ZOC 22B/32Px
ZOC 22B/32PxX2
ZOC 23B/32Px
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Electronic Pressure Scanning Module

INSTRUCTION and SERVICE MANUAL

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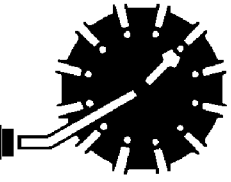

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SPECIFICATIONS

Inputs (Px)	32 or 64(PxX2)
Full Scale Ranges	±10, 20 inch H_2O(2.5,5 kPa) 1,2.5,5,15, and 50 psid (7,17,35,100, and 350 kPa)

Accuracy

10 inch H_2O	±.20% FS
20 inch H_2O	±.15% FS
1 to 2.5 psi	±.15% FS
5 to 50 psi	±.10% FS

Sensor Excitation	+5.00 Vdc Constant Voltage (Internal)
Full Scale Output	Standard ±2.5Vdc (Addressed channel) Optional ±5Vdc, ±10Vdc
Scan Rate	20 kHz(Standalone)
Resolution	Infinite
Operating Temp	0 to 60°C

Temp. Sensitivity (%FS/°C)

Range	Zero	Span
10 inH_2O	0.25%	0.10%
20 inH_2O	0.20%	0.10%
1-50psid	0.10%	0.05%

Overpressure (No Damage)	10in H_2O to 1 psid	- 10 psi(70kPa)
	2.5 to 50 psid	- 400% or 75 psi(517kPa) (whichever is less)
Max Ref Press	50 psig (350 kPa)	
Media	Gases compatible with Silicon, Silicone, Aluminum, and Buna-N	
Connector Type	15 pin MDM 15SL2P	
Power Requirements	±15Vdc @ 45mA	

Weight

ZOC22B/32Px	- 3 oz(85.05 g)
ZOC22B/32PxX2	- 3.1 oz(87.89 g)
ZOC23B/32Px	- 6 oz(170.10 g)
ZOC23B/32PxX2	- 6.1 oz (172.94 g)
ZOC23B/8Px ml	- 0.93 oz (26.37 g)

GENERAL DESCRIPTION

The ZOC22B/23B electronic pressure scanner family can accept up to 64 pneumatic inputs. Each ZOC22B/23B module incorporates 32 individual piezoresistive pressure sensors. The ZOC22B/23B electronic pressure scanning module is specifically designed for use in wind tunnels or applications where space is at a premium and pressures will not exceed 50 psi.

The ZOC/22B sensors are arranged in blocks of 16. Each block of sixteen sensors has its own individual calibration valve. The ZOC/23B sensors are arranged in blocks of 8. Each block of eight sensors has its own individual calibration valve. The calibration valves have four modes of operation:

(1) Operate
(2) Calibrate
(3) Purge
(4) Isolate

The modes are selected by applying control pressures in a predetermined logical order. The ZOC22B/23B calibration valve utilizes valve logic where the valve defaults to the purge mode when no control pressures are applied.

The ZOC22B/23B is powered by ±15Vdc. Both modules are manufactured in a 32 channel model and a 64 channel duplexed model. The ZOC23B module is also available in 8 channel muxless units.

ZOC22B/32Px

This module contains thirty two (32) sensors in two sixteen channel blocks. Each block contains:

1. Sixteen sensors
2. Calibration valve
3. 16 input tubes

The module has a common excitation/amplifier board. The output of each sensor is directed to the multiplexer/amplifier. The output of the module is ±2.5Vdc corresponding to the channel selected by a 6 bit binary address.

ZOC22B/32PxX2

This module contains thirty two (32) sensors in two sixteen channel blocks. Each sensor block contains:

1. Sixteen sensors
2. Calibration valve
3. Duplexing valve
4. 32 input tubes (Bank A and Bank B)

The sensors are arranged in groups of sixteen. Each sensor has two pneumatic inputs: A and B. The inputs are switched pneumatically by enabling the duplexing valve. Each group of sixteen sensors may be a different range. The output of the module is ±2.5Vdc corresponding to the channel selected by a 6 bit binary address.

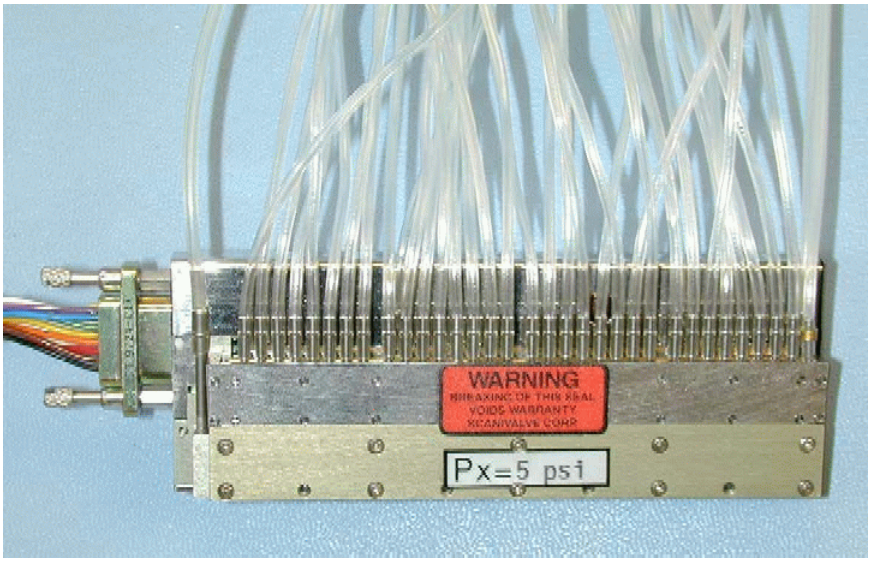


Figure 1 - ZOC22B/32Px Module

ZOC23B/32Px

This module contains thirty two (32) sensors in four satellite sensor packs. Each sensor pack contains:

