapping tab (part of the standard modules)



User Defined Label Editor



I/O Image Overview



Power supply and memory resource analysis

Functions (continued)

“Diagnostics” tab

This tab allows the user to perform diagnostics for the station connected to the PC terminal where the Advantys™ configuration and debugging software resides.

“Options” tab

This tab, accessible when the island is offline, provides the user with options to configure I/O or network interface module.

- Prioritize the selected I/O module in a group of fast-solve modules that are scanned by the NIM more frequently than other modules. By default, the software automatically prioritizes the first 10 prioritizable modules. If the island consists of more than 10 prioritizable modules, you must prioritize the modules manually.
- Designate the selected I/O module as mandatory. If a mandatory module fails or is removed from the Island, the entire Island bus will switch to pre-operational mode and stop. It will return to its operational state only if you reinstall the same functional module, or a new module of the same type, at this exact location on the bus.
- Mark the selected I/O module as Virtual Placeholder. The Virtual Placeholder allows you to remove certain physical Island I/O modules from a base configuration while keeping the identical process image. Thus, you can define an Island with various options removed without changing the PLC program which controls the Island.
- Configure run-time parameters (on network interface module), this reserves a set of registers in the fieldbus image. These registers allow the user to control the transfer of parameters at application program level using normal I/O operations. These registers are indicated in the I/O Image as RTP.
- Set maximum node ID on the CANopen extension (on network interface).

“I/O Mapping” tab (part of the standard modules)

You can edit the I/O mapping of the selected module using the I/O Mapping tab in the Module Editor. This dynamic I/O mapping allows you to optimize the Island’s process image on a module-by-module basis.

User Defined Label Editor

This tab allows you to assign user labels in a single editor to all module data items on the island.

This editor enable the import/export of user labels in CSV format.

I/O Image Overview

It provides a utility with an overview of the I/O data and status allocation for all modules on the Island. It also gives you a view of any data that may be written to the Island bus or read by the fieldbus master. It contains Fieldbus Image tab containing the fieldbus view and Modbus Image tab containing the Modbus view depending on the network interface type. Each view has input and output table.

Analysis of the station memory and power supply resources

At any time during the configuration process, you can view the following information expressed as a percentage:

- Power consumption at various voltages:
 - 5 V ∴ logic voltage supplied by the STB N●● network interface module
 - 5 V ∴ logic voltage supplied by the STB XBE 1200/1300 BOS bus extension module
 - 5 V ∴ logic voltage supplied by the STB CPS 2111 auxiliary power supply module, this module should be associated with an STB PDT ●10● power supply module.
 - 24 V ∴ voltages supplied by the STB PDT 3100/3105 power distribution module(s)
 - 115/230 V ∼ voltages supplied by the STB PDT 2100/2105 power distribution module(s)
- Usage of the memory built into the network interface module:
 - Image field for inputs and outputs
 - Field dedicated to the human machine interface

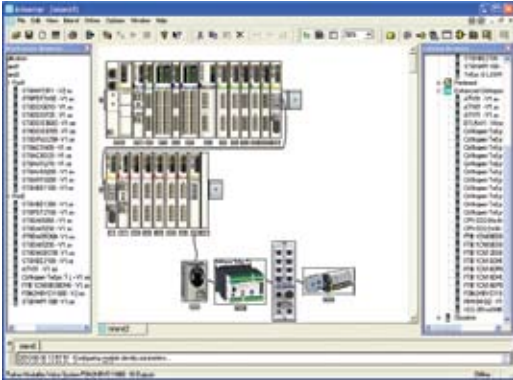
Downloading of configuration data

The software enables bi-directional transfer of configuration data:

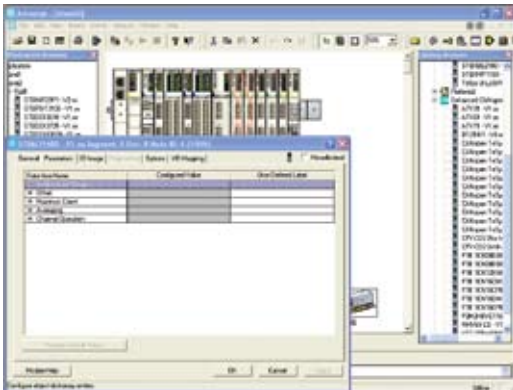
- From the PC to the RAM and Flash memory of the station network interface module in order to make the station operational. If the network interface module includes the STB XMP 4440 32 KB removable memory card, data will be written to the card, providing a backup.
- From the station network interface module to the PC

Modicon® STB distributed I/O solution

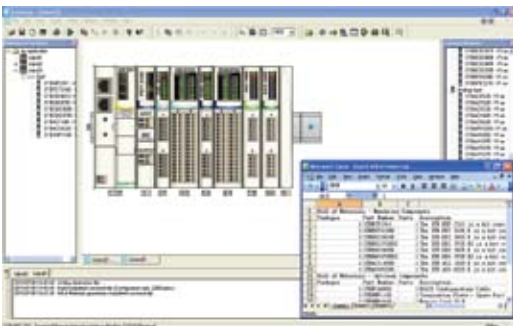
Configuration and debugging software



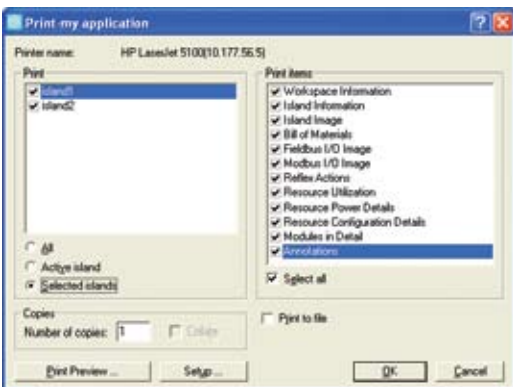
Access via RTP to external components such as ATV variable speed drives, etc.



"Absent" modules will actually be installed as needed.



Bill of Materials



Printing: Selection of stations and elements to be inserted in the design report

Functions (continued)

RTP run-time parameters

The RTP (*Run-Time Parameters*) function enables access from the PLC to data (1) of the external CANopen components connected to an STB station.

The main uses are:

- Writing the parameters of a component: Inoperative Device Replacement (IDR) operation
- Reading the variables for the monitoring and diagnostics of any object connected to the station

"Absent" modules

This function of the Advantys STB SPU 1 configuration and debugging software allows you to declare I/O modules that will not actually be included in the station at the outset. This means that:

- "Virtual" module slots are reserved in the station configuration.
- The exchange data of the "virtual" modules are included in tables of exchanges with the PLC.

The physical modules can be integrated into the automation station as actual requirements increase.

Export of user labels ("tags")

The Advantys™ software allows you to create tags (symbol names) for objects and I/O parameters of the Modicon STB configuration, including external devices connected to the CANopen bus.

The "File/export" function exports these names at the same time as the mapping, regardless of the fieldbus or network used. This information can be used directly on controllers. This eliminates the need to declare I/O objects again and promotes consistency in the naming of machinery or equipment. User labels can be exported in CSV format.

Import/export of station mapping files

This function allows you to carry out mapping and export it in the format of any PLC programming software, regardless of the fieldbus or network.

Bill of Materials

The Bill of Materials provides the description of a selected island including mandatory and optional components. In addition to getting a printout of the Bill of Materials using the Print function, the information for the Bill of Materials can be exported to a CSV file.

It is possible to customize the output of the Bill of Materials according to your preferred:

- Calculation algorithm (based on kits or individual parts)
- Amount of module information
- Type of connectors (spring or screw)
- Extension cable length selection

The default type of connectors is the screw type.

Design report printout

This function allows you to select topics to be sent to a printer or to a PDF or editable RTF file. The following items can be selected:

- Graphic image of the station
- Any portion of the station information:
 - List of mandatory components, including accessories, such as bases, connectors, etc.
 - List of optional components, such as labels, keying pins, memory cards, etc.
 - Information about the workspace
 - Information about the station
 - Image of the station
 - List of components
 - Fieldbus I/O image
 - Modbus I/O image
 - Reflex actions
 - Resource usage
 - Resource power supply details
 - Resource configuration details
 - Module details
 - Notes

(1) Data: Configuration and adjustment parameters and variables

Modicon® STB distributed I/O solution

Configuration and debugging software

Functions (continued)

Test mode

There are two test modes:

- **PLC offline test:** Bus or network communication is disconnected. The outputs can be controlled directly from the Advantys application connected via the Modbus® port on the network interface module.
- **Online test:** Bus or network communication is operational. The outputs can be forced directly from the Advantys application. This mode can be accessed by entering a configurable password.

These test modes allow you to import the station configuration and read the error messages and I/O states.

Update at: www.schneider-electric.us

The Advantys STB SPU 1000 configuration and debugging software and the databases of its module catalog are available on our web site: www.schneider-electric.us. From the web site, you can:

- Download the Advantys STB SPU 1000 software application for a free 21-day trial
- For officially registered software, obtain function updates and updates for the catalog of components that can be connected to Modicon STB automation stations

Reflex functions editor

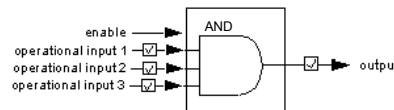
For applications requiring short response times (< 3 ms), the Modicon® STB distributed I/O solution allows you to create reflex functions using the configuration and debugging software. These reflex functions act directly at the level of the station output modules and therefore are not taken into account or processed by the station master. These reflex functions can be associated with "priority" I/O modules to help ensure reliable response times.

A Modicon STB station can call up to 10 reflex functions. These functions are created from blocks whose inputs are activated by digital or analog input channels and whose results activate a digital or analog output channel. You can nest two reflex functions.

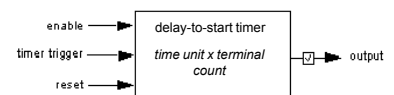
Reflex types and function blocks

Various types of function blocks are available:

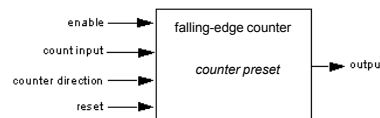
Boolean logic blocks: XOR block, AND blocks with 4 inputs and 1 output



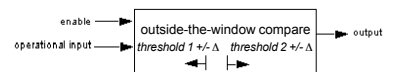
Timer/monostable blocks: when working, when idle, upon activation and upon deactivation



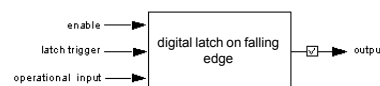
Up/down counter blocks: on a rising or falling edge, from 0 to 65,535



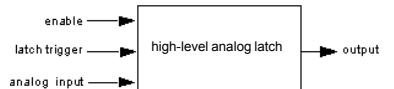
Comparison blocks on signed integers (-32,768 to 32,767): i <, i >, <i >, i <, and i >



Digital latch blocks: on state 0 or 1 or on rising or falling edge, storing of state 0 or 1



Analog latch blocks: on state 0 or 1 or on rising or falling edge, storing of signed integer (0 to 65,535) or unsigned integer (-32,768 to 32,767)



Documentation: A document entitled "Reflex actions" is available on the STB SUS 8800 CD-ROM and on our web site: www.schneider-electric.us.

