The TBX AMS 620 distributed input/output module

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Subject of this chapter

This chapter presents the **TBX AMS 620** module, its characteristics and terminal wiring.

What's in this Chapter?

This chapter contains the following topics:

Introduction to the TBX AMS 620 module

General

The module **TBX AMS 620** is a module with 6 non-isolated high level analog inputs and 2 isolated outputs. It must be used with a **TBX LEP 030** communicator. This module can be used as a basic module or as an extension.

This module can provide each input with the following ranges:

- high level voltage: 0/5 V -10 V,
- high level current: 0/20 mA and -4/20 mA,

and the inputs on this module have the following ranges:

- high level voltage: 10 V,
- high level current: 0/20 mA and -4/20 mA.

Technical specifications

The following table provides the technical specifications of the module.

TBX AMS 620			
Supply voltage +SV		19,2 to 60 V	
Nominal voltage +SV		24 V	48 V
Current drawn at +SV by the AMS used as a basic module (1)		224 mA typically 321 mA max.	114 mA typically 164 mA max.
Additional current drawn from a basic module when the AMS module is used as an extension		59 mA typically 87 mA max.	30 mA typically 44 mA max.
Current drawn at +SV by the AMS used as an extension		162 mA typically 202 mA max.	84 mA typically 104 mA max.
Isolation	between input channels	non isolated	
	between output channels	500 V rms - 50/60 Hz for 1 min	
	between channels and ground (GND)	500 V rms - 50/60 Hz for 1 min	
	between channel and supply	1500 V rms - 50/60 Hz for 1 min	
Permissible common mode voltage between channel and ground and between channels during operation		150 V rms - 50/60 Hz for 1 min	

Characteristics of the outputs of module TBX AMS 620

General characteristics of the inputs

This table presents the characteristics of the inputs of module **TBX AMS 620**:

Module **TBX AMS 620**					
Number of channels		6			
Electrical range		+ or -10 V	0/5 V	0/20 mA	4/20 mA
Full scale (FS)		10 V	5 V	20 mA	20 mA
Resolution		11 bits + sign	12 bits	12 bits	12 bits
LSB		5,13 mV	1,30 mV	4,97 µA	4,97 µA
Converter		by successive approximation			
Maximum error	at 25 °C	0,2 % FS	0,15 % FS	0,25 % FS	0,25 % FS
	at 60 °C	0,26 % FS	0,22 % FS	0,43 % FS	0,43 % FS
Temperature drift		20 ppm (FS) °C	15 ppm (FS) °C	40 ppm (FS) °C	40 ppm (FS) / °C
Impedance		10 MΩ	10 MΩ	250 MΩ	250 MΩ
Time to read	one channel	5,3 ms			
	6 channels	42.4 ms			
Permissible overload	voltage	+ or -30 V DC (voltage range)			
	current	30 mA ; + or -7.9 V (current range)			
Digital filtering		1° order with configurable time constant			
Linearization		automatic			
Monotonocity		Yes			

General characteristics of the outputs

This table presents the characteristics of the outputs of module **TBX AMS 620**:

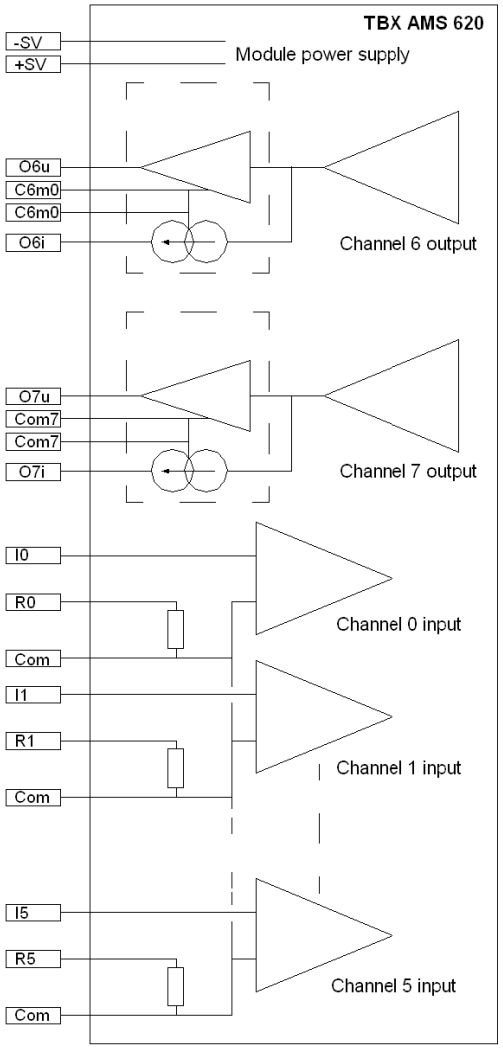
Module **TBX AMS 620**		
Number of channels	2	
Range	+ or -10V	0/20 mA 0/40 mA
Full scale (FS)	10 V	20 mA
Resolution	11 bits + sign	11 bits
LSB	4,88 mV	9,76 µA
Load impedance	≥ 1 kΩ	≤600 Ω

