Hays Cleveland
Div. of UniControl Inc.

Series 7216.01 INSTRUCTION MANUAL
Basic Function Manual/Auto Stations with Analog Input and Analog Output

This manual covers Models:
7211-110-00 and 7211-120-00
7211-210-00 and 7211-220-00

INSTRUCTION MANUAL 7216.01
Manual\Auto Stations with Basic Function

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.

CLEVELAND CONTROLS, INC.

1111 BROOKPARK RD. **CLEVELAND, OHIO 44109**
216/741-9444 TELEX 98-5485

CLEVELAND MANUAL/AUTO STATIONS
BASIC FUNCTION
SERIES 7000
INSTRUCTION MANUAL

CONTENTS

CLEVELAND MANUAL/AUTO STATIONS
BASIC FUNCTION
SERIES 7000

1 INTRODUCTION

1.1 Description

The Cleveland 7000 Manual/Automatic Basic Station is one of a series of panel mounted electronic instruments designed to generate or condition standard process control signals. The station permits an operator to replace a remotely generated control signal (automatic mode) with a signal that is locally generated by the station and manually adjusted by the operator (manual mode).

1.2 Specifications

POWER REQUIREMENT	120 vac nominal, 105-120 vac 50-60 hz., .03a.
ISOLATION	300 v maximum lines to case
OUTPUT SIGNAL RANGE	1-5 v or 4-20 ma dc
OUTPUT LOAD LIMITS	250 ohms minimum for 1-5 v dc 750 ohms maximum for 4-20 ma dc
INPUT SIGNAL RANGE	1-5 v or 4-20 ma dc
INPUT IMPEDANCE	100,000 ohms for 1-5 v 250 ohms for 4-20 ma dc
AUXILIARY METER RANGE	1-5 v or 4-20 ma dc
AUXILIARY METER IMPEDANCE	20,000 ohms for 1-5 v dc 250 ohms for 4-20 ma dc
AUXILIARY METER ISOLATION	50 v maximum, meter terminals to any other signal terminal
AMBIENT TEMPERATURE RANGE	5 to 50° C. 41 to 122° F.
STABILITY VS. TIME	Less than 1% f.s. change in output per week, non-accumulative
STABILITY VS. LINE VOLTAGE	Less than 1% f.s. change in output for a 10% change in line

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1.3 Model Numbering System

The Station is described by its model number as indicated below. GG will normally be 00 unless the station contains a special feature, which has been assigned a GG number by the factory. Special features are described in an instruction manual supplement. Name Plates containing the model number are located on the station chassis and on the housing.

7 A B C – D E F – GG

A. Type:

Manual/Auto Station	2

B. Function:

Basic	1
Bias	2
Set Point	3
Wide Ratio (10 to 0)	4
Square Root Ratio ($\sqrt{10}$ to 0)	5
Ratio – Narrow (1 to .9)	6
Ratio – Narrow (1 to .5)	7

C. Power Supply:

Integral	1

D. Input

4-20 ma dc	1
1-5 v dc	2

E. Output:

4-20 ma dc	1
1-5 v dc	2
Switched	3

F. Auxiliary Meter

None	0
4-20 ma dc	1
1-5 v dc	2

GG. Special Feature:

None	00

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2 INSTALLATION

2.1 Mechanical

Panel cut outs may be made by referring to figure 1. The unit may then be installed as shown. 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 following bench test may be performed prior to installation to assure that the station is working properly.

2.2.1 Connect terminal 4 to terminal 5.

2.2.2 Models 721X-1XX-OO only:
Connect a 4-20 ma signal source to input terminals 10 (+) and 11.
The signal source can be any variable power supply that will furnish *lO* ma at 5 v.

2.2.3 Models 721X-2XX-OO only:
Connect a 1-5 v signal source to input terminals 10 (+) and 11.
The signal source can be any variable power supply that will furnish 20 ma at 5 v.

2.2.4 Switch the MAN-AUTO switch to AUTO.

2.2.5 Vary the input signal from O to 100% and see that the OUTPUT meter goes from O to 100%.

2.2.6 While pressing the BAL button, see that rotating the MAN knob will cause the OUTPUT meter to move.

2.2.7 Switch the MAN-AUTO switch to MAN.

2.2.8 See that rotating the MAN knob will cause the OUTPUT meter to move.

2.2.9 Press the BAL button and see that the OUTPUT meter reads the input signal.

2.3 Field Wiring

Power line voltage must not be applied to any terminals other than 1 and 2 or serious damage may result. The optional auxiliary meter is isolated from the input-output circuitry allowing it to be connected to any circuit without additional isolation.

2.3.1 Current Output Models 72.XX-XlX-OO

On these models, the negative input and negative output terminals are at different electrical potentials and must not be externally interconnected. Typical field connections are shown in figure 3.

2.3.2 Voltage Output Models 72.XX-X2X-OO

On these models, the negative input and negative output terminals are directly connected internally. Typical field connections are shown in figure 4.

3 OPERATION

The station has two operator selected modes of operation, manual or automatic, with means provided for transferring between the two modes without disturbing the station's output (bumpless transfer). There are no internal operator adjustments and no regular maintenance is required.