Modicon® STB distributed I/O solution

Configuration and debugging software



STB SPU 1●●●

References

The Advantys™ configuration and debugging software is multilingual and compatible with the following operating systems:

- 32 bit Windows XP® Professional SP3
- 32 bit Windows Vista® Business SP1
- 32 bit Windows Vista® Ultimate SP1
- 32 bit Windows® 7 Professional
- 32 bit Windows® 7 Ultimate
- 32 bit Windows® 7 Enterprise

Online help is available in 5 languages: English, French, German, Spanish, and Italian. Internet Explorer® (Version 4.0 or later) is required to access the online help.

Trial period

For STB SPU 1●●●, you must register the software with Schneider Electric within 21 days to obtain permanent user rights.

During the trial period of 21 days, all services are available. Once the trial period has expired, online services are not available anymore without registration. All other product families have full functionality.

Custom user registration

Custom user registration can be accessed free-of-charge online, via e-mail, fax, or telephone for pack types from the single-station version to the site version. This allows you to receive customized updates within your company.

Description	Use	Reference	Weight kg
Advantys configuration and debugging software	Single station - 1 workstation: Includes 1 cable and 1 CD-ROM	STB SPU 1000	–
	3 stations: Includes 3 cables and 3 CD-ROMs	STB SPU 1003	–
	10 stations: Includes 10 cables and 10 CD-ROMs	STB SPU 1011	–
	10 workstations on one site Unlimited registration capacity: Includes 10 cables and 10 CD-ROMs	STB SPU 1130 (1)	–
Subscription to Advantys configuration and debugging software - Duration: 1 year	1 station	STB BBS 1000	–
	3 stations	STB BBS 1003	–
	10 stations	STB BBS 1011	–
	10 workstations on one site Unlimited registration capacity	STB BBS 1130 (2)	–

Documentation

User documentation (3)	Multilingual on CD-ROM	STB SUS 8800	–
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Replacement part

Connection cable from PC to NIM network interface module	Length 2 m	STB XCA 4002	–
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References, Alliance SI program

Description	Use	Reference	Weight kg
Advantys configuration and debugging software	10 workstations on one site for a member of the Alliance SI program. Includes 10 cables and 10 CD-ROMs	STB SPU 1010	–
Subscription to Advantys configuration and debugging software - Duration: 1 year	10 workstations on one site for a member of the Alliance SI program	STB BBS 1010	–

(1) Replaces STB SPU 1100 reference.

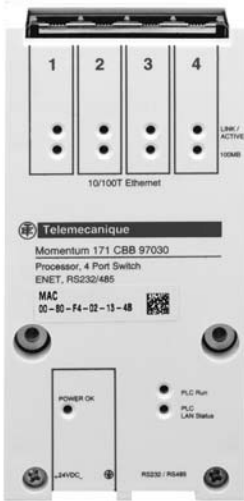
(2) Replaces STB BBS 1100 reference.

(3) The following two documents are available on the STB SUS 8800 CD-ROM and on our web site: www.schneider-electric.us:

- Advantys Configuration and Debugging Software: Quick Start Guide
- Advantys Configuration and Debugging Software: User Manual

Modicon® STB distributed I/O solution

Momentum™ PLC 171 CBB 970 30 processor
Open and modular system



171 CBB 970 30

Introduction

The Momentum™ 171 CBB 970 30 processor integrates both a full programmable controller, an Ethernet switch with 4 x 10/100 Mbps ports, and a Modbus® serial communication port. Supporting a wide temperature range from -20 to 70°C (-4 to 158°F), and powered with 24 V DC, it also has a realtime clock and a battery for backing up the memory.

Processor

- 0.25 ms/Kinstructions
- Concept™ software IEC 61131-1 and ProWORX™ software 32 LL984
- Realtime control using Ethernet:
 - Distributed I/O connectivity
 - Peer-to-peer interprocessor communication
- Realtime clock
- Battery for backing up data
- 19.2 to 42.5 V DC power supply

Communication

- Integrated Ethernet switch with 4 ports
- 10/100 Mbps, half/full duplex autonegotiated
- RS232/RS485 Modbus serial communication port
- Simple menu-driven configuration

This integration results in:

- A reduction in the number of components required, simplification of the wiring, lower setup costs
- Unrivalled flexibility in designing system architectures: the Momentum 171 CBB 970 30 processor's compact dimensions make it ideal for installation where space is limited or in small machines
- Direct high-performance Ethernet connectivity to the I/O, other control systems and HMI terminals
- Faster response times on high-traffic networks thanks to its half/full duplex communication with autonegotiation
- Setup made easy by simple menu-driven configuration

Applications

Ethernet 10/100 Mbps communication supports the Modbus TCP/IP protocol, offering connectivity to the distributed I/O and host systems, communication with other peer processors, drives, operator and programming terminals, as well as simple browser access to embedded web pages.

The Modbus serial communication port can be used to connect the processor to any RS232 or RS485 device in master or slave mode.

The processor program can be expressed in one of the five IEC 61131-1 languages in the Concept environment or as a ProWorX 32 Ladder 984 logic diagram.

These capacities make it the ideal processor for distributed I/O and device systems on Ethernet; for example, intelligent sub-system connected to a master or supervision processor, multiprocessor distributed processing applications, etc. The Momentum 171 CBB 970 30 processor is suitable for a wide variety of applications:

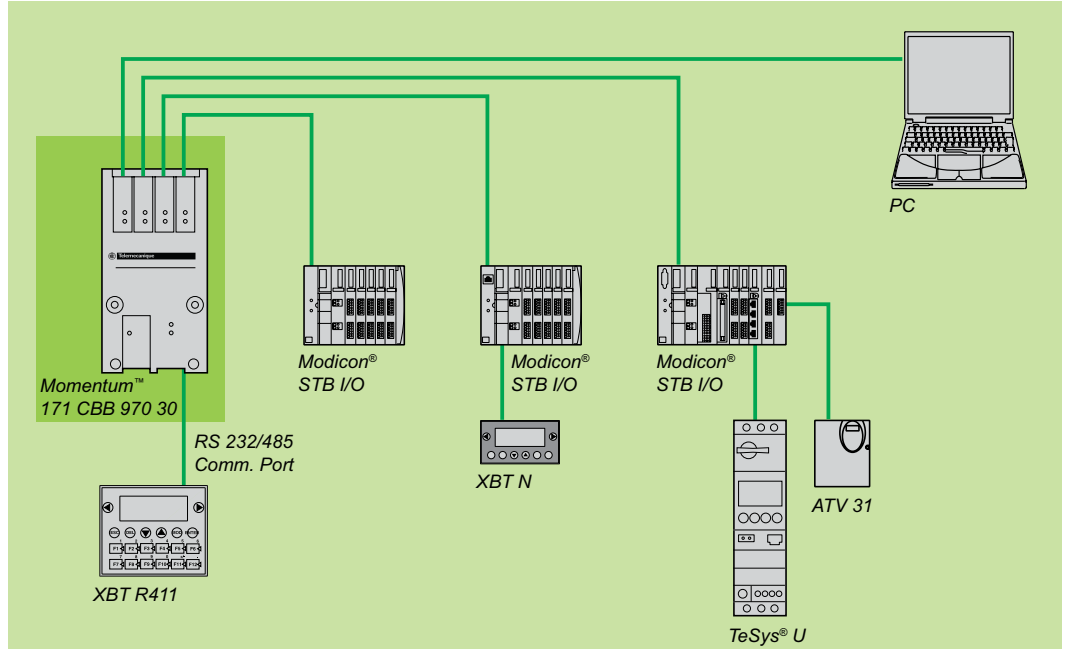
- Conveying, handling
- Packaging
- Water/waste treatment
- Infrastructure
- Pumping, RTU, heating, air conditioning
- Batch/process control
- Data acquisition, monitoring

Modicon® STB distributed I/O solution

Momentum™ PLC 171 CBB 970 30 processor
Open and modular system

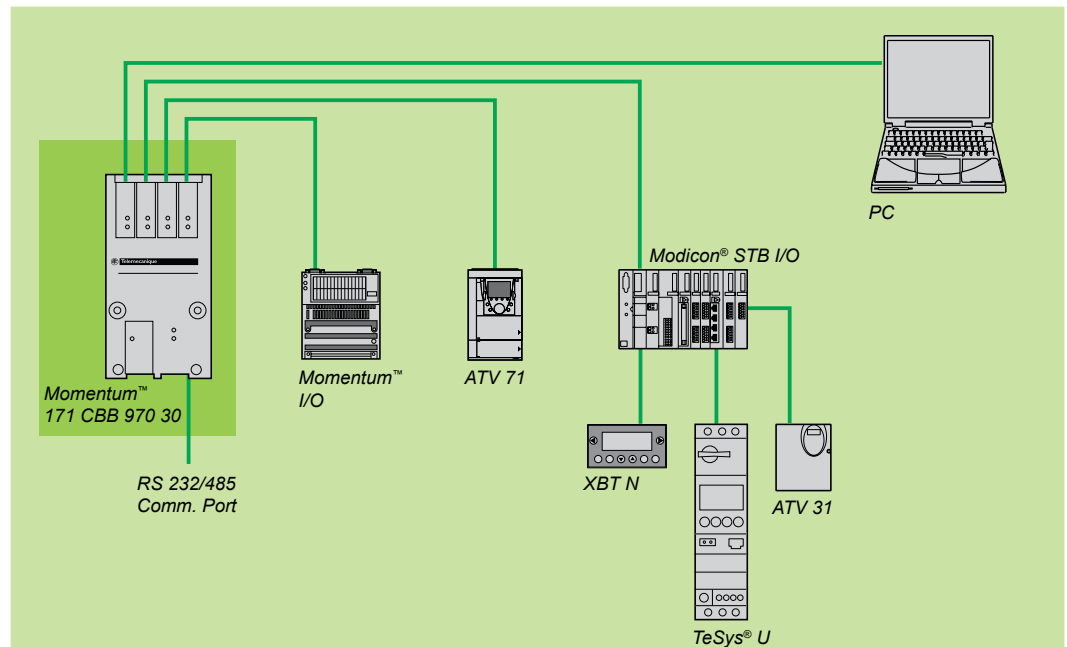
Configuration

Single-processor processing system with 3 I/O lines



The system can include up to 3 Momentum™ or Modicon® STB I/O stations.

