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Modicon Premium automation platform
TBX distributed analog I/O modules

Decentralising the I/O meets the requirements of both users and machine manufacturers while maintaining performance comparable with that of a centralised structure.

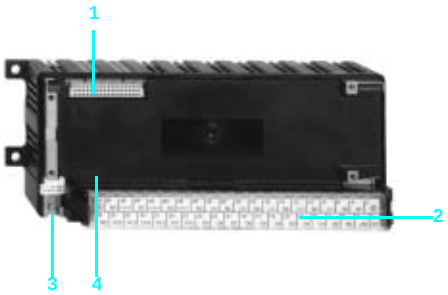
Distributed analog I/O modules complete the TBX range of distributed I/O modules. They provide general discrete I/O module functions with the benefit of:
- Connection to the Fipio fieldbus.
- Wiring system.
- Size.

Distributed analog I/O base units offer a wide range of analog inputs for acquisition of high and low level measurements, both voltage and current.
Three modular base units are available:
- 4 multi-range inputs, TBX AES 400.
- 6 high level inputs (voltage/current), 2 outputs (voltage/current), TBX AMS 620.
- 2 outputs (voltage/current), TBX ASS 200.

A TBX LEP 030 communication module is required when 1 or 2 analog base units (base or extension) are connected at any Fipio fieldbus connection point. The number of analog channels for TBX base units of the same type is limited to1008.

Description

Modular analog base units



Distributed analog I/O base units comprise:

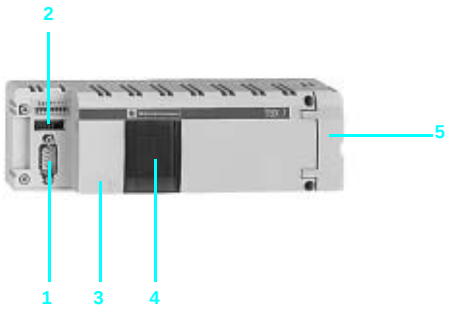
1 32-way female 1/2 DIN connector for connecting to the TBX LEP 030 communication module.

2 Removable screw terminal block (with terminal label) for wiring the analog sensors and actuators.

3 Screw clamp for earthing the base unit.

4 Location for user's identification label.

Fipio communication module



The TBX LEP 030 communication module comprises:

1 9-way male SUB-D type connector for connecting to the Fipio fieldbus.

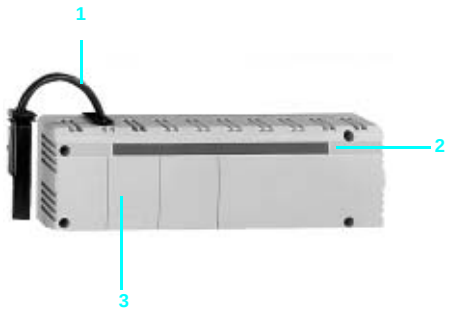
2 Five dip switches for setting the Fipio address together with an address coding label.

3 Location for the user's module/connection point identification label.

4 I/O display window.

5 Access cover for 32-way female 1/2 DIN connector for connecting the Extension base unit.

Cover and cable for extension modules



The TBX CBS 010 cover and cable unit comprises:

1 Flexible connecting cable with two 32-way male 1/2 DIN moulded connectors for connecting the base unit to the TBX LEP 030 communication module.

2 Cover to be fixed to the discrete or analog I/O base unit.

3 Location for the user's module/connection point identification label.

Functions: page 42313/3
Characteristics: page 42313/4
References: page 42313/5
Connections: page 42313/5

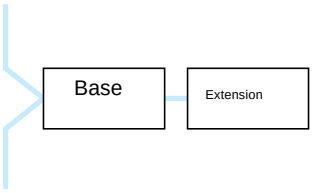
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Modicon Premium automation platform
TBX distributed analog I/O modules

Modular TBX base unit combinations

Analog base units require a TBX LEP 030 communication module for connecting the connection point to the Fipio fieldbus.
As they are modular in structure, discrete and analog base units can be used in the following combinations:

Mix of modules *(1)*



Base		Extension	
Communicator	**Base unit**	**Base unit**	**Cover**
TBX LEP 030	TBX A●S ●●●	–	–
TBX LEP 030	TBX A●S ●●● *(1)*	TBX D●S ●●● *(1)*	TBX CBS 010
TBX LEP 030	TBX A●S ●●●	TBX A●S ●●●	TBX CBS 010
TBX LEP 030	TBX D●S ●●● *(1)*	TBX A●S ●●● *(1)*	TBX CBS 010

(1) In the case of the Premium automation platform, the combinations of base units and extensions on any one Fipio connection point must be of the same type (it is not possible to mix discrete I/O and analog I/O).

Functions

TBX AES 400 analog modules, with 4 high level (voltage or current) or low level (temperature probe or thermocouple) isolated inputs, TBX AMS 620, with 6 high level isolated inputs (voltage or current) / 2 isolated outputs (voltage or current), and TBX ASS 200, with 2 isolated outputs (voltage or current) offer the following functions:

Input channels

■ Measurement acquisition
□ selection of the input range for each channel and first order filtering with user-configurable time constant.

