Hays Cleveland
Div. of UniControl Inc.

Series C-07206.21 INSTRUCTION MANUAL

Basic or Ratio Function Manual Auto Stations with Analog Input/Switched Output

This manual covers Models:
C-07211-130-00 and C-07211-230-00
C-07261-130-00 and C-07261-230-00
C-07271-130-00 and C-07271-230-00

INSTRUCTION MANUAL C-0 7206.21
M/A Station with Analog In/Switched Out

SAFETY WARNINGS

(Safety symbols and terminology per ANSI Z21.)

Failure to comply in full with the following safety requirements can result in equipment damage and personal injury/death.

1. Read the entire manual to become familiar with the use and operation of this device.
2. Only qualified personnel should attempt to install, wire, commission, startup, service or operate this device.
3. This device is not suitable for use in an explosive ambient atmosphere.
4. Before working on this device, be sure that you understand the processes affected by this device completely.
5. Before working on this device, be sure that any process affected by this device is secure and safe for servicing.
6. Take appropriate precautions to avoid electric shock when working with this device near water.
7. Exercise caution while wiring or working on this device. Multiple voltage sources may be present: take appropriate precautions to avoid electric shock.

CONTENTS

1 INTRODUCTION

1.1 Description:

The Cleveland 7000 Station is one of a series of panel mounted electronic instruments designed to generate or condition standard process control signals. In the automatic mode, input signals are converted into "increase", "off" or "decrease" signals to proportionally position an electric actuator. Operator adjusted ratio or bias controls are optionally available to modify the actuator response. In the manual mode, the actuator is directly controlled by the operator. A retransmit output permits sending the actuator position to other system components.

1.2 Specifications:

POWER REQUIREMENTS:	105 to 130 VAC, .03 a 50 to 60 Hz
ISOLATION:	300 V maximum, lines to case or AC lines to DC lines
INPUT SIGNAL RANGES:	1 to 5 VAC or 4 to 20 mA DC
INPUT IMPEDANCE:	100,000 ohms for 1 to 5 VDC 250 ohms for 4 to 20 mA DC
OUTPUT LOAD:	.1 a. minimum, 1.9 a maximum 120 VAC 1 phase
RETRANSMIT OUTPUT	1 to 5 VDC into a load greater than 5,000 ohms
RATIO RANGE (ratio models):	1 to .9 or 1 to .5
DEAD BAND RANGE:	2 to 6% of input range
AMBIENT TEMPERATURE RANGE:	5 to 50 degrees C.

ACTUATOR POSITION POTENTIOMETER REQUIREMENTS:

ACTIVE RANGE:	60% minimum
RESISTANCE:	135 to 5,000 ohms
RESOLUTION:	.5% of active range, minimum

1.3 Model Numbering System:

The station is described by its model number as indicated below. GG will normally to 00 unless the station contains a special feature, which has been assigned a GG number by the factory.

7 A B C – D E F – GG

A.	Type:	
	Manual/Auto Station	2
B.	Function:	
	Basic	1
	Input-Output Ratio, 1 to ± 10%	6
	Input-Output Ratio, 1 to – 50%	7
C.	Power Supply:	
	Integral	1
D.	Input:	
	4 to 20 mA	1
	1 to 5 V*	2
E.	Output:	
	Switched	3
F.	Auxiliary Meter:**	
	None	0
	4 to 20 mA	1
	1 to 5 V	2
GG:	Special Feature:	
	None	00

*For 0-4 V operation see section 1.5.1.

**As of 1-1-78 an Auxiliary Meter is no longer available.

1.4 Indicators and Operator Controls:

1.4.1 Position Meter:

The POSITION meter, located at the top of the front panel, indicates the actuator position in percent of maximum actuator travel as set by the SPAN adjustment rather than the maximum capability of the actuator.

1.4.2 Manual-Automatic Switch:

The MANUAL-AUTOMATIC switch, located at the right center of the front panel, is used to select either the manual or automatic mode of operation. In the manual mode, the operator controls the actuator with the INCREASE-DECREASE switch. In the automatic mode, the actuator responds only to the input signal.

1.4.3 Increase-Decrease Switch:

The INCREASE-DECREASE switch, located at the left center of the front panel is a three position momentary switch used by the operator to control the actuator when operating in the manual mode. When the switch is moved to INC, terminal 4 will be energized. When it is moved to DEC, terminal 3 will be energized.

1.4.4 Ratio Control:

The RATIO control, located at the bottom of the front panel, is used to set the actuator span. The control may be internally programmed for one of three modes of operation: 50-100% actuator span (as indicated by the POSITION meter when a 100% input signal is present), ± 10% actuator span or off (fixed 100% span). See section 1.5.4.

1.5 Service Controls:

1.5.1 Zero Control:

The single turn ZERO control, located on the service panel at the rear of the station is used to set the minimum actuator position. Turning it clockwise will increase the actuator position. **It cannot be used to zero the POSITION meter.** The meter will read 0% only if the actuator position potentiometer is aligned to produce less than .08 VDC at terminals 6(+) and 7(−) of the stations when the actuator is fully decreased. When the control is turned fully clockwise, 0 to 4 VDC input signals may be used.

1.5.2 **Span Control:**

The single turn SPAN control is used to set the maximum actuator position by adjusting the excitation voltage applied to the actuator's position potentiometer. Turning the control clockwise increases the actuator span. **Adjusting the span control does not change the position meter calibration.** See section 1.4.1.

1.5.3 **Dead Band Control:**

The single turn DEAD BAND adjustment, is used to set the change in input signal required to reverse the actuator direction. Unstable processes such as liquid level or draft may require that the adjustment be turned clockwise for a wider dead band. This prevents undue wear on mechanical components such as actuators and valves by assuring that the station responds only to significant changes in the process. For closer control of a stable process, a narrower dead band may be used, but one should **always use the widest band possible**, consistant with satisfactory control.

1.5.4 **Ratio Programming Plugs:**

Two plugs, located at the lower front corner of the printed circuit board, are used to determine the RATIO control function. (See section 1.4.4). Each plug may be set in one of two positions. If the on-off plug is set in the ON position, the ratio selector plug may be set to the 50% or ±10% position and the RATIO control will function accordingly. If the on-off plug is set in the OFF position, the RATIO control is inoperative.

1.6 **DC Signals:**

1.6.1 **Input Signal:**

The station is shipped with a 250 ohm resistor connected to input terminals 8(−) and 9(+) for 4 to 20 mA DC input signals. For 0 to 4 or 1 to 5 volt DC input signals, remove the resistor. (See section 1.5.1).

