INSTALLATION AND SERVICE INSTRUCTION
MODEL 372 INDICATOR STATION

MOORE PRODUCTS CO., Spring House, PA 19477
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1.4 SPECIFICATIONS

1.4.1 MECHANICAL

DIMENSIONS
Panel Cutout ........................................ See Figure 2-1
Indicator ........................................... See Figure 2-2
MOUNTING ........................................... Single Station or row mounting

1.4.2 ELECTRICAL

POWER REQUIREMENTS
A — Standard ........................................ 120 Vac (+10%, -15%) 47 to 63 Hz
B — Optional ......................................... 24 Vac (+10%, -15%) 47 to 63 Hz
C — Optional ......................................... 24 Vdc (+20%, -15%)
E — Optional ......................................... 220/240 Vac (+10%, -15%) 47 to 63 Hz

POWER CONSUMPTION ................................ 13 Watts, maximum

TWO-WIRE TRANSMITTER POWER ................. +26 Vdc (± 7.5%); 45mA maximum, short circuit protected

INPUTS
Input Range .......................................... 0 to 6 Vdc
Standard Calibration .............................. 1 to 5 Vdc
Input Type ........................................... Single ended
Input Filter .......................................... 1Hz breakpoint frequency
Input Impedance .................................... >1 Megohm
Calibration Accuracy .............................. <±2% of span
Maximum Continuous Input ........................ ± 30 Vdc

1.4.3 ENVIRONMENTAL

IEC LOCATION CLASSIFICATION .................... B (IEC 654-1)

OPERATING TEMPERATURE LIMITS .................. 0°C to +50°C (+32°F to +122°F)
See section 2.2 for forced air statement.

OPERATING HUMIDITY AND MAXIMUM
MOISTURE CONTENT .................................. 5 to 95% RH; 0.028 pounds water/pound dry air

TRANSPORTATION AND STORAGE
TEMPERATURE LIMITS .............................. -40°C to +85°C (-40°F to +185°F)

TRANSPORTATION AND STORAGE
HUMIDITY LIMITS .................................. 0 to 100% RH, Non-Condensing

1.4.4 ELECTRICAL CLASSIFICATION

FOR INSTALLATION IN .............................. Class I, Division 2, Groups A, B, C and D areas
1.0 INTRODUCTION

1.1 DOCUMENTATION

This Instruction, the Installation and Service Instruction, Model 372 Indicator is divided into four sections:

Section 1 - INTRODUCTION  
Section 2 - INSTALLATION  
Section 3 - CIRCUIT DESCRIPTION  
Section 4 - MAINTENANCE

Section 1, INTRODUCTION, gives general information pertaining to product description, model designation, and specifications. Section 2, INSTALLATION provides general installation considerations, mounting and wiring guidelines, and specific mounting procedures. Section 3, CIRCUIT DESCRIPTION, supplies a block diagram level description of the Main Board and the Display Assembly. Section 4, MAINTENANCE, furnishes preventive maintenance guidelines, troubleshooting, and subassembly replacement procedures. A Parts List is at the end of this section.

IMPORTANT

Save this Instruction and make it available for installation and maintenance of the indicator.

1.2 PRODUCT DESCRIPTION

1.2.1 GENERAL

The Model 372 Indicator is a 1 to 5 Vdc receiver which displays two process variables. It is compatible in appearance and identical in mounting to the MYCRO 352 Single Loop Digital Controller. Front panel dimensions conform to DIN standards. The Display Assembly contains two LED bargraphs for process variable indication. The Main Board contains the circuitry for input signal processing and also provides a 26 Vdc transmitter supply. All user connections are made to screw terminals located on the rear of the case.

The Indicator can be converted in the field into a MYCRO 352 Single Loop Digital Controller (SLDC). Twenty screw terminals for electrical connections are standard and will accommodate the Model 372 Indicator or a Model 352B SLDC. Forty screw terminals can be ordered for future conversion to a Model 352E SLDC.

1.3 MODEL DESIGNATION

Sample Model Number

<table>
<thead>
<tr>
<th>Model Series</th>
<th>Power Requirement</th>
<th>Rear Connections</th>
<th>Display Type</th>
<th>Reserved For Factory Use</th>
<th>Electrical Approval</th>
</tr>
</thead>
</table>
| 372 A 1 1 N N | A — 120 Vac (+10%, -15%) 47 to 63 Hz  
B — 24 Vac (+10%, -15%) 47 to 63 Hz  
C — 24 Vdc (+20%, -15%)  
E — 220/240 Vac (+10%, -15%) 47 to 63 Hz | 1 — 20 Screw Terminals  
2 — 40 Screw Terminals | 1 — Dual Bargraph, 64 segments | N | N — Not Required  
F — FM (Div. 2)  
C — CSA (Div. 2) |
2.0 INSTALLATION

This section provides general information such as installation considerations and mounting and wiring guidelines. It also provides specific information on Indicator mounting and electrical connections.