■ Processing
□ automatic linearization (TBX AES 400),
□ integral cold junction compensation for thermocouples (TBX AES 400).

■ Operation
□ conversion of measurements into standard units or temperatures whose parameters can be defined by the user.

■ Checks
□ recalibration and self-calibration of each channel in relation to an internal reference (TBX AMS 620),
□ checking input value overruns (± 5% of the selected range),
□ checking the sensor link.

Output channels

■ Output range selection
□ voltage or current for each module channel.

■ Output fallback
On a communication fault with the PLC, the user can select:
□ fallback of the output to a defined value,
□ to maintain the output at its previous value,
□ On an internal module fault, all the outputs on the same module fall back to zero.

■ Output protection
Output modules are protected against:
□ open circuit overloads,
□ short-circuits.

All these parameters are selected during software configuration.

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Modicon Premium automation platform

TBX distributed analog I/O modules

Type of base unit				TBX AES 400	TBX AMS 620	TBX ASS 200
Analog input modularity				4 channels	6 channels	–
Input ranges			**mV**	± 20	–	–
			mV	± 50	–	–
			mV	± 200	–	–
			mV	± 500	–	–
			V	± 5	0…5	–
			V	± 10		–
			mA	0…20		–
			mA	4…20		–
	Temperature probes			Pt 100, Pt 1000, Ni 1000	–	–
	Thermocouples			B, E, J, K, N, R, S, T	–	–
Special characteristics						
	Self-calibration			No	Yes	–
	Automatic linearization			Yes	Yes	–
Resolution				12 bits + sign	12 bits	–
Acquisition period	For entire module		**ms**	For 4 channels: 400 (50 Hz mode) 340 (60 Hz mode)	For 6 channels: 42.4	–
Rejection (50 Hz)	Serial mode		**dB**	50	–	–
	Common mode		**dB**	> 130 for ± 20 mV	–	–
			dB	> 90 for ± 10 V	–	–
Maximum error at 25 °C/60 °C		± 10 V	**% FS**	0.23/0.99	0.20/0.29	–
		0…5 V	**% FS**	0.23/0.99	0.15/0.22	–
		0…20 mA	**% FS**	0.23/0.99	0.25/0.43	–
		4…20 mA	**% FS**	0.23/0.99	0.25/0.43	–
		Low level	**% FS**	0.90/1.69 *(1)*	–	–
External resistors (supplied with TBX AES 400 module)	Use as 4…20 or 0…20 mA		Ω	250 at 0.1% parallel on the input	–	–
Permitted overload		Voltage	**V**	± 30	± 30	± 30
		Current	**mA**	± 25	± 30	± 30
Isolation *(2)*	Between input channels		**V rms**	500	Non-isolated	–
	Between output channels		**V rms**	–	1500	1500
	Between channels and earth		**V rms**	500	1500	1500
	Between channels and supply		**V rms**	1500	1500	1500
	Between supply and earth		**V rms**	1500	–	–
Common mode voltage *(2)* **permitted during operation between channel and earth and between channels**			**V**	⎓ ± 100	–	–
			V rms	75	150	–
Temperature	Operation		**°C**	0…55		
	Storage		**°C**	- 25…+ 70		

Type of base unit			TBX AES 400	TBX AMS 620	TBX ASS 200
Analog output modularity			–	2 channels	
Output ranges	Voltage	**V**	–	± 10	
	Current	**mA**	–	4…20, 0…20	
Resolution	Voltage		–	11 bits + sign	
	Current		–	11 bits	
Refresh period	Per channel	**ms**	–	5	
Load impedance	Voltage	Ω	–	≥ 1000	
	Current	Ω	–	≤ 600	
Leakage current	Current	**µA**	–	50 (0…20 mA)	
Maximum error at 25 °C/60 °C	Voltage	**% FS**	–	0.45/0.75	
	Current	**% FS**	–	0.52/0.98	

(1) Accuracy at low level covers the whole ± 20 mV, ± 50 mV range, the middle of the range for Pt 100, Pt 1000 and Ni 1000, with any orientation, and the middle of the range for B, E, J, K, N, R, S and T thermocouples.
(2) Voltage in volts rms 50/60 Hz for 1 minute.

