

Instruction Bulletin 30598-386-01A1 July 1997

# 48 VDC 16 Input Base Unit TBX DES1633

**User's Manual** 





### WARNING

### UNINTENTIONAL EQUIPMENT OPERATION

To avoid improper handling of equipment:

The application of this product requires expertise in the design and programming of control systems. Only persons with such expertise should be allowed to program, install, alter, and apply this product.

Failure to observe this instruction can result in death or serious injury.



### **A** CAUTION

### **EQUIPMENT DAMAGE HAZARD**

To avoid improper handling of equipment:

- Never remove this device while power is ON.
- Do not subject to static discharge. This module contains electronic components that are very susceptible to damage from electrostatic discharge.

Failure to observe this instruction can result in equipment damage.

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Electrical equipment should be serviced only by qualified electrical maintenance personnel. No responsibility is assumed by Schneider S.A. for any consequences arising out of the use of this material

#### DESCRIPTION

The TBX DES1633 is a distributed input base unit containing sixteen 48 VDC digital inputs. This base unit may be coupled with a compatible communications interface to form a complete distributed block, which is well suited for the control of discrete field devices located some distance from a host programmable logic controller (PLC). The application of distributed I/O blocks saves installation and maintenance cost, as compared to direct wiring of field devices to a centralized I/O system over long distances.

The TBX DES1633 base unit can be used with either SY/MAX® or Telemecanique PLCs, through the use of a compatible communications interface, or "top hat". The interface mounts directly on the base unit, and allows the PLC to read and write to the I/O points through a suitable control network. The Class 8030 Type CRM275 Distributed Remote IO/NET™ Interface (DRIO) supports connection to the IO/NET control network as part of the PASSPORT™ I/O System. The TBX LEP020 and TBX LEP030 communications interfaces support connection to the FIPIO bus. The TBX CBS010 Expansion Interface allows inexpensive connection of a second TBX base unit to a single communications top hat.

The TBX DES1633 base unit supports the following TBX I/O features:

- Sixteen 48 VDC IEC1131-compatible input points Suitable for use with discrete field devices such as limit switches, proximity switches, and push buttons.
- Input power loss indication Reports when the input or field power supply drops below the valid level.
- *Input pulse latching* Captures momentary transitions of input signals and holds them until they can be read by the host controller.
- 48 VDC logic power supply Converts to proper voltage levels for top hat and for on-board electronics; may be wired independently from input or output power supplies.
- Removable field wiring terminal strip Mounts securely to the base unit without use of screws or fasteners.

This bulletin contains information on the installation and application of the TBX DES1633 base unit with either SY/MAX or Telemecanique PLCs. For information about programming a SY/MAX PLC for use with the TBX DES1633 base, refer to the Class 8030 Type CRM275 (DRIO) instruction bulletin (#30598-380). For information about programming a Telemecanique PLC for use with the TBX DES1633 base, refer to the Telemecanique TBX Distributed I/O Modules manual (TSX DM TBXV52E). Please read and keep all the appropriate manuals close at hand when using TBX base units.

Top hats receive +48 VDC from the primary base, which the top hat converts to logic power for the top hat and bases. For additional information on the DRIO Interface and the Expansion Interface, refer to instruction bulletins 30598-380 and 30598-371 respectively.

### **SPECIFICATIONS**

### **Base Unit Power**

Operating voltage: 24 VDC nominal; 38-60 VDC

Operating current at nominal voltage:

Configuration	Nominal
Base only	20 mA
Base with comms interface	55 mA
Base, interface and expansion base	71 mA

### Inputs

Inputs per base unit 16 Number of input commons 1

Isolation rating 1500 V rms between inputs and earth terminal

Voltage operating range 38-60 VDC

Nominal input current draw 7 mA

Must turn-on voltage 30 VDC

Must turn-on current 6 mA

Must turn-off voltage 10 VDC

Must turn-off current 2 mA

Input power loss indication True (1) indication ≤ 14 VDC

False (0) indication  $\geq$  19.2 VDC

Nominal turn-on time 5 ms

Maximum turn-on time 11 ms

Nominal turn-off time 5 ms

Maximum turn-off time 13 ms

I/O status indication Visual indication provided by communications

interface; 1 LED per input point

**Environmental and Physical** 

Operating temperature rating 0 to  $60^{\circ}$ C (32 to  $140^{\circ}$ F) Storage temperature rating -40 to  $80^{\circ}$ C (-40 to  $176^{\circ}$ F)

