

720 Series II pH & ORP MONITOR/CONTROLLER Operation Manual

16 November 17

INSTALLATION • OPERATION • MAINTENANCE

pH Models: 721II, 722II, 723II & 724II

ORP Models: 726II, 727II, 728II & 729II

ACCURACY • RELIABILITY • SIMPLICITY

MYRON L[®]
COMPANY
Water Quality Instrumentation
Accuracy • Reliability • Simplicity

720 Series II MONITOR/CONTROLLER QUICK REFERENCE GUIDE!

If you read nothing else in this manual please read this Quick Reference Guide.

PLEASE READ and COMPREHEND ALL WARNINGS, CAUTIONS and ADVISEMENTS CONTAINED WITHIN THIS MANUAL.

Failure to comply is beyond the responsibility of the Myron L® Company.

WARNING: ALL MONITOR/CONTROLLERS ARE FACTORY SET TO OPERATE ON 115 VAC. BEFORE APPLYING POWER ENSURE THE INPUT POWER "115/230 VAC" SELECTION IS CORRECT FOR YOUR REQUIREMENTS. FAILURE TO DO SO IS BEYOND THE RESPONSIBILITY OF THE Myron L® Company. See section II.E.2. and figure II.E.1.

WARNING: ENSURE POWER IS OFF WHILE INSTALLING ELECTRICAL EQUIPMENT. IF MONITOR/CONTROLLER IS INSTALLED, ENSURE THE POWER IS OFF BEFORE SERVICING. FAILURE TO DO SO COULD CAUSE DAMAGE TO THE INSTRUMENT, AND COULD BE HARMFUL OR FATAL TO PERSONNEL. ONLY QUALIFIED PERSONNEL SHOULD INSTALL OR SERVICE ELECTRICAL EQUIPMENT.

WARNING: THE DISPLAY WILL BE IRREPARABLY DAMAGED IF THE DISPLAY HARNESS IS INSTALLED UPSIDE-DOWN OR MISALIGNED. THE HARNESS MUST BE INSTALLED AS SHOWN IN FIGURE II.E.5.

CAUTIONS:

Before installation, ensure you have the correct model (with options), AND it is ranged for your application. See sections I.A., I.B. & I.G.

Do you have the correct sensor? See section I.E.
Mounting requirements. What is needed? See section II.B.

Isolated 24 VDC output is referenced to the 0-10 VDC output. To maintain the isolation, do NOT ground. See section II.B.4.

The following will give the installer and user a quick overview. See the sections listed for details.

REMOVING FRONT PANEL

NOTE: When opening instrument, remove front cover with care; a ribbon cable connects the front panel and main board.

1. Ensure power is **OFF**.
2. Remove the screws on the front panel.
3. Carefully wiggle the front panel to loosen the gasket and pull gently toward you. Do not pull more than about 8 inches/20CM or you could damage the wiring harness.

REASSEMBLY

1. Carefully reinstall the front panel, bottom first.

Ensure no wires have been pinched between enclosure and front panel.

2. Reinstall the screws and tighten.
3. To operate, turn power **ON**.

INTRODUCTION - Section I.

This section covers the specifications of your new Monitor/controller including sensor information.

INSTALLATION - Section II.

This section covers how to install your new Monitor/controller; mechanically and electrically.

OPTIONS & ACCESSORIES - Section III.

This section covers the specifications, installation, set up, and operation of each option.

QUICK LOCATOR

SC/SCO MODULE, (Second Relay), see section III.A.

4A/4AO MODULE (4-20mA), see section III.B.

TP/TPO MODULE (Temperature), see section III.C.

TH/THO MODULE (Alarm /control Harness), see section III.D.

DUAL (stacking) Temperature (TPO) & 4-20mA (4A/4AO), see section III.E.

PA/PAO (Piezo Alarm), see section III.F.

RA (Remote Alarm), see section III.G.

OPERATING PROCEDURES - Section IV.

This section covers a brief description of different models and their features; how they work, and how to set them up for your particular use.

QUICK SET POINT CONVERSION (SPC) /

REVERSING SET POINT - See Section IV.C.1.

pH & ORP Monitor/controllers are configured to trigger the alarm relay as the reading increases.

To reverse:

1. Locate the jumper block for the alarm to be configured. See figure V.A.1.
2. Remove and rotate the jumpers 1/4 turn and reinstall them on their posts.

QUICK CHECK-OUT PROCEDURE -

See Section IV.C.2.

It is assumed that the Monitor/controller power is **ON**, that it is connected to an appropriate Sensor, and that the Sensor is immersed in water within the range that the Monitor/controller will be required to read; and the front panel is removed.

1. Make a note of the reading on the display.
2. While pressing the Calibration/Full Scale Test Switch (FS SW), verify that the front panel display is indicating a full scale reading. If not, see Calibration, section V.C.

Continued

- Press and hold the "SET POINT" switch on the front panel. Using a tweaker or a small screwdriver, adjust the Set Point trimmer adjustment screw on the circuit board to sweep the display from zero to full scale. (A digital display may be blank at the full scale end. This is normal.) Listen for the alarm relay to click on and off as the alarm set point moves past the water reading.
- Adjust the alarm to the desired set point value. Release the "SET POINT" switch.

NOTE: For Models with SC/SCO module, repeat STEPS 3 & 4 to check out Set Point #2.

QUICK SET POINT ADJUSTMENT -

See Section IV.C.3.

The set point setting is based upon the user's particular water purity specifications or requirements. **NOTE:** The optional **second** relay/alarm is "stacked" on the first relay/alarm, therefore, when setting the optional **second** relay/alarm Set Point, the #1 Set Point must be 'set' first.

- While pressing the "SET POINT" switch, turn the Set Point #1 adjustment screw (see figure V.A.1) until the desired set point value is indicated on the display.

HYSTERESIS (DEAD BAND) ADJUSTMENT -

See Section IV.C.4.

PRIMARY COMPONENT IDENTIFICATION -

Section V.A.

Review the figure below to familiarize yourself with the Main circuit board assembly. The diagram has the second alarm/control module option installed.

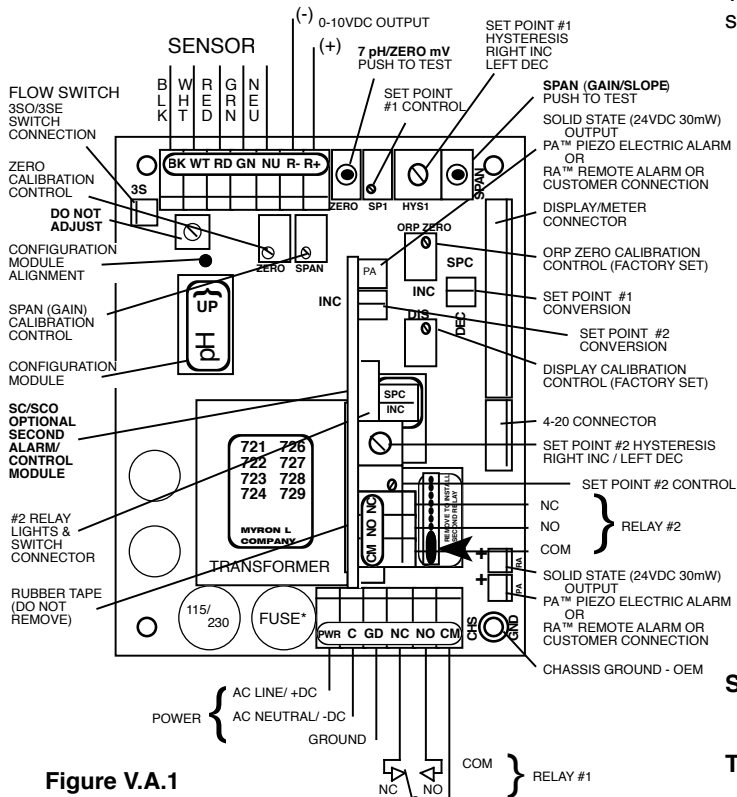


Figure V.A.1

QUICK CALIBRATION - Section V.C.

WARNING: When performing calibration procedures, the technician must take extreme care to avoid contacting the circuitry other than the CALibration control. Failure to do so could result in damage to the equipment, property and/or personal injury.

The following assumes the front panel has been removed and the power is ON.

ELECTRONIC CALIBRATION (CIRCUIT ONLY) - See Section V.C.1.

ZERO Adjustment

- Press and hold the **ZERO** Test switch. The display should indicate 7 pH or 0 mV selected. If not, set to 7 pH or 0 mV with the **ZERO** CALibration control.
- Turn power **OFF**.
- Re-install front panel as described in "REASSEMBLY".
- To operate, turn power **ON**.

0-10VDC Recorder Calibration - See Section V.C.2.

Using Standard Solutions - Section V.C.3.

The **BEST** method of verifying and recalibrating your pH or ORP Monitor/controller is with NIST traceable Standard Solution (available from the Myron L® Company). Because it includes the sensor, the entire system is recalibrated.

NOTE: Another means of verification or calibration of pH or ORP models is to use the transfer standard method, using a hand-held or portable instrument capable of these measurements, i.e. the Myron L Ultrameter™. See section V.C.4 for description.

The following procedure describes the easiest method for standard solution calibration of your Monitor/controller.

- Using 7pH buffer solution rinse a clean glass beaker thoroughly with the buffer solution.
- Place sensor in the beaker of buffer solution. Level of buffer solution should be high enough to cover at least 1" above the sensor lower end.
- Carefully shake the sensor to remove air bubbles from inside the sensor bore hole.
- Allow 5-10 minutes for temperature to equilibrate. For the quickest and the best results, both the sensor and solution should be at the same temperature.
- Read the panel meter/display. The display should match the value and units of measure located on the bottle of buffer solution. If the reading is different, adjust **ZERO** calibration control on the main control circuit board until the reading is 7pH or 0mV.
- Repeat steps 2 - 5 using either 4 or 10 pH buffer solution.
- If reading is incorrect, adjust **SPAN** calibration control on the main control circuit board until reading matches buffer solution.
- After adjustment, turn power **OFF**.
- Re-install front panel as described in "REASSEMBLY".
- To operate, turn power **ON**.

SENSOR SUBSTITUTE CALIBRATION - See Section V.C.4.

TRANSFER STANDARD METHOD - See Section V.C.5.



720 Series II

Model 723II-SC

(A Digital pH Monitor/controller,
with a Second Alarm/Control)

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I. INTRODUCTION

Thank you for selecting one of the Myron L® Company's new 720 Series II Monitor/controllers. The 720 Series II is based on input from 'you' - our customers, time proven designs, and many years of instrumentation experience.

Since 1957, the Myron L® Company has been providing customers with quality products at an affordable price by designing and producing products that are Accurate, Reliable, Simple to use. Quality you have come to rely and depend on.

As you read through this operation manual you will see the 720 Series II is truly designed to be user friendly with simple to install options and accessories as conditions or applications change.