1. Eight sensors
2. Calibration valve
3. Excitation board
4. 8 input tubes

The output of each sensor is directed to the multiplexer/amplifier. The output of the module is ±2.5Vdc corresponding to the channel selected by a 6 bit binary address

ZOC23B/32PxX2

This module contains thirty two (32) sensors in four satellite sensor packs. Each sensor pack contains:

1. Eight sensors
2. Calibration valve
3. Duplexing valve
4. Excitation board
5. 16 input tubes (Bank A and Bank B)

The sensors are arranged in eight groups of eight. Each sensor has two pneumatic inputs: A and B. The inputs are switched pneumatically by enabling the duplexing valve. Each group of eight sensors may be a different range. The output of the module is ±2.5Vdc corresponding to the channel selected by a 6 bit binary address.

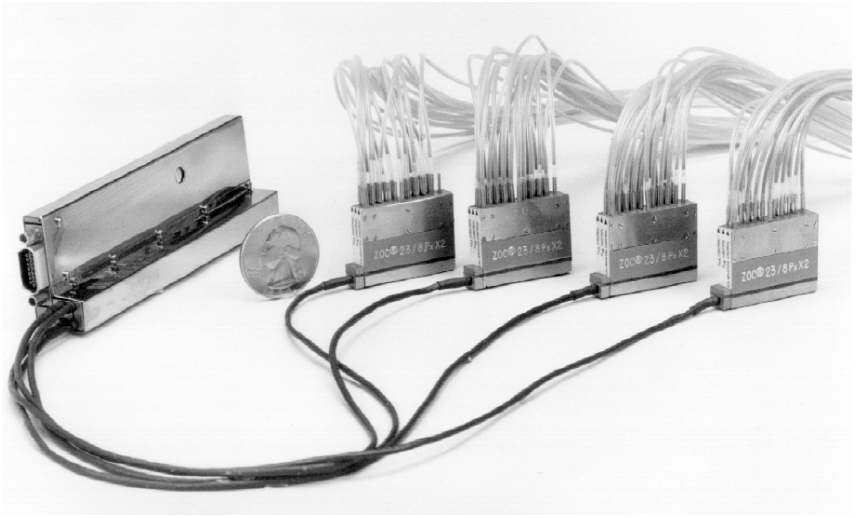


Figure 2 - ZOC23B/32Px Module

Valveless Configurations

All ZOC22 and ZOC23 modules have a “Valveless” configuration option. These modules do not have a calibration valve. All calibrations are performed using the reference port.

ZOC22 Valveless

This module contains thirty two(32) sensors in two groups of 16 sensors. Each module contains:

a) thirty two sensors
b) an excitation board
c) a high speed multiplexer

The output of each sensor is directed to the multiplexer/amplifier. The channel to be output is selected by a binary address.

ZOC23 Valveless

This module contains thirty two(32) sensors in four sensor packs. Each sensor pack contains:

a) eight sensors
b) an excitation board
c) a high speed multiplexer

The output of each sensor is directed to the multiplexer/amplifier. The channel to be output is selected by a binary address.

OPERATION AND INSTALLATION

ZOC22B/23B modules are designed to function best when used with a Digital Service Module, Model DSM3000/3200 or a RAD3200. They can also be used as a stand alone module, with a customer's data system, or with other High Speed Data Acquisition Systems.

Figure 3 shows a ZOC22B/32PxX2 module. The ZOC22B/32Px module is identical in size and layout. The only difference is that the 32Px module does not have the B bank input tubulations.

Figure 4 shows a ZOC23B/32PxX2 module. The ZOC23B/32Px module is identical in size and layout. The only difference is that the 32Px module does not have the B bank input tubulations.

Figure 5 shows a ZOC23B/8PxX2 muxless module. The ZOC23B/8Px muxless module is identical in size and layout. The muxless version has a 2 wire millivolt output for each sensor. This model does not have a multiplexer/amplifier. The only other difference is that the 8Px module does not have the B bank input tubulations.