2.1 INSTALLATION CONSIDERATIONS

The Indicator is intended for flush panel mounting in a vibration-free instrument panel or rack. It is also intended that the Indicator be operated in an indoor or sheltered location. It can be mounted either singly or row mounted in a single panel cutout with other Model 372 Indicators. It can also be row mounted with Model 352 Single Loop Digital Controllers and Model 362 Recorders. Panel cutout dimensions are shown in Figure 2-1 and overall station dimensions are shown in Figure 2-2.

Do not mount the Indicator where direct sunlight can strike the Display Assembly or case. Direct sunlight can make the displays difficult to read and will interfere with heat dissipation.

The Indicator should be mounted either horizontally or with a backward tilt (i.e., the front of the case higher than the rear). If the Indicator is to be mounted with electronic recorders, pneumatic recorders, or pneumatic stations, tilt back restrictions for these units may have a bearing on panel design or layout.

Industrial environments often contain particulate, liquid, and gaseous contaminants. Particulate matter, usually dust and dirt, is abrasive and can cause intermittent contact in connectors associated with circuit subassemblies. A layer of dust on circuit boards will interfere with semiconductor heat dissipation. Liquid and gaseous contaminants can have a corrosive effect on metal, rubber, plastic, and circuit board components. Extended exposure to these contaminants may result in equipment malfunctions.

To reduce contaminant related equipment malfunctions:

1. Identify contaminants and implement methods to reduce their presence.
2. When cleaning equipment and surrounding area, especially the floor, either vacuum away all dust and dirt or use a dampened rag or mop. Sweeping or dry dusting recirculates dust and dirt.
3. Clean or replace all air conditioning filters, room air filters, and equipment filters regularly.
4. Inform all personnel with access to the equipment of the need for cleanliness.

2.2 ENVIRONMENTAL CONSIDERATIONS

Refer to section 1.4.3 for Indicator operating temperature limits and operating humidity and maximum moisture content. Note that the air surrounding all operating indicators must be kept below 50° C (122° F).

CAUTION

Exceeding the specified operating temperature limits can adversely affect performance and may cause damage.

Forced air ventilation should be considered when indicators are mounted in a partially or completely enclosed panel. Figure 2-3 provides guidelines for forced air ventilation. When clean air is present, exhaust fans are often mounted across the top of a panel and louvers formed in the panel bottom. Air is then drawn upward between the station cases. When air contains particulate matter, fans and filters are generally located at the panel bottom and louvers at the top. Filtered air is now forced upward between the station cases. Filters must be changed or cleaned periodically.

Only high quality, quiet running fans should be used. Also, the fans should not generate electrical noise which could interfere with electronic instruments.

Forced air conditioning may be required in very high density panels or consoles. Periodically change or clean air filters.

2.3 MOUNTING GUIDELINES

The following paragraphs provide guidelines and practices for mounting and connecting indicators in a panel or rack.

The panel face should provide a flat and rigid mounting surface. Stiffeners should be welded to the back of the panel if there is a possibility that the panel face will bow. Rear support is recommended where panel cutout density is high, and where panel face distortion may occur. Rear supports can be square stock, angle iron, metal channel, etc. The panel cutout should be square and flat, especially the bottom edge. Uneven cutting of the bottom edge can cause the station case(s) to cock and detract from front panel appearance.

Raceways, conduit, and wiring should not interfere with the removal or accessibility of the instruments, control devices, alarms, and related equipment.
FIGURE 2-1 Panel Cutout Dimensions

NOTE: 15" (381MM) MINIMUM FRONT OF PANEL CLEARANCE REQUIRED FOR BOARD ASSEMBLY REMOVAL

FIGURE 2-2 Indicator Dimensions
GUIDELINES

FAN: PAMOTOR TYPE 4600X SHADED POLE FAN WITH 5501 FINGER GUARD OR EQUIVALENT.

NO. OF FANS: ONE FOR EACH 16 STATIONS OR 3 FT. OF PANEL WIDTH.

AIR INLET: 30 IN² FOR EACH FAN. IF FILTERS ARE USED THEY MUST BE CHANGED PERIODICALLY (INCREASE INLET TO 50 IN²)

PA-0659-1

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FIGURE 2-3 Forced Air Ventilation For Enclosed Panels
2.4 WIRING GUIDELINES

All electrical connections are made to the terminals located at the rear of the Indicator. Rear terminals are shown in Figure 2-4 and their assignments in Table 2.1. Figure 2-5 shows typical input connections. The recommended wire size for signal wiring is 18 gauge (AWG); power wiring 14 gauge (AWG). The terminals have #6 screws and pressure plates.

**WARNING**

Remove power from all involved wires and terminals to eliminate electrical shock hazard.