Maximum error	at 25 °C	0,45 % FS	0,52 % FS
	at 60 °C	0,75 % FS	0,98 % FS
Maximum drift		65 ppm (FS) / °C	103 ppm (FS) / °C
Update period		5 ms	
Continuous overvoltage		+ or - 30 V	
Monotonicity		Yes	
Maximum leakage current		-	50 µA (0/20 mA)

Connecting the module TBX AMS 620

Circuit diagram

The following illustration shows the circuit diagram for the module **TBX AMS 620**.

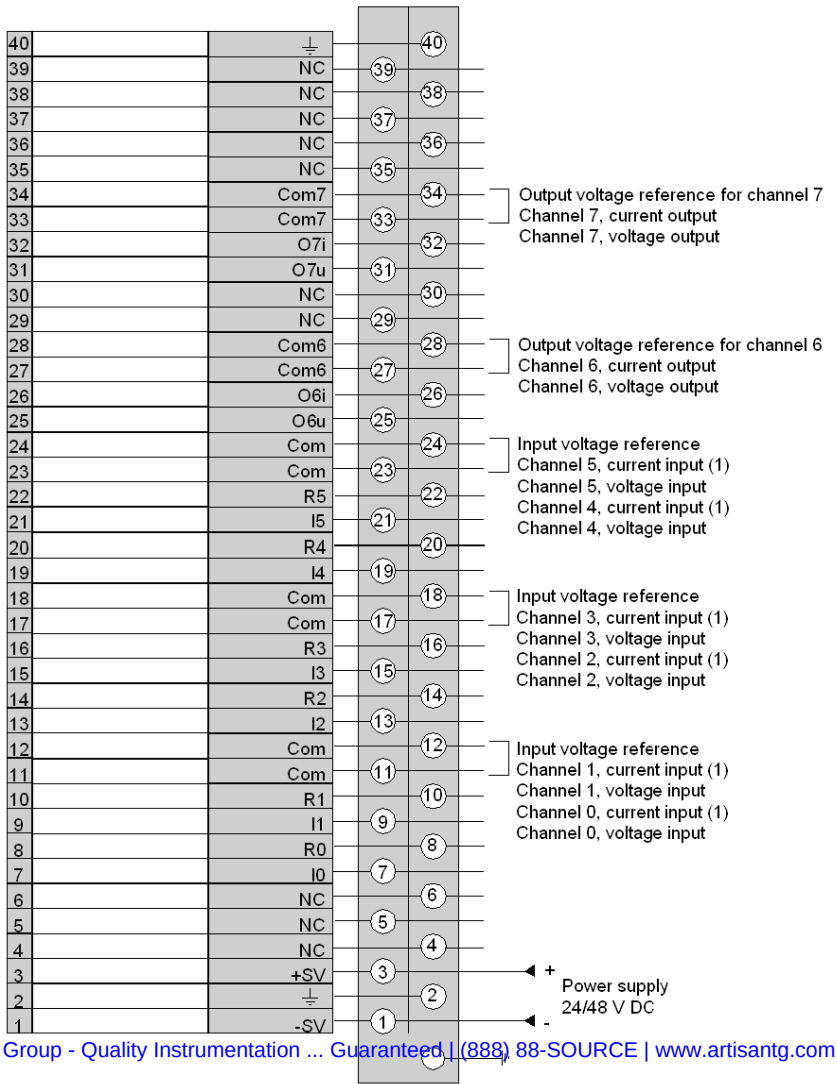


NOTE: to use an input channel in current, the I and R terminals must be connected to the channel concerned.