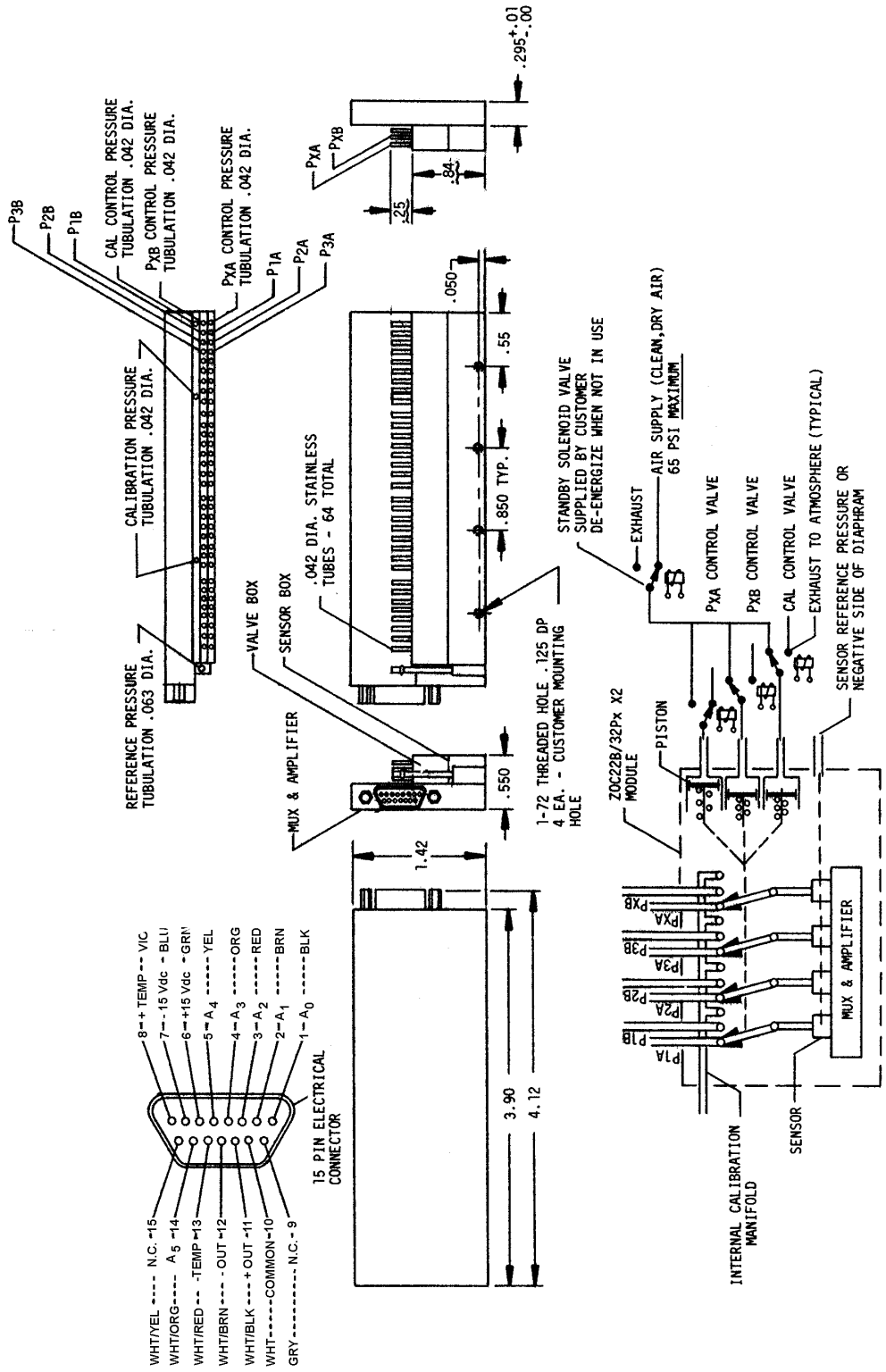


Figure 3 - ZOC22B/32PxX2 Module

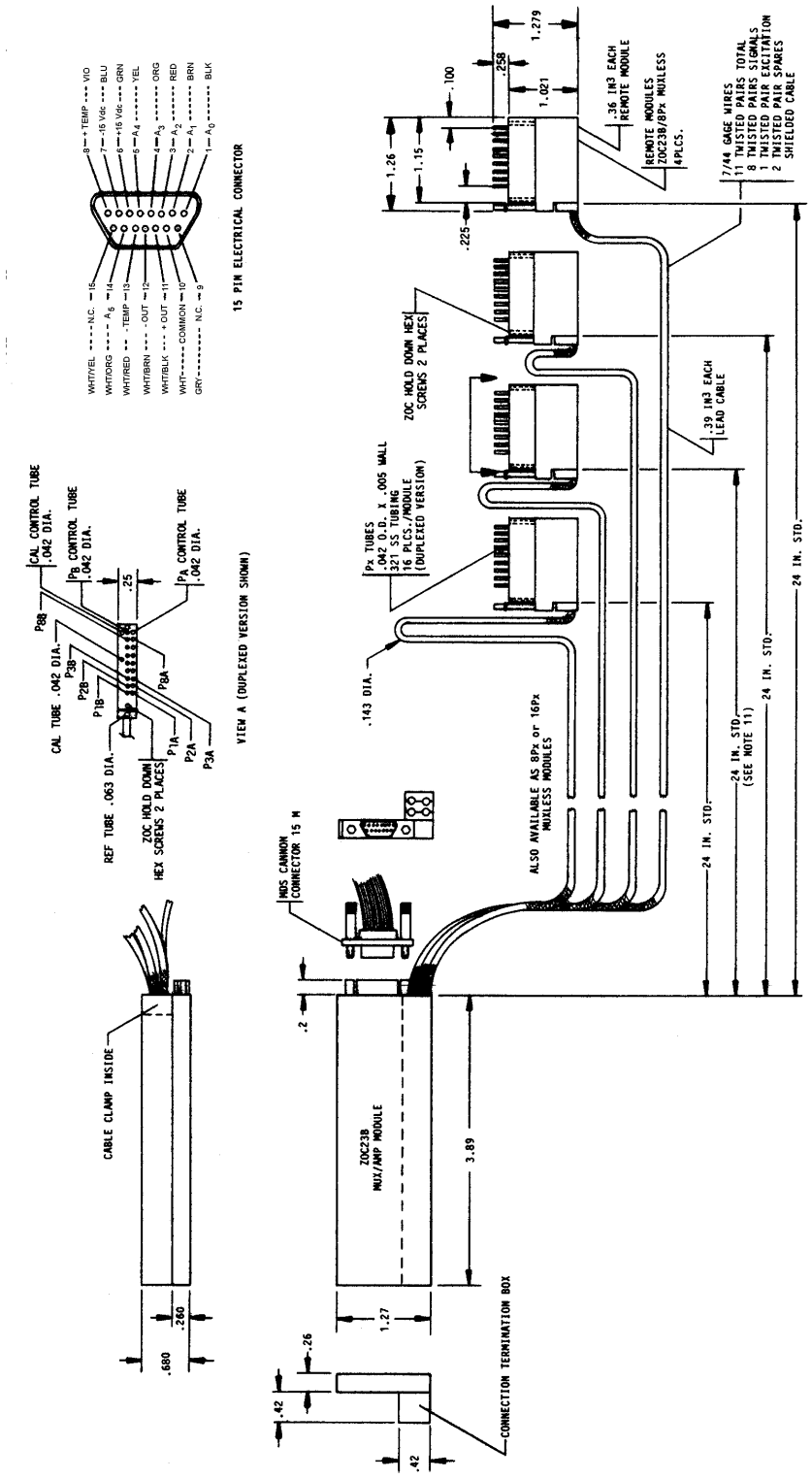


Figure 4 - ZOC23B/32PxX2 Module

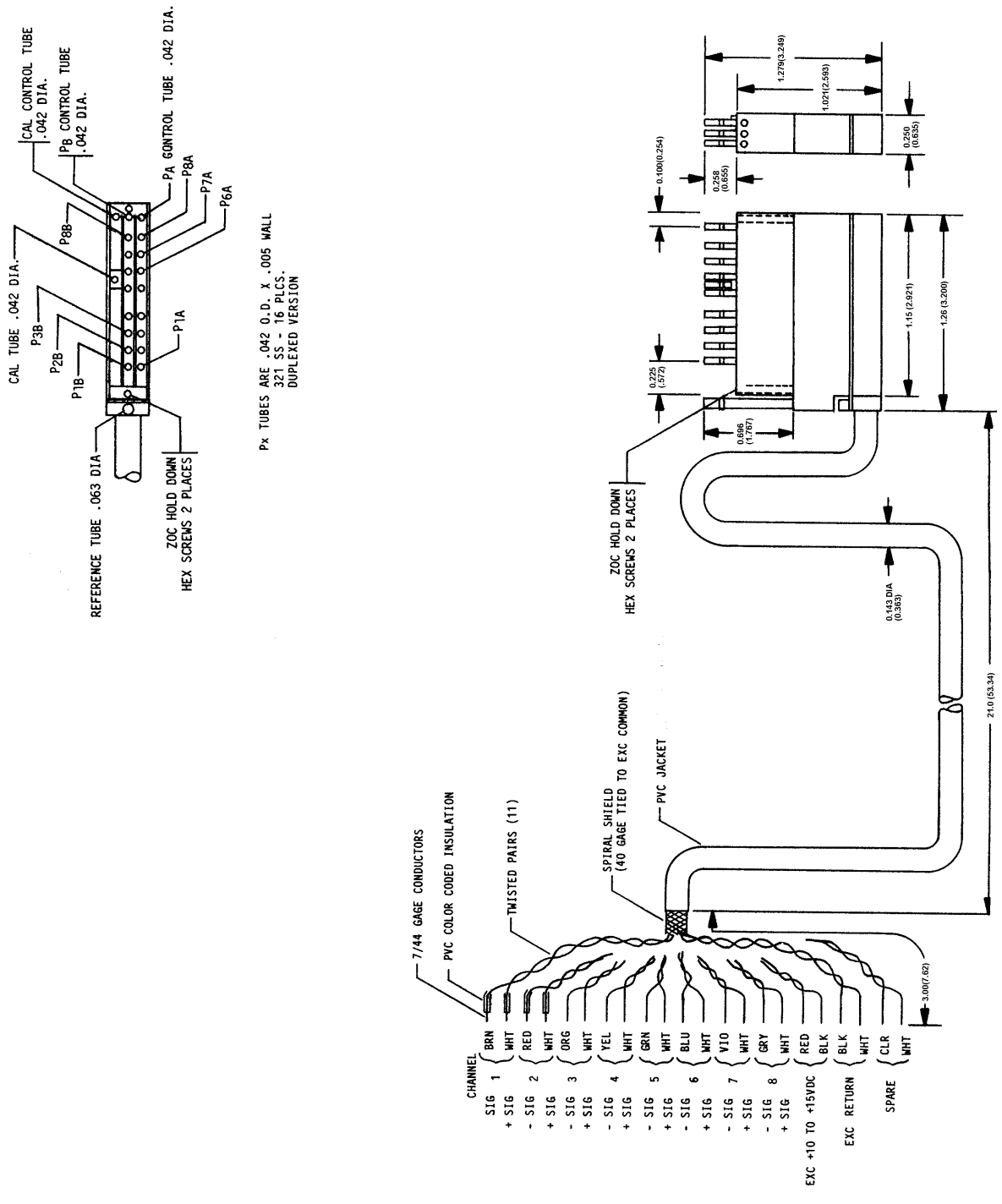


Figure 5 - ZOC23B/8Px - Muxless Module

Electrical Inputs and Outputs

The Electrical Input and Output wiring is compatible with all other ZOC cable serviced modules. The ZOC22B/23B may be installed into existing HyScan Systems without changing configurations. For use in a DSM system, a RTD must be installed so the temperature of the module can be measured. The RTD installation is a standard feature of all ZOC22B modules shipped after serial number 200. The RTD installation is an option for ZOC23B modules. When a RTD is installed in a ZOC23B module, it will be installed in satellite one only.

The user is cautioned to follow safe instrumentation practices while handling ZOC22B/23B modules.

1. Make all connections to the module with power off. The module may be damaged if the I/O connector is connected or disconnected with power on.
2. Recommended power input to the module is ±15 Vdc.