1.6.2 **Feedback Signals:**

Terminals 5(+) and 7(−) supplies an excitation voltage to the actuator position potentiometer. This voltage will be between 4 and 7 volts DC depending upon the SPAN control setting. Terminal 6 receives the actuator position signal from the position potentiometer wiper. The position potentiometer must be adjusted to supply 0 volts DC, measured between terminals 6(+) and 7(−), when the actuator is in the maximum decrease position. When the actuator is in the maximum increase position, (100% on the POSITION meter) the position signal will be about 4 volts DC.

1.6.3 **Retransmit Output:**

A retransmit signal is produced at terminals 10(−) and 11(+). As the actuator position signal varies from 0 to 4 VDC, this signal changes 1 to 5 VDC, providing a standard position signal to other system components.

2 INSTALLATION

2.1 Mechanical:

Panel cutouts may be made by referring to figure 1. The station may then be installed as shown in figure 2. CAUTION! While the station is ruggedly constructed, meters are inherently susceptable to damage from rough handling or severe vibration. Do not install the station in a panel until the panel machining has been completed.

2.2 Electrical Inspection:

If desired, the station may be bench tested prior to installation to assure that it is working properly. Before proceeding, read sections 2.3 and 3.1.

2.2.1 Connect the station to an actuator, as shown in figure 3, and to a variable input signal source. The signal source can be any variable DC power supply that will supply 1 to 5 V or 4 to 20 mA.

2.2.2 Switch the manual-automatic switch to MAN. Operate the increase-decrease switch and see that the actuator moves accordingly.

2.2.3 Switch the manual-automatic switch to AUTO. Vary the input signal from 0 to 100% and see that the actuator and position meter move correspondingly.

2.3 Field Wiring:

The station should be wired as shown in figures 3 or 4. Exceptional care should be taken to wire terminals 1, 2, 3 and 4 correctly. Failure to do so may cause an excessive output load, blowing the station fuse and possibly burning out the solid state relays.

NOTE: The terms "increase" (INC) and "decrease" (DEC) as used in this manual, refer only to the direction of actuator travel, not to the actual result of that travel. An actuator may, therefore, be used to decrease a flow, temperature, etc. when it moves in the increase direction.

3 OPERATION

3.1 Placing in Service:

To avoid damage to the station, it is strongly recommended that the following procedure be observed.

3.1.1 Before applying power to the station, switch the manual-automatic switch to MAN.

3.1.2 Apply 120 VAC power.

3.1.3 Operate the increase-decrease switch and see that the actuator responds accordingly.

3.1.4 If it does not respond, **do not** switch the station to AUTO. Check the field wiring and the fuse. A blown fuse indicates improper field wiring or excessive load or inrush current. The station is factory equipped with a two ampere "standard blow" fuse for the best internal protection.

If inrush currents higher than two amperes are present, a "slow blow" two ampere fuse may be substituted. If this is done, extreme care must be taken not to short output terminals 3 or 4 to the 120 V line to avoid burning out the solid state relays.

3.1.5 If a wiring error is located or the fuse replaced, operate the increase-decrease switch again and check for proper operations.

3.1.6 If the fuse continues to blow, recheck the wiring and load current. Do not switch the MANUAL-AUTOMATIC switch to AUTO.

3.1.7 When the station is working properly in the manual mode, switch the MANUAL-AUTOMATIC switch to AUTO.

3.1.8 **For locating the 100% starting point for the RATIO control knob:**

If the RATIO control is programmed for the 50% mode, turn the control fully clockwise. If the control is programmed for the ±10% mode, set the control at mid range.

3.1.9 Apply a 0% signal to the input and adjust the zero control to move the actuator to the desired minimum position.

3.1.10 Apply a 100% input signal and adjust the span control to move the actuator to the desired maximum position.

3.1.11 Adjust the dead band control as indicated in section 1.5.3.

3.2 **Operating:**

The operator should familiarize himself with the function of all front panel controls as described in section 1.4 of this manual. There will normally be no need to disturb the service adjustments on the rear service panel. When needed, such adjustments should be made only by qualified service personnel. The station requires no regular maintenance.

4 CIRCUITRY

4.1 Power Supply:

Power is supplied to relays K1 and K2 by power transformer T1, bridge rectifier BR1 and filter capacitors C5 and C6. The ± 15 VDC is reduced to +8.2 VDC by regulator IC1 and further by Q3 and span control R35 to supply 3 to 7 VDC to terminal 5 for position potentiometer excitation. The -15 VDC supply is reduced to -8.2 VDC by regulator diode D3.

4.2 **Automatic Mode:**

Input signals and position signals from the actuator are compared by the station circuitry. When the input signal becomes greater than the position signal, the circuit applies 120 VAC power to the INC terminal, moving the actuator and thereby increasing the position signal until it equals the debiased input signal. When the two signals are equal, power to the actuator is turned off. Conversely, when the input signal drops below the position signal, power is applied to the DEC terminal.

The 1-5 VDC input signal is applied to the input of amplifier A1 through resistor R2. R1 converts 4 to 20 mA DC signals to 1 to 5 VDC. Using the current supplied by zero control R4, A1 debiases and inverts the 1 to 5 V input to produce 0 to -4 VDC at its output. Transient input noise is filtered out by C1. The output of A1 is then applied to the input of summing amplifier A2 through R9 and R39. Position signals of 0 to 4 V from the actuator are also applied to the input of A2 through R10. A2 supplies the inverted algebraic sum of the two signals to the input of toggle amplifier A3. Negative feedback for A3 is supplied by dead band amplifier A4. The gain of A4 is great enough that when positive or negative signals from A2 cause the output of A3 to reach ± .2 VDC A4 will go into saturation and no longer provide negative feedback. Positive feedback through R15 then converts A3 into an infinite gain toggle amplifier, causing its output to go to +6 VDC to turn on transistor Q1 and relay K1 or to -6 VDC to turn on Q2 and K2. When K1 or K2 is energized 120 VAC is applied to terminal 3 or terminal 4 respectively.

4.3 **Manual Mode:**

In the manual mode, all the electronic circuitry is by-passed by the MANUAL-AUTOMATIC switch S1 and the actuator is controlled directly by INCREASE-DECREASE switch S2.

5 MAINTENANCE

5.1 **Trouble Shooting:**

If a malfunction occurs, repairs should be made only by individuals thoroughly familiar with solid state analog control circuitry. The following check list may be used to assist in the source of difficulty.

5.1.1 Symptom: Actuator moves in a direction opposite to that desired.
Fault: Field wiring. Interchange wires to terminals 3 and 4 and interchange wires to terminals 5 and 7.