All wiring must conform to the National Electrical Code and local codes. DC wiring should be separated from AC wiring, and away from AC powered pushbuttons, alarms, annunciators, motors, solenoids, and similar devices. Metallic and non-metallic raceway and conduit are commonly used for routing panel wiring. Wiring not installed in raceways or conduit should be clamped or supported approximately every 12 inches.

Indicator power input is dependent upon model designation. Before wiring, verify power input. See section 1.3 and Indicator nameplate label.

Signal inputs to the Indicator must be a voltage. When a current input (e.g., 4 to 20mA) is to be applied to the Indicator, a precision range resistor must be placed across the input terminals. A range resistor may not be required if the input is wired in parallel with other 1 to 5 Vdc receiving instruments. Refer to loop diagrams and determine if a range resistor is required. Supplied range resistors are 250 ohms for 4 to 20mA inputs.

**IMPORTANT**

Rear terminals must be tightened to ensure electrical connection. A loose screw can produce an open or intermittent connection.

### TABLE 2.1 Rear Terminal Assignments

This table lists rear terminal designations, assignments, and comments. Specifications are contained in section 1.4. Note that terminal columns C and D are optional and if present will be used only if an Indicator is converted to a Model 352E SLDC (see SD352).

<table>
<thead>
<tr>
<th>REAR TERMINAL</th>
<th>TERMINAL ASSIGNMENT</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER INPUT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AH</td>
<td>HOT</td>
<td>AC Hot or DC (+)</td>
</tr>
<tr>
<td>AN</td>
<td>NEUTRAL</td>
<td>AC Neutral or DC (-)</td>
</tr>
<tr>
<td>AG</td>
<td>GROUND</td>
<td>Case Ground</td>
</tr>
<tr>
<td>ANALOG INPUTS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A4</td>
<td>A11+</td>
<td>Each analog input is connected between an A1(#)+ terminal and an A1C- terminal. All analog inputs must be 1 to 5 Vdc. For mA inputs, a range resistor must be connected across the analog input terminals. This precision (0.1%) resistor should be metal film, 1/2W. Supplied range resistors are 250 ohms: quantity 2. A11 + = Left Bar; A12 + = Right Bar.</td>
</tr>
<tr>
<td>A5</td>
<td>A1C-</td>
<td></td>
</tr>
<tr>
<td>A6</td>
<td>A12+</td>
<td></td>
</tr>
<tr>
<td>A8</td>
<td>A1C-</td>
<td></td>
</tr>
<tr>
<td>TWO-WIRE TRANSMITTER POWER</td>
<td>+26V</td>
<td>Supply to power two process transmitters; 26 Vdc (±7.5%) @ 45mA maximum, referenced to A1C-.</td>
</tr>
<tr>
<td>NO CONNECTION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A7</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>A9</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>A10</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>B1</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>B2</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>B3</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>B4</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>B6</td>
<td>—</td>
<td>Do not connect wires to these terminals.</td>
</tr>
<tr>
<td>B7</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>B8</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>B9</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>B10</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>C1 Through D10</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>
FIGURE 2-4 Rear Terminals

PA-0835-1

REAR TERMINALS

4 TO 20 MADC TWO-WIRE TRANSMITTER

(+)

B5

+25 VDC TRANSMITTER SUPPLY

(−)

A4 OR A6

A4 = LEFT BAR INPUT (+)
A6 = RIGHT BAR INPUT (+)

A5 OR A6

A5 = INPUT COMMON (−)
A8 = INPUT COMMON (−)

RANGE RESISTOR —
SEE NOTE

4 TO 20 MADC SIGNAL SOURCE

(+)

A4 OR A6

A4 = LEFT BAR INPUT (+)
A6 = RIGHT BAR INPUT (+)

A5 OR A6

A5 = INPUT COMMON (−)
A8 = INPUT COMMON (−)

RANGE RESISTOR —
SEE NOTE

NOTE:
INDICATOR REQUIRES 1 TO 5 VDC INPUTS. FOR MILLIAMPS (MADC) INPUTS, A RANGE RESISTOR MUST BE CONNECTED AS SHOWN.
A PRECISION (0.1%) RESISTOR SHOULD BE METAL FILM, 1/2W AS FOLLOWS.

MADC INPUT | RANGE RESISTOR
-------------|----------------|
1 TO 5      | 1000 OHMS
4 TO 20     | 250 OHMS
10 TO 50    | 100 OHMS

FIGURE 2-5 Typical Input Connections

2-5
2.5 STATION MOUNTING

This section provides procedures for single station mounting and multiple station row mounting of the Indicator. Procedures are also given for handling and installation of the Main Board since some shipments are made with it removed and packaged separate from the case.

IMPORTANT
The board retainer, shown in Figure 2-6, must be in place whenever the Main Board is installed in the case.