3.1 Manual Mode

When the man-auto switch is in the MAN position, the operator controls the station output entirely by positioning the 10 turn MAN knob. The output, read on the OUTPUT meter, is increased by turning the knob in a clockwise direction. The knob has no hard stops at 0 to 100% output, but turning it beyond these limits will neither change the output nor damage the station.

3.2 Automatic Mode

When the man-auto switch is in the AUTO position, any signal present at the input will appear at the output. For example, a 25% of full scale input will produce a 25% output, a 70% input will produce a 70% output, etc. In this mode, the MAN knob has no influence over the station output.

3.3 Transferring

For a bumpless transfer from one mode to the other, select the procedures below which best fit the requirements of the control system.

3.3.1 Manual to automatic transfer, input adjustment method:

Observe the OUTPUT meter reading. Push the BAL button and remotely adjust the input signal so that the meter reads the same as when the button is released. Release the button and switch the man-auto switch to AUTO.

3.3.2 Manual to automatic transfer, output adjustment method:

Push the BAL button and observe the OUTPUT meter reading. Release the button and adjust the MAN knob until the meter reads the same as when the button is depressed. Switch the man-auto switch to AUTO.

3.3.3 Automatic to Manual Transfer

Observe the OUTPUT meter reading. Push the BAL button. While it is depressed, adjust the MAN control until the meter reads the same as when the button is released. Release the button and switch the man-auto switch to MAN.

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4 CIRCUITRY

4.1 Power Supply

The signal circuitry is isolated from the line voltage on terminals 1 and 2 by step down transformer T1. See figures 5 and 6. The output of T1 is rectified to !.28 v.d.c. by bridge rectifier BR1. Current from the +28 v supply Is supplied to the positive current output terminal and to transistor Q3 through R18 for voltage output models or through the output load for current output models. Current is also supplied through resistors R4 and R22 to 13 v regulator diodes D3 and D2 respectively. Power from the 13 v regulator is used to operate amplifiers A1 and A2 and to supply current through R14 to the 6.2 v reference regulator D1. Current from the 6.2 v supply passes through R20 and R3 to the manual potentiometer R31. R3 is adjusted for 5 v at R31 to establish the maximum manual output signal. Current is also supplied to potentiometer R13 through R14. R13, and therefore the output (10) of voltage follower A2, is set for 1 v. The output of A2 establishes the elevated zero reference for output meter M1 and the minimum output level for manual potentiometer R31.

4.2 Manual Mode

In the manual mode, the voltage present at the wiper of the manual potentiometer passes through S1 and R7 to the input (5) of operational amplifier A1. A1 will always maintain, by negative feedback, a voltage at A1-4 equal to the voltage applied to A1-5. Thus, if 2 v is present at A1-5, the voltage present at the output, A1-10 will be the voltage required to turn on Q3 sufficiently to produce 2 v at the emitter of Q3. This is then fed back through RS to A1-4.

On voltage output models, this voltage is also present at output terminal 6. R19 is not used. On current output models, the voltage present at the emitter of Q3 causes a current to flow through R19 that is equal to the voltage present divided by the resistance of R19. In the example given, the current would then be .008 a or 8 ma. This current flows through Q3 to current output terminal 5. R18 is not used in current output models.

In the manual mode, output meter M1 normally reads the 1-5 v signal appearing at the emitter of Q3. When the balance switch, 82 is pushed, the meter reads the automatic signal appearing at terminal 10. Q1 is used as a zener diode to protect M1 from overload.

4.3 Automatic Mode

When the man-auto switch, S1 is switched to AUTO, the manual signal from R31 is replaced with the input (automatic) signal appearing at terminal 10. The function of 82 is also changed so that it normally reads the station output as before, but reads the manual signal when depressed.

5 MAINTENANCE

If a malfunction occurs, repairs should be attempted only by individuals thoroughly familiar with solid state analog control circuitry.

5.1 Trouble Shooting

The following check list may be used to assist in locating faulty components.

Station operates properly, but output meter does not indicate:

- Meter coil open
- R5 or R6 open
- Q1 shorted

Auxiliary meter does not indicate:

- Meter coil open
- R15 or R16 open
- Q2 shorted

Output signal present only when no load is connected (voltage output models only):

- Shorted field wiring

Output signal present only when output is shorted (current output models only):

- Field wiring open

Maximum output at all times:

- Q3 shorted
- A1 inoperative

No output:

- T1, BR1, A1 or Q3 inoperative
- R7, R9, or R1O open

Station functions properly in manual mode but not in automatic:

- No signal present at input
- S1 faulty

Station functions properly in automatic mode, but. not in manual:

- S1 faulty
- R3 or R20 open
- R31 faulty

Minimum output too high or too low:

- A2 inoperative
- R17, R13, R12 or D1 shorted or open

5.2 Alignment

To align a properly working unit:

5.2.1 Apply 120 vac to terminals 1 and 2.

5.2.2 Switch the man-auto switch to MAN.

5.2.3 Turn the MAN knob fully counterclockwise.

5.2.4 Connect a meter of the proper range to the output terminals.

5.2.5 Adjust R13 for the minimum specified output signal (1 v or 4 ma)

5.2.6 Turn the MAN control fully clockwise.

5.2.7 Adjust R3 for the maximum specified output signal (5 v or 20 ma)

5.3 Factory Repairs

A defective controller 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 .25 watt resistors listed below are 1% tolerance, metal film type. All .5 watt and 2 watt resistors are 5% tolerance, carbon composition. All 3 watt resistors are 1% tolerance, wire wound.