5.1.2 Symptom: Actuator will not move in manual or automatic mode.
Fault: Blown fuse. Field wiring. No power. Faulty actuator.

5.1.3 Symptom: Actuator goes to one end of travel and stops there. Manual operation is normal.

Fault: Wires to terminals 5 and 7 interchanged. Electronic circuit failure.

5.1.4 Symptom: Actuator moves in a direction opposite to that indicated on the INCREASE-DECREASE switch when operating in the manual mode.

Fault: Wires to terminals 3 and 4 interchanged.

5.1.5 Symptom: No voltage present at potentiometer terminals 5 (+) and 7.

Fault: Shorted field wiring. Blown fuse. Electronic circuit failure.

5.2 **Alignment**:

The following procedure may be used to set the two alignment potentiometers located on the printed circuit board. This need be done only if certain components have been replaced or if the adjustments have been disturbed.

5.2.1 Remove the station from its housing and connect it to an actuator.

5.2.2 Set the "ON-OFF" selector on the P.C. Board at OFF and the "50-10" selector at "10".

5.2.3 Turn the zero control fully cw.

5.2.4 Turn the span control fully ccw.

5.2.5 Turn the dead band control to the center of its range.

5.2.6 Turn the front panel ratio control fully ccw.

5.2.7 Switch the manual-automatic switch to MAN.

5.2.8 Apply 120 VAC power to terminals 1 and 2.

5.2.9 Operate the increase-decrease switch and see that the actuator responds accordingly.

5.2.10 Switch the manual-automatic switch to AUTO.

5.2.11 Apply 1 VDC ± .02 V to the input.

5.2.12 Turn the zero control slowly ccw. until the actuator is fully decreased.

5.2.13 Adjust R24 on the P.C. Board for 1 VDC ± .02.

5.2.14 Apply 4 VDC ± .08 to the input.

5.2.15 Slowly adjust the position control, R39 on the P.C. Board, for 4 VDC ± .06 on the DVM after the actuator stops.

5.2.16 See that the position meter reads 75% ± .5 division.

5.2.17 Apply 5.0 VDC to the input.

5.2.18 Turn the span control slowly cw. until the actuator is fully increased. (Turning it too far will cause the position meter to read under 100%).

5.2.19 Set the "On-Off" selector at ON.

5.2.20 See that the "Position" meter goes to 90% ± .5 division.

5.2.21 Set the "50-10" selector at "50".

5.2.22 See that the position meter goes to 45% ± 1 division.

5.3 **Factory Repairs:**

A defective station may be returned to the factory for repair service. Factory authorization must be obtained before shipping. Pack it securely and include a detailed description of the difficulties experienced. Replacement parts may also be obtained from the factory. Include model and serial number in the order. All units returned for replacement or repair must be shipped to the factory prepaid.

5.4 **Replaceable Parts:**

All 1% tolerance resistors are .25 watt, metal film type except where otherwise noted. All 5% tolerance resistors are .5 watt carbon composition.

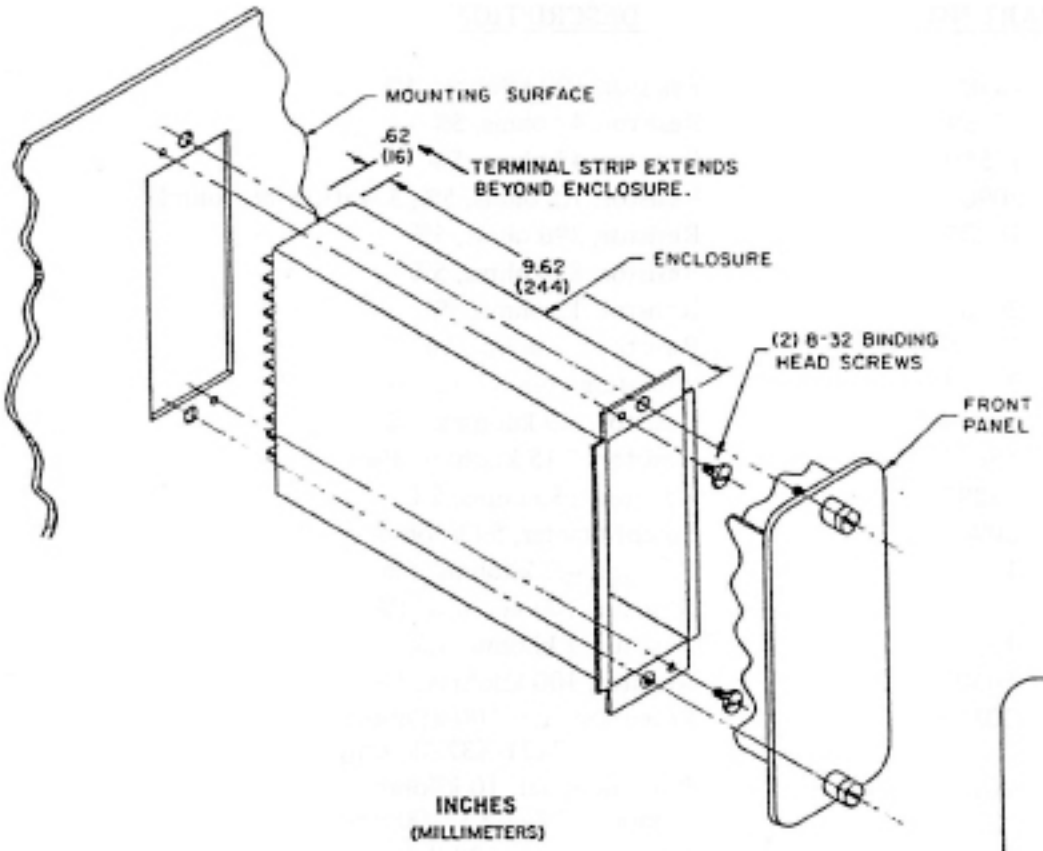
ITEM	PART NO.	DESCRIPTION
A1	16312	Amplifier, operational, 741C
A2	16312	Amplifier, operational, 741C
A3	16312	Amplifier, operational, 741C
A4	16312	Amplifier, operational, 741C
A5	16312	Amplifier, operational, 741C
BR1	14033	Rectifier, bridge
C1	20663	Capacitor, 5 ufd., 100 V, Mylar
C2	17007	Capacitor, .47 ufd., 100 V, Mylar
C3	13760	Capacitor, .05 ufd., 500 V, ceramic
C4	13760	Capacitor, .05 ufd., 500 V, ceramic
C5	14482	Capacitor, 250 ufd., 50 V, electrolytic
C6	14482	Capacitor, 250 ufd., 50 V, electrolytic
C7	15527	Capacitor, .005 ufd., 500 V, ceramic