Humidity rating 5-95% RH, non-condensing

Dimensions (H x W x D): See Figure 1

Base unit w/ terminal strip 3.43 x 9.25 x 2.4 in (87 x 235 x 61 mm)

Base w/ comms. interface or

Base w/ CBS010 Interface 3.43 x 9.25 x 2.91 in (87 x 235 x 73.9 mm)

Weight (Base unit only) 1.3 lb (0.6 kg)

### **Agency Compliance**

Complies with UL508, CSA C22-2 requirements, and FM Class I, Division 2 Hazardous Locations approval requirements.

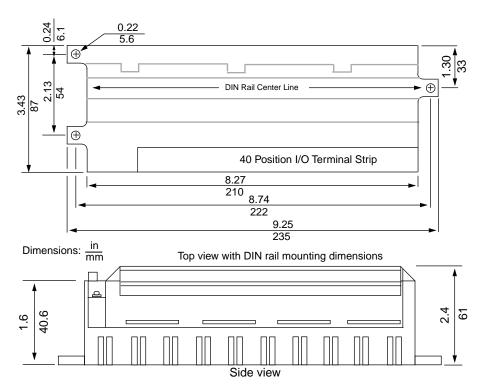


Figure 1: Dimensions

BASE UNIT WIRING

### **A** CAUTION

### UNINTENTIONAL EQUIPMENT OPERATION

With SY/MAX systems, use the TBX DES1633 base unit ONLY as an expansion base with the CRM275 DRIO. Do not use it as a primary base in a SY/MAX system.

Failure to observe this precaution can result in equipment damage.

Input devices are wired to the terminal strip on the top of the base unit. Figure 2 shows the terminal strip pin-out for the base unit.

Bulletin No. 30598-386-01A1 July 1997

The TBX DES1633 provides separate terminals for base voltage and control input voltage. These terminals may be connected to a common 48 VDC supply or may be sourced by independent supplies (terminals 1 and 4 must be at the same potential).

### **A** WARNING

### UNINTENTIONAL EQUIPMENT OPERATION

Be sure to use the appropriate SY/MAX or Telemecanique terminal strip label when wiring inputs or outputs. Two terminal strip labels are packaged with the base unit. If you are using the base unit with a SY/MAX system, use the terminal strip label with I/O numbered from 1-16; if you have a Telemecanique system, use the terminal strip label with I/O numbered from 0-15.

Failure to observe these instructions can result in death, serious injury, or equipment damage.

### **▲** WARNING

#### INCORRECT WIRING

The base must be properly grounded before applying power. Equipment MUST be grounded using the screw provided.

Do not use metallic conduit as a ground conductor.

Failure to observe these instructions can result in death or serious injury.

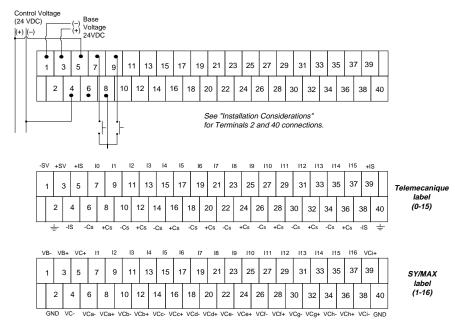


Figure 2: TBX DES1633 Wiring Connections & Terminal Block Signal Assignments

### MOUNTING INSTRUCTIONS

The base unit can be mounted horizontally or vertically as shown in Figure 3.