This manual is actually more complex than the 720 Series II Monitor/controller, but must be to address all the variables. Where applicable the Original Equipment Manufacture (OEM) models are separated as necessary to clarify and define their differences. As defined by the Myron L® Company, an OEM model does not have an enclosure. However, many OEMs use our enclosure just as if it were a standard model, therefore, as an end user you must decide whether to follow the OEM instructions or the "standard" models with enclosure.

All OEMs mount the circuit board assemblies in differing locations making it impossible for us to describe exactly where to find them. By looking in section V. for the Main circuit board (CB) assembly, you will have a picture of what it looks like. If your OEM has a display, follow the display harness back to the Main CB. Once located you will be able to locate any installed options by following the harnesses, i.e. 4A (4-20mA output).

A. SCOPE

This operation manual provides the user with the necessary information to install, operate and maintain the Myron L® Company's 720 Series II pH & ORP Monitors/controllers.

Section I. Descriptions, Applications, Specifications.

Section II. Installation; mounting, wiring and set up.

Section III. Options and Accessory installation procedures.

Section IV. Operating Procedures.

Section V. Component Identification; Identifies their primary components and provides the user with easy-to-use calibration and preventive care procedures.

Section VI. Options & Accessories List.

Section VII. Replacement Components.

Section VIII. Warranty information.

Section IX. Glossary, definitions.

Section X. Notes.

Section XI. Addendum.

1. FUNCTIONAL DESCRIPTIONS

All models except OEMs have water & corrosion resistant IP65/NEMA 4X enclosures suitable for panel, bench or surface mounting. The 720 Series II are a compact 6.0" (152mm) x 4.8" (122mm).

Bright green/red LEDs indicate HIGH/LOW set point readings. All models except 721II, 724II, 726II, & 729II, (see below) feature a heavy-duty 10 amp output relay, operating on either increasing or decreasing readings.

For specific Monitor/controller configurations, reference the following individual model descriptions.

Models 723II pH & 728II ORP

Digital Monitor/controller. Standard front panel is equipped with a 3 1/2 digit liquid crystal display (LCD), and a "SET POINT" switch with High/Low LED indicator lights. Single set point is internal to discourage unauthorized adjustments. A second set point alarm/control is available as an option. May use an optional 4-20mA output for PLC or SCADA operations.

Models 724II pH & 729II ORP

Digital monitor ONLY. Standard front panel is equipped with a 3 1/2 digit liquid crystal display (LCD) only, no relay, LED indicators or set point switch. May use an optional 4-20mA output for PLC or SCADA operations.

Models 722II pH & 727II ORP

Analog Monitor/controller. Standard front panel is equipped with a linear analog meter display and a "SET POINT" switch with High/Low indicator lights. Single set point is internal to discourage unauthorized adjustments. A second set point alarm/control is available as an option. 4-20mA output option is available on OEM models only.

Models 721II pH & 726II ORP

Analog monitor ONLY. Standard front panel is equipped with a linear analog meter only, no relay, LED indicators or set point switch. 4-20mA output option is available on OEM models only.

2. APPLICATIONS

pH & ORP

Reverse Osmosis

Process Control

Seawater Desalinization

Wastewater Treatment

Food Processing

Plating

Power Plants

Laboratories

Printing

Boiler

Cooling Tower

Deionization (DI) and Distillation Ultrapure Water

Treatment Systems

Electronics

Pharmaceutical

Are just a few of the many applications

B. SPECIFICATIONS

RANGES:

pH 0-14

ORP ±2000 mV

DISPLAY:

Models 721II, 722II & 726II, 727II:

2 1/2" (63mm) analog meter

Models 723II, 724II & 728II, 729II:

1/2" (13mm) 3 1/2 digit LCD

NOTE: 3 1/2 digit LCD may be replaced with a 3 1/2 digit Back lit LCD - available as an option.

LINEARITY

Electronics: $\pm 0.05\%$ (± 0.01 pH units / ± 1 mV of full scale)

RESOLUTION

Digital Display: ± 0.01 pH units / ± 1 mV

Analog Meter: ± 0.13 pH units / ± 40 mV

SENSITIVITY

0.05 % of full scale (0.01 pH units / 1 mV)

STABILITY

± 0.05 % of full scale (± 0.01 pH units / ± 1 mV)

REPEATABILITY

± 0.05 % of full scale (± 0.01 pH units / ± 1 mV)

CALIBRATION CHECK

Built in (7 & 0 pH / 0 & -2000 mV)

RECORDER OUTPUT

Isolated 0-10 VDC @ 5 mA max. (linear); standard on all models

OUTPUT IMPEDANCE

100 Ω $\pm 5\%$

SENSOR INPUT

1 (optional 3 sensor Input available)

NOTE: pH and ORP may NOT be mixed.

CONTROL FUNCTIONS

Models 722II, 723II & 727II, 728II:

Single set point alarm/control continuously adjustable
0-100% of span

Second set point alarm/control (Optional).

Continuously adjustable - 0-100% of span

Hysteresis

Adjustable from 0.3-3 % of full scale

Indicators

"HIGH" (red) and "LOW" (green) set point LEDs - reversible.

Relay Contact Rating

SPDT 10 amp @ 250 VAC, 30 VDC. Relay operates
increasing or decreasing reading (user selectable).

Solid State Output

24 VDC unregulated, 30 mA Maximum.

Powers optional PA - Piezo Electric Alarm, RA™ - Remote
Alarm, or customer alarm within above limits.

Second Alarm/control Module, with above specifications, opt. on
Models 722II, 723II & 727II, 728II:

POWER SPECIFICATIONS

115/230 VAC $\pm 15\%$, 50/60 Hz (User selectable)
overvoltage category II

100 mA Maximum Current

Double Insulated (with circuit board ground for OEM operation)

Fuse - 100 mA Slow Blow (T.10A) for both 115 & 230 VAC (V~)
User replaceable

Humidity - 20-90% non-condensing

Max. Altitude -

40,000 ft/12,000 meters non-operating

10,000 ft/3000 meters operating

Pollution degree 2

24 VAC or 24 VDC Option available on Special Order

Overvoltage category II (24 VAC)

250 mA Maximum Current

Double Insulated (with circuit board ground for OEM operation)

Fuse - 250 mA Slow Blow (T.25A) User replaceable

AMBIENT TEMPERATURE RANGE

32°F to 140°F (0°C to 60°C)

DIMENSIONS

6.0" (152 mm) H x 4.8" (122 mm) W x 3.8" (96 mm) D

HOUSING CONSTRUCTION

Fully gasketed heavy-duty ABS for splashproof and corrosion
resistance.

Rated IP65/NEMA 4X

Double Insulated



DOUBLE INSULATED

WEIGHT

720 Series II: average 2 lbs. (0.9 kg)

C. OPTIONAL FEATURES

- SC Second Alarm/control Module (M/c models only)
- 4A 4-20 mA Isolated output (Digital & OEM only)
- PA 70 db Piezo Electric Alarm (digital M/c models only)
- PAT Piezo Alarm & Timer Module (digital M/c models only)
- 35BL 3 1/2 digit backlit LCD
- TP Temperature Module Requires -TP sensor
(Digital Models Only)
- TH Alarm/control Interface Harness (requires SC & TP)
- PC 115 VAC Powercord (8 ft. with USA plug and strain
relief) - **NOT** for use with 230 VAC.
- 24VA 24 VAC isolated power supply (special order)
- PTST Panel mounted ZERO (7 pH or 0 mV) Test switch
(special order)

D. ACCESSORIES (ordered separately)

- SCO Second Alarm/control Module (M/c models only)
- 4AO 4-20 mA Isolated output (Digital & OEM only)
- 3SO 3 Sensor Input Switch Module with
3 foot/1 meter cable*.
- 3SE 3 Sensor Input Switch with enclosure.
- PAO 70 db Piezo Electric Alarm only (723II/728II)
- PATO Piezo Alarm & Timer Module (723II/728II)
- 35BLO 3 1/2 digit backlit LCD w/Bezel
- TPO Temperature Module Requires additional ITS1
sensor (Digital Models Only)
- THO Alarm/control Interface Harness
(requires SCO & TPO)
- PCO 115 VAC Powercord (8 ft. with USA plug and strain
relief) - **NOT** for use with 230 VAC.
- SMP50 Surface Mounting Plate
- RA Remote Alarm - RA™ (controller models only)
- VR Powersupply, 24 VAC, 20VA (115 VAC, indoor use)
- 024-1 24 VAC 1" Solenoid Valve
- 720SS pH/ORP Sensor Substitute (NIST Traceable)
- pHC NIST Certificate without Sensor
- pHCS NIST Certificate with Sensor in Buffer Solutions
- OC NIST Certificate without Sensor

*Customer mounted separately

E. SENSORS

1. pH

720 series II pH Monitor/controllers use the P72 series sensors. Its compact size allows mounting in a standard 1/2" or 3/4" MNPT fitting or tee depending on model.

2. ORP

720 series II ORP Monitor/controllers use the O72 series sensors. Its compact size allows mounting in a standard 1/2" or 3/4" MNPT fitting or tee depending on model.

For detailed descriptions of these and other sensors, see pH/ORP Sensor Selection Guide.

3. SENSOR SPECIFICATIONS

BASIC pH Sensors

Single Junction 100PSI@50°C intermittent use.

P72S 1/2" MNPT

P74SR 3/4" MNPT

Double Junction (KNO₃ gel) Environmental Applications

P72D 1/2" MNPT

P74DR 3/4" MNPT

Low Conductivity RO/DI Applications (DJ)

P72LC 1/2" MNPT

P74LCR 3/4" MNPT

HEAVY DUTY pH Sensors

FLAT TIP SELF-CLEANING

with Double Junction & High Temperature gel.

(For continuous use; 100°C @ 50PSI, 81°C @ 85PSI, and 76°C @ 100PSI).

P72F 1/2" MNPT

P74FR 3/4" MNPT

BASIC ORP Sensors

Single Junction 100PSI@50°C intermittent use.

O72S 1/2" MNPT

O74SR 3/4" MNPT

Double Junction (KNO₃ gel) Environmental Applications

O72D 1/2" MNPT

O74DR 3/4" MNPT

Low Conductivity RO/DI Applications (DJ)

O72LC 1/2" MNPT

O74LCR 3/4" MNPT

HEAVY DUTY ORP Sensors

with Double Junction & High Temperature gel.

(For continuous use; 100°C @ 50PSI, 81°C @ 85PSI, and 76°C @ 100PSI).

O72F 1/2" MNPT

O74FR 3/4" MNPT

4. SENSOR OPTIONS

-25 25' Shielded Cable (Standard 5 wire sensor)*

-100 100' Shielded Cable (Standard 5 wire sensor)*

TEMPERATURE COMPENSATION

pH Nernst Equation, Automatic to 25°C, between 32-212°F (0-100°C) May be disabled as required.