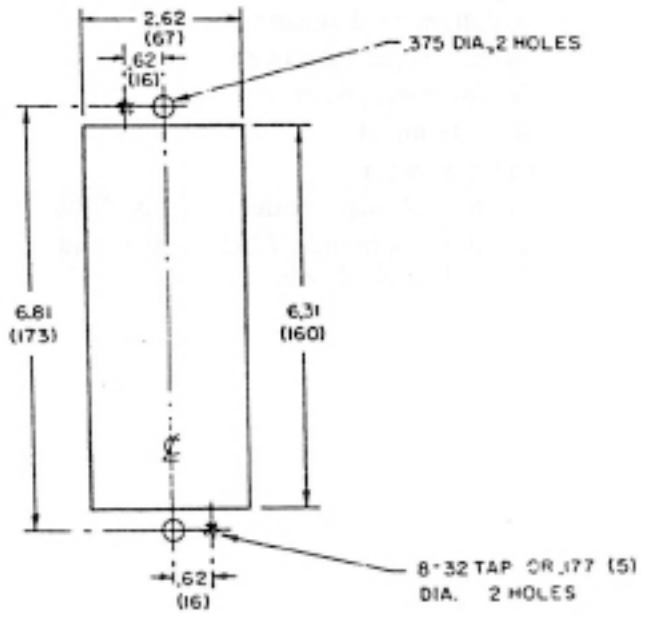
ITEM	PART NO.	DESCRIPTION
C8	13760	Capacitor, .05 ufd., 500 V, ceramic
C9	13760	Capacitor, .05 ufd., 500 V, ceramic
D3	16299	Diode, zener, 1N5237B
IC1	16867	Regulator, voltage, 723C
HS1	20746	Heat sink
HS2	20746	Heat sink
K1	21154	Relay, power, Crydom Controls D2402
K2	21154	Relay, power, Crydom Controls D2402
M1	16766	Meter, 0-200 uA.
M2	20299	Meter, 50-250 uA. (optional)
Q1	17554	Transistor, 2N3566
Q2	14184	Transistor, 2N3644
Q3	14526	Transistor, 2N3052
Q4	15682	Transistor, 2N3417
Q5	15682	Transistor, 2N3417
R1	17374	Resistor, 250 ohms, 1%, 3 watt, wire wound
R2	16502	Resistor, 100 kilohms, 1%
R3	18340	Resistor, 39 kilohms, 5%
R4	20354	Potentiometer, 5 kilohms
R5	16283	Resistor, 18 kilohms, 5%
R6	16502	Resistor, 100 kilohms, 1%
R7	17536	Resistor, 200 kilohms, 1%
R8	12415	Resistor, 33 kilohms, 5%
R9	15905	Resistor, 82 kilohms, 5%
R10	16323	Resistor, 100 kilohms, 5% except models 72 (6, 7) 1-X3X-00
R10	16322	Resistor, 47 kilohms, 5%, models 7271-X3X-00 only
R10	20977	Resistor, 91 kilohms, 5%, models 7261-X3X-00 only
R11	20306	Resistor, 4.64 kilohms, 1%
R12	20307	Resistor, 15 kilohms, 1%
R13	16323	Resistor, 100 kilohms, 5%
R14	13549	Resistor, 1 kilohm, 5%
R15	17116	Resistor, 680 kilohms, 5%
R16	16043	Resistor, 820 ohms, 5%
R17	17559	Resistor, 47 ohms, 5%
R18	20763	Potentiometer, 100 ohms
R19	14414	Resistor, 6.8 kilohms, 5%
R20	16284	Resistor, 270 kilohms, 5%
R21	12873	Resistor, 10 kilohms, 5%
R22	12873	Resistor, 10 kilohms, 5%
R23	15574	Resistor, 3.3 kilohms, 5%
R24	18823	Potentiometer 1 kilohm
R25	14132	Resistor, 5.6 kilohms, 5%
R26	16502	Resistor, 100 kilohms, 1%

CLEVELAND MANUAL/AUTO STATIONS
SWITCHED OUTPUT FUNCTION
SERIES 7000

ITEM	PART NO.	DESCRIPTION
R27	16502	Resistor, 100 kilohms, 1%
R28	17559	Resistor, 47 ohms, 5%
R29	17559	Resistor, 47 ohms, 5%
R30	20965	Resistor, 1.5 ohms, 5%, 3 watt, wire wound
R31	16285	Resistor, 390 ohms, 5%
R32	16043	Resistor, 820 ohms, 5%
R33	20966	Resistor, 12 ohms, 5%
R34	16275	Resistor, 1 kilohm, 1%
R35	20354	Potentiometer, 5 kilohms
R36	14147	Resistor, 3.9 kilohms, 5%
R37	16872	Resistor, 7.15 kilohms, 1%
R38	16291	Resistor, 150 ohms, 5%
R39	20967	Potentiometer, 50 kilohms
R40	15528	Resistor, 4.7 kilohms, 5%
R41	16502	Resistor, 100 kilohms, 1%
R42	13549	Resistor, 1 kilohm, 5%
R43	16502	Resistor, 100 kilohms, 1%
R44	20313	Potentiometer, 100 kilohms models 7221-X3X-00 only
R44	20116	Potentiometer, 10 kilohms models 7261-X3X-00 only
R44	20963	Potentiometer, 50 kilohms models 7271-X3X-00 only
S1	10927	Switch, manual-automatic
S2	11193	Switch, increase-decrease
T1	20746	Transformer, power
TS1	20762	Strip, terminal
1	13940	Pad, transistor
10	20311	Knob, dual, bias, models 7221-X3X-00 only
10	20792	Knob, ratio, models 7261-X3X-00 and 7271-X3X-00 only