2.5.1 SINGLE STATION MOUNTING

Single station mounting consists of mounting one indicator in a single panel cutout.

1. Loosen and remove mounting brackets. See Figure 2-2.
2. Insert Indicator into panel cutout.
3. Install and partially tighten mounting brackets.
4. Square Indicator with panel.
5. Square mounting brackets with panel.
6. Alternately tighten mounting brackets until Indicator is secured to panel. Do not over tighten.

2.5.2 MULTIPLE STATION ROW MOUNTING

Multiple station row mounting consists of grouping a number of Indicators side by side within a single panel cutout.

1. Loosen and remove mounting brackets from all indicators. See Figure 2-2.
2. Insert an end of row indicator into panel cutout; install and partially tighten mounting brackets.
3. Insert remaining indicators into panel cutout; install and partially tighten mounting brackets.
4. Square and space the Indicators in cutout.
5. Alternately tighten mounting brackets on each Indicator until all are secured to panel. Do not over tighten.

2.5.3 MAIN BOARD

Since the Main Board contains integrated circuits which can be damaged by electrostatic discharge, special handling is required. Handling guidelines and installation procedures are provided in the following sections.

2.5.3.1 Handling Guidelines

1. The Main Board may be shipped in a static shielding bag. If so, keep it in its bag until time of installation.
2. A grounding wrist strap must be used when handling the Board.
   Moore Products Co. part numbers for a Grounding Wrist Strap and Mat Kit and Static Shielding Bags are given in the Maintenance section of this Instruction.
3. Apply equal force to the top and the bottom of the Main Board to keep it from cocking during installation in the case.

2.5.3.2 Installation

1. Remove Display Assembly (if installed) by loosening captive screw behind ID plate.
2. Remove board retainer, if installed.
3. Snap grounding wrist strap around wrist and attach ground clip where shown in Figure 2-6.
4. Remove Main Board from static shielding bag and insert Board into card guides.
5. Push on top and bottom of Board with equal force to slide Board into case.
6. Install board retainer as shown in Figure 2-6.
7. Connect Main Board ribbon cable to Display Assembly.
8. Detach ground clip from case.
10. Secure Display Assembly by tightening captive screw behind ID plate.
3.0 CIRCUIT DESCRIPTION

The indicator consists of a case with screw terminals on the rear plate, a Main Board with a power converter and signal processing circuits, and a Display Assembly to provide indication of the relative amplitude of two analog inputs on left and right LED bargraph arrays. Each bargraph array has 64 LEDs.

The indicator is factory calibrated for 1.0 to 5.0 Vdc inputs and a 0 to 100% indication on the bargraph arrays.

A two paragraph summary describing the operation of the indicator follows. Refer to Figure 3-1. When power is applied to an indicator with no analog inputs, both LED 1's will be lighted. These "reset" LEDs function as "keep alive" indicators to signify proper power converter operation and on-board power-up of the digital circuitry. The oscillator, anode and cathode counters, and the cathode scanner and drivers are activated and all bargraph LED array cathodes are scanned (i.e., receive successive application of cathode potential). The left and right anode scanners and drivers for LEDs 2 through 64 are inactive; therefore, these LEDs are dark.

When an analog input between 1.0 and 5.0 Vdc is applied, the anode scanning process is enabled permitting the application of anode driver potentials to the appropriate LEDs. The number of lighted LEDs will be proportional to the amplitude of the input signal.

---

**FIGURE 3-1 Simplified Functional Block Diagram**
3.1 DISPLAY BOARD

Figure 3-2 is a schematic of a Display Assembly bargraph. The schematic indicates that a bargraph contains 8 LED arrays, each with a common cathode connection. Each LED array contains 8 LEDs with an individual anode connection. Note the parallel connection of LED anodes shown in Figure 3-2.

When an Indicator is powered and receiving, for example, a 3 Vdc analog input, LED 1 is lighted and one cycle of the scanning sequence will be as follows:

- Cathode scanning voltage is applied to cathode 1, anodes 2 through 8 are scanned, and LEDs 2 through 8 are lighted one at a time.
- Voltage is removed from cathode 1 and applied to cathode 2, anodes 1 through 8 are scanned, and LEDs 9 through 16 are lighted one at a time.
- Voltage is removed from cathode 2 and applied to cathode 3, anodes 1 through 8 are scanned, and LEDs 17 through 24 are lighted one at a time.
- Voltage is removed from cathode 3 and applied to cathode 4, anodes 1 through 8 are scanned, and LEDs 25 through 32 are lighted one at a time.

Since LEDs 1 through 32 represent 3 Vdc (50% of span and 50% of LEDs), no additional LEDs are to be lighted and the anode scanning is stopped. LED flicker is eliminated by the very fast scanning frequency so LED's 1 through 32 appear to be on continuously. When one scan cycle is completed, the digital circuits are reset and another cycle is started.