ORP NONE

PRESSURE/TEMPERATURE LIMITS

See pH/ORP Sensor Selection Guide

CABLE

5 wire Shielded; 10' (3 meters) standard; 25' (7 meters) and 100' (30 meters) lengths also available.

Cable only: Part Number pHCRD-(length)

Example: pHCRD-300(90)

NOTE: 1000 ft/300 meter cable lengths have been tested with no adverse affects on the readings. However, unusual conditions may be experienced when extended long distances, i.e. power or ground reversal. These conditions are beyond the control and responsibility of the Myron L® Company. A clean installation is required. If you are experiencing errors, check the Monitor/controller with a 10 ft/3 meter cable before contacting your distributor or the Myron L® Company.

DIMENSIONS

6 1/2" overall Typ.

Contact factory for data sheets for other models.

F. ORDERING INFORMATION

1. HOW TO ORDER MONITOR/CONTROLLERS

EXAMPLE:

MODEL	OPTIONS
723II	— SC - 4A - PA

Written as — 723II-SC-4A-PA

This is a Digital pH Monitor/controller with a Second Alarm/control, a 4-20mA output and a Piezo electric alarm.

NOTE: Monitor model number does not include sensor. Please specify sensor required when ordering.

2. HOW TO ORDER SENSORS

Add option to model number as in examples below. pH sensor used in examples.

EXAMPLE:

MODEL	OPTIONS
P72S	— -100

Written as — P72S-100

The above is a basic 1/2" MNPT single junction pH sensor, with a 100 foot/30 meter cable.

ORP

EXAMPLE:

MODEL	OPTIONS
O72F	— -25

Written as — O72F-25

The above is a 1/2" MNPT Heavy Duty double junction ORP sensor, with a 25 foot/8 meter cable.

G. 720 SERIES II CONFIGURATION GUIDE

pH & ORP

pH requires P7XX series sensor
ORP requires 07XX series sensor

	721II, 722II, 723II & 724II	726II, 727II, 728II & 729II
CONFIGURATION	pH	ORP
pH (Analog & Digital)	CMpH	
ORP Digital		CMORPD
ORP Analog		CMORPA

pH/ORP Sensor Part Numbers

Part Number Description:

First Location = Sensor type, i.e. P = pH, or O = ORP

Second Location = Monitor/controller model, i.e. 7 = 720II

Third location = Sensor size, i.e. 2 = 1/2" MNPT or 4 = 3/4" MNPT

Fourth location = Sensor option, i.e. S = Single Junction, D = Double Junction, LC = Low Conductivity, or F = Flat.

Size	Single Junction	Double Junction	Low Conductivity	Heavy Duty Flat Tip
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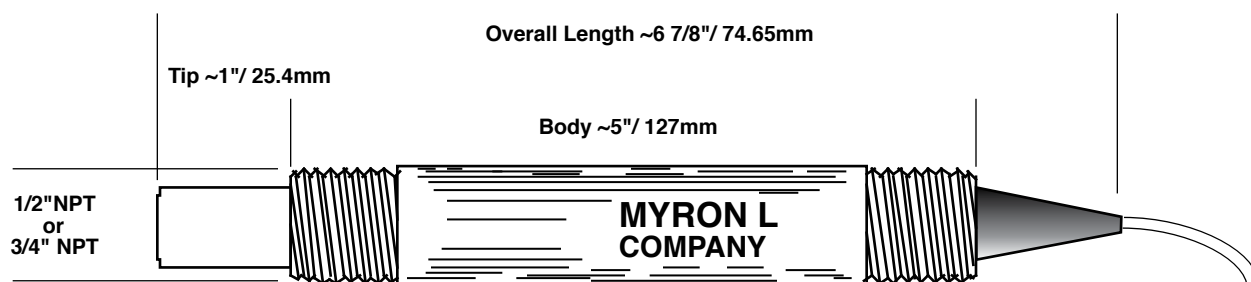
pH Sensors

1/2" NPT	P72S	P72D	P72LC	P74F
3/4" NPT	P74SR	P74DR	P74LCR	P74FR

ORP Sensors

1/2" NPT	O72S	O72D	O72LC	O72F
3/4" NPT	O74SR	O74DR	O74LCR	O74FR

High Temperature / High Pressure sensors may be available for some applications. Price & delivery on request.



NOTE:
HEAVY DUTY "P72F" MODEL SENSOR SHOWN
1/2" NP Diameter = .840" or 21.3mm
3/4" NP Diameter = 1.050" or 25.5mm

II. INSTALLATION

A. GENERAL

This section provides the recommended procedures for properly installing the 720 Series II pH/ORP Monitor/controller, and sensors. For OEM models see section II.C.



CAUTION - READ FOLLOWING CAREFULLY

WARNING: THE Myron L® Company RECOMMENDS THAT ALL MOUNTING AND ELECTRICAL INSTALLATIONS BE PERFORMED BY QUALIFIED PERSONNEL ONLY. FAILURE TO DO SO COULD CAUSE DAMAGE TO INSTRUMENT, AND COULD BE HARMFUL OR FATAL TO PERSONNEL.

B. MECHANICAL INSTALLATION

All Monitor electronics are packaged inside drip/weather-proof housings. The physical dimensions of the housing is suitable for panel, bench or surface mounting.

There are three basic guidelines to consider when selecting a Monitor's mounting location:

1. Select a site that limits the Monitor/controller's exposure to excessive moisture and corrosive fumes.
2. If at all possible, mount the Monitor/controller at eye level for viewing convenience.
3. If needed, the enclosure may be rotated or mounted upside down so that the cutouts are on the opposite side.

1. SURFACE MOUNTING WITH SMP

NOTE: A Surface Mounting Plate (SMP50) may be required when access to the back side of the mounting site is impractical or if the Monitor/controller must be mounted on a solid wall. The SMP50 comes with the proper hardware to mount the Monitor/controller to the SMP, however, the installer must provide

the four (4) additional screws/bolts to mount the SMP to the wall or fixture. Their size is to be determined by the user.

1. Select your mounting location. Mark four (4) required mounting holes. For hole locations, use the SMP as a template.
2. Drill the corner holes in the SMP according to the size of the screws or bolts selected.
3. Attach and securely fasten the SMP to the Monitor using the 1/4" - 20 X 3/8" screws provided.
4. Mount the SMP to the prepared site using the selected screws or bolts.

2. SURFACE MOUNTING WITHOUT SMP

NOTE: Surface mounting will require two (2) 1/4" - 20 screws of a length equal to the thickness of the mounting site plus 3/8".

1. Select mounting site location. Mark and drill the required mounting holes. For hole drilling locations, see figure II.B.1.
2. Insert the 1/4" - 20 screws into the holes from the side opposite the mounting site.
3. Hold the Monitor/controller in place while starting and tightening the mounting screws.

3. PANEL MOUNTING

A panel mounting fastening kit is provided with all Monitor/controllers. Panel mounting will require the use of the fastening kit's two (2) 4-40 mounting screws/nuts or two (2) #4 - 1/2" sheet metal screws. See figure II.B.1 for panel cutout dimensions.

1. Select your mounting location. Mark the appropriate panel cutout and complete the necessary panel cut.
2. Carefully unfasten and separate the Monitor/controller's front panel from its enclosure.
3. Disconnect all panel cable(s)/wires from the Monitor/controller's main circuit board.



DOUBLE INSULATED

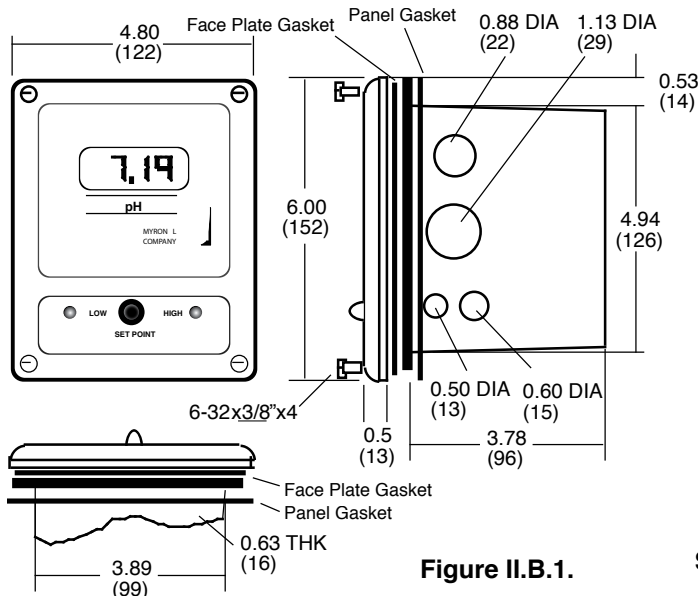
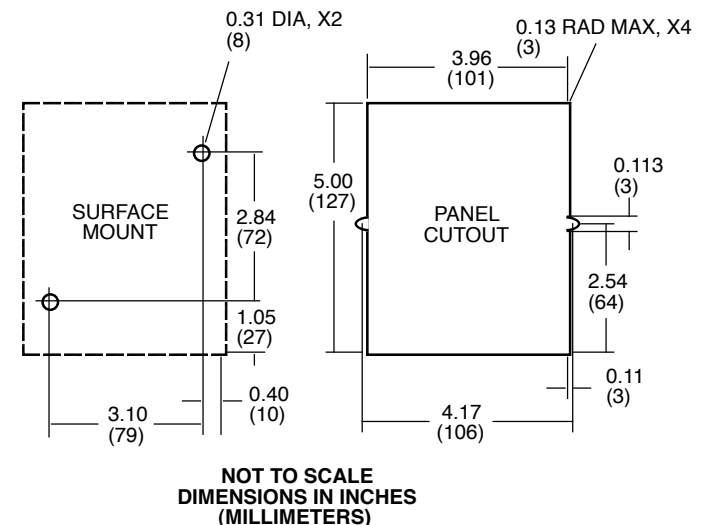


Figure II.B.1.



SURFACE AND PANEL MOUNTING DIAGRAMS

4. Slide the enclosure through the panel cutout until its flange contacts the panel.
5. Insert mounting screws through the flange mounting holes and tightly secure.
6. Reconnect all panel cable(s)/wires and re-secure the front panel using 6-32 x $\frac{3}{8}$ " screws provided.

Caution: Do not use 6-32 x $\frac{1}{2}$ " used on "picture frame" front panel models.

C. CIRCUIT BOARD AND DISPLAY MOUNTING

This section provides the recommended procedures for properly installing the OEM 720 Series II pH/ORP Monitor/controller.

NOTE: Mounting of the OEM monitor/controller circuit board is left up to the OEM. It is recommended that the following be noted and observed.

1. CIRCUIT BOARD

Total height of CB is 1.40" (36mm).