CLEVELAND MANUAL/AUTO STATIONS
BASIC FUNCTIONS
SERIES 7000

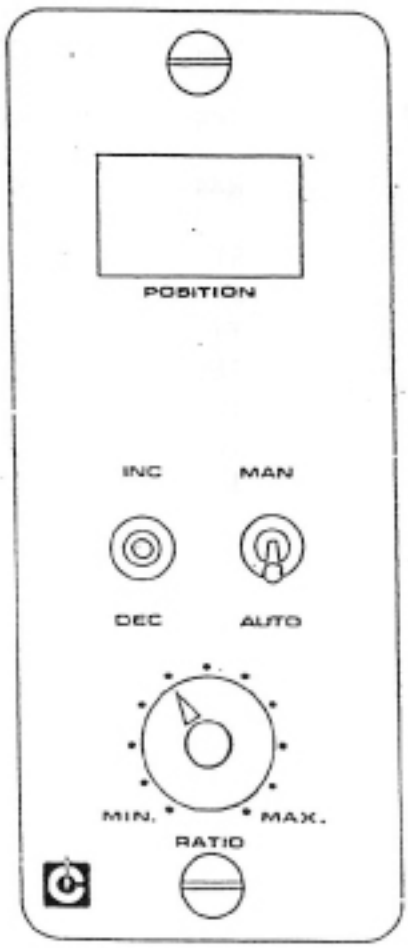




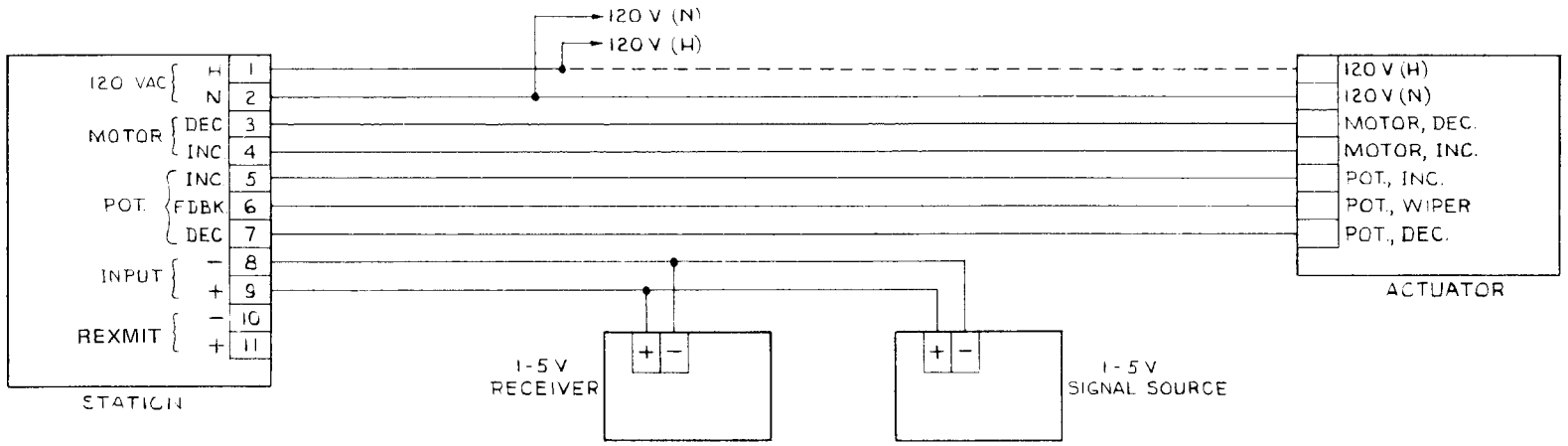
MOUNTING SURFACE CUT-OUT

DIMENSIONS — INSTALLATION

FIGURE 1



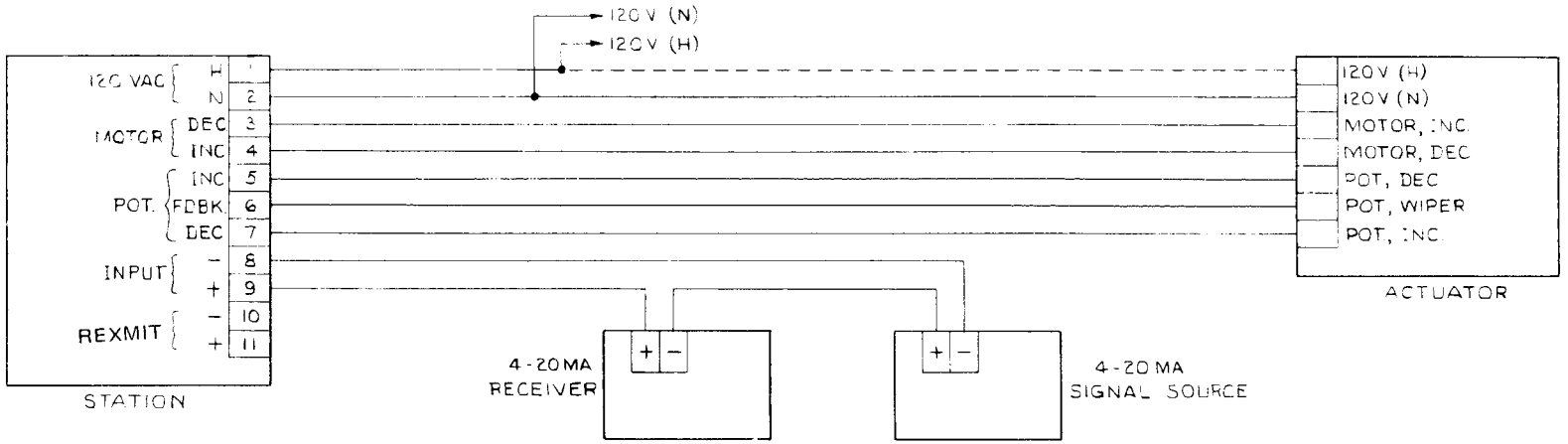
MANUAL/AUTO RATIO STATION
FRONT PANEL
FIGURE 2



FIELD WIRING FOR 1-5 V "DIRECT" ACTING STATION

FIELD WIRING
STANDARD INPUTS

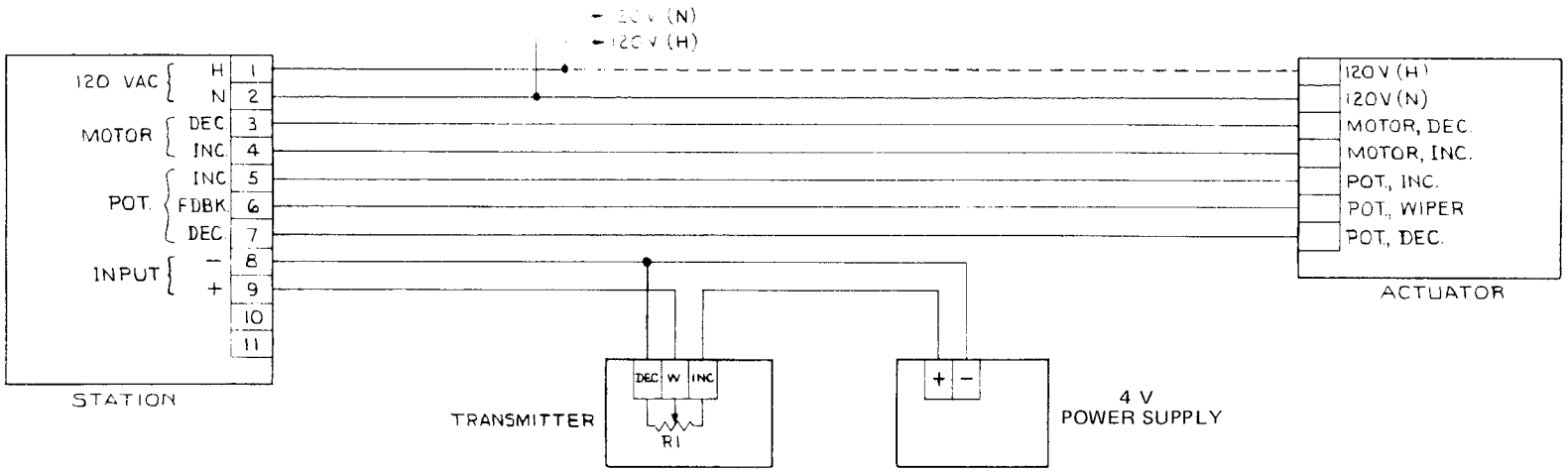
FIGURE 3A



FIELD WIRING FOR 4-20 MA "REVERSE" ACTING STATION

FIELD WIRING
STANDARD INPUTS

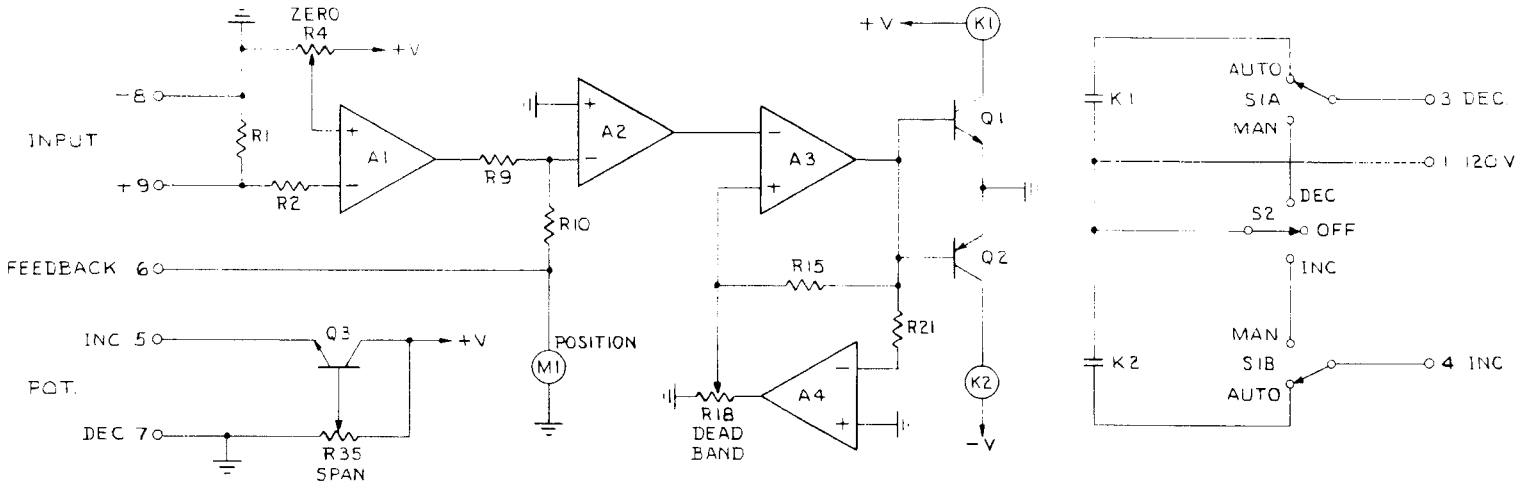
FIGURE 3B



FIELD WIRING FOR 0 TO 4 V POTENTIOMETER INPUT

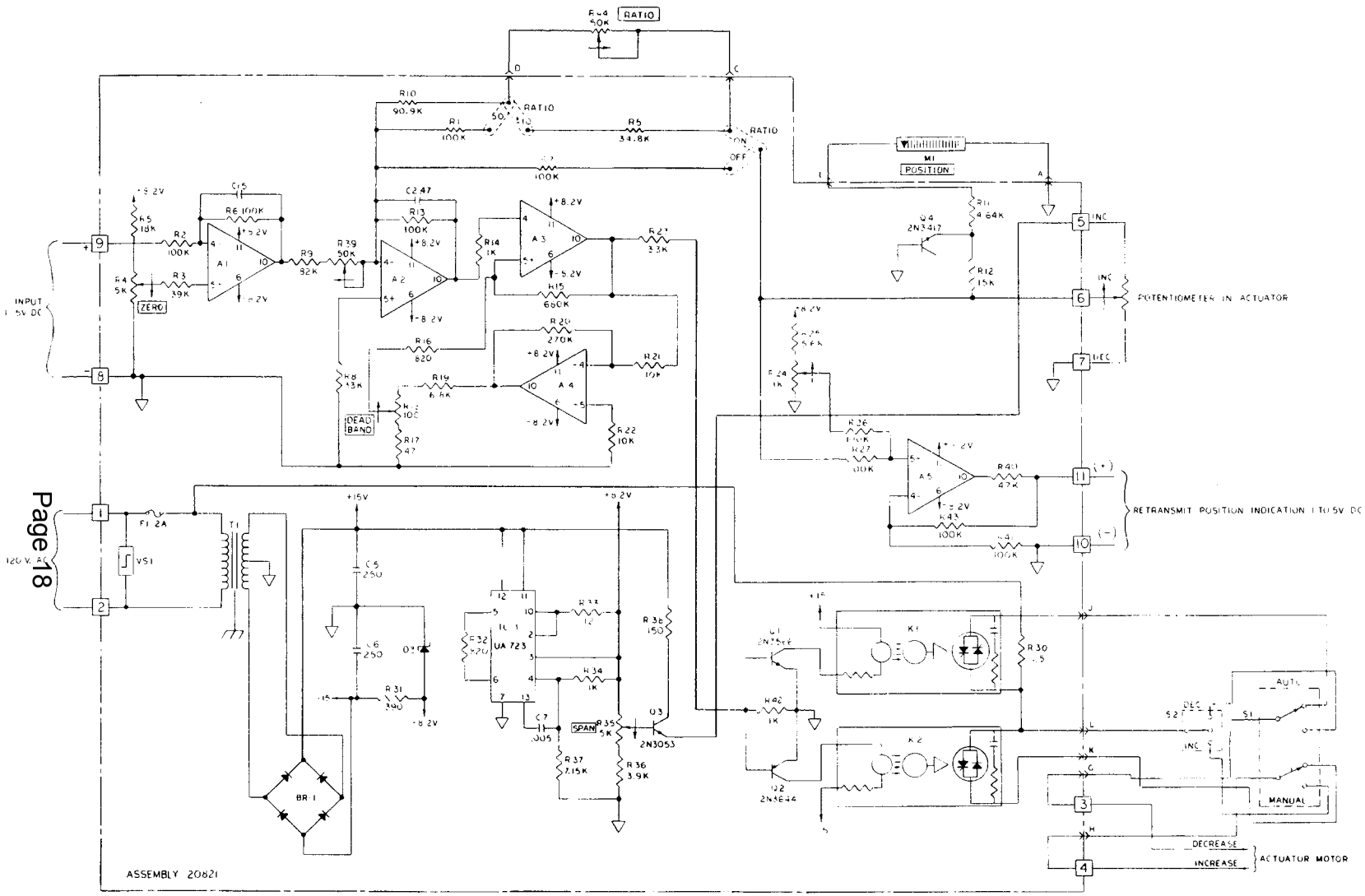
FIELD WIRING
POTENTIOMETER INPUT

FIGURE 4



SIMPLIFIED SCHEMATIC

FIGURE 5



HIGHEST REFERENCE DESIGNATION			
R47	C7	Q4	A5
UNUSED REFERENCE DESIGNATIONS			
	C 3,4,8 9		

COMPLETE SCHEMATIC

FIGURE 6

NOTE
UNLESS OTHERWISE SPECIFIED
RESISTANCE VALUES ARE IN OHMS
CAPACITANCE VALUES ARE IN MICROFARADS
⊥ CIRCUIT COMMON
⏚ CHASSIS

ADDENDUM

DIGITAL POSITION METER

POSITION ADJUSTMENTS:

1) Apply a 0% signal to the input and adjust the zero control to move the actuator to the desired minimum position.

2) Apply a 100% input signal and adjust the span control to move the actuator to the desired maximum position.