---

**FIGURE 3-2 Bargraph Schematic, Display Assembly**
3.2 MAIN BOARD

The functional block diagram in Figure 3-1 shows that the Main Board consists of a circuit board which contains the principle electronic components of the Indicator. These include both analog and digital circuits and a power converter which varies according to the model selected. Refer to section 1.3 for the input voltages for various model numbers. A physical layout of the Main Board is shown in Figure 3-3.

The standard power converter is designed for a 120 Vac, single-phase input with outputs of 12V (+V) and -0.7V (-V), 6.9V (+VR), and 12V (+VD). A regulated +26V supply, referenced to common, is available at output terminal B5 for powering one or two, 2-wire transmitters. Factory-soldered jumpers W1 and W2 prepare the input circuitry to accept the required power in accordance with the model number. See Figure 3-3 for jumper location.

The oscillator functions as a free-running oscillator generating a squarewave output at approximately 30kHz for synchronizing the counters and modulators. The oscillator's output signal provides the clock input to the anode counter. The counter is a binary divide-by-sixteen up-counter with a three bit output applied to and decoded by both anode scanners and drivers. A "Carry Output" (C.O.) signal, generated at the termination of the count sequence, clocks the cathode counter through its sequence.

The cathode counter is a binary divide-by-eight up-counter with the lowest three output bits applied to and decoded by the cathode scanner and drivers. The counter's eighth count provides a "Reset" signal from its Q4 output for the modulators and the anode counter. This initiates a repetition of the entire count sequence.

As long as power is supplied, the cathode scanner and drivers are enabled and the cathode counter's output is decoded to drive the LED cathodes; however, the anode scanner and drivers are enabled only when a voltage between 1.0 and 5.0V is present at an input terminal.

A modulator accepts an analog input signal from a buffer/amplifier stage and produces an output pulse with a time duration determined by the amplitude of the analog input. This pulse from the modulator enables an anode-scanner and drivers allowing the anode counter's output count sequence to be decoded and drive the appropriate LED anodes.

In summary, the length of time allowed for the count sequence to pass through an anode scanner and drivers is controlled by the pulse width of the modulator output. The greater the amplitude of the analog input, the longer the pulse duration of the output and the higher the count that passes through the anode scanner and drivers.

When the modulator "times out" and disables the anode scanner and drivers, the count continues in both counters until an output pulse from the cathode counter resets both modulators and the anode counter in preparation for another rapid conversion (i.e., transforming the analog input into a varying width digital signal at the output of the modulator).

The scanning of all 64 LEDs from LED 1 to 64 is considered to be one conversion. The reset action from the cathode counter to both modulators and the anode counter allows the analog input to be sampled repeatedly to provide a corresponding bargraph indication.

--- FIGURE 3-3 Typical Main Board, Physical Layout ---
4.0 MAINTENANCE

4.1 PREVENTIVE MAINTENANCE

An effective preventive maintenance program for the Indicator is one which maintains the instrument in operation by preventing the conditions from occurring which could cause an interruption of service. It consists of cleaning, visual inspection, and periodic calibration checks.

4.1.1 CLEANING

The Indicator should be cleaned as often as operating conditions require. Excessive accumulation of dust or dirt on the enclosure prevents efficient heat dissipation and can cause overheating and component breakdown.

Circuit boards should not be cleaned unless accumulated foreign material is causing a problem. The enclosed station design should prevent particulate matter from building up. If cleaning becomes necessary, remove debris with either a soft brush or low velocity deionized air.

The bezel is cleaned with a mild, non-abrasive liquid cleaner and a soft, lint-free cloth - do not use a paper towel.

4.1.2 VISUAL INSPECTION

The Indicator should be checked occasionally for defects such as defective LEDs and loose or open connections at the terminal screws on the rear panel.

Also, look for damaged circuitry and heat stressed parts. Check for excessive dirt or dust build-up which may impede air flow and inhibit proper heat dissipation.

4.1.3 CALIBRATION CHECK

To ensure instrument accuracy, check the calibration at 6 month intervals or as required by the plant maintenance schedule. Disconnect analog inputs and connect 1.0 to 5.0 Vdc variable input. (Use power supply or electronic calibrator with an accuracy of 1.0% or better). Verify that 1.0 Vdc provides an indication of 0% and 5.0 Vdc an indication of 100%.

If the Indicator fails the calibration check, return the Main Board to the factory for calibration.

4.2 TROUBLESHOOTING

The following system troubleshooting procedures and guidelines will isolate, in most cases, the trouble to the board level. Board substitution is the recommended maintenance procedure. Faulty boards should be returned to the factory for repair.

Table 4-1 provides symptom versus possible failure versus remedial action information to assist in isolating a problem. The following steps outline a checkout procedure for the Indicator.