Single-processor processing system with distributed devices

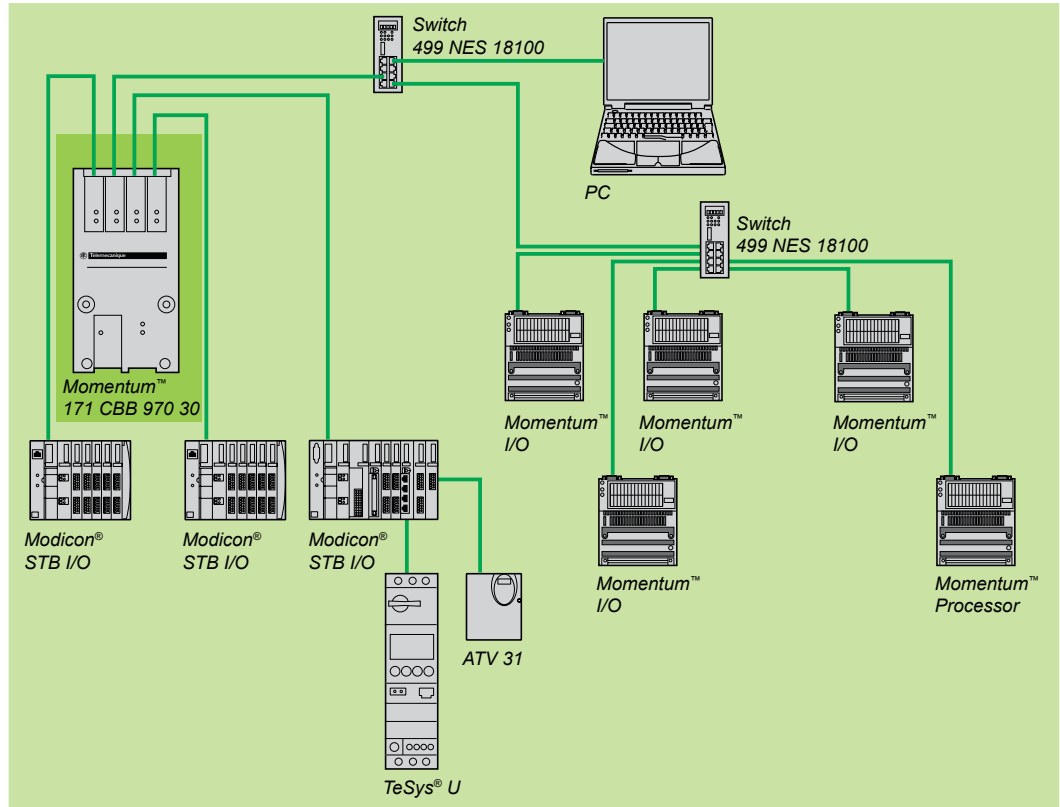


Modicon® STB distributed I/O solution

Momentum™ PLC 171 CBB 970 30 processor
Open and modular system

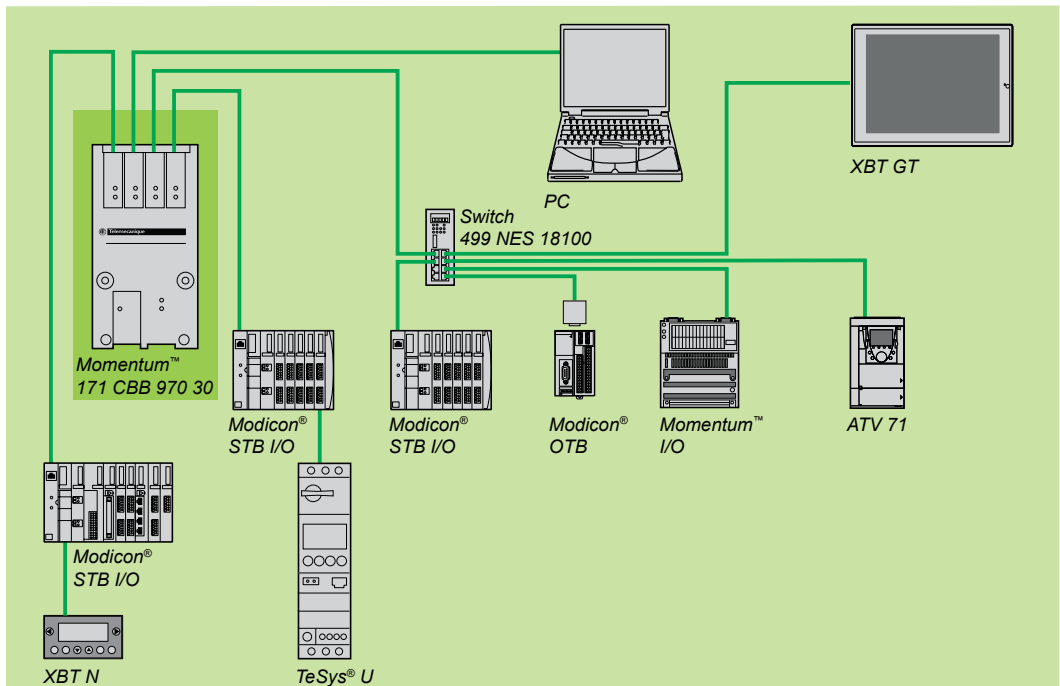
Configuration (continued)

Multiprocessor decentralized processing system



The system can include an existing M1E processor.
Up to 14 processors in *peer-to-peer* communication.

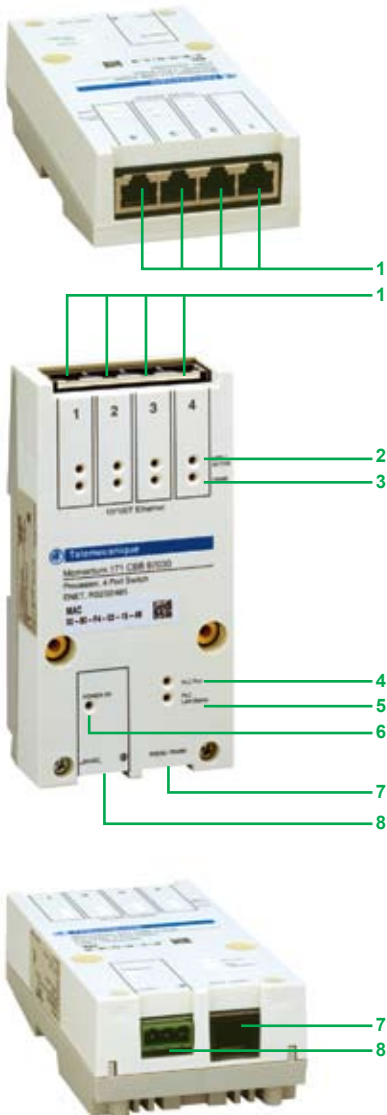
Processing system extended by a second Ethernet switch



Extending the Ethernet network allows additional devices to be connected.

Modicon® STB distributed I/O solution

Momentum™ PLC 171 CBB 970 30 processor
Open and modular system



Description

- 1 4 RJ45 10/100 Mbps Ethernet ports
- 2 4 Ethernet activity LEDs
- 3 4 100 Mbps speed indicator LEDs
- 4 1 processor running status LED
- 5 1 LAN status LED
- 6 1 24 V power supply status LED
- 7 RS232/RS485 Modbus® serial link port
- 8 24 V power supply connector

Web server

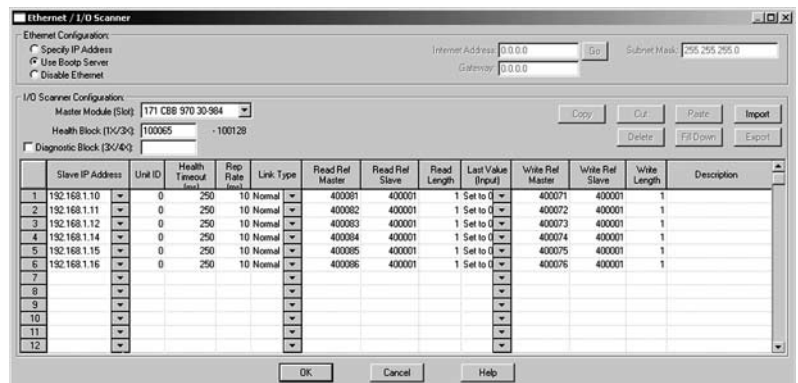
A PC equipped with a browser is what you need to access the Web server hosted by the Momentum™ 171 CBB 970 30 processor and its 4 pages of information updated in real time:

- Processor home page
- Processor configuration, system status
- Ethernet transmission/reception statistics
- Links to Schneider Electric web sites

Device configuration

The *Ethernet I/O scanner* software provides a simple, menu-driven way of configuring Momentum 171 CBB 970 30 processor communication with the I/O devices connected to it:

- IP address
- Timeout and transaction repetition rate
- Address of the first processor register where data is to be read/written
- Length of exchanges in number of words
- *Ethernet I/O scanner* is included in both Concept™ and ProWORX™ software.



Modicon® STB distributed I/O solution

Momentum™ PLC 171 CBB 970 30 processor

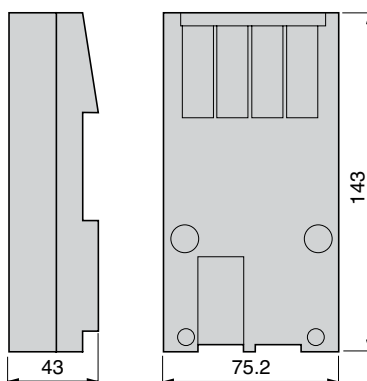
Open and modular system

Environment			
Processor			171 CBB 970 30
Temperature	Operation	°C (°F)	-20 to +70 (-4 to 158)
	Storage	°C (°F)	-40 to +70 (-40 to 158)
Relative humidity			5 to 95% at 60°C, non-condensing, 24 hrs
Altitude		m	2000
Mechanical resistance (immunity)	Vibration		57...150 Hz at 1 g 10...57 Hz at 0.075 mm d.a.
	Shock		± 15 gn peak, 11 ms, semi-sinusoidal wave
Conformity			UL, CSA, CE, FM Class 1 Div. 2, Groups A, B, C and D, and IP20 compliant with IEC 529
Specifications			
Processor			Base 186
Word length		bit	16
Material			Lexan
Power supply	Voltage	V ---	19.2...42.5
	Power consumption	mA	100 at 24 V ---
IFR immunity/EMI susceptibility/Electrostatic discharge			CE compliant for open equipment. Open equipment to be installed in a standard industrial enclosure, with access restricted to qualified maintenance personnel
Dielectric strength	RS232		Not isolated from the logical 0 V
	Ethernet ports		500 V --- for one minute
LED indicators	PLC RUN		Logic calculations performed
	PLC LAN ST		Ethernet - processor internal communication established
	4 x Link/Active		Ethernet port activity
	4 x 100 MB		Ethernet port communication at 100 Mbps
Processor speed		MHz	50
Switch	Type		Unmanaged
	Topology		Star
Communication ports Nos. 1 to 4	Type		Ethernet
	Protocol		Modbus TCP/IP
	Speed		10/100 Mbps with auto negotiation
	Connector		RJ45
	Medium		Shielded twisted pair, category 5E
	Error detection		CRC-32
	Module status		Normal I/O mode
	Addressing		Unique IEEE (MAC) global address User-defined IP address
	Type of operations		Master-Slave
	No. 5	Type	
Protocol			Modbus
Speed			19200 bps
Connector			RJ45
Medium			2 or 4-wire
Error detection			CRC-16
Type of operations			Master-Slave
Topology			Multi-drop
Capacities	Program memory	Kb	IEC: 200
			984 LL: 18
	Registry memory		26032 registers
	Inputs/Outputs:		8192 input points, 8192 output points. The actual number of I/O that can be connected to the 171 CBB 970 30 processor depends on the number of distributed I/O stations and the type of I/O.
	Ethernet devices		64
	Scan time	ms/K	0.25 instructions
Mounting			On symmetrical DIN rail, 35 mm wide
Weight		kg	0.190
Dimensions		mm	75.2 x 143 x 43
Transparent Ready® service	Web class		B
	Web services		4 embedded web pages Home page Controller configuration: system information Ethernet statistics: display of transmission/reception statistics Links to Schneider Electric web sites
	Messaging		Maximum message length: 125 words Capacity: 4000 I/O messages per second

Modicon® STB distributed I/O solution

Momentum™ PLC 171 CBB 970 30 processor
Open and modular system

Dimension diagram



Reference

Description	Reference	Weight kg
Momentum™ processor with integrated 4-port Ethernet switch	170 CBB 970 30	0.190

Modicon® STB distributed I/O solution

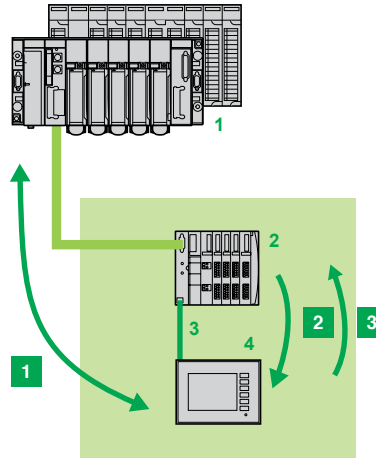
Combination with Magelis® display units and HMI terminals



STB NCO 2212 (cover open) and STB XCA 4002 cable

Application

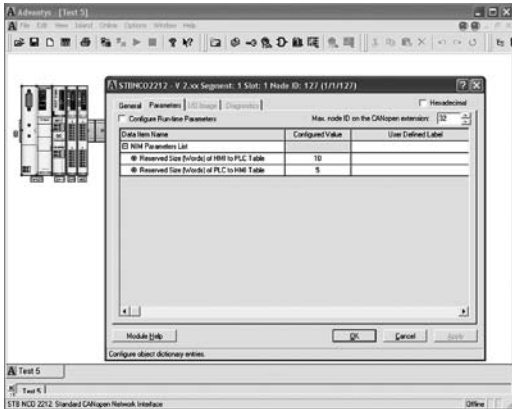
A Magelis® XBT terminal or display unit can be connected directly to a Modicon® STB station via the Modbus programming port.