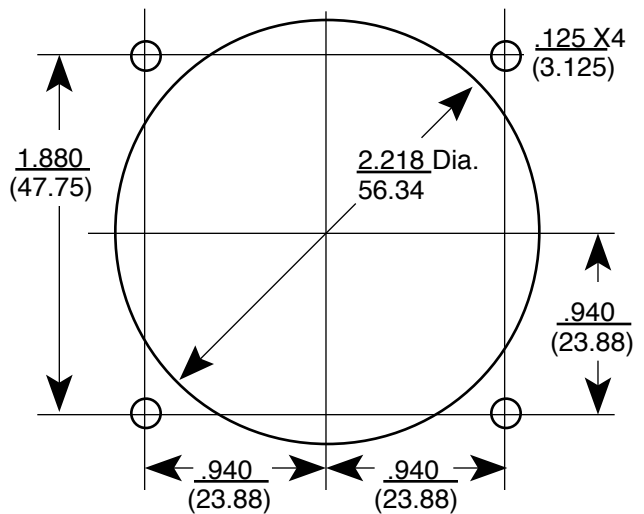
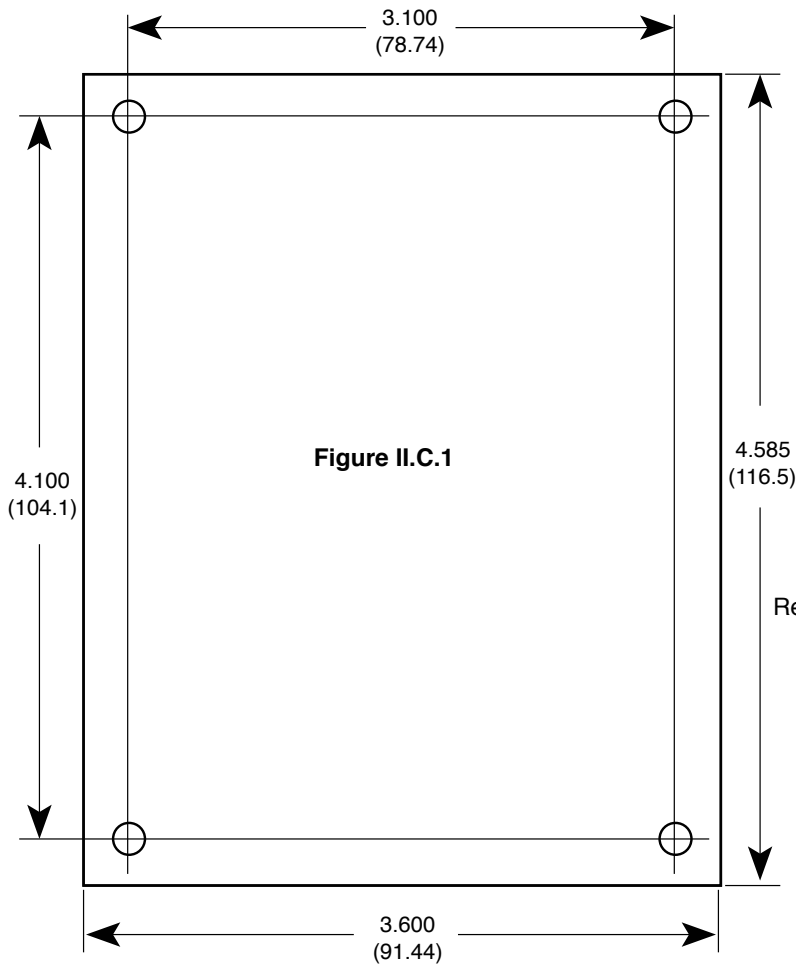
The circuit board has four .175" (4.4 mm) holes for mounting. The centers are 3.10" (78.7 mm) x 4.10" (104.1 mm) see figure II.C.1.

CB must be mounted on at least .250" (6.35 mm) standoffs to prevent shorting to metal chassis (standoffs user supplied).

CB must be mounted in a clean and dry environment.

Allow working room for inserting wires, testing and calibration.

Indicator lights and switches require $\frac{1}{4}$ " (6.35mm) holes.

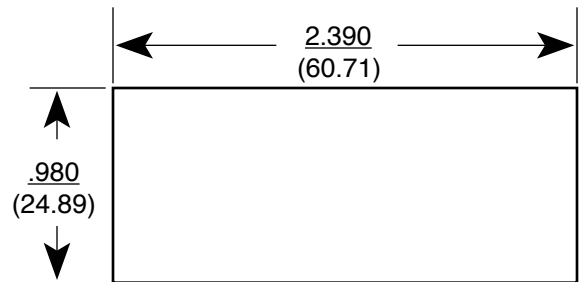


**Analog Meter Hole Pattern
Figure II.C.2**

2. METER MOVEMENT

Refer to figure II.C.2 for dimensions.

1. Cut opening in user panel.
2. Drill four holes at locations as shown.
3. Install meter movement.



**Digital Display Cutout Pattern
Figure II.C.3**

3. DIGITAL DISPLAY

Refer to figure II.C.3 for dimensions.

1. Cut opening in user panel
2. Install LCD with brackets supplied.

D. SENSOR INSTALLATION

The pH/ORP Sensor's mounting orientation must provide a continuous and adequate circulation flow to prevent the trapping of air bubbles within the Sensor's electrode area. Failure to do so will result in conditions that will prevent the Sensor from functioning properly.

1. INSERTION MODE (in-line installation)

Use one of the following as a guide. The Heavy Duty pH or ORP sensor may be installed in any direction including inverted (sensor UP). Substitute ORP sensor for pH where applicable.

Use approved sealant, i.e. Teflon tape as required.

1. Insert the Sensor Fitting assembly into the "T" fitting as shown in one of the figures below.
2. Tightly secure.

2. IMMERSION OR DIP SENSOR ASSEMBLY

Use approved sealant, i.e. Teflon tape as required.

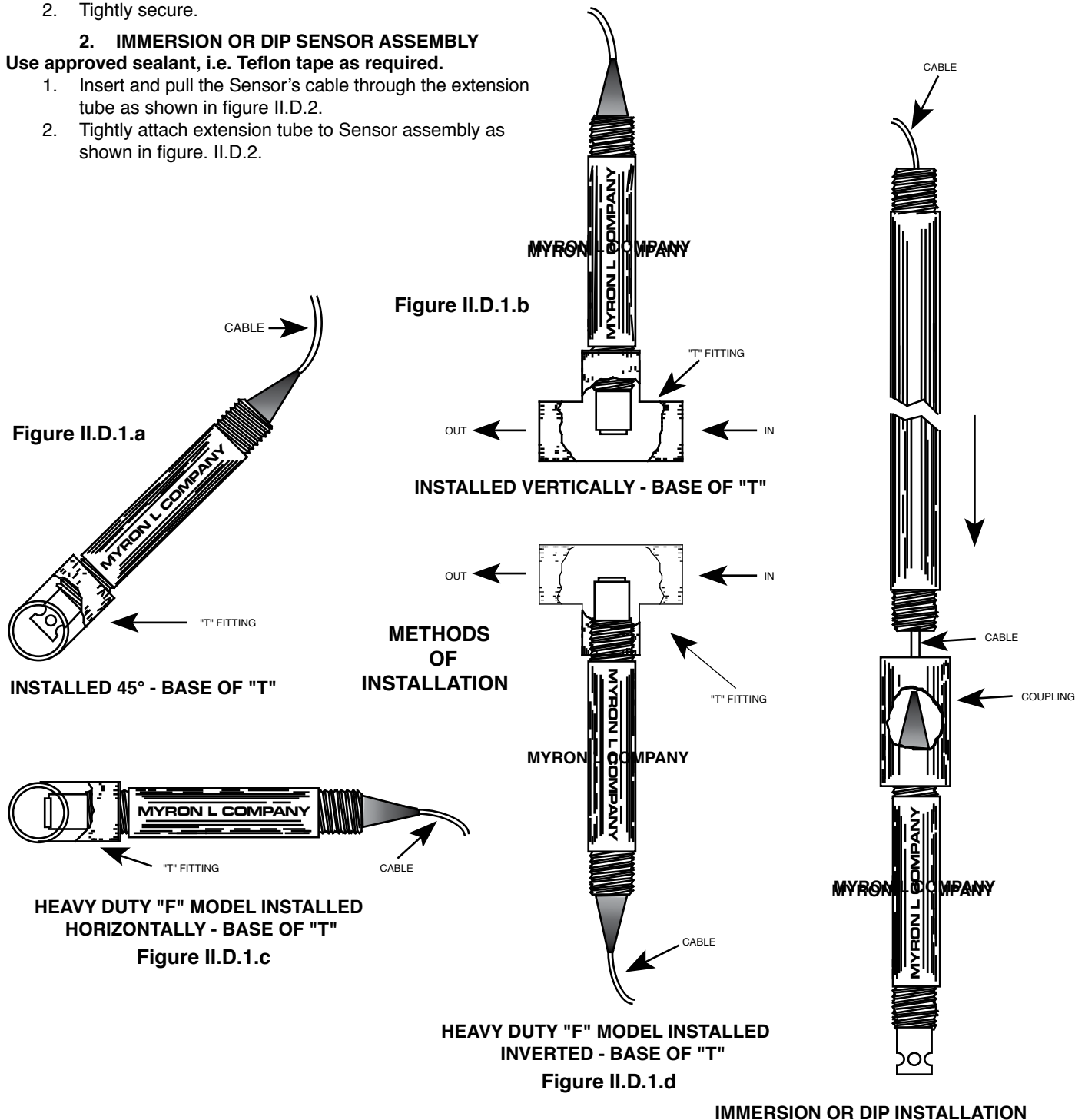
1. Insert and pull the Sensor's cable through the extension tube as shown in figure II.D.2.
2. Tightly attach extension tube to Sensor assembly as shown in figure. II.D.2.

The sensor cable may be extended as necessary.

Additional cable may be ordered: Part Number pHCRD-(length)

Example: pHCRD-300(90m)

NOTE: 1000 ft/300 meter cable lengths have been tested with no adverse affects on the readings. However, unusual conditions may be experienced when extended long distances, i.e. power or ground reversal. These conditions are beyond the control and responsibility of the Myron L® Company. A clean installation is required. If you are experiencing errors, check the Monitor/controller with a 10 ft/3 meter cable before contacting your distributor or the Myron L® Company.



NOTE: HEAVY DUTY "F" MODEL SENSORS MAY BE INSTALLED IN **ANY** DIRECTION INCLUDING **INVERTED**.

Figure II.D.2

E. ELECTRICAL INSTALLATION

The electrical installation procedures provided in this manual are common to all pH & ORP Monitor/controllers. See figure II.B.1 for the hole dimensions of the enclosure's cable access holes. Unless otherwise instructed, refer to figure II.E.1. for the 720 Series II Monitor's terminal block connector wiring designations.

NOTE: After removing an enclosure's access hole plug, it is suggested that the user mount a watertight restraint fixture prior to installing a cable.



WARNING !

A device to disconnect the Model 720II from the power supply is required. It is recommended that this switch or circuit breaker be labeled as the disconnection device for the Model 720II.