1. Apply AC input power and connect a DC voltmeter between B5 (+26V) and A5 or A8 (common) to measure DC voltage to 2-wire transmitter. The presence of

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>POSSIBLE FAILURE</th>
<th>REMEDIAL ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Both left and right bargraphs dark, LED 1's dark. 2-wire transmitters off-line.</td>
<td>AC power input lost.</td>
<td>Restore AC power input.</td>
</tr>
<tr>
<td></td>
<td>Blown fuse F1</td>
<td>Replace F1; see Figure 3-2.</td>
</tr>
<tr>
<td></td>
<td>Connection to Display Board loose or disconnected.</td>
<td>Check connection to Display Board.</td>
</tr>
<tr>
<td></td>
<td>Main Board not seated properly.</td>
<td>Seat Main Board in rear plate connector.</td>
</tr>
<tr>
<td></td>
<td>Main Board failure.</td>
<td>Replace Main Board.</td>
</tr>
<tr>
<td>Either left or right bargraph dark, except LED 1. Other bargraph indicating normally.</td>
<td>Analog input failure to one channel.</td>
<td>Check external wiring and signal source.</td>
</tr>
<tr>
<td></td>
<td>Main Board failure.</td>
<td>Replace Main Board.</td>
</tr>
<tr>
<td>No process signal indication on either bargraph. LED 1 lighted on both bargraphs. Analog inputs present at both terminals.</td>
<td>Main Board failure in circuitry common to both channels.</td>
<td>Replace Main Board.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Individual LEDs in bargraph defective.</td>
<td>Replace Display Board.</td>
</tr>
<tr>
<td>Item</td>
<td>Part No.</td>
<td>Description</td>
</tr>
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<td>Display (Incl. Items 2-9)</td>
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<td>Captive Screw</td>
</tr>
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<td>* 7</td>
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<td>Spring</td>
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<td>8</td>
<td>15738-88</td>
<td>I.D. Card</td>
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<td>15739-57</td>
<td>Cover</td>
</tr>
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<td>*10a</td>
<td>15821-1</td>
<td>Indicator Main Board (120 Vac)</td>
</tr>
<tr>
<td>*10b</td>
<td>15821-11</td>
<td>Indicator Main Board (24 Vac)</td>
</tr>
<tr>
<td>*10c</td>
<td>15821-21</td>
<td>Indicator Main Board (24 Vdc)</td>
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<tr>
<td>*10d</td>
<td>15821-31</td>
<td>Indicator Main Board (220-240 Vac)</td>
</tr>
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<td>*11a</td>
<td>7447-52</td>
<td>Fuse, 1.25A, 250V, &quot;SL0 BLO&quot;</td>
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<tr>
<td>*11b</td>
<td>7447-53</td>
<td>Fuse, 1.25A, 250V, &quot;SL0 BLO&quot;</td>
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<td>*12</td>
<td>15738-59</td>
<td>Card Guide</td>
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<td>Board Retrainer (Incl. Items 24, 25 &amp; 26)</td>
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<td>Case - 40 Terminal - 120 Vac (Incl. Items 12, 14J, 15, 18-23a, 23b, 27-29)</td>
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<td>14b</td>
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<td>Case - 40 Terminal - 24 Vdc (Incl. Items 12, 14J, 15, 18, 19, 21-23a, 27-29)</td>
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<td>14d</td>
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<td>Case - 20 Terminal - 120 Vac (Incl. Items 14J, 15, 18-21, 23b, 27-29)</td>
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<td>Case - 20 Terminal - 24 Vdc (Incl. Items 12, 14J, 15, 18, 19, 21-23a, 27-29)</td>
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<td>Case - 20 Terminal - 24 Vac (Incl. Items 12, 14J, 15, 18, 19, 21-23a, 27-29)</td>
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<td>Case - 20 Terminal - 220/240 Vac (Incl. Items 12, 14J, 15, 18-21, 23b, 27-29)</td>
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<td>15738-49</td>
<td>Mounting Bracket (Incl. Items 16 &amp; 17)</td>
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<td>12740-253</td>
<td>Screw</td>
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<td>12740-262</td>
<td>Alignment Screw (20 Terminal)</td>
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<td>(40 Terminal)</td>
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<tr>
<td>19</td>
<td>7418-341</td>
<td>Cover Plate (20 Terminal)</td>
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<td>19</td>
<td>7418-339</td>
<td>(40 Terminal)</td>
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<td>Power Terminal Cover</td>
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<td>Receptacle (20 Terminal)</td>
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<td>15738-61</td>
<td>(40 Terminal Only)</td>
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<td>23a</td>
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<td>Rear Plate (40 Terminal)</td>
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<td>23b</td>
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<td>Rear Plate (20 Terminal)</td>
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<td>3175-149</td>
<td>Captive Screw</td>
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<td>15738-240</td>
<td>Washer</td>
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<td>Trench Ring</td>
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<td>Flu Screw 4-20</td>
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<td>29</td>
<td>3175-146</td>
<td>Coated Screw</td>
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</table>

* Recommended On-Hand Spare Parts. Always Specify Range, Serial No. or Other Nameplate Information When Ordering Spare Parts.
INSTRUCTION INVOLVED
SD372, Model 372 Indicator Station Installation And Service Instruction, issue 2

SUBJECT
Wiring Guidelines

DISCUSSION
This addendum provides additional information concerning the wiring of the case rear terminals. The material in this addendum supplements that in section 2.4 Wiring Guidelines.