PLC

Modicon STB distributed I/O station with standard NIM communication module STB N●●2212

Modbus® serial cable and adaptor if required (see compatibility table on next page)
Magelis XBT display unit or HMI terminal



Configuring the exchange memory size with Advantys STB SPU 1 software

Functions

With this architecture, the XBT terminal or display unit is the Modbus serial link master; the Modicon STB standard communication module is the slave.

The connection allows:

- 1 Data transfer between the Magelis XBT terminal and the PLC via the exchange area defined by the user in the Modicon STB memory. Two word tables have to be configured (sizes, labels) in the memory of the NIM communication module using the Advantys® STB SPU 1 configuration software:
 - One written by the terminal and read by the PLC (HMI->PLC)
 - The other written by the PLC and read by the terminal (PLC->HMI)
 The Modicon STB distributed I/O station is used as a neutral gateway between the PLC and the terminal.
The terminal can display information coming from the PLCs and, conversely, control automatic functions in the normal way.
- 2 Display of the following Modicon STB data on the Magelis terminal:
 - Input and output values
 - Internal states
- 3 When the Modicon STB is in "Test" mode, writing of the station's output values

Note: Functions 2 and 3:

- Do not require communication to be established between the PLC and the Modicon STB station
- Cannot be performed simultaneously

Modicon® STB distributed I/O solution

Combination with Magelis® display units and HMI terminals



XBT GT2220

Connection cables

Magelis® family	Type	Size	Adaptor	Length	Cable
XBT N (1)	Compact display units		–	2.5 m	XBT Z988
XBT R (2)	Compact terminals				
XBT RT (3)		3.9"	–	2 m	XBT Z988
XBT GT1●	Graphic terminals	3.8"	XBT ZG 939	2.5 m	XBT Z988
XBT GT2●	Touch screen graphic terminals	5.7"	–	2 m	STB XCA 4002
XBT GT4●		7.5"			
XBT GT5●		10.4"			
XBT GT6●		12.1"			
XBT GT7●		15"			
XBT GK2●	Graphic terminals with keypad	5.7"	–	2 m	STB XCA 4002
XBT GK5●		10.4"			
XBT GTW450	Open graphic terminals	8.4"	–	2 m	STB XCA 4002
XBT GTW750		15"			

(1) Except XBT N200 and XBT N400

(2) Except XBT R400

(3) Except XBT RT400

Modicon® STB distributed I/O solution

High-density I/O modules and the Modicon Telefast® ABE 7 pre-wired system

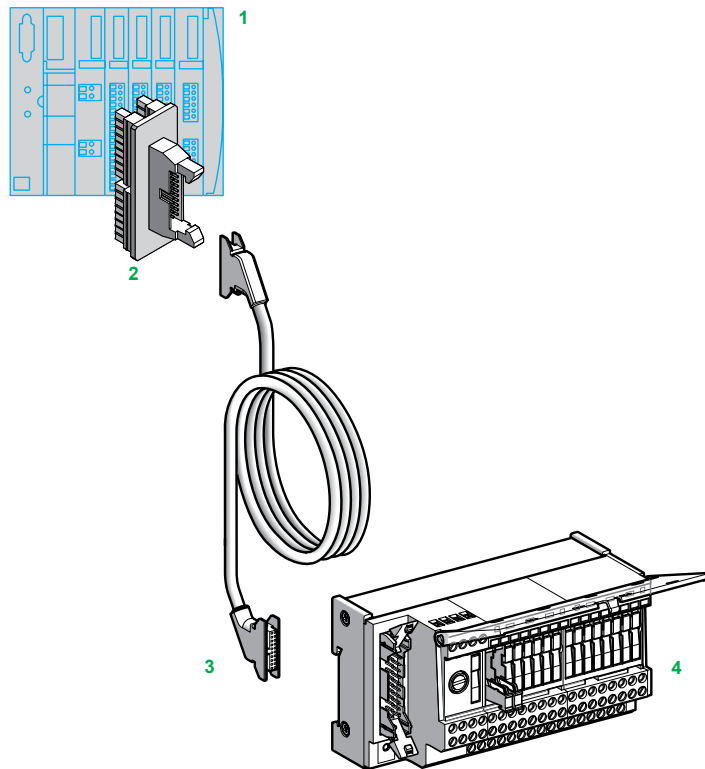
Application

Using the Modicon® Telefast® ABE 7 pre-wired system rationalizes and simplifies enclosure wiring.

Far less space is required in the enclosure and the Modicon Telefast ABE 7 base replaces the connection terminals at the bottom of the enclosure.

Designed for the 16-way high-density modules STB DDI 3725 and STB DDO 3705, Modicon Telefast ABE7 HE10 connectors offer a simple wiring solution simple when combined with standard Telefast cables, Modicon Telefast ABE7 blocks and Twido Telefast blocks for the following voltages:

- 24 V $\overline{\text{---}}$
- 48 V $\overline{\text{---}}$ and 48 V \sim
- 110 V \sim
- 230 V \sim



- 1 Modicon STB I/O station incorporating an STB DDI 3725 and/or STB DDO 3705 high-density module
- 2 STB XT5•10 (DDI) or STB XT6•90 (DDO) HE10 connector
- 3 TSX CDP•02 rolled ribbon cable (100 mA max.) or TSX CDP•03 connection cable (500 mA max.) equipped with two 20-way HE10 connectors.
- 4 Modicon Telefast ABE 7 connector or adaptor base

Examples of cables available (non-exhaustive list):

TSX CDP053	TSX CDP103
TSX CDP203	TSX CDP303
TSX CDP503	TSX CDP102
TSX CDP202	TSX CDP302
ABF T20E050	ABF T20E100
ABF T20E200	ABF H20H100
ABF H20H200	ABF H20H300

Note: For more information about the Modicon Telefast ABE 7 pre-wired system, please refer to the "Interfaces, I/O splitter boxes and power supplies" catalog.

Modicon® STB distributed I/O solution

High-density I/O modules and the Modicon Telefast® ABE 7 pre-wired system

References

Input connector for STB DDI 3725

Description	Use	Reference	Weight kg
HE10 connector for 16-input module STB DDI 3725	To Twido® Sub base	STB XTS 5510	–
	To Modicon® Telefast® ABE 7 base	STB XTS 6510	–

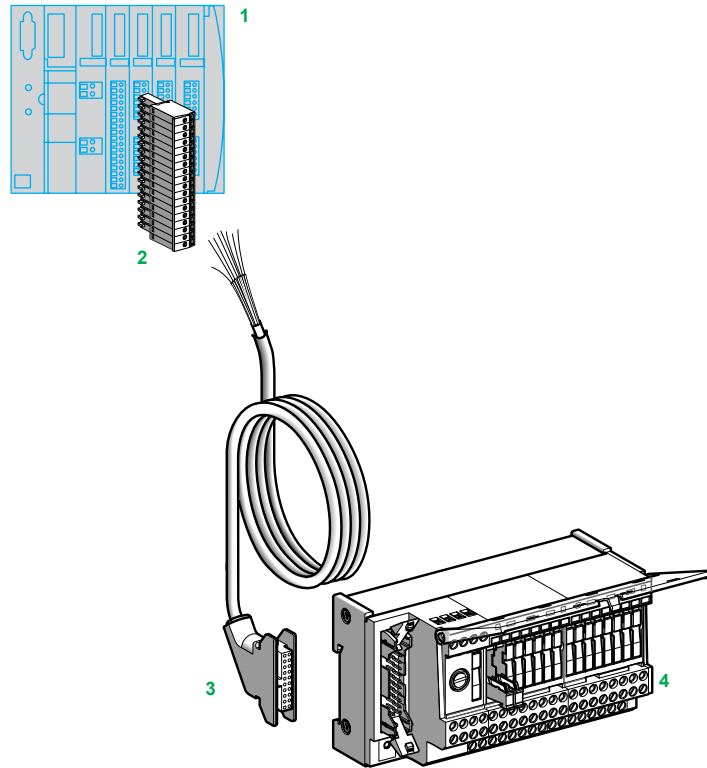
Output connector for STB DDO 3705

Description	Use	Reference	Weight kg
HE10 connector for 16-output module STB DDO 3705	To Twido Sub base	STB XTS 5610	–
	To Modicon Telefast ABE 7 base	STB XTS 6610	–

Modicon® STB distributed I/O solution

High-density I/O modules
and the Modicon Telefast® ABE 7 pre-wired system

Other wiring solution





- 1 Modicon® STB I/O station incorporating a high-density module STB DDI 3725 and/or STB DDO 3705
- 2 STB XTS 1180 (screw-type) or STB XTS 2180 (spring-type) 18-way connector
- 3 TSX CDP 301 (3 m), TSX CDP 501 (5 m) or TSX CDP 1001 (10 m) pre-wired cable with HE 10 connector at one end and flying leads at the other end
Cross-section 0.324 mm², AWG 24
- 4 Modicon® Telefast® ABE 7 connector or adaptor base (see compatibility table opposite)


Note: For more information about the Modicon Telefast ABE 7 pre-wired system, please refer to the "Power supplies, splitter boxes and interfaces" catalog.

Modicon® STB distributed I/O solution

High-density I/O modules and the Modicon Telefast® ABE 7 pre-wired system

Combinations of Modicon® STB high-density modules and Modicon® Telefast® ABE 7 system			
Modicon STB module		High-density inputs STB DDI 3725	High-density outputs STB DDO 3705
Module base		STB XBA 3000	
18-way connectors 2	Screw	STB XTS 1180 (1)	
	Spring	STB XTS 2180 (1)	
Pre-wired cable 3	Specifications	Flying leads at Modicon module end HE 10 connector at Modicon Telefast end Wire cross-section 0.324 mm ² , AWG 24	
	References	TSX CDP 301 (3 m) TSX CDP 501 (5 m) TSX CDP 1001 (10 m)	
Modicon STB module		STB DDI 3725	STB DDO 3705
Passive connection bases (16-channel) 4			
Universal	ABE 7H16R●●		
	ABE 7H16R●●E		
	ABE 7H16S21		
	ABE 7H16S43		
	ABE 7H16F43		
Miniature	ABE 7H16C10		
	ABE 7H16C11		
	ABE 7H16C21		
	ABE 7H16C31		
Input adapter active bases (16-channel) 4			
	ABE 7S16E2●●		
	ABE 7 S16E2●●E		
	ABE 7P16F310		
	ABE 7P16F310E		
	ABE 7P16F312		
Output adapter active bases (16-channel) 4			
	ABE 7S16S●●●		
	ABE 7S16S●●●E		
	ABE 7R16S11		
	ABE 7R16S11●E		
	ABE 7R16T●●●		
	ABE 7P16T●●●		

 Compatible
 Not compatible

 The Modicon STB module can supply 24 V $\overline{\text{DC}}$ power to the Modicon Telefast block provided the current does not exceed 50 mA per group of 4 channels. Otherwise an external power supply will be required and only the 0 V reference should be connected between the Modicon STB module and the Modicon Telefast ABE 7 block.