All terminals referenced COM are connected in the module interior.

Terminal block wiring

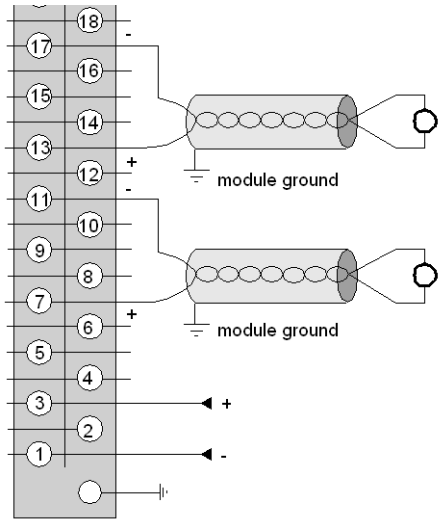
The following diagram illustrates the wiring of the terminal. *(see page 127)*.

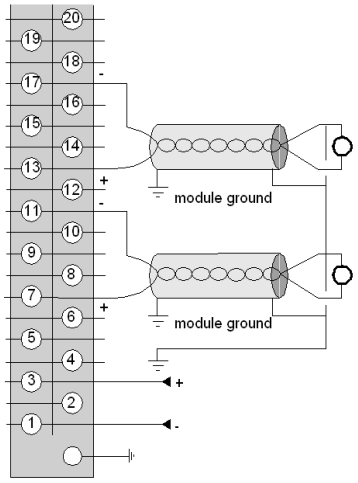
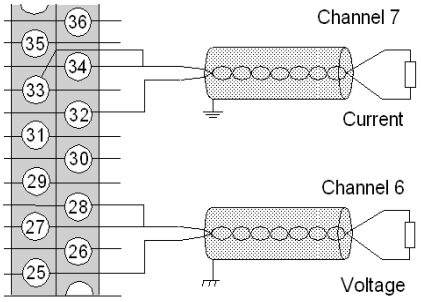


Wiring and installation recommendations for the model TBX AMS 620

Wiring recommendations

To protect the signal from induced external noise in serial mode and noise in common mode, it is advisable to take the following precautions regarding:

Precautions to take		
Type of conductors	Use screened twisted pairs, with a minimum conductor cross-section of 0.28 mm^2.	
Cable screening	Connect the cable screening to the shortest TBX module ground on the **TBX GND 015** grounding strip.	
Arrangement of the conductors in cables	Multipair cables can be rearranged for signals of a similar type which have the same reference to ground.	
Cable routing	Keep the measurement wires separate from the discrete I/O cables (in particular from relay outputs) and from power cables.	
Preactuator and sensor reference to ground	The **TBX AMS 620** module has 6 inputs which are not isolated from each other but which are isolated from the PLC bus, and 2 outputs which are isolated from each other and from the PLC bus. The sensor cold points are connected to each other internally by the Com terminals. To ensure good immunity to high frequency interference, a 4.7 nF capacitor is connected between the channel voltage and the ground. To ensure correct operation of the analog measurement system, the following precautions must be taken: ● The sensors must be in close proximity to each other (several meters apart). ● All sensors must be referenced at the same point. This point is then connected to the terminal ground. **Note**: There are no technical restrictions in referencing the preactuators to ground. However, for safety reasons, it is advisable to avoid using a ground voltage which is some distance from the terminal, as this ground voltage may be very different from the nearby ground voltage. Distributed I/O modules minimize this risk as they are usually close to the process.	

Precautions to take		
Sensor reference to ground	If the following characteristics are respected, then each sensor can be assigned a voltage rate according to ground: ● The sensors must be in close proximity to each other (several meters apart). ● all sensors are referenced to the same point. This point is then connected to the COM terminal on the terminal block.	
Preactuator reference to ground	● Recommended voltage and current wiring: It is advisable to use preactuators which are not referenced with respect to ground, with each channel reference being connected to the ground via a 4.7 nF capacitor.	
Preactuator reference to ground (cont.)	● Possible voltage wiring: The preactuators can be referenced to ground if the modules have voltage outputs and if the following precautions are taken: ● The common mode voltages must be below the safety voltage (48 V peak), ● Connecting a point in the preactuator to a reference voltage causes a leakage current to be generated. If several analog modules are used, measure the total leakage current and check that it will not interfere with the application.