Figure 6 shows the output connector pin assignments of the ZOC22B/23B/32Px and ZOC22B/23B/32PxX2 Modules.

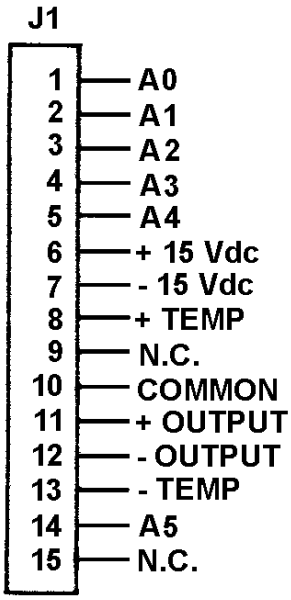


Figure 6 - ZOC22B/23B/Px Input/Output Connector

Pneumatic Inputs

Pneumatic inputs consist of: 32 Px Inputs, Control Pressure Inputs (PxA Ctl, Cal Ctl), a Calibration Input, and a Reference Input. The duplex version also has a duplex control pressure input (PxB).

All Px inputs are .042 inch(1.067mm) bulged tubulations. These tubulations are designed to accept any .042 inch tubing manufactured by Scanivalve Corp. Each module contains thirty two(32) or, in the duplex version, sixty four(64) Px inputs. ZOC22B/23B modules are capable of measuring pressures up to 50 psid.

Control pressure inputs consist of: PxA CTL and CAL CTL. The duplex module has a third control pressure input, PxB CTL. These inputs are used to switch the valve logic to each of the four(4) states: Operate, Calibrate, Purge, and Isolate. The control pressures must be at least 55 psi , but not exceed 65 psi.

Calibration/Reference Inputs consist of a Calibration input and a Reference input. The Calibration input is an .042 inch O.D. tubulation. It is normally connected to a source of calibration pressures. Internally, this input is manifolded to all of the sensors through the calibration valving. The Reference input is an .063 inch (1.6mm)O.D. tubulation. It provides a point of reference for the transducers. All of the sensors share a single reference.

Figure 7 is a pictorial of the ZOC23B/23B valve logic. Figure 8 is a truth table of 32Px Valve Logic. Figure 9 is a truth table of 32PxX2 Valve Logic.

Calibration Valve Operation

Operate Mode

This connects each Px input to its associated pressure sensor. The ZOC22B/23B/32PxX2 module allows the customer to select one of two input banks for pressure input.

Calibrate Mode

This mode connects all the pressure sensors to the calibration manifold.

Purge Mode

This mode connects the Px inputs to the pressure sensors and the calibration manifold. A safe purge pressure can be applied to purge input lines.

Isolate Mode

This mode isolates the pressure sensors from the Px inputs and the calibration manifold(s).