1. MAIN INPUT POWER INSTALLATION

WARNING: All Monitor/controllers are factory set for 115 VAC. Before starting, ensure the input power "115/230" selection is correct for your requirements. Failure to do so is beyond the responsibility of the Myron L® Company. See section II.E.2 below and figure II.E.1.

NOTE: Some models may have either a 24 VAC or a 24 VDC input power requirement - check labels carefully.

1. Verify that the main power source is turned "OFF" or disconnected.
2. Using a standard slot screwdriver remove the screws on the front panel.
3. Carefully wiggle the front panel to loosen the gasket and pull gently toward you. Do not pull more than about 8 inches/20CM or you could damage the wiring harness.
4. Turn the front panel around so that the back side is facing you and set aside for now.
5. Carefully remove front panel, leaving the harness connected. For OEM models skip to step #4.
6. Using the enclosure cutouts, install the proper wire and watertight cable restraint (not provided) to comply with local electrical codes. Skip for OEM.
7. Neatly connect wires to the Monitor/controller's connectors, as shown in figure II.E.1.

***CAUTION:** The input power connectors require only a small screwdriver or a pen to push on the release levers. The release levers may be broken or damaged if not pushed straight toward the circuit board. DO NOT push the release levers sideways.



CAUTION - READ FOLLOWING CAREFULLY

2. 115/230 VAC CONVERSION

1. Before turning power on to the Monitor/controller ensure the proper input voltage has been selected. Failure to do so will blow the fuse. It could, under some conditions, cause injury and damage the instrument voiding the warranty.
2. Locate switch located next to the fuse holder.
3. Using a screwdriver, turn switch to required voltage.

3. CONNECTING THE SENSOR CABLE

For OEM models skip #1.

A 10 ft/3 meter sensor cable length is standard. 25 ft/7.5 meter and 100 ft/30 meter cable lengths are available as options. The sensor cable may be extended up to 1000 feet/300 meters by ordering cable only. It is recommended proper water tight and shielding methods (i.e. junction box) be used when extending the cable.

Cable only: Part Number pHCRD-(length)

Example: pHCRD-300 (90m)

NOTE: 1000 ft/300 meter cable lengths have been tested with no adverse affects on the readings. However, unusual conditions may be experienced when extended long distances, i.e. power or ground reversal. These conditions are beyond the control and responsibility of the Myron L® Company. A clean installation is required. If you are experiencing errors, check the Monitor/controller with a 10 ft/3 meter cable before contacting your distributor or the Myron L® Company.

1. Place the sensor cable and user supplied watertight cable restraint into the enclosure's appropriate access hole.
2. Install the sensor cable wire to comply with local electrical codes. Follow the color code as marked. See figure II.E.1.

CAUTION: The circuit board connectors require only a small screwdriver or a pen to push on the release levers. The release levers may be broken or damaged if not pushed straight toward the circuit board. DO NOT push the release levers sideways.

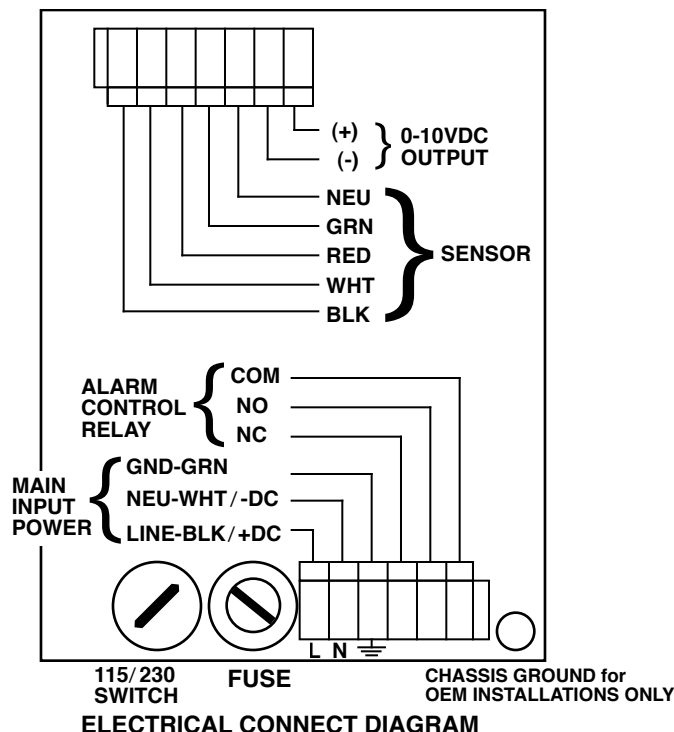


Figure II.E.1

a. MODIFICATION FOR US PHARMACEUTICAL 25 (No Temperature Compensation)

This simple modification will allow your Monitor/controller to meet the USP 25 requirements by disabling the normal temperature compensation circuit thus giving "uncompensated" readings as required.

Specifications:

As required to meet USP 25.

Installation

Briefly -

The BLACK and WHITE sensor leads are REVERSED in the sensor connector.

Requirements:

None



CAUTION - READ FOLLOWING CAREFULLY

WARNING: BEFORE STARTING, IF MONITOR/CONTROLLER IS INSTALLED, ENSURE THE POWER IS OFF. FAILURE TO DO SO COULD CAUSE DAMAGE TO THE INSTRUMENT, AND COULD BE HARMFUL OR FATAL TO PERSONNEL. ONLY QUALIFIED PERSONNEL SHOULD INSTALL OR SERVICE ELECTRICAL EQUIPMENT.

NOTE: When opening instrument, remove front cover with care; a ribbon cable connects the front panel and main board. If the front panel has all ready been removed from the enclosure skip to #4.

1. Using a standard slot screwdriver remove the screws on the front panel.
2. Carefully wiggle the front panel to loosen the gasket and pull gently toward you. Do not pull more than about 8 inches/20CM or you could damage the wiring harness.
3. Turn the front panel around so that the back side is facing you and set aside.
4. If sensor is installed; locate and REVERSE the BLACK and the WHITE sensor leads on the MAIN Circuit Board, as shown in figure II.E.2.
5. If sensor is NOT installed; install the BLACK sensor lead into the connector labeled WT (WHITE) AND the WHITE lead into the connector labeled BK (BLACK). Install the remaining sensor leads as color coded.
6. To return to "normal" temperature compensation, reinstall the sensor leads as labeled - WHITE to (WT) and BLACK to (BK).
7. Carefully reinstall the front panel, bottom first. Ensure no wires have been pinched between enclosure and front panel.
8. Reinstall the screws and tighten.
9. To operate, turn power ON.

NOTE: Recalibration will require both the solution and sensor be at 25°C for maximum accuracy.

4. ISOLATED SOLID STATE OUTPUT

CAUTION: Isolated 24 VDC output is referenced to the 0-10 VDC output. To maintain the isolation, do NOT ground.

24 VDC Unregulated 30mA max. The following instructions are assuming the Monitor/controller enclosure is already open.

a. Piezo Electric Alarm - PA/PAO (option)

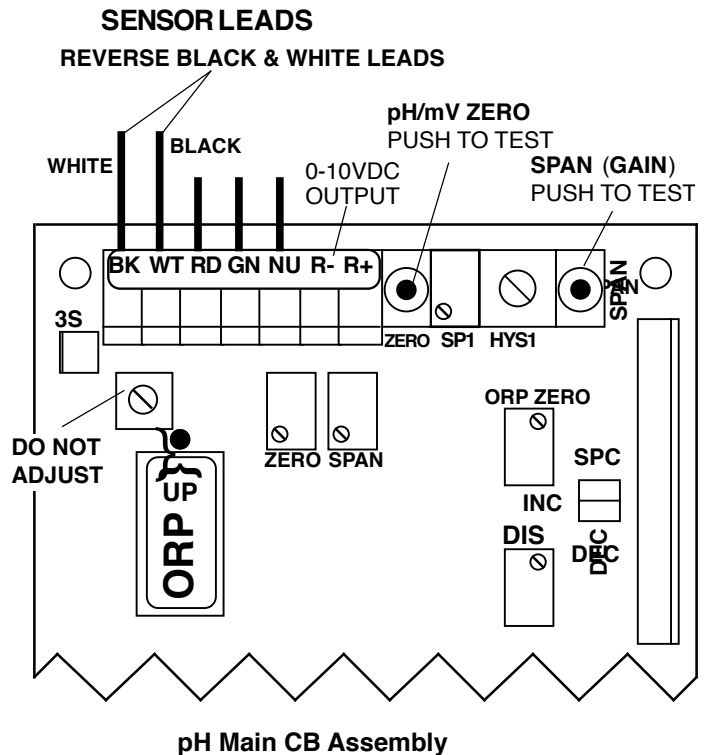
For additional information, see Piezo Alarm under Options in section III.G.

1. If not already installed, peel tape backing from PIEZO and press into place per figure III.I.3.
2. Attach connector to main circuit board per figure III.I.4.

NOTE: If remotely mounted; cut wires and splice as necessary, use comparable wire. Piezo requires 1/4" (6.35mm) hole in user panel.

b. Remote Alarm - RA™ (option)

For additional information, see RA Instructions under options in section III.H.



pH Main CB Assembly

Figure II.E.2

1. Run user supplied #22, 2 conductor speaker type wire from Monitor/controller to RA location as necessary. Additional wire may be ordered part #RAW-200, see Options & Accessories.
2. Open the RA by removing the four screws.
3. Locate and remove the 8" 2 conductor wire attached to RA.
4. At the controller, connect the extension wires to the 8" 2 conductor wire with the wire nuts provided — Black to Positive (+) and White to Negative (-). Be sure to first pass the wire through the user supplied waterproof strain relief in the enclosure.
5. Plug the reddish brown female connector into the male connector on the controller CB marked either RA or PA (see inside case label for location). It will only go on the connector one way.
6. At the RA, connect the wires to the connector — Black to Positive (+) and White to Negative (-).
7. To test, simply turn on the controller and adjust

controller set point until the alarm/piezo sounds off. If controller is not yet connected to a functioning sensor, it may be necessary to press and hold the ZERO test switch.

The black button on the front of the RA will mute the piezo alarm for approximately three minutes or until you improve the water quality (readjust controller set point). The piezo alarm will continue to sound off every three minutes until the user has improved the alarm condition inside the controller. If three minutes muting is fine for your application, skip to step 9.

8. If three minutes is too long or too short, adjust time delay control inside RA until desired mute time is achieved (adjustable from approximately 6 seconds to 10 minutes).
9. Replace the bottom of the RA, and secure RA to the surface you have selected for its installation.

NOTE: If the RA does not sound off;

1. Check the polarity of the extension wire connections.
2. Be sure the controller is actually switching (relay will click).

c. Connect to your own alarm

Use the following as guidelines.

Connector is a standard 2 wire Methode* style connector. Connector with 8" wires, part #RAH, is available from the Myron L® Company.

Ensure your requirements do not exceed the 24 VDC Unregulated 30mA maximum.

Ensure the polarity is correct (RED is positive), see figure V.A.1.

Attach wires to RA.