3) If unable to adjust for steps 1 and 2, check the feedback potentiometer calibration. Place actuator in the minimum position. Remove field wiring from terminals X1, Y1, and Z1. Set potentiometer for 10±2 ohms for a 1K potentiometer, or 40±8 ohms for a 4K potentiometer.

METER ADJUSTMENTS:

1) To gain access to the meter adjustments, loosen the two front panel screws and slide the chassis out until the adjustments are in view. Take care not to ground any line voltage terminals. The adjustments are located on the meter pc board.

2) Apply a 0% signal to the input (minimum position).

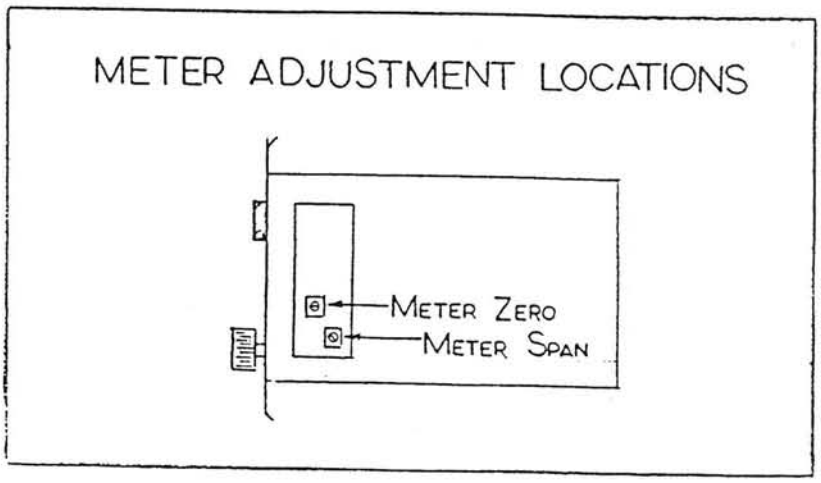
3) Set the meter "zero" potentiometer so that the digital meter reads "00".

4) Apply a 100% signal to the input (maximum position).

5) Set the meter span potentiometer so that the digital meter reads "100".

NOTE: PARAGRAPH 1.4.1, "Position Meter", in this manual, NO LONGER APPLIES.

REPLACEABLE PARTS:
P/N 30050 Digital Meter
P/N 30044 PC Board Assembly



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Cleveland OH 44109

Telephone: 216.398.4414

Fax: 216.398.8556

email: **customerservice@unicontrolinc.com**

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http://www.hayscleveland.com

Repairs

Damaged or defective units may be returned to the factory for repair. However, factory authorization must be obtained before shipping whether warranty or non-warranty service is required, and all units must be shipped prepaid.