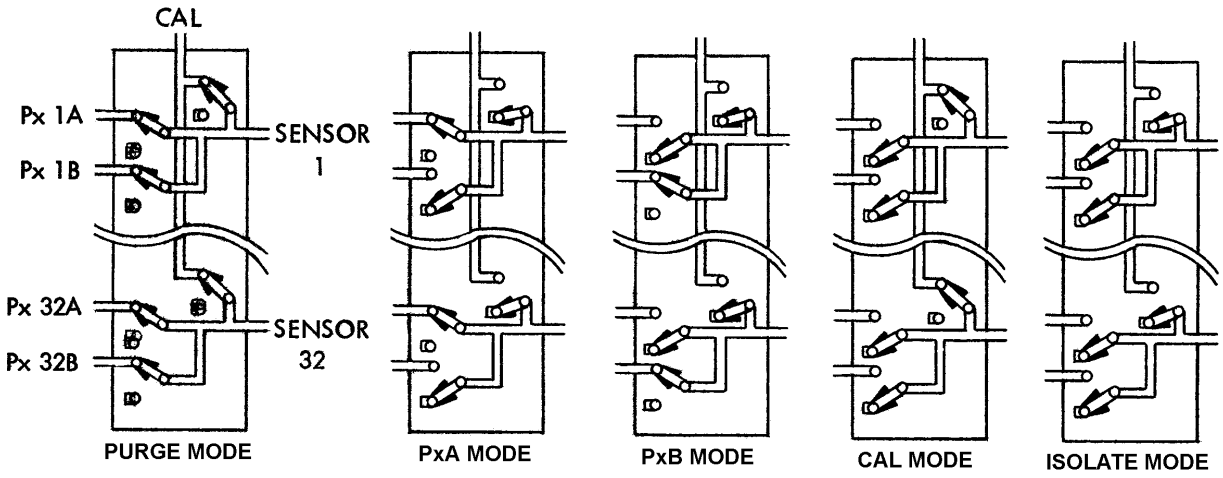


Figure 7 - ZOC22B/23B Valve Logic - X2 valve shown

MODE	Px CTL	CAL CTL
OPERATE - PxA	X	65 psi
CALIBRATE	65 psi	X
PURGE	X	X
ISOLATE	65 psi	65 psi

Figure 8 - ZOC22B/23B/32 Px Valve Logic

MODE	PxA CTL	PxB CTL	CAL CTL
OPERATE - PxA	X	65 psi	65 psi
OPERATE - PxB	65 psi	X	65 psi
CALIBRATE	65 psi	65 psi	X
PURGE	X	X	X
ISOLATE	65 psi	65 psi	65 psi

Figure 9 - ZOC22B/23B/32PxX2 Valve Logic

ZOC22B TCU THERMAL CONTROL UNIT

An optional Thermal Control Unit (TCU) is available for applications where temperature swings may be great enough to induce errors in the pressure measurements. The TCU consists of a housing, insulation and a proportional heater which will maintain the temperature of the module at 40 ±0.3 ^{o}C.

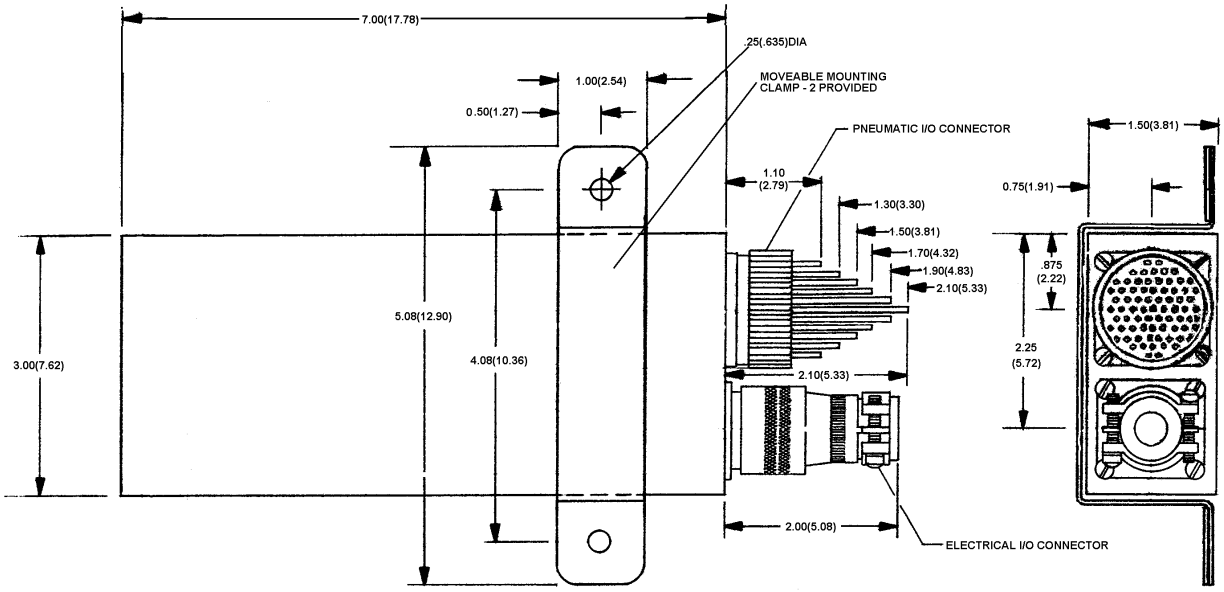


Figure 10 - ZOC22B/ Thermal Control Unit(TCU)

ZOC22B TCU Connectors

This section shows the pneumatic and electrical connectors on a ZOC22B TCU. Figure 11 shows the pneumatic connector and Figure 12 shows the electrical connector,