ITEM	PART NO.	DESCRIPTION
A1	16312	Amplifier, Operational
A2	16312	Amplifier, Operational
BR1	14033	Rectifier, Bridge
C1	16301	Capacitor, 500 ufd.
C2	16718	Capacitor, 100 ufd.
D1	20305	Diode, zener
D2	16408	Diode, zener, 1N4743
D3	16408	Diode, zener 1N4743
M1	16766	Meter, 0-200 ua.
M2	20299	Meter, 50-250 ua.*
Q1	15682	Transistor, 2N3417
Q2	15682	Transistor, 2N3417*
Q3	14526	Transistor, 2N3053
R1	17374	Resistor, 3 watt, 250 ohms*
R2	17374	Resistor, 3 watt, 250 ohms*
R3	18823	Potentiometer, 1k ohms
R4	12420	Resistor, 2 watt, 1k ohms
R5	20307	Resistor, .25 watt, 15k ohms
R6	20306	Resistor, .25 watt, 4.64k ohms

*Not used on some models.

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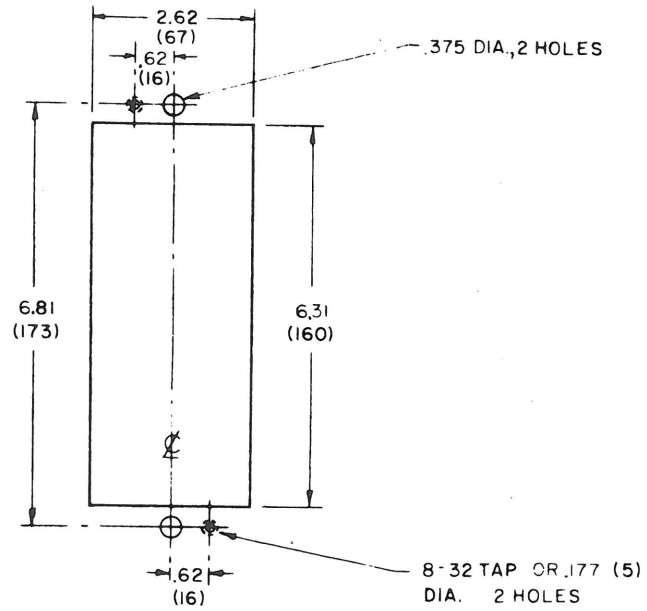
Replaceable Parts — Continued

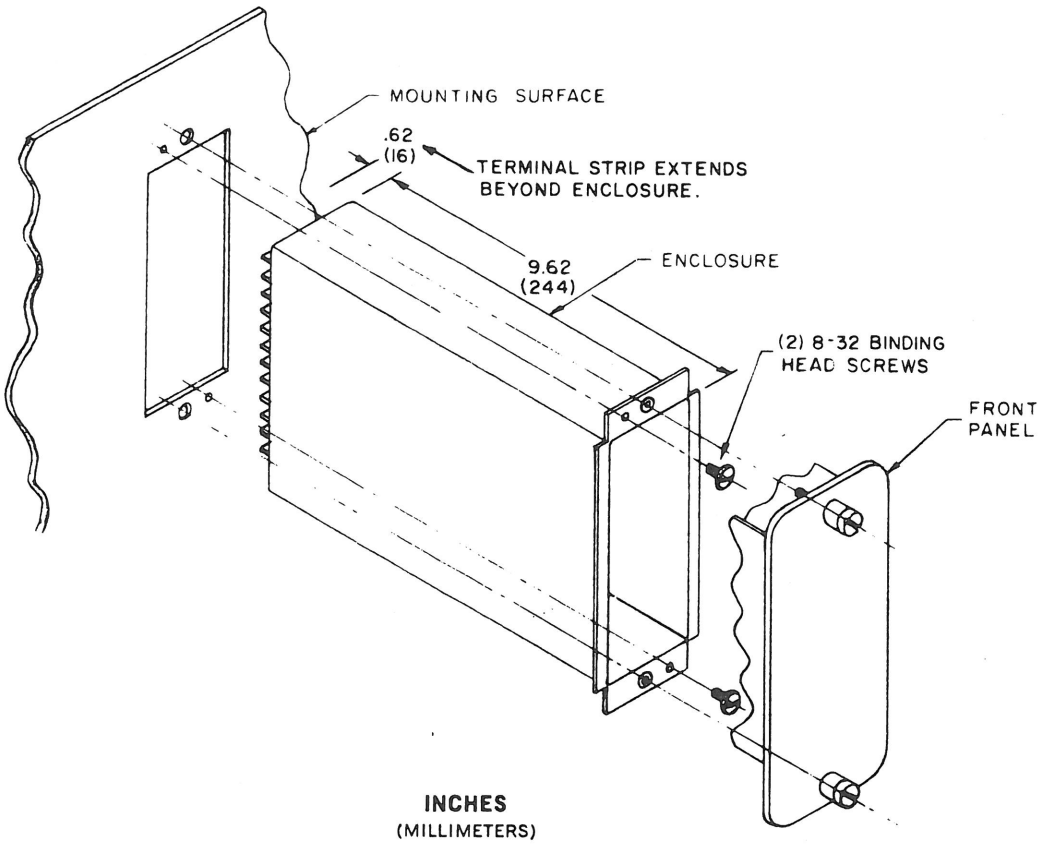
ITEM	PART NO.	DESCRIPTION
R7	14142	Resistor, .5 watt, 22k ohms
R8	14142	Resistor, .5 watt, 22k ohms*
R9	15528	Resistor, .5 watt, 4.7 ohms
R10	20308	Resistor, 2 watt, 220 ohms
R11	13549	Resistor, .5 watt, 1k ohms
R12	13830	Resistor, .5 watt, 1.8k ohms
R13	18823	Potentiometer, 1k ohms
R14	12414	Resistor, .5 watt, 12k ohms
R15	20306	Resistor, .25 watt, 4.64k ohms*
R16	20307	Resistor, .25 watt, 15k ohms*
R17	13549	Resistor, .5 watt, 1k ohms
R18	14146	Resistor, .5 watt, 560 ohms*
R19	17374	Resistor, 3 watt, 250 ohms*
R20	16503	Resistor, .5 watt, 270 ohms
R21	16323	Resistor, .5 watt, 100k ohms
R22	20432	Resistor, 2 watt, 680 ohms
R31	20300	Potentiometer, 2k ohms
S1	20314	Switch, toggle
S2	17265	Switch, push button
T1	16780	Transformer, power
	20304	Strip, terminal
	14534	Cooler, transistor*
	13940	Pad Transistor
	17173	Cap
	17296	Knob, round
	20311	Knob, dual skirted
	20531	Standoff, Male-Female
	20526	Assembly, housing