(1) Sold in pairs (2 connectors per module).

Modicon® STB distributed I/O solution

High-density I/O modules and the Modicon Telefast® ABE 7 pre-wired system

Examples of combinations for logic input module STB DDI 3725

Voltage V	Modicon® Telefast® ABE 7 base
48 ---	ABE7 S16E2E1
48 ~	ABE7 S16E2E0
115 ~	ABE7 S16E2F0
230 to 240 ~	ABE7 S16E2M0

Examples of combinations for logic output module STB DDO 3705

Type	Voltage V	Current per channel A	Modicon Telefast ABE 7 base	Relay
Relay	24 ---	0.5	ABE7 S16S2B0	-
		0.5	ABE7 S16S1B2	-
		≥ 0.7	ABE7 P16T●●●● (1) ABE7 P16F●●●● (1)	-
Relay	48 ---	0.5	ABE7 P16T2●●● (1)	ABS7 C2E
Relay	48 ~	0.5	ABE7 P16T2●●● (1)	ABS7 SA2M
Relay	115 ~	0.5	ABE7 P16T2●●● (1)	ABS7 SA2M
Relay	230 to 240 ~	0.5	ABE7 P16T2●●● (1)	ABS7 SA2M
Solid state	24 to 240 ~	1.5	ABE7 P16T3	ABS7 SA3MA
Solid state	24 to 48 ---	1.5	ABE7 P16T3	ABS7 SC3E
Solid state	24 ---	2	ABE7 P16T3	ABS7 SC3BA
Economy relay	30 ---	2	ABE7 R16S●●●	-
		2 to 5	ABE7 R16S210/212	-
Economy relay	230 ~	2	ABE7 R16S●●●	-
		2 to 5	ABE7 R16S210/212	-

(1) Empty bases

Modicon® STB distributed I/O solution

High-density I/O modules and the Modicon Telefast® ABE 7 pre-wired system

STB DDI 3725 module - TSX CDP ●01 connections

⚠ The inputs must be powered via the Modicon® STB DDI 3725 module. (1)

STB DDI 3725		TSX CDP ●01		STB DDI 3725		TSX CDP ●01	
Left connector	Channel	HE 10		Right connector	Channel	HE 10	
A	IN	Terminal no.	Wire color	B	IN	Terminal no.	Wire color
1	PDM V1 + (1)	17 (2)	White/grey	1	PDM V1 + (1)	19 (2)	White/pink
2	I1	1	White	2	I9	9	Black
3	–	–	–	3	–	–	–
4	I2	2	Brown	4	I10	10	Purple
5	–	–	–	5	–	–	–
6	I3	3	Green	6	I11	11	Grey/pink
7	–	–	–	7	–	–	–
8	I4	4	Yellow	8	I12	12	Red/blue
9	PDM V1 -	18 (3)	Grey/brown	9	PDM V1 -	20 (3)	Pink/brown
10	–	–	–	10	–	–	–
11	I5	5	Grey	11	I13	13	White/green
12	–	–	–	12	–	–	–
13	I6	6	Pink	13	I14	14	Brown/green
14	–	–	–	14	–	–	–
15	I7	7	Blue	15	I15	15	White/yellow
16	–	–	–	16	–	–	–
17	I8	8	Red	17	I16	16	Yellow/brown
18	–	–	–	18	–	–	–

- (1) Wires 17 and 19 in cable TSX CDP ●01 (terminals 1 on the STB DDI 3725 connectors) should only be connected if the following two conditions are met:
 - No external power supply connected to the Telefast® ABE 7 base
 - Consumption does not exceed 50 mA per group of 4 channels
- (2) Terminals 17 and 19 on the HE10 connector connected inside the ABE 7 base
 (3) Terminals 18 and 20 on the HE10 connector connected inside the ABE 7 base

STB DDO 3705 module - TSX CDP ●01 connections

⚠ The outputs must be powered via the Modicon® Telefast® ABE 7 base.

STB DDO 3705		TSX CDP ●01		STB DDO 3705		TSX CDP ●01	
Left connector	Channel	HE 10		Right connector	Channel	HE 10	
A	OUT (1)	Terminal no.	Wire color	B	OUT (1)	Terminal no.	Wire color
1	OUT 1	1	White	1	OUT 9	9	Black
2	PDM V -	20 (2)	Pink/brown	2	PDM V -	18 (2)	Grey/brown
3	OUT 2	2	Brown	3	OUT 10	10	Purple
4	–	–	–	4	–	–	–
5	OUT 3	3	Green	5	OUT 11	11	Grey/pink
6	–	–	–	6	–	–	–
7	OUT 4	4	Yellow	7	OUT 12	12	Red/blue
8	–	–	–	8	–	–	–
9	NC	–	–	9	NC	–	–
10	OUT 5	5	Grey	10	OUT 13	13	White/green
11	–	–	–	11	–	–	–
12	OUT 6	6	Pink	12	OUT 14	14	Brown/green
13	–	–	–	13	–	–	–
14	OUT 7	7	Blue	14	OUT 15	15	White/yellow
15	–	–	–	15	–	–	–
16	OUT 8	8	Red	16	OUT 16	16	Yellow/brown
17	–	–	–	17	–	–	–
18	NC	–	–	18	NC	–	–

- (1) NC: Not connected
 (2) Terminals 18 and 20 on the HE10 connector connected inside the ABE 7 base

Modicon® STB distributed I/O solution

Phaseo® regulated power supplies

ABL 7 power supplies

The ABL 7 range of power supplies is designed to provide the DC voltage required by the control circuits of automation system equipment. Split into three families, this range meets the needs encountered in industrial, commercial and residential applications. Single-phase or 3-phase (1), of the electronic switch mode type, they provide an output current quality that is suitable for the loads supplied and compatible with the line supply available in the equipment. Clear guidelines are given for selecting the protective devices that are often used with them, thus providing a comprehensive solution.

Phaseo® switch mode power supplies

These switch mode power supplies are totally electronic and regulated. The use of electronics makes it possible to significantly improve the performance of these power supplies. The power supplies provide the following features:

- Very compact size
- Integrated overload, short-circuit, overvoltage and undervoltage protection
- Very wide range of permissible input voltages, without any adjustment required
- High degree of output voltage stability
- High efficiency
- LED indicators on the front panel

Phaseo power supplies are available in single-phase and 3-phase versions (1). They deliver a voltage that is accurate to 3%, whatever the load and whatever the type of line supply, within a range of 85 to 264 V for single-phase or 360 to 550 V for 3-phase. Conforming to IEC standards and UL- and CSA-certified, they are suitable for universal use. The inclusion of overload and short-circuit protection makes downstream protection unnecessary if discrimination is not required.

ABL 7 RE and ABL 7 RP supplies are also equipped with an output undervoltage control that causes the product to trip if the output voltage drops below 19 V to help ensure that the voltage delivered is always usable by the actuators being supplied. Products are equipped with an output voltage adjustment potentiometer to compensate for any line voltage drops in installations with long cable runs. These power supplies are designed for direct mounting on 35 mm and 75 mm U rails.

The single-phase power supplies referenced in this catalog are specially adapted for use with the Modicon® STB modules for automation stations (network interface modules and power distribution modules).

■ ABL 7RE universal single-phase supplies:

- Power between 48 W (2 A) and 240 W (10 A)
- Compact size
- For machine equipment
- Suitable for use in automation system environments based on any Modicon® PLC platforms requiring a 24 V DC supply

■ ABL 7RP universal single-phase supplies:

- Power between 60 W (2.5 A) and 240 W (10 A)
- Output voltage available: 12, 24, and 48 V DC
- Input filter (PFC) for commercial and residential environments (conforming to standard EN 61000-3-2)
- Two operating modes possible for handling of overloads and short circuits:
 - "AUTO" mode provides automatic restarting of the power supply on elimination of the detected fault
 - "MANU" mode requires manual resetting of the power supply to restart. Resetting is achieved by switching off the line supply power.

(1) For 3-phase power supplies, refer to the Automation & Control - Interfaces, I/O Splitter Boxes, and Power Supplies catalog.



2/3 A power supply



5 A power supply



10 A power supply

Modicon® STB distributed I/O solution

Phaseo® regulated power supplies

Use of 24 V $\overline{\text{---}}$

- The use of 24 V $\overline{\text{---}}$ enables protected installations (PELV) to be implemented. PELV includes a protective measure against direct and indirect contact with dangerous voltage. Specifications relating to these installations are defined in publication NF C 12-201 and in standard IEC 364-4-41.
- The application of these measures to the electrical equipment in machines is defined in standard NF EN 60204-1 with the following requirements:
 - The voltage used must be less than 60 V DC in dry environments and 30 V DC in damp environments
 - One side of the PELV circuit, or one point of the source, must be connected to the equipotential protection circuit associated with higher voltages.
 - Switchgear and control gear designed to help ensure a sufficient separation between power circuits and control circuits must be used.
- PELV circuits require a sufficient separation between the power circuits and the control circuits. This sufficient separation is designed to prevent the development of hazardous voltages in 24 V $\overline{\text{---}}$ safety circuits.
- The relevant reference standards are:
 - IEC 61558-2-6 and EN 61558-2-6 (safety transformers)
 - IEC 664 (isolation coordination)Schneider-electric power supplies meet these requirements.
- Moreover, to help ensure that these products will operate correctly with respect to the reinforced isolation requirements, it is recommended that they be mounted and wired as indicated below:
 - They should be placed on a grounded mounting plate or rail.
 - They should be connected using flexible cables, with a maximum of two wires per connection, and tightened to the nominal torque.
 - Conductors of the correct insulation class must be used.
- If the DC circuit is not connected to an equipotential protection conductor, an earth ground leakage detector will indicate any accidental insulation faults (please consult your Regional Sales Office).

Operating voltage

- The permissible tolerances for the operating voltage are listed in publications IEC 1131-2 and DIN 19240.
 - For nominal voltage $U_n = 24\text{ V } \overline{\text{---}}$, the extreme operating values must fall between -15% to +20% of U_n , whatever the supply fluctuations in the range of -10% to +6% (as defined by standard IEC 38) and load variations in the range 0-100% of I_n .
- Schneider-electric 24 V $\overline{\text{---}}$ power supplies are designed to provide a voltage within this range.
- It may be necessary to use a voltage measurement relay to detect when the normal voltage limits are being exceeded and to deal with the consequences of this (please consult your Regional Sales Office).

Modicon® STB distributed I/O solution

Phaseo® regulated power supplies

Selection of power supplies

Consider the following characteristics when selecting a power supply:

- Required output voltage and current
- Line voltage available in the installation

This may, however, result in several products being selected as suitable. Other selection criteria must therefore be taken into account.