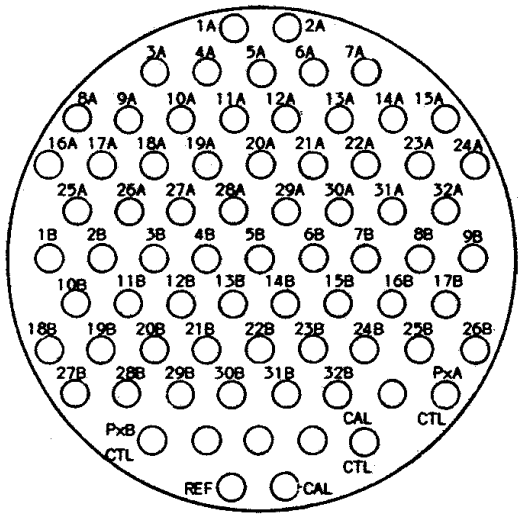


Figure 11 - ZOC22B TCU Pneumatic Connector

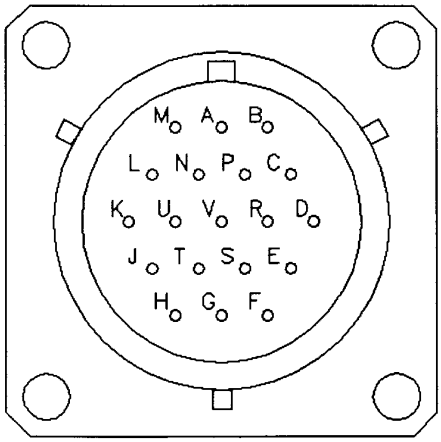


Figure 12 - ZOC22B TCU Electrical Connector

ZOC 22B TCU Pneumatic Inputs

The Pneumatic inputs refer to Figure 11

Channels	Tubes	Notes
1 - 32	1A - 32A	
33 - 64	1B - 32B	These tubes are only used with duplex modules
PxA CTL	PxA CTL	
PxB CTL	PxB CTL	PxB CTL is not connected in a non-duplex module
CAL CTL	CAL CTL	
CAL INPUT	CAL	
REF INPUT	REF	

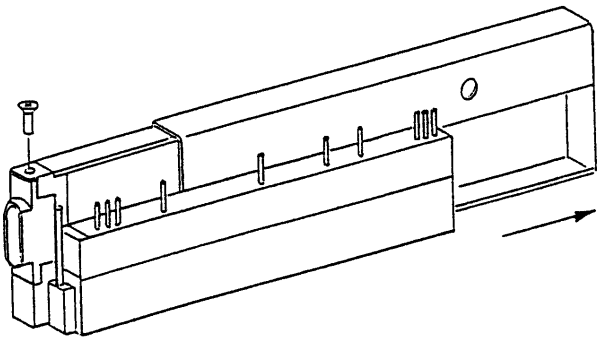
ZOC 22B TCU Electrical Inputs/Outputs

The electrical inputs and outputs refer to Figure 12

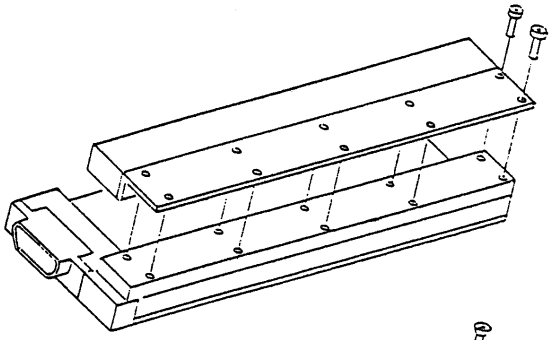
Pin Number	Function	Notes
A	Address 0	
B	Address 1	
C	Address 2	
D	Address 3	
E	Address 4	
F	+15 Vdc	
G	-15 Vdc	
H	+ Temp	ZOC 22B/23B Internal RTD
J	- Temp	ZOC 22B/23B Internal RTD
K	Common	±15 Vdc Return
L	+ Output	± 2.5 Vdc Nominal
M	- Output	
P	+ Temp(Heater)	Heater Temperature - Not installed in TCU's built after March 2000
S	Address 5	
T	- Temp(Heater)	Heater Temperature - Not installed in TCU's built after March 2000
U	+24 Vdc	Heater Power
V	+24 Vdc Return	Heater Power Return

ZOC22B SENSOR REPLACEMENT

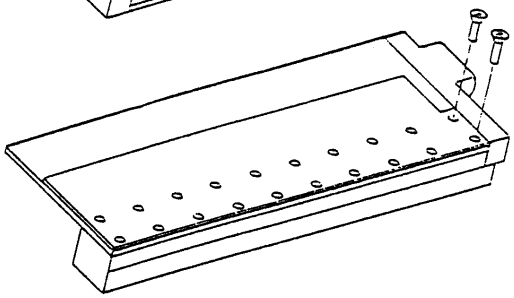
The sensors used in a ZOC22B module are field replaceable with standard hand tools, but it is recommended that a user obtain training from Scanivalve Corp prior to changing sensors. It is very important that proper ESD practices be observed at all times during this procedure.



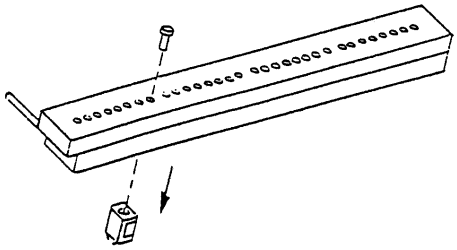
1. Remove the single screw holding the case in place and carefully slide the case off of the module.



2. Remove the ten(10) screws holding the valve block in place and lift the valve block from the module body.



3. Turn the module over and remove the twenty(20) screws that hold the sensor housing in place. Be careful not to stress the circuit board during this step.

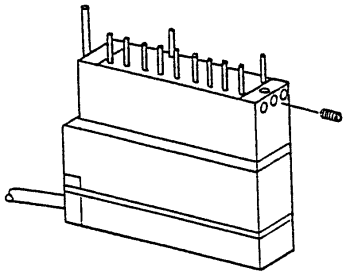


4. The sensors are held in place by screws that have been drilled through. Remove the failed sensor and replace it. Use the same screw.