A letter of transmittal that includes the following information should accompany the returned instrument:

1. Location, type of service, and length of time in service of the unit.

2. Description of the faulty operation of the device and the circumstances of the failure.

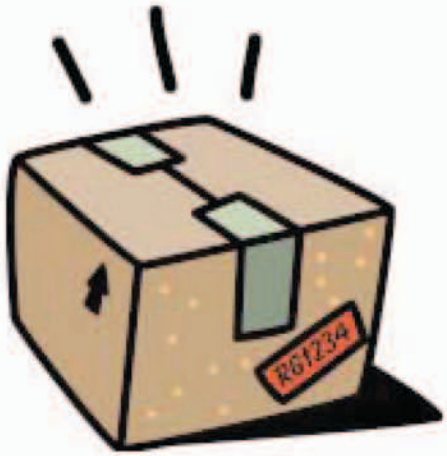
3. Name and telephone number of the person to contact if there are questions about the unit.
4. Indicate whether warranty or non-warranty service is requested.
5. Attach Purchase Order for all out-of-warranty repairs.
6. Complete shipping instructions for the return of the repaired instrument.
7. Original purchase order number and date of purchase.
8. Return Goods Authorization number provided by the factory when you called.

Clearly label the shipping container:

RETURN FOR REPAIR

Model _____

RG # _____



Ship prepaid to:

HAYS CLEVELAND

1111 Brookpark Road

Cleveland OH 44109-5869

216-398-4414

Please follow this procedure. It expedites handling of the returned item, and avoids unnecessary additional charges for inspection and testing to determine the problem before repairing it.

Service

A **Maintenance and Service Contract** can ensure trouble-free, economical operation of **Hays Cleveland** equipment for many years. One-time on-site service by a factory-trained service engineer can also be provided as needed. Contact Hays Cleveland for information on these service options.