- The terminals at the rear of the case contain #6 screws and pressure plates. They are for use with stranded wire or with spring spade tongue or ring tongue crimp-on terminals with insulated barrels.
- Refer to section 2 Installation for wire gauge recommendations. Also, consult the wire vendor and the National Electrical Code for additional recommendations and suggestions when selecting wire.

Some wire selection considerations are:
- Current and voltage to be carried
- Total length of each wire run
- Whether wire will be bundled or run singly
- Indoor or outdoor installation
- Temperature extremes
- Exposure to sunlight
- Vibration
- Types of contaminates

- Strip wire end 1/4" to 5/16" or as recommended by the crimp-on terminal manufacturer.

When stripping stranded wire, do not nick or cut away conductor strands.

- When using crimp-on terminals, use a high quality crimping tool recommended by the terminal manufacturer. Carefully inspect the crimped connection for mechanical strength and stray strands of wire that could short to an adjacent screw terminal; conductor should not be visible outside the crimp-on terminal body.

- Insert the stripped wire end or crimp-on terminal under the pressure plate and tighten the terminal screw; the screw must be tightened for a reliable electrical connection; if a crimp-on terminal is not used, wire insulation should butt against the connector, conductor should not be visible.

**CAUTION**

- Before applying power, carefully inspect and test for the following:

Correct connection to each terminal; each wire should be clearly marked (e.g., color or wire marker)

An exposed conductor or stray wire strand that could be contacted by installation or maintenance personnel, or short to another wire or terminal possibly damaging equipment

Mechanically strong crimp-on connections

Terminal screws are tight ensuring good electrical contact

Wires are properly supported throughout their runs (e.g., clamps, trays).

Service Publications Group
REPAIR INFORMATION

RETURN FOR REPAIR

Remove a failed station from service and proceed as follows to return it to the factory for repair.

TO RETURN EQUIPMENT

- Call the Service Department at (215) 646-7400, ext 4RMA (4762) weekdays between 8:00 a.m. and 4:45 p.m. Eastern Time to obtain an RMA (Return Material Authorization) number. Mark the RMA number prominently on the outside of the shipment.

- When calling for an RMA number, provide the reason for the return. If returning equipment for repair, failure information (e.g., error code, failure symptom, installation environment) will be requested. A purchase order number will also be needed.

MATERIAL SAFETY DATA SHEET

- A Material Safety Data Sheet (MSDS) must be included with each item being returned that was stored or used anywhere hazardous materials were present.

PACKAGING

- Package item in original shipping materials. Otherwise, package it for safe shipment or contact the factory for shipping recommendations.

An electronic module must be placed inside a static shielding bag to protect it from electrostatic discharge.

Moore Products Co. assumes no liability for errors or omissions in this document or for the application and use of information included in this document. The information herein is subject to change without notice.
INTRODUCTION

Cet addendum indique les précautions, relatives aux emplacements dangereux définis par la CSA, que doit prendre l'utilisateur lors de l'installation ou du dépannage de l'appareil décrit dans la notice ci-jointe. Ces directives complètent celles qui sont données dans la notice ci-jointe.

AVERTISSEMENT

Si les précautions suivantes ne sont pas prises, il pourrait résulter un danger d'explosion.

PRÉCAUTIONS

Emplacements dangereux de classe I, division 1 et classe I, division 2:

Les pièces de rechange doivent être autorisées par l'usine. Les substitutions peuvent rendre cet appareil impropre à l'utilisation dans les emplacements dangereux.

Emplacements dangereux de division 2:

Lorsque l'appareil décrit dans la notice ci-jointe est installé sans barrières de sécurité, on doit couper l'alimentation électrique à la source (hors de l'emplacement dangereux) avant d'effectuer les opérations suivantes:

— branchement ou débranchement d'un circuit de puissance, de signalisation ou autre.
— remplacement d'un fusible, d'une carte de circuit imprimé ou de tout autre élément connecté au circuit électrique.

Ceci termine la section Précautions.
INTRODUCTION

This addendum provides CSA hazardous location precautions that should be observed by the user when installing or servicing the equipment described in the accompanying Instruction. These statements supplement those given in the accompanying Instruction.

WARNING

Failure to observe the following precautions could result in an explosion hazard.