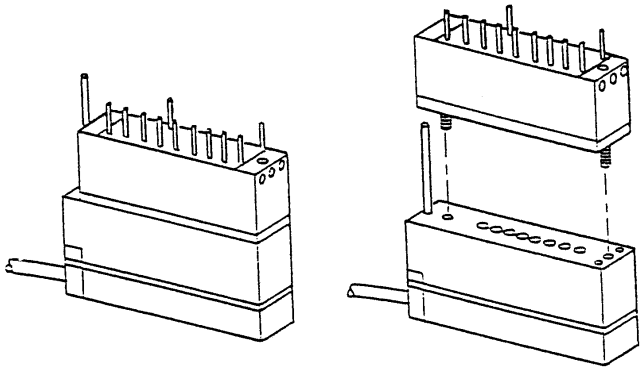
5. Reassemble the module by following these steps in reverse order.

ZOC23B SENSOR REPLACEMENT

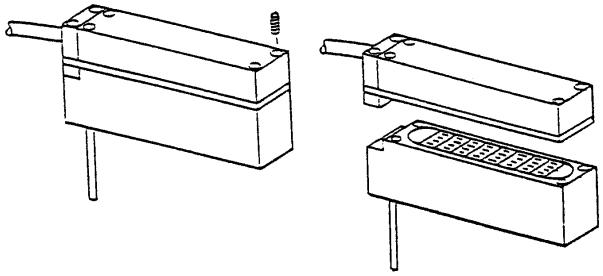
The sensors used in a ZOC23B module are field replaceable with standard hand tools, but it is recommended that a user obtain training from Scanivalve Corp prior to changing sensors. It is very important that proper ESD practices be observed at all times during this procedure.



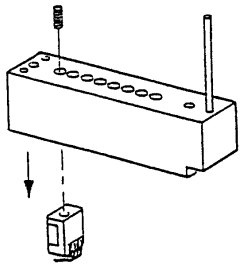
1. Remove the center set screw.



2. Remove the two(2) set screws, one at each end of the valve body and lift the valve body from the sensor pack.



3. Remove the four(4) set screws from the sensor pack top cover and remove the cover.



4. The sensors are held in place by special screws. Remove the screws and the failed sensor. Install the new sensor using the same or similar screw.

5. Re-assemble the satellite by following these steps in the reverse order.

ZOC23B SATELLITE REPLACEMENT

A ZOC23B may be purchased with less than 4 satellites. A satellite may also be replaced in the field. This can be done by a user who has had training from Scanivalve Corp. The installation wiring is shown on the following page in Figure 13.

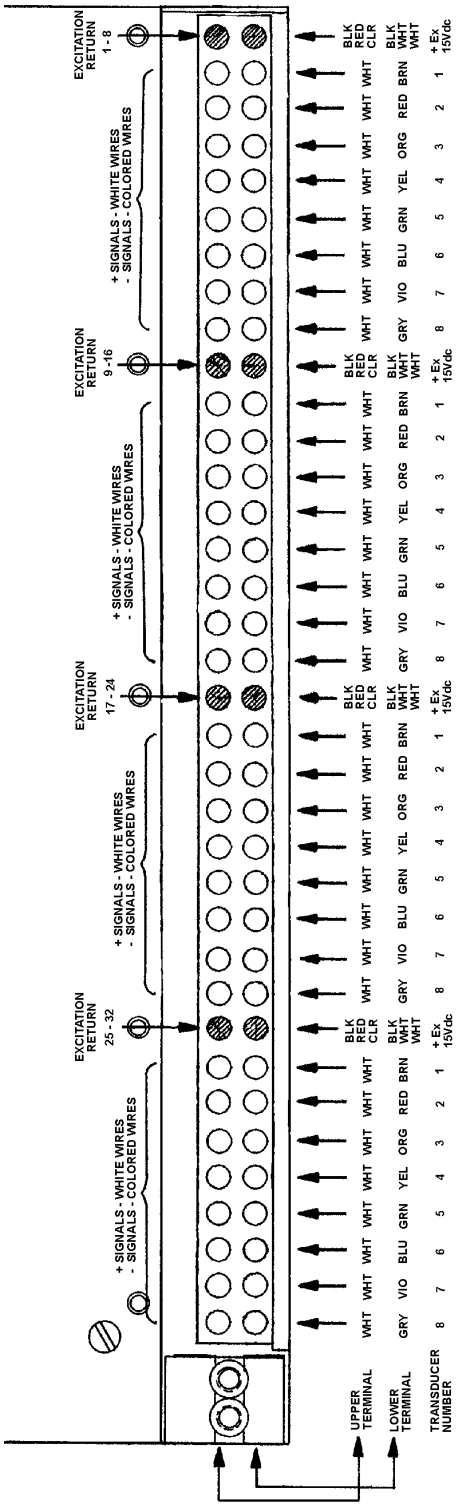


Figure 13 - ZOC23B Satellite module connections to the Multiplexer Amplifier

All ZOC22B and ZOC23B modules are extensively tested prior to shipment. All modules are packed to minimize the chances of shipping damage. However, damage can still occur. The customer must inspect modules and shipping materials for obvious signs of damage. If it is suspected that damage may have occurred, the customer should contact Scanivalve Corp., Technical Services Department immediately.