Standard Terms and Conditions of Sale

TERMS OF SALE: 1% discount if paid in ten (10) days, net amount due and payable in thirty (30) days.

AGREEMENT OF SALE: Acceptance by Seller of any order placed for goods whether submitted on Buyer's purchase order form or on seller's Sales Order Acknowledgment form, shall be subject to Seller's Standard Terms and Conditions of Sale and is conditioned upon the Buyer's acceptance of these Standard Terms and Conditions.

TERMS OF CONTRACT: Any terms or conditions of the buyer's order which are inconsistent with these terms and conditions shall not be binding on the Seller and shall not be considered applicable to the sale or shipment of goods or materials. Unless buyer shall notify Seller in writing to the contrary within ten (10) days after the mailing of the Sales Contract by Seller, acceptance of the terms and conditions hereof by Buyer shall be indicated and, in the absence of such notification, the sale and shipment by Seller of the goods and materials covered hereby shall be conclusively deemed to be subject to the terms and conditions hereof.

PRICES: All prices and specifications and applicable discounts are subject to change without notice. Sales contracts which call for delivery in the future will be billed at prices in effect at the time of shipment. Shipping weights shown are approximate and subject to change without notice.

SHIPMENT AND PAYMENTS: All prices contained on the Sales Contract are F.O.B. factory in Cleveland, Ohio. No freight is allowed on any shipments. Shipments and deliveries shall at all times be subject to the approval of Seller's Credit Department, and at any time seller may require payment in advance or satisfactory security or guarantee that invoices will be promptly paid when due. If buyer fails to comply with any terms of payment, seller, in addition to its other rights and remedies, but not in limitation thereof, reserves the right to withhold further deliveries or terminate the Agreement, and any unpaid amount thereon shall become due immediately. Terms of payment shall be as set forth on the Sales Contract.

DELAYS AND DEFAULTS: Delays or defaults in delivery by Seller of the goods and materials covered by the Sales Contract shall be excused so far as the same is caused by fire, strikes, accident, governmental regulation, or any delays unavoidable or beyond reasonable control of Seller. In no event shall Seller be liable for any consequential, special, or contingent damages on account of any default or delay in delivery.

NONCANCELLATION: Orders are not subject to suspension, reduction, or cancellation, except on terms that will indemnify Seller against loss.

SPECIFICATIONS: Seller relies on specifications and other data furnished by the Buyer, an architect, contractor, or consulting engineer in all phases of the work covered by the Sales Contract. Seller shall be responsible to check quantities only. Alterations to or changes in specifications, approval of samples, changes in delivery instructions and all other instructions must be submitted in writing to Seller.

In the event Seller performs design or engineering work at the request of Buyer, an architect, contractor, consulting engineer, or representative in any phase of the work covered by the Sales Contract, Seller shall not be responsible for any damages claimed by Buyer as a result of alleged errors or defects in such design or engineering work.

WARRANTY AND LIMITATION OF LIABILITY: Seller warrants that the goods supplied by it have been manufactured in accordance with its standard manufacturing practices and conform to the contract or catalog description set forth in the order. Seller further warrants that the goods supplied by it are fit for the ordinary purpose or purposes specified in its catalog for which such goods are used when installed in accordance with Seller's recommended installation procedures. Except as stated herein, Seller makes no express warranty with respect to goods supplied by it and Seller makes no warranty that the goods are fit for any particular purpose.

When the use of materials not manufactured by Seller is suggested by Seller's recommended installation procedures or otherwise, Seller makes no express warranty with respect to such materials nor that such materials are merchantable or fit for any particular purpose.

Seller will, at its sole option, credit, repair or replace, any goods supplied by it which its examination shall disclose to its satisfaction are defective in workmanship or material and are returned to it within one year from the date of shipment and any claim not made within this period shall conclusively be deemed waived by Buyer. Credit, repair or replacement will be preconditioned upon examination of the goods by Seller, and, if requested by Seller, return of the goods to Seller at its direction and expense. No goods are to be returned to Seller without its written consent. Seller shall not be liable for any expense incurred by Buyer in order to remedy any defect in its goods. Seller shall not be liable for any consequential, special, or contingent damage or expense, arising directly or indirectly from any defect in its goods or from the use of any defective goods. The remedies set forth herein shall constitute the exclusive remedies available to Buyer and are in lieu of all other remedies.

CLAIMS: Claims for shortage of goods or for mistakes or errors in billing must be presented within forty-five (45) days from the date of shipment of goods and must state the packing slip number and container number applicable to the claim. Any claim not so presented will be conclusively deemed waived.

TAXES: Any federal taxes or other government charges on the sale, shipment, or installation of the goods or equipment covered by the Sales Contract shall be added to the price and paid by Buyer, or, in lieu thereof, the Buyer shall furnish the Seller with tax-exemption certificates acceptable to the taxing authority. The procedure also applies to duty and other similar charges on export sales. Seller is not responsible for sales and/or use tax in any state other than Ohio. The purchase made under this Sales Contract must be exempt or paid directly by Buyer. If Seller is required to pay any such tax, there shall be added to the prices quoted herein all such state and local taxes. Buyer agrees to reimburse and save Seller harmless from all such state and local taxes, including interest and penalties thereon, which may at any time be payable to any state or local government unit with respect to the sale of any goods or materials covered by the Sales Contract.

CORRECTIONS: Typographical or clerical errors contained in the Sales Contract, including prices, are subject to correction by the Seller.

FAIR LABOR STANDARDS: All goods covered by the Sales Contract have been produced in conformity with all applicable provisions of the Fair Labor Standards Act of 1938 as amended.

RENEGOTIATION: Unless advised by Buyer in writing, Seller assumes that Buyer's order and the Sales Contract are not renegotiable under the Renegotiation Act of 1951.

APPLICABLE LAW: All questions arising out of the Sales Contract, which shall be deemed an Ohio contract, shall be governed by the laws of the state of Ohio.

EXCLUSIVE TERMS: The Sales Contract shall constitute the complete contract between the parties, and no one has authority to depart from the terms and conditions set forth therein, nor to make any representations or arrangements other than those printed thereon whether in the execution or in the performance of the Sales Contract, unless the same are written on the face of the Sales Contract or are given in writing with it or in pursuance of it, and are fully approved in writing by an officer or authorized employee of the Seller.

LIMITATION FOR SUITS: Any controversy or claim arising out of or relating to this Sales Contract or the breach thereof, must be commenced within one (1) year after the cause of action accrued.

Intentionally Blank

Intentionally Blank

Hays Cleveland
Div. of UniControl Inc.
1111 Brookpark Road
Cleveland OH 44109