PRECAUTIONS

For Class I, Division 1 and Class I, Division 2 hazardous locations:
— Use only factory authorized replacement parts. Substitution of components can impair the suitability of this equipment for hazardous locations.

For Division 2 hazardous locations:
When the equipment described in the accompanying Instruction is installed without safety barriers, the following precautions should be observed. Switch off electrical power at its source (in non-hazardous location) before:
— Connecting or disconnecting power, signal, or other wiring
— Replacing a fuse, circuit board, or any other component connected to the electrical circuit.

This completes the precautions.

Service Publications Group
SUPPORT, REPAIR, AND WARRANTY INFORMATION

PRODUCT SUPPORT
Product support can be obtained from the Moore Products Co. Technical Information Center (TIC). TIC is a customer service center that provides direct phone support on technical issues related to the functionality, application, and integration of all products supplied by Moore Products Co.

To contact TIC for support, either call 215-646-7400, extension 4TIC (4842) or leave a message in the bulletin board service (BBS) by calling 215-283-4968. The following information should be at hand when contacting TIC for support:

- Caller ID number, or name and company name

When calling for support for the first time, a personal caller number is assigned. This number is mailed in the form of a caller card. Having the number available when calling for support will allow the TIC representative taking the call to use the central customer database to quickly identify the caller's location and past support needs.

- Product part number or model number and software title and version

- If there is a problem with a product's operation:
  - Is the problem intermittent or constant?
  - What steps were performed before the problem occurred?
  - What steps have been performed since the problem occurred?
  - What symptoms accompany the problem? Is an error message displayed?
  - What is the installation environment? For example:
    - type of plant and process, involved loop, control strategy, and related equipment.
    - workstation or personal computer manufacturer and model, amount of memory, and operating system.

For product support outside of North America, contact your nearest Moore Products Co. subsidiary. Subsidiary addresses and telephone and FAX numbers can be found at www.mooreproducts.com.

RETURN FOR REPAIR
Remove a failed instrument from service and proceed as follows to return it to the factory for repair.

TO RETURN EQUIPMENT

- Call Moore Products Co. at (215) 646-7400, ext. 4RMA (4762) weekdays between 8:00 a.m. and 4:45 p.m. Eastern Time or outside of North America go to www.mooreproducts.com for the address and telephone and FAX numbers of your nearest Moore Products Co. subsidiary. Ask for an RMA (Return Material Authorization) number and be sure to mark the RMA number prominently on the outside of the shipment.

MOORE PRODUCTS CO., Spring House, PA 19477-0900
An ISO 9001 registered company.
When calling for an RMA number, provide the reason for the return. If returning equipment for repair, failure information (e.g., error code, failure symptom, installation environment) will be requested. A purchase order number will also be needed.

MATERIAL SAFETY DATA SHEET

- A Material Safety Data Sheet (MSDS) must be included with each item being returned that was stored or used anywhere hazardous materials were present.

PACKAGING

- Package assembly in original shipping materials. Otherwise, package it for safe shipment or contact the factory for shipping recommendations.

An electronic module must be placed inside a static shielding bag to protect it from electrostatic discharge.

WARRANTY

The Company warrants all equipment manufactured by it and bearing its nameplate, and all repairs made by it, to be free from defects in material and workmanship under normal use and service. If any part of the equipment herein described, and sold by the Company, proves to be defective in material or workmanship and if such part is within twelve months from date of shipment from the Company's factory, returned to such factory, transportation charges prepaid, and if the same is found by the Company to be defective in material or workmanship, it will be replaced or repaired, free of charge, f.o.b. company's factory. The Company assumes no liability for the consequence of its use or misuse by Purchaser, his employees or others. A defect in the meaning of this warranty in any part of said equipment shall not, when such part is capable of being renewed, repaired or replaced, operate to condemn such equipment. This warranty is expressly in lieu of all other warranties, guaranties, obligations, or liabilities, expressed or implied by the Company or its representatives. All statutory or implied warranties other than title, are hereby expressly negated and excluded.

Warranty repair or replacement requires the equipment to be returned to one of the following addresses.

1. **Equipment manufactured or sold by MOORE PRODUCTS CO.**

   MOORE PRODUCTS CO.
   Sunnyside Pike
   Spring House, PA 19477 USA

2. **Equipment manufactured or sold by MOORE PRODUCTS CO. (CANADA) INC.**

   MOORE PRODUCTS CO. (CANADA) INC.
   2KM West of Mississauga Rd. Hwy 7
   Brampton, Ontario Canada

3. **Equipment manufactured or sold by MOORE PRODUCTS CO. (U.K.) LTD**

   MOORE PRODUCTS CO. (U.K.) LTD
   Copse Road,
   Lufton, Yeovil,
   Somerset, BA22 8RN England

Warranty will be null and void if repair is attempted without authorization by Moore Products Co.

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