*Not used on some models.

CLEVELAND MANUAL/AUTO STATIONS
BASIC FUNCTIONS
SERIES 7000



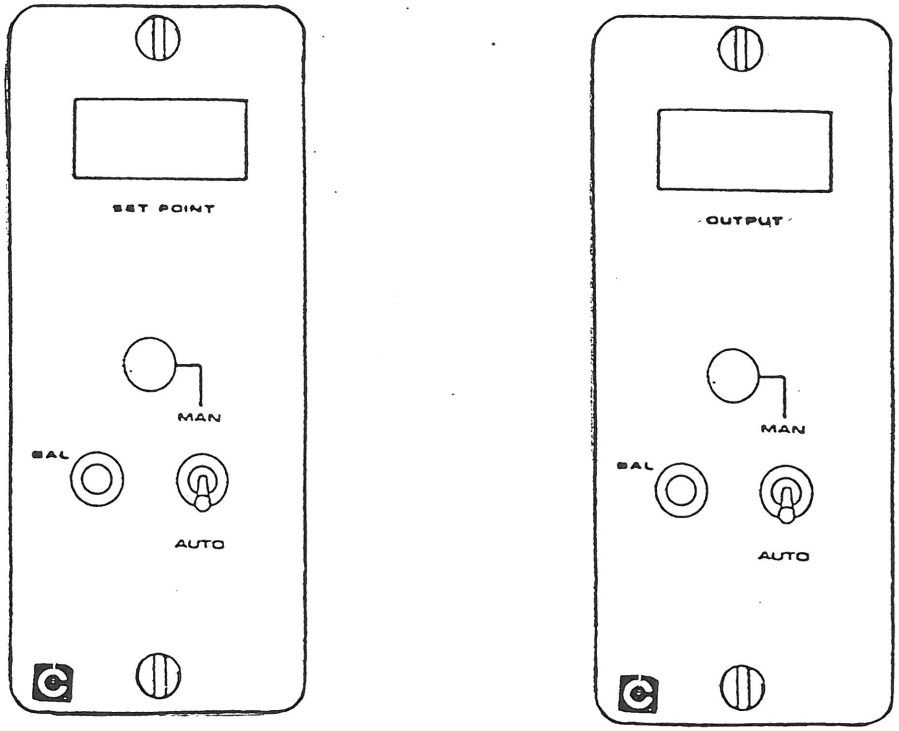
MOUNTING SURFACE CUT-OUT



DIMENSIONS — INSTALLATION

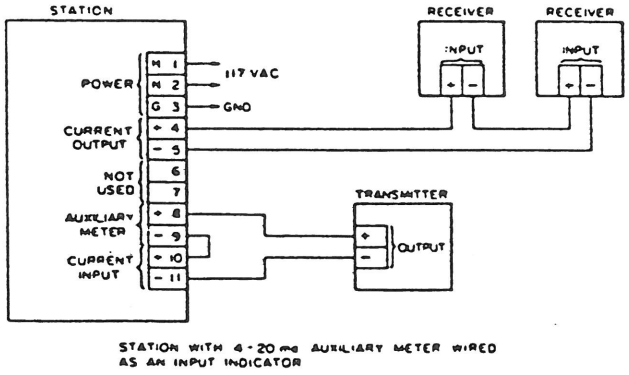
FIGURE 1

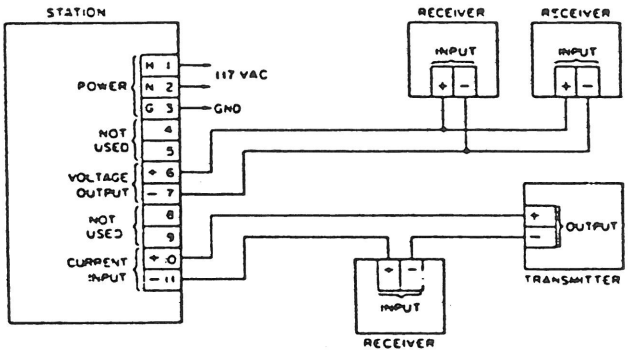