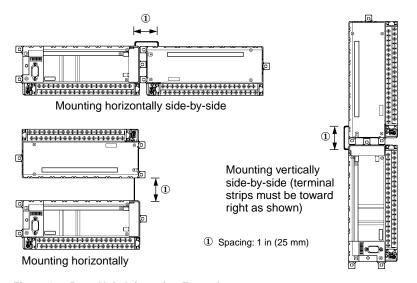


Figure 3: Base Unit Orientation Examples

To mount the base unit on a 35-mm DIN rail:

- 1. Hook the base unit onto the rail as shown in Figure 4.
- Press down and toward the DIN rail until the base unit is secure. (There are two spring clips in the top of the groove on the back of the unit.)

To remove the base unit from a DIN rail:

- Press down on the base unit.
- 2. Swing the unit outward and lift it off the rail at the same time as pressing down.

NOTE: If the base unit is to be used in a high-vibration environment, mounting the unit on a panel rather than a DIN rail provides more stability. Use cable ties to secure the communication cable.

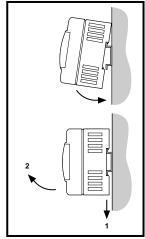


Figure 4: Mounting and Removing the Base Unit

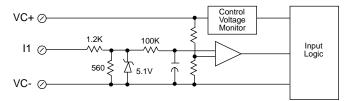
#### INSTALLATION AND APPLICATION CONSIDERATIONS

NOTE: The base unit is not compatible with the SY/MAX Type CRM270 interface. The base unit is compatible with SY/MAX Type CRM275 and Telemecanique TBX LEP020 and TBX LEP030 interfaces.

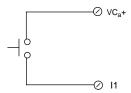
- Base Voltage The TBX DES1633 base requires a 48 VDC operating voltage to be applied between terminals 3 and 1.
- *Grounding* The green ground wire must be connected to the ground screw beside the terminal block.
- Jumper Wire-A#16 AWG wire must be installed between terminals 2 and 40.
- Commons The TBX DES1633 base unit has one common terminal pair for every two inputs.
- Control Input Voltage The control input voltage connected to terminal 5 and terminal 4 is available at terminals 6 through 36 for powering input devices. There is one set of control input voltage terminals for every two inputs. For example, terminals 6 and 8 provide control power for inputs 1 and 2 while terminals 10 and 12 power inputs for 3 and 4, and so on. There are two spare control input voltage terminals 39 and 38.
- User Supplied Input Power The input devices may be powered from a different 48 V control input voltage power supply than that used to power the base. This supply must be connected between terminals 5 and 4. If separate supplies are used, they must share the same common. If the input devices are to be powered from the same supply that powers the base, then a jumper wire is required from terminal 3 to terminal 5. Base and control power lines should be externally fused by the user.

#### **FUNCTIONAL CONSIDERATIONS**

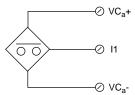
- Control Voltage Sensing The TBX DES1633 base unit monitors and reports
  the status of the inputs' power supply. (The status of this voltage is
  indicated in bit 1 of SY/MAX register S0003. See "Register Usage for Rack
  Addressing" for bit sense.) A flashing "RCK ERR" LED indicates a control
  voltage problem on the Type CRM275 interface.
- Removable Terminal Block Before removing the terminal block assembly, be sure that all power to the module is disconnected. The assembly may be removed by pushing the holding tabs on each end directly out from the assembly. After reinstallation, ensure that the holding tabs are returned to their upright position.



Simplified schematic for 48 VDC input



Method of connecting a "hard contact" input



#### Method of connecting a "solid-state" input

NOTE: The solid-state input device must have a current sourcing (or PNP) output.

Figure 5: Simplified Schematics & Input Connections for TBX DES1633 Base Unit

## REGISTER USAGE WITH SY/MAX CLASS 8030 TYPE CRM275 DRIO MODULE

The TBX DES1633 base unit supports the assignment of three registers for I/O, diagnostic and configuration registers. Additional information about base unit register usage is contained in the DRIO instruction bulletin (#30598-380).

This base unit supports I/O power loss indication (Register 3) and input pulse latching (Register 4, bits 7-10; Register 9). Refer to Chapter 4 of the DRIO instruction bulletin for more information about register assignments.

### WARNING

### UNINTENTIONAL EQUIPMENT OPERATION

Do not use reserved registers and bits in PLC programs. Erratic operation may result.

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



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