There are 3 possible power supply options for Modicon® STB modules:

- Option 1: One single power supply for the network interface module, sensors, and actuators. Advantages: Simple and low-cost.
- Option 2: Two power supplies: 1 for the network interface module and 1 for the sensors/actuators. Advantage: Separation of the bus and fieldbus.
- Option 3: Three power supplies: 1 for the network interface module, 1 for the sensors, and 1 for the actuators. Advantage: Suitable for applications requiring minimum interference at the inputs. See power supply combination table on page 121.

Quality of the line supply

The Phaseo® range is the ideal solution because it helps to ensure accuracy to 3% of the output voltage, whatever the load current and the input voltage. In addition, the wide input voltage range of Phaseo power supplies allows them to be connected to line supplies within this range, without any adjustment required.

The Phaseo RP family can also be connected to 110 and 220 V $\overline{\text{---}}$ emergency supplies.

Harmonic pollution (power factor)

The current drawn by a power supply is not sinusoidal. This results in harmonic currents that pollute the line supply. European standard EN 61000-3-2 limits the harmonic currents produced by power supplies. This standard covers devices between 75 W and 1000 W, drawing up to 16 A per phase and connected directly to the public distribution system. Devices connected downstream of a private, low voltage, general transformer are therefore excluded.

Regulated switch mode supplies always produce harmonic currents. A filter circuit (Power Factor Correction or PFC) must therefore be added to comply with standard EN 61000-3-2.

Phaseo ABL 7RP power supplies conform to EN 61000-3-2 and can therefore be connected directly to public distribution systems.

Electromagnetic compatibility

Levels of conducted and radiated emissions are defined in standards EN 55011 and EN 55022.

Products in the Phaseo range have Class B certification and can be used without any restrictions due to their low emissions.

Behavior in the event of short circuits

Phaseo power supplies are equipped with an electronic protection device. This protection device resets itself automatically on correction of the detected fault (around 1 second for ABL 7RE/RP) eliminating the need to take action or change a fuse. In addition, the Phaseo ABL 7RP ranges allow the user to select the reset mode in the event of a detected fault:

- In the "AUTO" position, resetting is automatic
- In the "MANU" position, resetting occurs after elimination of the detected fault and after switching the line supply power off and back on.

This feature allows Phaseo ABL 7RP power supplies to be used in installations where the hazards associated with untimely restarting are significant.

Selection of reset mode

Reset mode is selected using the microswitch on the front panel of the product.

Modicon® STB distributed I/O solution

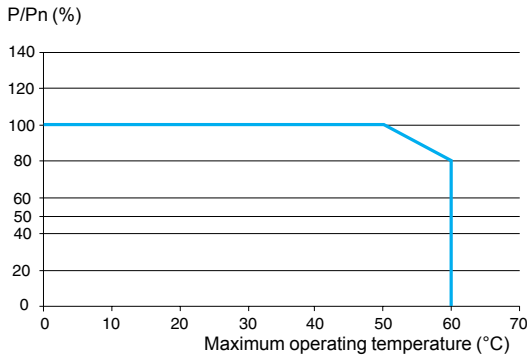
Phaseo® regulated power supplies

Technical specifications			
Power supply type		ABL 7RE	ABL 7RP
Approvals		UL, CSA, TÜV, CTick	
Compliance with Safety standards		UL 508, CSA 22.2 no. 950	
EMC		EN 50081-1, IEC 61000-6-2 (EN 50082-2)	
LF harmonic currents		-	EN 61000-3-2
Input circuit			
LED indication		Orange LED	Orange LED
Input values	Nominal voltage	V 100 to 240 ~	100 to 240 ~ compatible with 110 to 220 ~ (1)
	Permissible voltages	V 85 to 264 ~ single-phase	85 to 264 ~, compatible with 100 to 250 ~ (1)
Permissible frequencies		Hz 47 to 63	
Efficiency at nominal load		> 85%	
Current consumption	Ue = 240 V	A 0.6 (48 W)/0.83 (72 W) 1.2 (120 W)/2.5 (240 W)	0.4 (72 W)/0.6 (120 W) 1.3 (240 W)
	Ue = 100 V	A 1.2 (48 W)/1.46 (72 W) 1.9 (120 W)/3.6 (240 W)	0.8 (72 W)/1 (120 W)/2.8 (240 W)
Current on power-up		A < 30	
Power factor		0.65, approximately	0.98, approximately
Output circuit			
LED indication		Green LED	Green LED
Nominal output voltage (U out)		V 24 ~	12, 24, and 48
Nominal output current		A 2/3/5/10	2.5/5/10
Accuracy	Output voltage	Adjustable from 100 to 120%	
	Line and load regulation	± 3%	
	Residual ripple - interference	mV < 200 (peak-peak)	
Micro-breaks	Holding time at I max and Ve min	ms > 10	> 20
Temporary overloads	Permissible inrush current (U out > 19 V)	See page 121	
Protection against	Short circuits	Permanent/automatic restart	Permanent/automatic restart or restart after switching off line supply power
	Overload	1.1 In	
	Overvoltage	Tripping if U > 1.5 Un	
	Undervoltage	Tripping if U > 0.8 Un	
Operating and environmental specifications			
Connections	Input	mm² 2 x 2.5 + earth ground	
	Output	mm² 2 x 2.5 + earth ground, multiple output depending on model	
Ambient conditions	Storage temperature	°C (°F) -25 to +70 (-13 to 158)	
	Operating temperature	°C (°F) 0 to +60 (32 to 148) [derating from 50°C (122°F), mounted vertically]	
	Maximum relative humidity	95% without condensation or dripping water	
	Degree of protection	IP 20 conforming to IEC 529	
	Vibration	Conforming to EN 61131-2	
Operating position		Vertical	
MTBF at 40°C		> 100,000 h	
Connections	Serial	Possible	
	Parallel	Possible (maximum temperature 50°C)	
Dielectric strength	Input/Output	3000 V/50 and 60 Hz 1 minute	
	Input/earth ground	3000 V/50 and 60 Hz 1 minute	
	Output/earth ground (and output/output)	500 V/50 and 60 Hz 1 minute	
Input fuse incorporated		Yes, not interchangeable	
Emission		EN 50081-1	
Conducted		EN 55011/EN 55022 cl.B	
Radiated		EN 55011/EN 55022 cl.B	
Immunity		IEC 61000-6-2 (generic)	
Electrostatic discharge		EN 61000-4-2 (4 kV contact/8 kV air)	
Electromagnetic		EN 61000-4-3 level 3 (10 V/m)	
Conducted interference		EN 61000-4-4 level 3 (2 kV), EN 61000-4-5, EN 61000-4-6 level 3, EN 61000-4-8 level 4.	
Line interference		EN 1000-4-11 (voltage drops and cuts)	

(1) Compatible input voltage not indicated on the product.

Modicon® STB distributed I/O solution

Phaseo® regulated power supplies



Derating

The ambient temperature is a determining factor that limits the power an electronic power supply can deliver continuously. If the temperature surrounding the electronic components is too high, their life span will be significantly reduced. Conversely, a power supply can deliver more than its nominal power if the ambient temperature remains largely below the nominal operating temperature.

The nominal ambient temperature for Phaseo® power supplies is 50°C. Above this, derating is necessary up to a maximum temperature of 60°C.

The adjacent graph shows the power P (in relation to the nominal power Pn) that the power supply can deliver continuously as a function of the ambient temperature (on the vertical axis). Derating must be taken into account for extreme operating conditions:

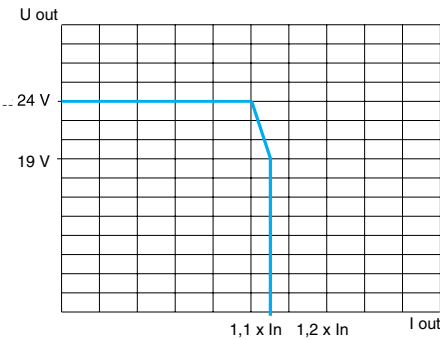
- Intensive operation (output current permanently close to the nominal current, combined with a high ambient temperature)
- Output voltage rising above 24 V (for example, to compensate for line voltage drops)
- Parallel connection to increase the total power

General rules to be complied with

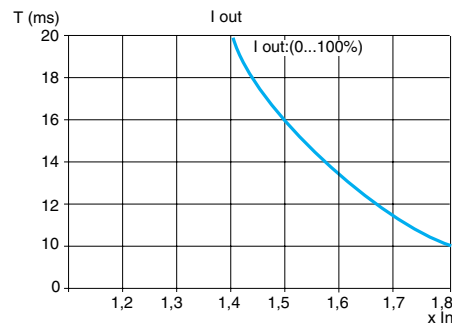
Intensive operation	See derating on graph at left. Example for ABL 7RE: □ Without derating, from 0°C to 50°C □ Derating of nominal current by 2% per additional °C, up to 60°C
Rise in output voltage	The nominal power is fixed. Increasing the output voltage means that the current delivered must be reduced.
Parallel connection to increase the power	The total power is equal to the power sum the power supplies used, but the maximum ambient temperature for operation is 50°C. To improve heat dissipation, the power supplies must not be in contact with each other.

There must be adequate convection around the products to assist cooling. A clearance of 50 mm must be maintained above and below Phaseo power supplies, as well as a clearance of 15 mm on the sides.

Load limits



Temporary overloads



ABL 7RE and ABL 7RP power supplies: Protection of the power supply line

Line supply type	115 V ~ single-phase			230 V ~ single-phase		
	Thermal-magnetic circuit breaker		gG fuse	Thermal-magnetic circuit breaker		gG fuse
	GB2	C60N		GB2	C60N	
ABL 7RE2402	GB2 ●B07	MG24517 (1)	2 A	GB2 DB06	MG24517 (1)	2 A
ABL 7RE2403	GB2 ●B07	MG24517 (1)	2 A	GB2 DB06	MG24518 (1)	2 A
ABL 7RE2405	GB2 ●B08	MG24518 (1)	4 A	GB2 DB07	MG24518 (1)	2 A
ABL 7RE2410	GB2 ●B12	MG17454 (1)	6 A	GB2 DB08	MG24516 (1)	4 A
ABL 7RP2403	GB2 ●B07	MG24517 (1)	2 A	GB2 DB07	MG17453 (1)	2 A
ABL 7RP2405	GB2 ●B07	MG24517 (1)	2 A	GB2 DB07	MG24516 (1)	2 A
ABL 7RP2410	GB2 ●B09	MG24519 (1)	4 A	GB2 DB07	MG24516 (1)	2 A

(1) UL-certified circuit breaker.

Combinations of Phaseo® single-phase power supplies with Modicon® STB modules

Modicon® STB module type	NIM network interface module STB N●● 2212/1010 BOS bus extension module STB XBE 1300 Auxiliary power supply STB CPS 2111	Power Distribution Module (PDM) STB PDT 3100/3105 (1)	
		Sensors	Actuators
Modicon STB installation with:	1 power supply	ABL 7RP2410 (10 A)	
	2 power supplies	ABL 7RE/RP2402 (2 A)	ABL 7RP2410 (10 A)
	3 power supplies	ABL 7RE/RP2402 (2 A)	ABL 7RE/RP2405 (5 A) ABL 7RP2410 (10 A)

(1) With basic power distribution module STB PDT 3105, installation with 1 or 2 power supplies only.