CLEVELAND MANUAL/AUTO STATIONS
BASIC FUNCTION
SERIES 7000

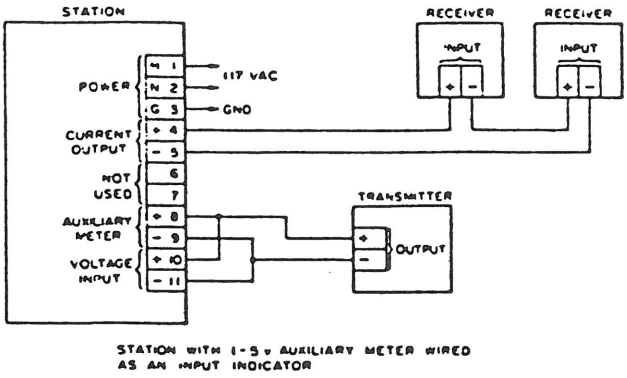


MANUAL/AUTO SET POINT STATION — FRONT PANELS — MANUAL/AUTO BASIC STATION

FIGURE 2

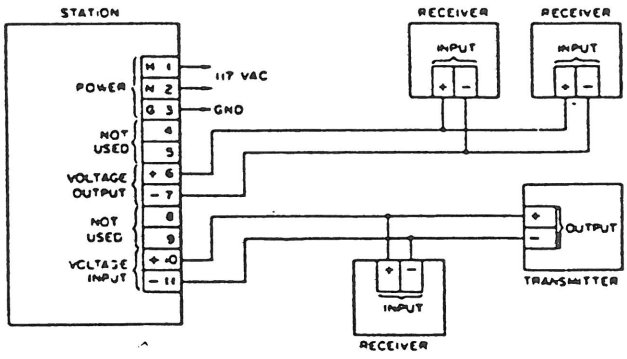






FIELD WIRING