Attach connector to controller connector (RA) per figure V.A.1.

*Methode is registered trademark of Methode Electronics, Inc.

5. ALARM/CONTROL RELAY CONNECTIONS

Myron L® Company Monitor/controllers are equipped with a "Dry Contact" relay which is designed to energize/de-energize when the set point is crossed. (See section IV.C.3 for set point adjustment procedure) The relay energizes on increasing or decreasing readings as set by the user, see section IV.C.1. When energized (above set point), the Common (CM) will disconnect from the Normally Closed (NC) contact and connect to the Normally Open (NO) contact. Devices may be operated using either the Normally Open contact or Normally Closed contact; or both relay contacts may be used to control two devices of the

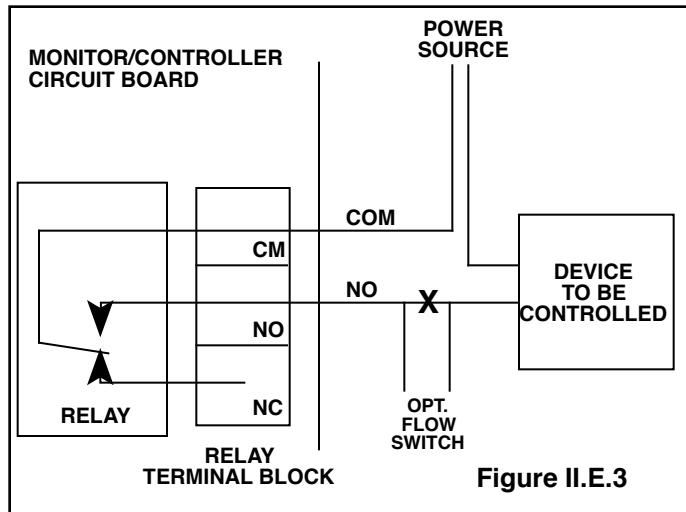


Figure II.E.3

same voltage.

NOTE: A flow switch may be installed (electrically connected) utilizing one of two convenient methods; the 3S connection, see figure II.E.2, (remove jumper and connect flow switch across terminals - 8" harness (RAH) available from the Myron L Company), or inline with either relay connection, see figure II.E.3 or II.E.4.

WARNING: CONNECTING BOTH POWER SOURCE LEADS TO THE RELAY TERMINAL BLOCK CONNECTORS WILL DAMAGE THE CIRCUIT BOARD AND MAY CAUSE PERSONAL INJURY.

1. Place the user supplied Alarm relay interface cable and watertight cable restraint into the enclosure's appropriate access hole. Skip for OEM.
2. Neatly connect the relay interface cable wires to the Monitor/controller's terminal block connectors, see figures II.E.1, II.E.4 or II.E.5.

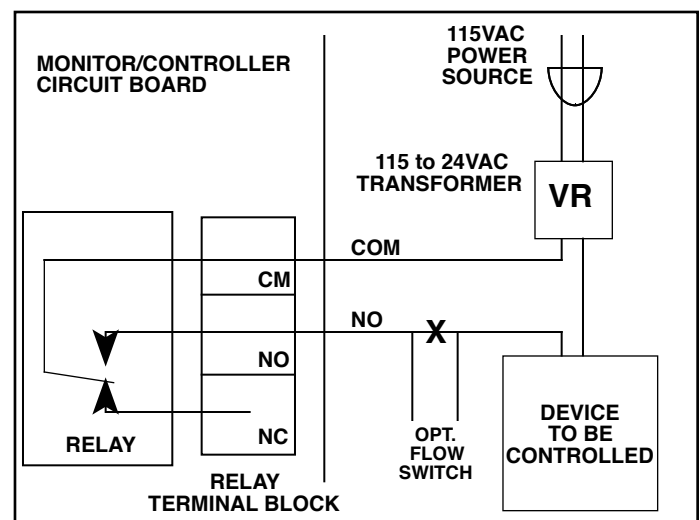


Figure II.E.4

CAUTION: The connectors require only a small screwdriver or a pen to push on the release levers. The release levers may be broken or damaged if not pushed straight toward the circuit board. DO NOT push the release levers sideways.

The easiest method of connecting the relay is shown in figures II.E.1, and II.E.3. These show how the dry contact relay can use incoming power to activate a controlled device (alarm, solenoid valve, etc.) of 10 amps or less.

For 24 VAC applications, the Myron L® Company offers a 115 VAC to 24 VAC transformer, Model #VR, see figure II.E.4. Other voltages must be user-supplied.

6. CONNECTING DISPLAY HARNESS TO DISPLAY

If the installation required the removal of the display harness from the display (OEM installation requires connection), the following procedure will ensure it is reinstalled without damaging the display.

WARNING: THE DISPLAY WILL BE IRREPARABLY DAMAGED IF THE HARNESS IS INSTALLED UPSIDE-DOWN OR MISALIGNED. THE HARNESS MUST BE INSTALLED AS SHOWN IN FIGURE II.E.5.

1. Grasp connector and align wires DOWN on display or with the small edge of the display as shown in figure II.E.5.
2. Press connector onto display pins. Ensure pins are aligned or they may become bent. Wiggle connector slightly "end to end" if necessary.

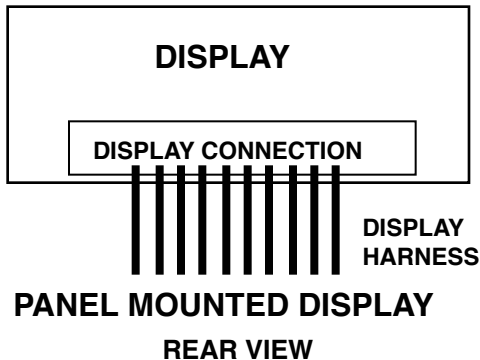


Figure II.E.5

F. 0-10 VDC RECORDER OUTPUT

The 0-10 VDC output is designed to give the user the capability of sending a signal to a remote meter, recorder, PLC or SCADA system.

1. CONNECTION

1. Place the user supplied interface cable and watertight cable restraint into the enclosure's appropriate access hole. Skip for OEM.
2. Connect the Recorder's plus (+) and minus (-) terminal wires to the Recorder output connectors. (See figure II.F.1)
3. Refer to Section V.C.1.b for the procedures to calibrate the 0-10 VDC voltage output.

2. VOLTAGE DIVIDER

A voltage divider gives the user the ability to scale or tailor the output to a particular need or requirement due to the input of another device, i.e. the output of the Main CB is 0-10V while the input requirement of a particular recording device is 0-5V.

a. INSTALLATION

Briefly—

Two resistors are installed across the 0-10V output. The output is recalibrated to required voltage.

Requirements

Select two (2) resistors as listed;

For 0-5V Output both "A & B" are 2K Resistors.

For 0-1V Output "A" is a 9K resistor and "B" is a 1K resistor.



CAUTION - READ FOLLOWING CAREFULLY

WARNING: BEFORE STARTING, IF MONITOR/CONTROLLER IS INSTALLED, ENSURE THE POWER IS OFF. FAILURE TO DO SO COULD CAUSE DAMAGE TO THE INSTRUMENT, AND COULD BE HARMFUL OR FATAL TO PERSONNEL. ONLY QUALIFIED PERSONNEL SHOULD INSTALL ELECTRICAL EQUIPMENT.

Physical

If the front panel has all ready been removed from the enclosure skip to #3.

1. Using a standard slot screwdriver remove the screws on the front panel.
 2. Carefully wiggle the front panel to loosen the gasket and pull gently toward you. Do not pull more than about 8 inches/20CM or you could damage the wiring harness.
 3. Turn the front panel around so that the back side is facing you and set aside for now.
 4. Solder two selected resistors together as shown in figure II.F.1.
 5. Attach leads to recording device as shown in figure II.F.1.
 6. Attach resistors to 0-10V Output as shown in figure II.F.2.
- Ensure resistors and leads DO NOT short to each other or to any part of the CB assembly.
7. Recalibration is required, see Calibration Procedures, section V.C.

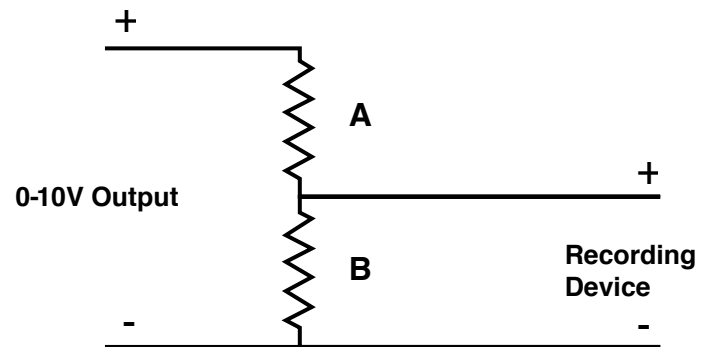
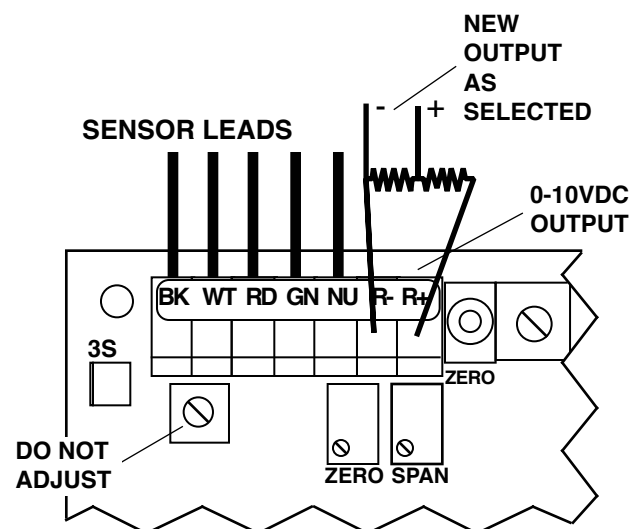


Figure II.F.1



Main CB Assembly

Figure II.F.2

Reassembly

1. Carefully reinstall the front panel, bottom first, ensure no wires have been pinched.
2. Reinstall the screws and tighten.
3. To operate, turn power ON.

G. RE-CONFIGURE YOUR MONITOR/CONTROLLER (Configuration Module Installation)

1. DESCRIPTION

The 720 Series II Monitor/controllers have been designed for easy field re-configurability. The Configuration Module consists of a 16 pin Header that plugs into a 16 pin socket.

NOTE: Changing from pH to ORP or visa versa, requires a different sensor.

pH Module	—	pH14
ORP Module	—	ORP2A ANALOG Module†
ORP Module	—	ORP2D DIGITAL Module†

NOTE: Some OEM models may not be re-configured being originally manufactured with fixed resistors. If your application requires re-configuring an OEM model, first contact the system manufacture for help. The Myron L® Company may re-configure or exchange your instrument at a cost.

2. INSTALLATION

Briefly -

The new Configuration Module simply replaces the Configuration Module presently installed, see figure II.G.1.