Description: page 42313/2 | Characteristics: page 42313/4 | References: page 42313/5 | Connections: page 42313/5

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Modicon Premium automation platform
TBX distributed analog I/O modules

References



TBX A●S ●●0

Analog base units *(1)*

Type of input/output	Number of channels	Ranges	Reference	Weight kg
Input 12 bits + sign	4 channels *(2)*	± 5 V, ± 10 V, ± 20 mV, ± 50 mV, ± 200 mV 0…20 mA, 4…20 mA, Low level ± 500 mV Thermocouples B, E, J, K, N, R, S, T Temp.probes Pt 100, Pt 1000, Ni 1000	**TBX AES 400**	0.280
Isolated output 11 bits	2 channels	± 10 V, 0…20 mA, 4…20 mA	**TBX ASS 200**	0.280
High level input 12 bits isolated output 11 bits	6 channels	± 10 V, 0…5 V, 0…20 mA, 4…20 mA	**TBX AMS 620**	0.280
	2 channels	± 10 V, 0…20 mA, 4…20 mA		



TBX LEP 030

Communication module and accessories

Description	Connection	Reference	Weight kg
Fipio communication module	Fipio fieldbus on TBX base units	**TBX LEP 030**	0.280
Cable connector	Tap link or daisy chain to Fipio fieldbus	**TBX BLP 01**	0.080

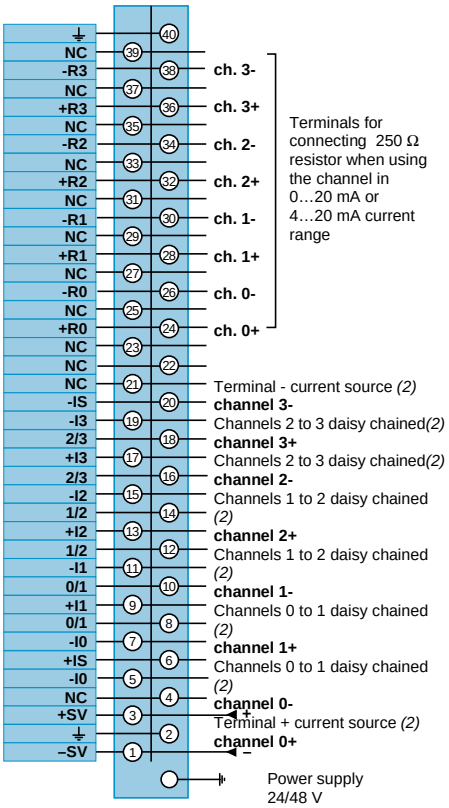
Replacement part

Set of 4 resistors 250 Ω ± 0.1 %	Adaptation for TBX AES 400 current range	**TSX AAK2**	0.100

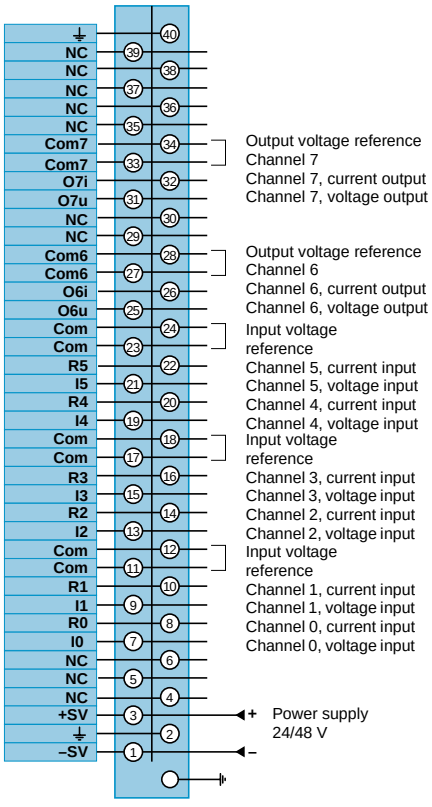
(1) Requires TBX LEP 030 communication module to constitute a base unit, requires TBX CBS 010 cover and cable unit to constitute an extension.
(2) Set of 4 resistors TSX AAK2 for adaptation to current range supplied.

Connections, dimensions *(1)*

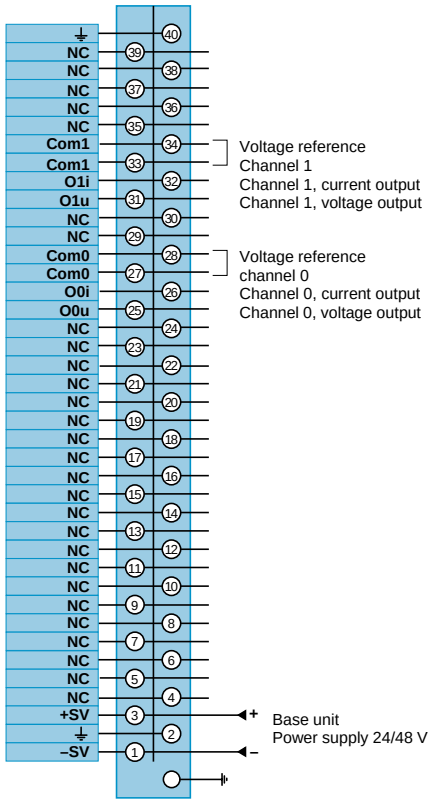
TBX AES 400 input



TBX AMS 620 input/output *(3)*



TBX ASS 200 output



(1) Dimensions the same as for TBX discrete I/O module: see page 42311/15.
(2) Inputs to be used for wiring temperature probes.
(3) To use an input channel as a current input, link terminals Ii and Ri of the corresponding channel.

Description: page 42313/2
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