CURRENT OUTPUT STATIONS

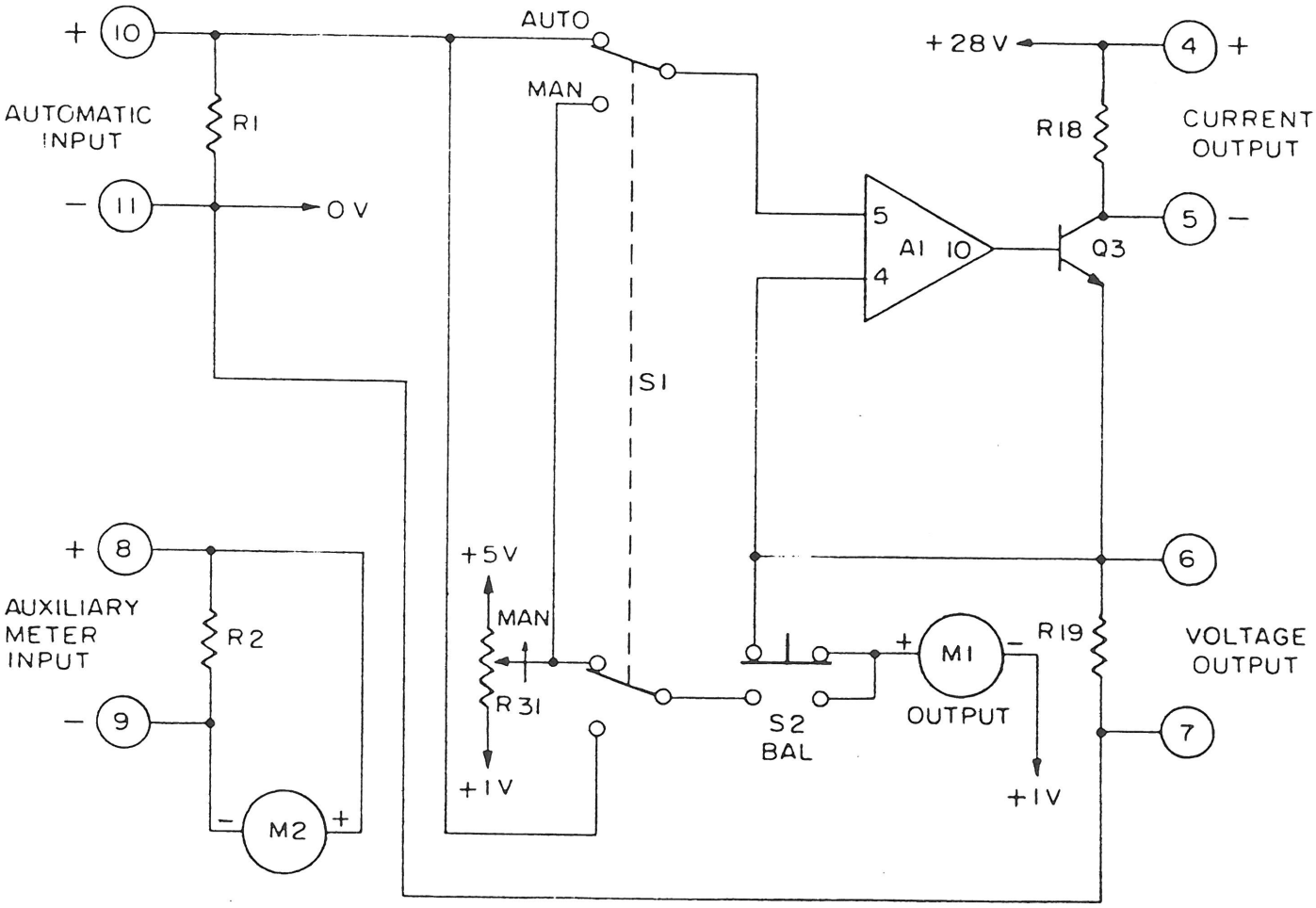
FIGURE 3



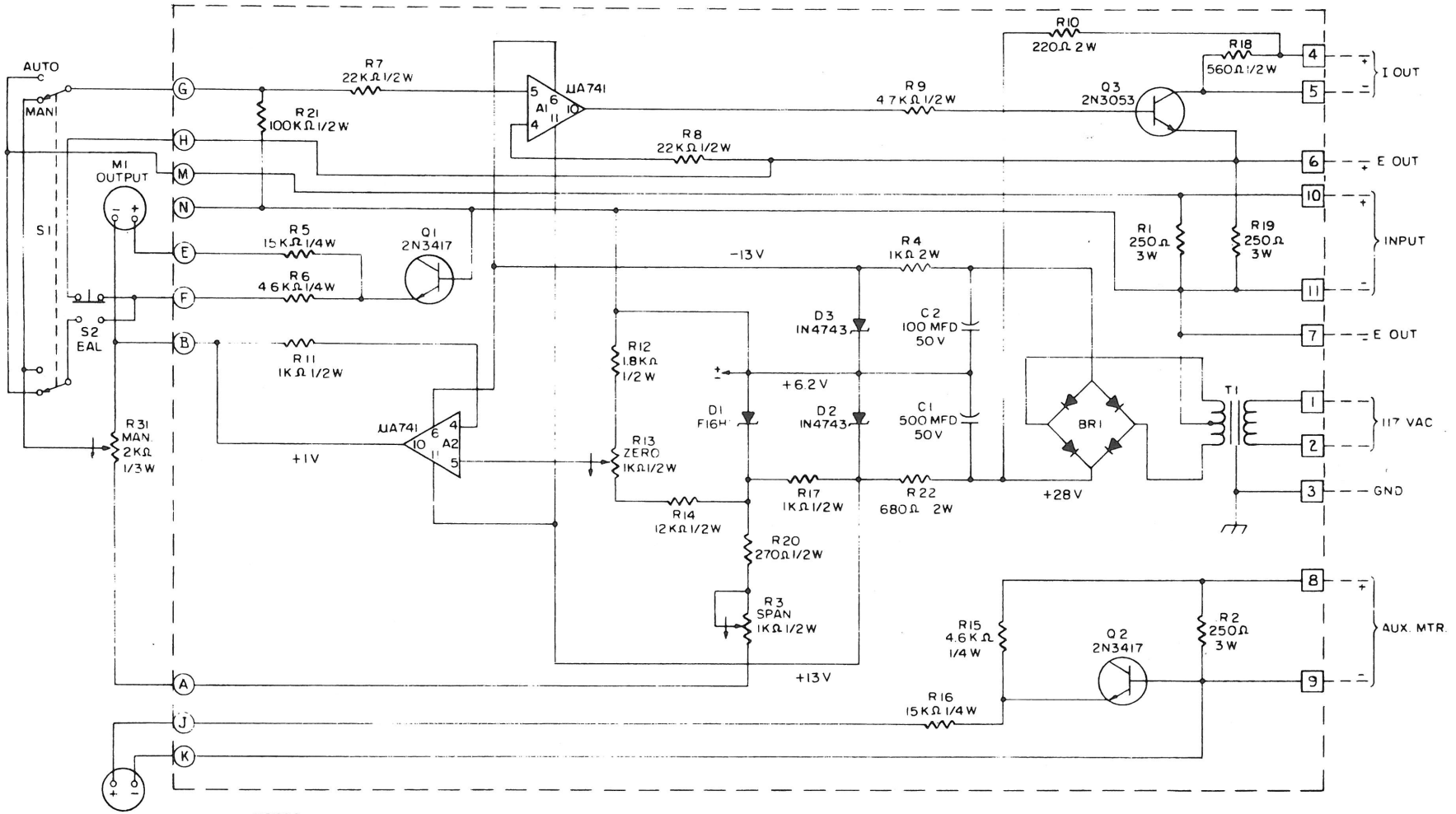
FIELD WIRING
VOLTAGE OUTPUT STATIONS

FIGURE 4

CLEVELAND MANUAL/AUTO STATIONS
BASIC FUNCTION
SERIES 7000



SIMPLIFIED SCHEMATIC