Type label will be required if changing from pH to ORP or visa versa.

ZERO and SPAN recalibration is performed.

IMPORTANT NOTES:

1. CHANGING FROM pH TO ORP OR VISA VERSA WILL REQUIRE A SCALE CHANGE ON ANALOG MODELS. SEE SECTION II.G.4 FOR INSTRUCTIONS.
- † 2. ANALOG and DIGITAL ORP MODELS REQUIRE DIFFERENT CONFIGURATION MODULES. SEE FIGURES II.G.8 AND II.G.9.



CAUTION - READ FOLLOWING CAREFULLY

WARNING: BEFORE STARTING, IF MONITOR/CONTROLLER IS INSTALLED, ENSURE THE POWER IS OFF. FAILURE TO DO SO COULD CAUSE DAMAGE TO THE INSTRUMENT, AND COULD BE HARMFUL OR FATAL TO PERSONNEL. ONLY QUALIFIED PERSONNEL SHOULD INSTALL OR SERVICE ELECTRICAL EQUIPMENT.

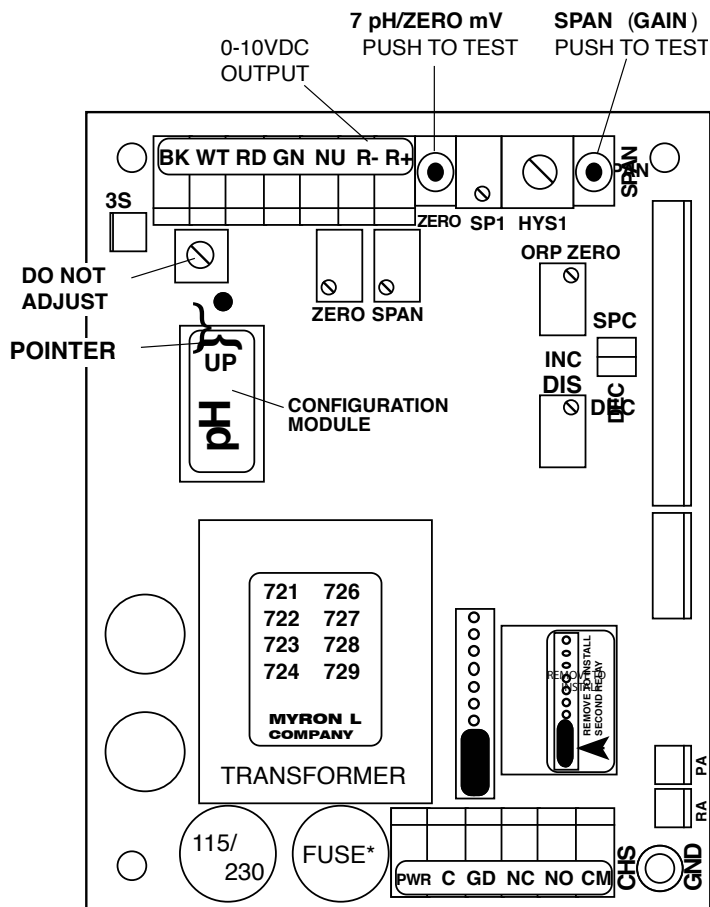
Physical

NOTE: When opening instrument, remove front cover with care; a ribbon cable connects the front panel and main board. If the front panel has all ready been removed from the enclosure skip to #4.

1. Using a standard slot screwdriver remove the screws on the front panel.
2. Carefully wiggle the front panel to loosen the gasket and pull gently toward you. Do not pull more than about 8 inches/20CM or you could damage the wiring harness.
3. Turn the front panel around so that the back side is facing you and set aside.
4. Locate and remove existing Configuration Module from MAIN Circuit Board, as shown in figure II.G.1. It is not

easy to remove, it was designed to stay in place under adverse conditions.

5. With the pointer up, carefully align the new configuration Module to the socket on the MAIN Circuit Board as shown in figure II.G.1.
6. Press firmly into place.
7. Analog models will require the meter scale to be changed. See Changing Analog Meter Scale, section II.G.3.
8. Recalibrate, see CALIBRATION PROCEDURES, V.C.



Main CB Assembly

Figure II.G.1

3. CHANGING ANALOG METER SCALE (DIAL)

After changing configurations (pH to ORP or visa versa) on an analog model 720II it will be necessary to change the meter scale (dial). The following steps will guide you through the change. Please read caution carefully.



CAUTION - READ FOLLOWING CAREFULLY

Exercise extreme caution while working on meter. Meter movement, and/or pointer (needle) may be damaged beyond repair. It is recommended only qualified personnel change scales.

DO NOT allow dust to enter the case while it is open.

Failure to follow these instructions may cause irreparable damage, and will VOID the warranty.

Briefly -

The meter is removed from front panel (except OEM models).

The cover is removed.

The hex screws retaining the scale are removed, and scale is slid out the top.

New scale is slid in place, and screws reinstalled.

Cover aligned, installed and zero set.

Physical

For OEM models skip to #4.

1. Using a wrench, nut driver or pliers remove the two (2) large nuts retaining the circuit board wiring harness connectors. Red wire is PLUS (+), Brown wire is MINUS (-). See figure II.G.2.
2. Using a standard slot screwdriver remove the four (4) screws, and the backing plate holding the meter to the front panel as shown in figure II.G.2.
3. Remove meter. Do not lose the gasket between the meter and the front panel, it must be reinstalled upon reassembly. See figure II.G.3. Align gasket to front panel so as the gasket does not show when meter is assembled to front panel.

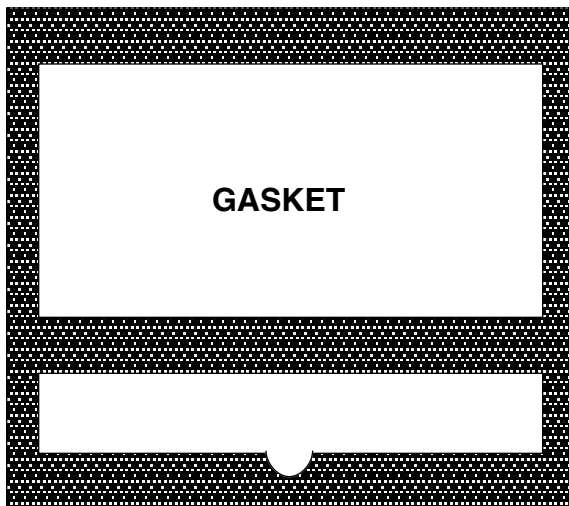


Figure II.G.3

4. Using a wide blade standard slot screwdriver, starting at a bottom corner, CAREFULLY pry the clear plastic cover loose from the movement case. See figure II.G.4.

5. Using a 1/8" (3.2mm) hex driver, remove the two (2) small screws holding the scale (dial). See figure II.G.5.
6. To remove the scale, lightly press on bottom of scale, the top will lift up. Be extremely careful not to bend the pointer (needle) or to move the Zero Adjust (ZA). See figure II.G.5.

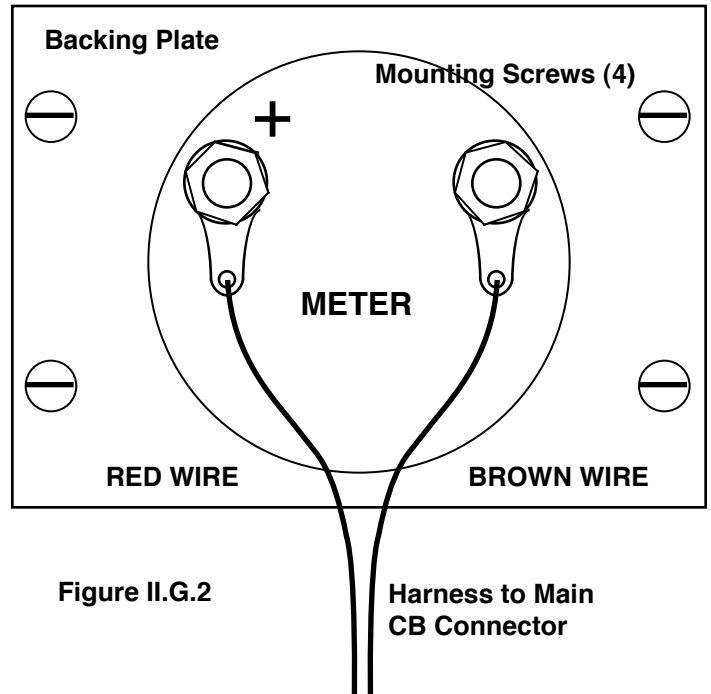


Figure II.G.2

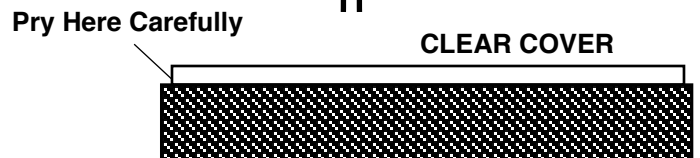


Figure II.G.4

7. Grasp top and slide scale slowly out from top. Be extremely careful not to bend the pointer (needle) or to move the Zero Adjust (ZA). See figure II.G.5.

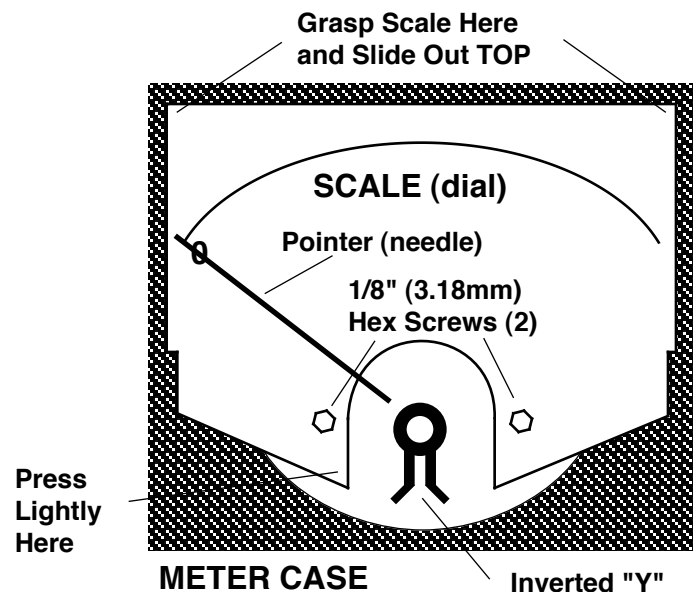
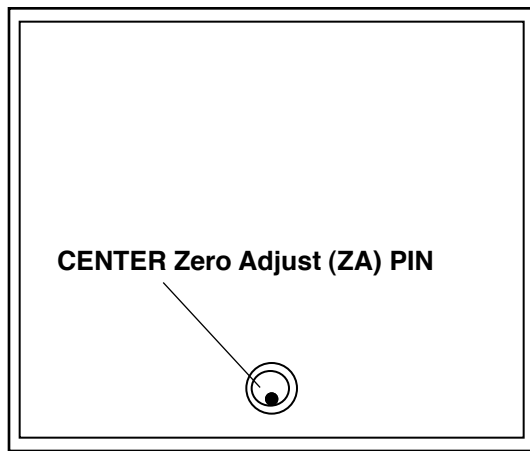