If the nominal current values for Phaseo® power supplies are exceeded, multiple power supplies can be used to power NIM, BOS, CPS, and PDT modules in accordance with the rules defined above (1, 2 or 3 power supplies).

Note:

- The STB CPS 2111 should be associated with an STB PDT ●10● power supply module.
 - 24 V $\bar{\bar{}}$ power supplies. The input current of these power supplies is as follows:
 - NIM network interface module STB N●●: 0.4 A
 - BOS bus extension module STB XBE 1200: 0.3 A
 - Auxiliary power supply STB CPS 2111: 0.3 A
 - Power distribution modules. The maximum current is as follows:
 - STB PDT 3100 for power supply to sensors: 4 A at 30°C, 2.5 A at 60°C
 - STB PDT 3100 for power supply to actuators: 8 A at 30°C, 5 A at 60°C
 - STB PDT 3105 for power supply to sensors/actuators: 4 A at 30°C, 2.5 A at 60°C
 - ABL 7RE power supply: built-in auto-protect with auto-reset
 - ABL 7RP power supply: built-in auto-protect with auto-reset or manual reset.
- EN 61000-3-2-compliant

References (1)



ABL 7RE2405
ABL 7RP2405

ABL 7RE single-phase regulated switch mode power supplies

Line input voltage 47 to 63 Hz	Output voltage	Nominal power	Nominal current	Auto-protect reset	Conforming to standard EN 61000-3-2	Reference	Weight
V	V $\bar{\bar{}}$	W	A				kg
100 to 240 \sim single-phase wide range	24	48	2	Auto	No	ABL 7RE2402	0.520
		72	3	Auto	No	ABL 7RE2403	0.520
		120	5	Auto	No	ABL 7RE2405	1.000
		240	10	Auto	No	ABL 7RE2410	2.200

ABL 7RP single-phase regulated switch mode power supplies

Line input voltage 47 to 63 Hz	Output voltage	Nominal power	Nominal current	Auto-protect reset	Conforming to standard EN 61000-3-2	Reference	Weight
V	V $\bar{\bar{}}$	W	A				kg
100 to 240 \sim single-phase wide range 110 to 220 $\bar{\bar{}}$ (2)	24	72	3	Auto/manual	Yes	ABL 7RP2403	0.520
		120	5	Auto/manual	Yes	ABL 7RP2405	1.000
		240	10	Auto/manual	Yes	ABL 7RP2410	2.200

(1) For other Phaseo power supplies, refer to the "Automation & Control - Interfaces, I/O splitter boxes, and power supplies" catalog.

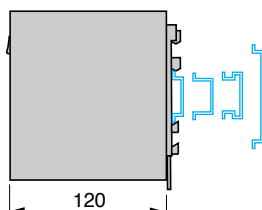
(2) Compatible input voltage not indicated on the product.

Dimensions

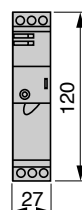
ABL 7RE24●●/ABL 7RP24●●

Common side view

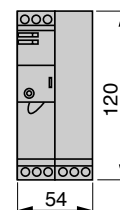
Mounted on 35 mm and 75 mm rails



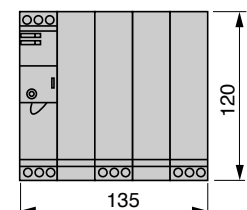
ABL 7RE2402/2403
ABL 7RP2403



ABL 7RE2405
ABL 7RP2405



ABL 7RE2410
ABL 7RP2410



Technical information







Automation products certifications

In some countries, certification of certain electrical components is enforced by law. A standard conformity certificate is then issued by the official organization. Each certified product must carry approval symbols when enforced. Use on board merchant navy vessels generally requires prior approval (= certification) of an electrical device by certain marine classification authorities.

Key	Certification body	Country
CSA	Canadian Standards Association	Canada
C-Tick	Australian Communication Authority	Australia
GOST	Gost Standard Scientific Research Institute	C.I.S., Russia
UL	Underwriters Laboratories	USA
Key	Classification authority	Country
IACS	International Association of Classification Societies	International
ABS	American Bureau of Shipping	USA
BV	Bureau Veritas	France
DNV	Det Norske Veritas	Norway
GL	Germanischer Lloyd	Germany
LR	Lloyd's Register	United Kingdom
RINA	Registro Italiano Navale	Italy
RMRS	Russian Maritime Register of Shipping	C.I.S.

The table below shows the situation as of 01/03/2008 for certifications obtained or pending from organizations for base PLCs. An overview of certificates for Schneider Electric products is available on our web site: www.schneider-electric.us

Product certifications

	Approvals						
	 UL USA	 CSA Canada	 ACA Australia	 GOST CIS, Russia	Hazardous locations Class I, Div 2 (1)	 ATEX Europe	 TÜV Rheinland ind
Modicon® OTB							
Modicon® STB					FM	Cat 3 G	
Modicon® Telefast® ABE 7							
ConneXium™							
Magelis® iPC™, Magelis® XBT GTW					UL		
Magelis® XBT GT						Cat 3 G-D	
Magelis® XBT GK							
Magelis® XBT F/FC/HM/PM							
Magelis® XBT N/R						Cat 3 G-D	
Magelis® XBT RT							
Modicon® M340™							
Modicon® Momentum™							
Modicon® Premium™							
Modicon® Quantum™							
Modicon® Quantum™ Safety							
Modicon® TSX Micro™							
Phaseo®	(3) (5)						
Twido®	(6)						

(1) Hazardous locations: UL 1604, CSA 22.2 no. 213 or FM 3611, certified products are acceptable for use in hazardous locations of Class I, division 2, groups A, B, C, D or unclassified only.

(2) Depending on product, consult our web site: www.schneider-electric.us

(3) cULus North American certification (Canada and USA).

(4) Certified for use in applications up to and including SIL3 according to IEC 61508.

(5) Except Universal power supplies and Function modules: UL certification pending.

(6) Except **TWID NO1 10M3 AS-Interface** module, only CE.

Local certifications








BG	Germany	TSX DPZ 10D2A safety module (Modicon® TSX Micro™ PLC). TSX PAY 262/282 safety modules (Modicon Premium™ PLC).
SIMTARS	Australia	Modicon TSX Micro automation platform Modicon Premium automation platform (PL7)
AS-Interface	Europe	TWID NO1 10M3 master module (Twido® PLC). TSX SAZ 10 master module (Modicon TSX Micro). TSX SAY 1000 master modules (Modicon Premium).

Technical information

Automation products certifications

Community regulations

Marine classification

	Marine classification authorities						
							
	ABS	BV	DNV	GL	LR	RINA	RMRS
	USA	France	Norway	Germany	UK	Italy	C.I.S.
Modicon® OTB							
Modicon® STB	(1)						
Modicon® Telefast® ABE 7							
ConneXium™							
Magelis® iPC™							
Magelis® iPC™, Magelis® XBT GTW				(2)			
Magelis® XBT GK							
Magelis® XBT F/FC/HM/PM							
Magelis® XBT N/R				(2)		(2)	
Magelis® XBT RT							
Modicon® M340							
Modicon® Momentum™							
Modicon® Premium™ (3)							
Modicon® Quantum™							
Modicon® TSX Micro™							
Phaseo®							
Twido®							

(1) Also meets US Navy requirements, **ABS-NRV** part 4.

(2) Depending on product, consult our web site: www.schneider-electric.us.

(3) Modicon® Premium™ PLC, also **KRS** (Korean register of Shipping) certified.

(4) Exceptions: compact bases **TWD LC●● 40DRF**, Extreme base **TWD LEDCK1**, I/O module **TWD DAI 8DT**, analog I/O modules **TWD AMI 2LT/4LT/8HT**, **TWD ARI 8HT**, **TWD AVO 2HT**, **TWD AMM 6HT**, communication modules **499 TWD 01100**, **TWD NCO1M**, **TWD NOI 10M3** and taps **TWD XCA ISO/T3RJ**.

Community regulations

European directives

The opening of European markets implies a harmonization of regulations in the various European Union member states.

European Directives are documents used to remove obstacles to the free movement of goods and their application is compulsory in the European Union.

Member states are obliged to transcribe each Directive into their national legislation and, at the same time, to withdraw any conflicting regulations.

The Directives, particularly those of a technical nature, only set objectives, called "general requirements".

The manufacturer must take necessary measures to help ensure that his products conform to the requirements of each Directive relating to his equipment.

As a general rule, the manufacturer affirms that his product conforms to the necessary requirements of the Directive(s) by applying the CE label to his product. The CE marking is applied to Schneider-electric products where relevant.

The significance of CE marking

- The CE marking on a product means that the manufacturer certifies that this product conforms to the relevant European Directives. It is necessary so that a product subject to a Directive(s) can be marketed and freely moved within the European Union.
- The CE marking is intended solely for the national authorities responsible for market regulation.

For electrical equipment, conformity of the product to standards indicates that it is suitable for use.

One or more Directives, as appropriate, may apply to our products, in particular:

- The Low Voltage Directive 2006/95/EC.
- The Electromagnetic Compatibility Directive 89/336/EEC, amended by Directives 2004/108/EC.
- Directive CE ATEX 94/9/EC.

Principle

The 5 V \overline{DC} required for the logic power supply to the I/O modules is supplied by the following modules:

- **Network interface module (NIM)** placed at the beginning of the primary segment
- **BOS bus extension module** placed at the beginning of each extension segment
- **CPS auxiliary power supply** placed within a segment

The NIM, BOS, and CPS modules use their 24 V \overline{DC} power supply to deliver a maximum current of 1200 mA at a logic voltage of 5 V \overline{DC} .

The power consumption per segment must be calculated to help ensure that the current required by the I/O modules does not exceed the current supplied by the different power supply modules. If necessary, add an STB CPS 2111 auxiliary power supply to the segment(s).

Instructions for using the table on the next page

For each segment:

- In the Number column, indicate the required number of I/O modules for each reference.
- In the Total column calculate the total current based on that number.
- In box **1**, enter the grand total of these values (mA).
- The total in box **1** must be less than or equal to 1200 mA, box **2**. If it is greater, add an auxiliary power supply, box **3**.

The Advantys™ STB SPU 1●●● configuration and debugging software calculates the power consumption automatically. You can also use an Excel spreadsheet available from your Regional Sales Office or from our web site: www.schneider-electric.us.