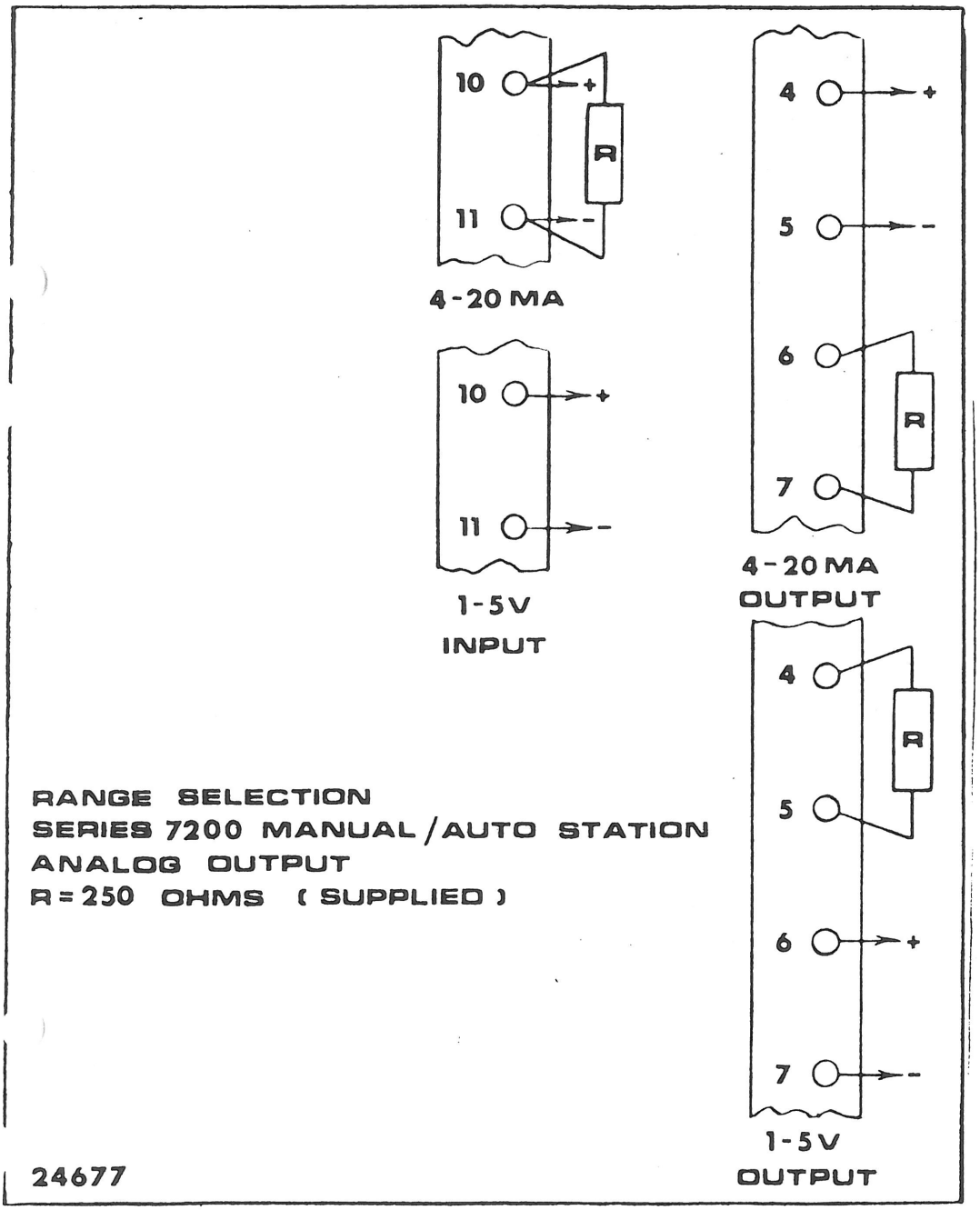
NOTES:
1. ALL VOLTAGES MEASURED FROM COMMON (±).
2. R1-2 USED ONLY FOR 4-20 MA INPUT.
3. R19 USED ONLY FOR 4-20 MA OUTPUT
   R18 NOT USED.
4. R18 USED ONLY FOR 1-5 V OUTPUT
   R19 NOT USED.
5. M1 & M2 PLUS ASSOCIATED COMPONENTS ARE OPTIONAL.