Segment	I/O module reference	Combined with base	Removable terminals (1)	Power distribution modules (standard/basic)	Number of I/O modules in the segment	Power consumption in mA at 5 V ...				
						Per I/O module	Total			
Discrete inputs	STB DDI 3230	XBA 1000	XTS ●100	PDT 3100/3105		55				
	STB DDI 3420 K	XBA 1000	XTS ●100	PDT 3100/3105		45				
	STB DDI 3425 K	XBA 1000	XTS ●100	PDT 3100/3105		45				
	STB DDI 3610 K	XBA 1000	XTS ●100	PDT 3100/3105		55				
	STB DDI 3615 K	XBA 1000	XTS ●100	PDT 3100/3105		45				
	STB DDI 3725 KC	XBA 3000	XTS ●180	PDT 3100/3105		100				
	STB DDI 3725 KS									
	STB DAI 5230	XBA 2000	XTS ●110	PDT 2100/2105		40				
	STB DAI 5260 K	XBA 2000	XTS ●110	PDT 2100/2105		45				
	STB DAI 7220	XBA 2000	XTS ●110	PDT 2100/2105		40				
	Discrete outputs	STB DDO 3200	XBA 1000	XTS ●100		PDT 3100/3105			50	
		STB DDO 3230	XBA 1000	XTS ●100		PDT 3100/3105			45	
STB DDO 3410		XBA 1000	XTS ●100	PDT 3100/3105	70					
STB DDO 3415		XBA 1000	XTS ●100	PDT 3100/3105	70					
STB DDO 3600 K		XBA 1000	XTS ●100	PDT 3100/3105	90					
STB DDO 3605 K		XBA 1000	XTS ●100	PDT 3100/3105	90					
STB DDO 3705 KC		XBA 3000	XTS ●180	PDT 3100/3105	135					
STB DDO 3705 KS										
STB DAO 5260 K		XBA 2000	XTS ●110	PDT 2100/2105	70					
STB DAO 8210		XBA 2000	XTS ●110	PDT 2100/2105	45					
STB DRC 3210 K		XBA 2000	XTS ●110	PDT 3100/3105	55					
STB DRA 3290 K		XBA 2000	XTS ●110	PDT 3100/3105	55					
Analog inputs		STB AVI 1270	XBA 1000	XTS ●100	PDT 3100/3105		30			
		STB AVI 1275 K	XBA 1000	XTS ●100	PDT 3100/3105		30			
		STB AVI 1255 K	XBA 1000	XTS ●100	PDT 3100/3105		30			
	STB AVI 0300 K	XBA 2000	XTS ●100	PDT 3100/3105	90					
	STB AVI 1400 K	XBA 2000	XTS ●100	PDT 3100/3105	90					
	STB ACI 1230 K	XBA 1000	XTS ●100	PDT 3100/3105	30					
	STB ACI 1225 K	XBA 1000	XTS ●100	PDT 3100/3105	30					
	STB ACI 0320 K	XBA 2000	XTS ●100	PDT 3100/3105	95					
	STB ACI 8320 K	XBA 2000	XTS ●100	PDT 3100/3105	95					
	STB ACI 1400 K	XBA 2000	XTS ●100	PDT 3100/3105	90					
	STB ART 0200 K	XBA 1000	XTS ●100	PDT 3100/3105	30					
	Analog outputs	STB AVO 1250 K	XBA 1000	XTS ●100	PDT 3100/3105			45		
		STB AVO 1265 K	XBA 1000	XTS ●100	PDT 3100/3105			45		
STB AVO 1255 K		XBA 1000	XTS ●100	PDT 3100/3105	45					
STB AVO 0200 K		XBA 2000	XTS ●100	PDT 3100/3105	265					
STB ACO 0120 K		XBA 2000	XTS ●100	PDT 3100/3105	155					
STB ACO 1210 K		XBA 1000	XTS ●100	PDT 3100/3105	40					
STB ACO 1225 K		XBA 1000	XTS ●100	PDT 3100/3105	40					
STB ACO 0220 K		XBA 2000	XTS ●100	PDT 3100/3105	210					
Application-specific modules		STB EPI 1145	XBA 2000	–	PDT 3100/3105			115		
		STB EPI 2145 K	XBA 3000	–	PDT 3100/3105			110		
	STB EHC 3020 KC	XBA 3000	XTS 2150	PDT 3100/3105	100					
Extension modules	STB XBE 1100	XBA 2400	–	–		25				
	STB XBE 2100	XBA 2000	XTS ●110	–		100				
Consumption per segment						Total current consumption per segment		1		
						≤				
Network interface modules						Primary segment		2 1200 mA		
Ethernet TCP/IP	STB NIP 2212	–	XTS ●120							
CANopen	STB NCO 2212	–	XTS ●120							
	STB NCO 1010	–	XTS ●120							
Modbus Plus™	STB NMP 2212	–	XTS ●120							
Fipio®	STB NFP 2212	–	XTS ●120							
INTERBUS®	STB NIB 2212	–	XTS ●120							
	STB NIB 1010	–	XTS ●120							
Profibus DP™	STB NDP 2212	–	XTS ●120							
	STB NDP 1010	–	XTS ●120							
DeviceNet™	STB NDN 2212	–	XTS ●120+XTS ●110							
	STB NDN 1010	–	XTS ●120+XTS ●110							
BOS bus extension module	STB XBE 1200	–	XTS ●120				2 1200 mA			
Auxiliary power supply module	STB CPS 2111 K	–	XTS ●120				3 1200 mA			

(1) For screw-type terminal replace ● with 1 and for spring-type terminal replace ● with 2.

Product reference index

1		STB ACO 1210	72	STB DDO 3605	50	STB XMP 6700	27	TSX FP CC 100	25
170 BNO 671 00	25	STB ACO 1210 K	71	STB DDO 3605 K	49		33	TSX FP CC 200	25
170 CBB 970 30	107	STB ACO 1225	72	STB DDO 3705	50		51	TSX FP CC 500	25
170 MCI 007 00	25	STB ACO 1225 K	71	STB DDO 3705 KC	49		73	TSX IBS CA 100	25
170 MCI 020 10	24	STB ART 0200	72	STB DDO 3705 KS	49		84	TSX IBS CA 400	25
170 MCI 020 36	24	STB ART 0200 K	70	STB DRA 3290	50	STB XMP 7700	27	TSX PBS CA 100	25
170 MCI 020 80	24	STB AVI 0300	72	STB DRA 3290 K	49		33	TSX PBS CA 400	25
170 MCI 021 20	24	STB AVI 0300 K	70	STB DRC 3210	50		51		
170 MCI 100 00	25	STB AVI 1255	72	STB DRC 3210 K	49		73		
170 XTS 020 00	24	STB AVI 1255 K	70	STB EHC 3020	92		84		
		STB AVI 1270	72	STB EHC 3020 KC	92		87	X	
4		STB AVI 1270 K	70	STB EPI 1145	87	STB XMP 7800	27	XBT GK2●	109
490 NAD 911 03	25	STB AVI 1275	72	STB EPI 2145	84		51	XBT GK5●	109
490 NAD 911 04	25	STB AVI 1275 K	70	STB EPI 2145 K	84		73	XBT GT1●	109
490 NAD 911 05	25	STB AVI 1400	72	STB NCO 1010	23	STB XMP 7810	33	XBT GT2●	109
490 NTW 000 02	24	STB AVI 1400 K	70	STB NCO 2212	23	STB XSP 3000	33	XBT GT4●	109
	84	STB AVO 0200	72	STB NDN 1010	23		73	XBT GT5●	109
490 NTW 000 05	24	STB AVO 0200 K	71	STB NDN 2212	23	STB XSP 3010	33	XBT GT6●	109
	84	STB AVO 1250	72	STB NDP 1010	23		73	XBT GT7●	109
490 NTW 000 12	24	STB AVO 1250 K	71	STB NDP 2212	23	STB XSP 3020	33	XBT GTW450	109
	84	STB AVO 1255	72	STB NFP 2212	23		73	XBT GTW750	109
490 NTW 000 40	24	STB AVO 1255 K	71	STB NIB 1010	23	STB XTS 1100	51	XBT N	109
490 NTW 000 80	24	STB AVO 1265	72	STB NIB 2212	23	STB XTS 1110	27	XBT R	109
		STB AVO 1265 K	71	STB NIP 2212	23	STB XTS 1120	23	XBT RT	109
		STB BBS 1000	101	STB NMP 2212	23	STB XTS 1130	33	XBT XTS 1180	51
990 NAD 211 10	24	STB BBS 1003	101	STB PDT 2100	33	STB XTS 2100	51	XBT Z988	109
990 NAD 211 30	24	STB BBS 1010	101	STB PDT 2100 K	33	STB XTS 2110	27	XBT ZG 939	109
990 NAD 230 00	24	STB BBS 1011	101	STB PDT 2105	33	STB XTS 2111	23		
990 NAD 230 10	24	STB BBS 1130	101	STB PDT 2105 K	33	STB XTS 2120	27		
		STB CPS 2111	26	STB PDT 3100	33	STB XTS 2130	33		
A		STB CPS 2111 K	26	STB PDT 3100 K	33	STB XTS 2150	92		
ABE 7●	113	STB DAI 5230	50	STB PDT 3105	33	STB XTS 2180	51		
	114	STB DAI 5230 K	48	STB PDT 3105 K	33	STB XTS 5510	111		
ABL 7RE2402	121	STB DAI 5260	50	STB SPU 1000	101	STB XTS 5610	111		
ABL 7RE2403	121	STB DAI 5260 K	48	STB SPU 1003	101	STB XTS 6510	111		
ABL 7RE2405	121	STB DAI 7220	50	STB SPU 1010	101	STB XTS 6610	111		
ABL 7RE2410	121	STB DAI 7220 K	48	STB SPU 1011	101	STB XTT 0220	27		
ABL 7RP2403	121	STB DAO 5260	50	STB SPU 1130	101		33		
ABL 7RP2405	121	STB DAO 5260 K	49	STB SUS 8800	23		73		
ABL 7RP2410	121	STB DAO 8210	50	STB XBA 1000	51				
APP 2R2E	87	STB DAO 8210 K	49	STB XBA 2000	27				
APP 2R4E	87	STB DDI 3230	50		51				
AS MBKT 085	24	STB DDI 3230 K	48	STB XBA 2100	27				
		STB DDI 3420	50	STB XBA 2200	33				
L		STB DDI 3420 K	48	STB XBA 2300	27				
LU9 R03	84	STB DDI 3425	50	STB XBA 2400	27				
LU9 R10	84	STB DDI 3425 K	48	STB XBA 3000	51				
LU9 R30	84	STB DDI 3610	50	STB XBA 3100	26				
		STB DDI 3610 K	48	STB XBE 1100	26	T			
S		STB DDI 3615	50	STB XBE 1300	26	TSX CAN CADD03	24		
SR2 CBL 06	23	STB DDI 3725	50	STB XBE 2100	26	TSX CAN CADD1	24		
STB ACI 0320	72	STB DDI 3725 KC	48	STB XCA 1001	27	TSX CAN CADD3	24		
STB ACI 0320 K	70	STB DDI 3725 KS	48	STB XCA 1002	27	TSX CAN CADD5	24		
STB ACI 1225	72	STB DDO 3200	50	STB XCA 1003	27	TSX CAN CBDD03	24		
STB ACI 1225 K	70	STB DDO 3200 K	49	STB XCA 1004	27	TSX CAN CBDD1	24		
STB ACI 1230	72	STB DDO 3230	50	STB XCA 1006	27	TSX CAN CBDD3	24		
STB ACI 1230 K	70	STB DDO 3230 K	49	STB XCA 3002	87	TSX CAN CBDD5	24		
STB ACI 1400	72	STB DDO 3410	50	STB XCA 3003	87	TSX CAN TDM4	24		
STB ACI 1400 K	70	STB DDO 3410 K	49	STB XCA 4002	23	TSX FP ACC 12	25		
STB ACI 8320	72	STB DDO 3415	50	STB XMP 1100	23	TSX FP ACC 14	25		
STB ACI 8320 K	70	STB DDO 3415 K	49	STB XMP 4440	23	TSX FP ACC 2	25		
STB ACO 0120	72	STB DDO 3600	50	STB XMP 5600	33	TSX FP ACC 4	25		
STB ACO 0120 K	71	STB DDO 3600 K	49			TSX FP CA 100	25		
STB ACO 0220	72					TSX FP CA 200	25		
STB ACO 0220 K	71					TSX FP CA 500	25		

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Modicon® STB IP 20 distributed inputs/outputs