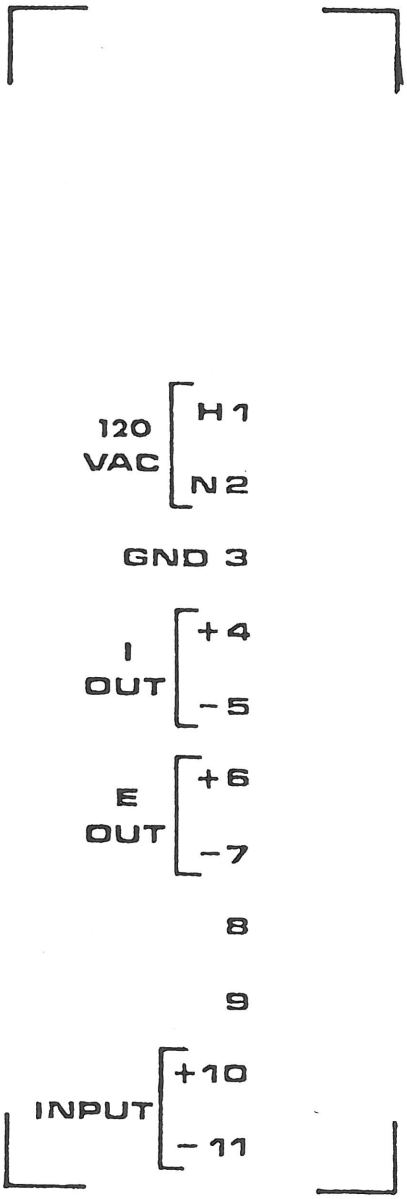
COMPLETE SCHEMATIC

FIGURE 6

CLEVELAND CONTROLS, INC.
CLEVELAND MANUAL/AUTO STATIONS
BASIC FUNCTION ANALOG OUTPUT
SERIES 7000
SUPPLEMENT 5.1.78

Effective January 1978 the 7200 Series Manual/Auto Stations terminal strip markers were revised and a programming decal added. The standard stations did not change, only the above items. These stations can be identified by the inclusion of these decals on the chassis. Decals are as shown below.





Terminal Marker Strip

THE STANDARD AVAILABLE STATIONS ARE AS LISTED BELOW

EVERY CONTROL REQUIRES THE USE OF ONE JUMPER ASSEMBLY P/N 22901 PER EACH "R" CALLOUT IN THE "FIELD TERMINALS" COLUMN. R= 250 OHM RESISTOR ASS'Y ACROSS FIELD TERMINALS INDICATED 0 = OPEN CIRCUIT ACROSS FIELD TERMINALS INDICATED.

FIELD PROGRAMMING CHART

Model Number	Sub-Assembly	Instr. Man. No.	Input Range	Output Range	Field Terminals 4-5	6-7	8-9	10-11
7211-110-00	23170	7216.0X	4-20 MA	4-20 MA	O	R	O	R
7211-120-00	23170	7216.0X	4-20 MA	1-5 V	R	O	O	R
7211-210-00	23170	7216.0X	1-5 V	4-20 MA	O	R	O	O
7211-220-00	23170	7216.0X	1-5 V	1-5 V	R	O	O	O
7261-110-00	23183	7246.0X	4-20 MA	4-20 MA	O	R	O	R
7261-120-00	23183	7246.0X	4-20 MA	1-5 V	R	O	O	R
7261-210-00	23183	7246.0X	1-5 V	4-20 MA	O	R	O	O
7261-220-00	23183	7246.0X	1-5 V	1-5 V	R	O	O	O
7271-110-00	23183	7246.0X	4-20 MA	4-20 MA	O	R	O	R
7271-120-00	23183	7246.0X	4-20 MA	1-5 V	R	O	O	R
7271-210-00	23183	7246.0X	1-5 V	4-20 MA	O	R	O	O
7271-220-00	23183	7246.0X	1-5 V	1-5 V	R	O	O	O

9/1/89

Cleveland Manual/Auto Stations
Switched Output Function
Series 7200

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 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).

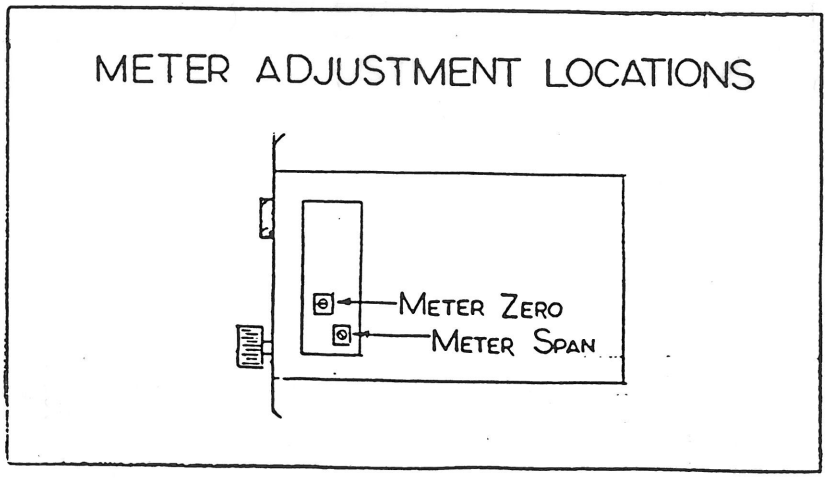
3) Set the meter "zero" potentiometer so that the digital meter reads "00".

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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Visit us on the WEB!

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.

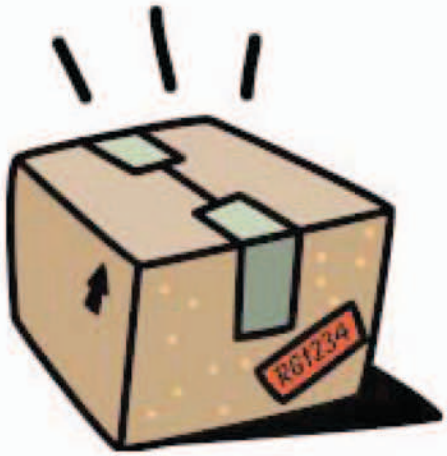
3. Name and telephone number of the person to contact if there are questions about the unit.
4. Indicate whether warranty or non-warranty service is requested.
5. Attach Purchase Order for all out-of-warranty repairs.
6. Complete shipping instructions for the return of the repaired instrument.
7. Original 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.

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