Figure II.G.5

8. Reverse the above procedure using the new scale.

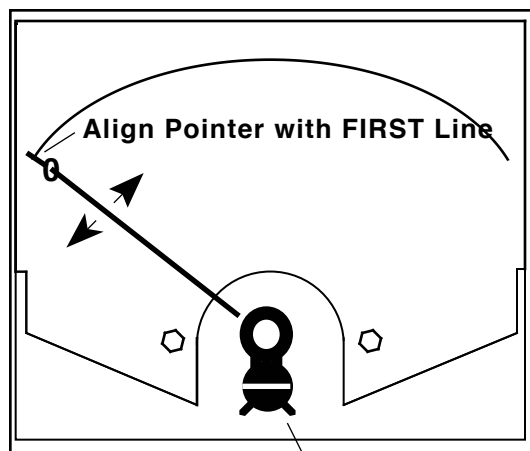
NOTE: While replacing the clear plastic cover, ensure the ZA screw pin on the cover aligns with the inverted “Y” shaped slot on the meter movement. See figure II.G.5. IF, the inverted “Y” shaped slot is inadvertently moved - BEFORE installing cover:

- a. Recenter the inverted “Y” to the meter case as shown in figure II.G.5.
 - b. Center the Zero Adjust (ZA) PIN on the clear plastic cover as shown in figure II.G.6.
9. Using a standard slot screwdriver, ensure the ZA is operating - pointer swings left and right when turning the ZA with a standard slot screwdriver. See figure II.G.7.
 10. Set Meter ZERO as shown in figure II.G.7.
 11. Reinstall meter to front panel, reversing steps 1-3 (except OEM models).



**CLEAR PLASTIC COVER
(Inside View)**

Figure II.G.6



**CLEAR PLASTIC COVER
(case not shown for clarity)**

Figure II.G.7

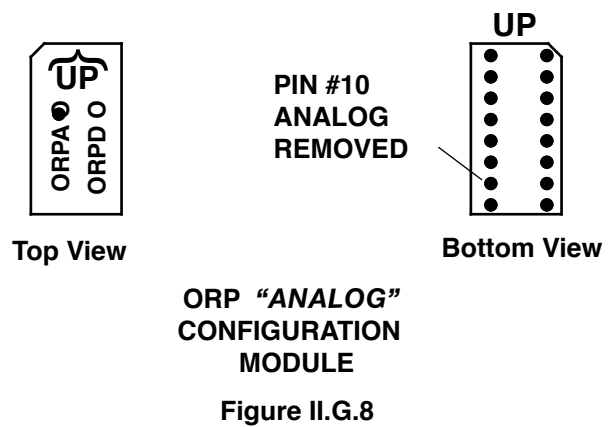


Figure II.G.8

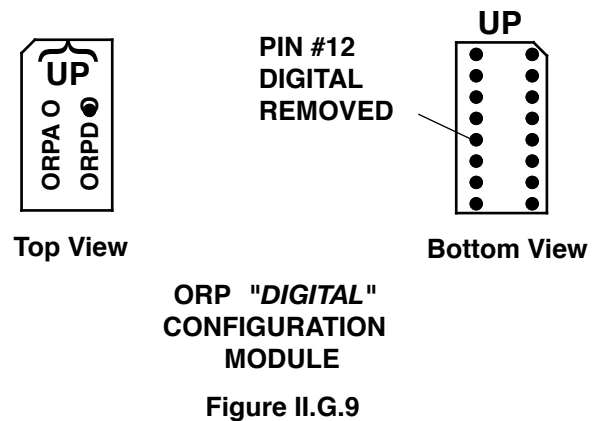


Figure II.G.9

REASSEMBLY

1. Carefully reinstall the front panel, bottom first, ensure no wires have been pinched.
2. Reinstall the screws and tighten.
3. To operate, turn power **ON**.

III. OPTIONS & ACCESSORIES

A. SC/SCO MODULE (SECOND ALARM/CONTROL OPTION) (Digital & OEM Models ONLY)

- SC Second Alarm Control Module ordered with Monitor/controller.
- SCO Second Alarm Control Module Kit ordered separately.

1. DESCRIPTION:

An essential component for applications requiring a DUAL setpoint. The Second Alarm/control module allows the user additional flexibility by being able to sound TWO Alarms, and Control TWO functions with the second 10 amp relay. The set points are non-overlapping. The #2 alarm/control (HIGH set point) rides on top of the #1 alarm/control (LOW set point). SCO kit comes with all items necessary to install and operate: SC Module, front panel harness with LED, switch, bezel, cap and two O-rings (006 & 008); and replacement lower front panel label (L2ALARM).

Specifications:

Control Function:

Setpoint control continuously adjustable 0-100% of span

Hysteresis:

Adjustable from 0.3-3% of full scale

Indicators:

Above (red) and below (green) setpoint LEDs (reversible)

Relay Contact Rating:

SPDT 10 amp ~ 250 VAC, 30 VDC. Relay operates increasing or decreasing reading (selectable)

Solid State Output:

Powered — 24VDC 30mA Maximum

2. INSTALLATION:

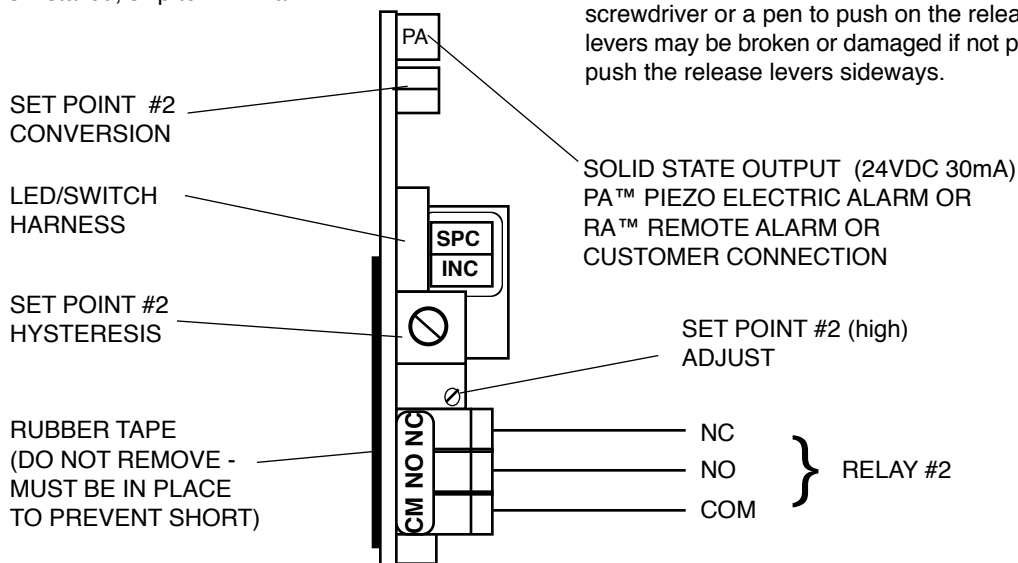
Briefly -

The Second Alarm/control module plugs into the main Monitor/controller circuit board.

The LED/switch harness is installed into the front panel.

Set point and hysteresis are set per "your" requirements.

If this option is installed, skip to III.A.2.a.



OPTIONAL SECOND ALARM/CONTROL MODULE

Figure III.A.1



CAUTION - READ FOLLOWING CAREFULLY

WARNING: BEFORE STARTING, IF MONITOR/CONTROLLER IS INSTALLED, ENSURE THE POWER IS OFF. FAILURE TO DO SO COULD CAUSE DAMAGE TO THE INSTRUMENT, AND COULD BE HARMFUL OR FATAL TO PERSONNEL. ONLY QUALIFIED PERSONNEL SHOULD INSTALL OR SERVICE ELECTRICAL EQUIPMENT.

Physical

If the front panel has all ready been removed from the enclosure skip to #3.

MAIN Circuit Board

1. Using a standard slot screwdriver remove the screws on the front panel.
2. Carefully wiggle the front panel to loosen the gasket and pull gently toward you. Do not pull more than about 8 inches/20CM or you could damage the wiring harness.
3. Turn the front panel around so that the back side is facing you and set aside for now.
4. Remove BLACK JUMPER from MAIN Circuit Board connector located next to the transformer as shown in figure III.A.2.

NOTE: Do not lose BLACK JUMPER. It must be reinstalled if second relay is removed for any reason and the #1 relay is expected to operate.

5. Carefully press the SCO Second Alarm/Control Module into MAIN Circuit Board as shown in figure III.A.4. When fully seated the SCO Module will snap into place.
6. Connect the Solid State output to PA or user supplied 24VDC/30mA alarm/valve or ??, and/or control wires to relay #2, as required, see figure III.A.4*.
 - a. Place the control cable and user supplied watertight cable restraint into the enclosure's appropriate access hole.
 - b. Neatly connect the control wires to the Monitor/controller's appropriate connectors. See figure III.A.4.

***CAUTION:** The relay connectors require only a small screwdriver or a pen to push on the release levers. The release levers may be broken or damaged if not pushed straight. DO NOT push the release levers sideways.

Front Panel

WARNING: there are two (2) O-rings installed on the switches, one (1) on the shank and the other is under the push button. Both of these O-rings must be reinstalled to maintain IP65/NEMA 4X ratings. See figure III.A.3.

1-4 assumes this is a conversion from a single alarm/control. Skip to #5 if new installation or assembly.

1. Carefully remove the RED LED from the front panel by pulling lightly on the wires. It may be necessary to use a small flat screwdriver to slightly spread the retaining ring.
2. Remove the set point switch from the front panel by rotating the round bezel nut CCW on the front panel, see figure III.A.4.
3. Remove the LOWER front label.
4. Clean off remaining adhesive, if possible with alcohol.
5. Install DUAL alarm LOWER label, P# L2ALARM.
6. Install the SCO Second Alarm/Control RED LED in the UPPER position as shown in figures III.A.5 & III.A.6.

7. Install the SCO Second Alarm/Control Set Point Switch in the UPPER center position.
8. Re-install #1 (original) Set Point Switch in the LOWER center position.
9. Re-install the #1 (original) RED LED in the LOWER position.
10. The GREEN LED stays in the same location.

a. Set Point Conversion (SPC) /

Reversing Set Point

The alarm/control circuit(s) on all 720 Series II pH and ORP Monitor/controllers are configured to trigger the alarm relay as the reading increases.

If the user's application requires it, the alarm/control circuit may be easily reconfigured to trigger the alarm/control relay as the pH (or ORP) reading decreases. Refer to figure III.A.4 for the locations of the SPC jumpers referred to in this section.

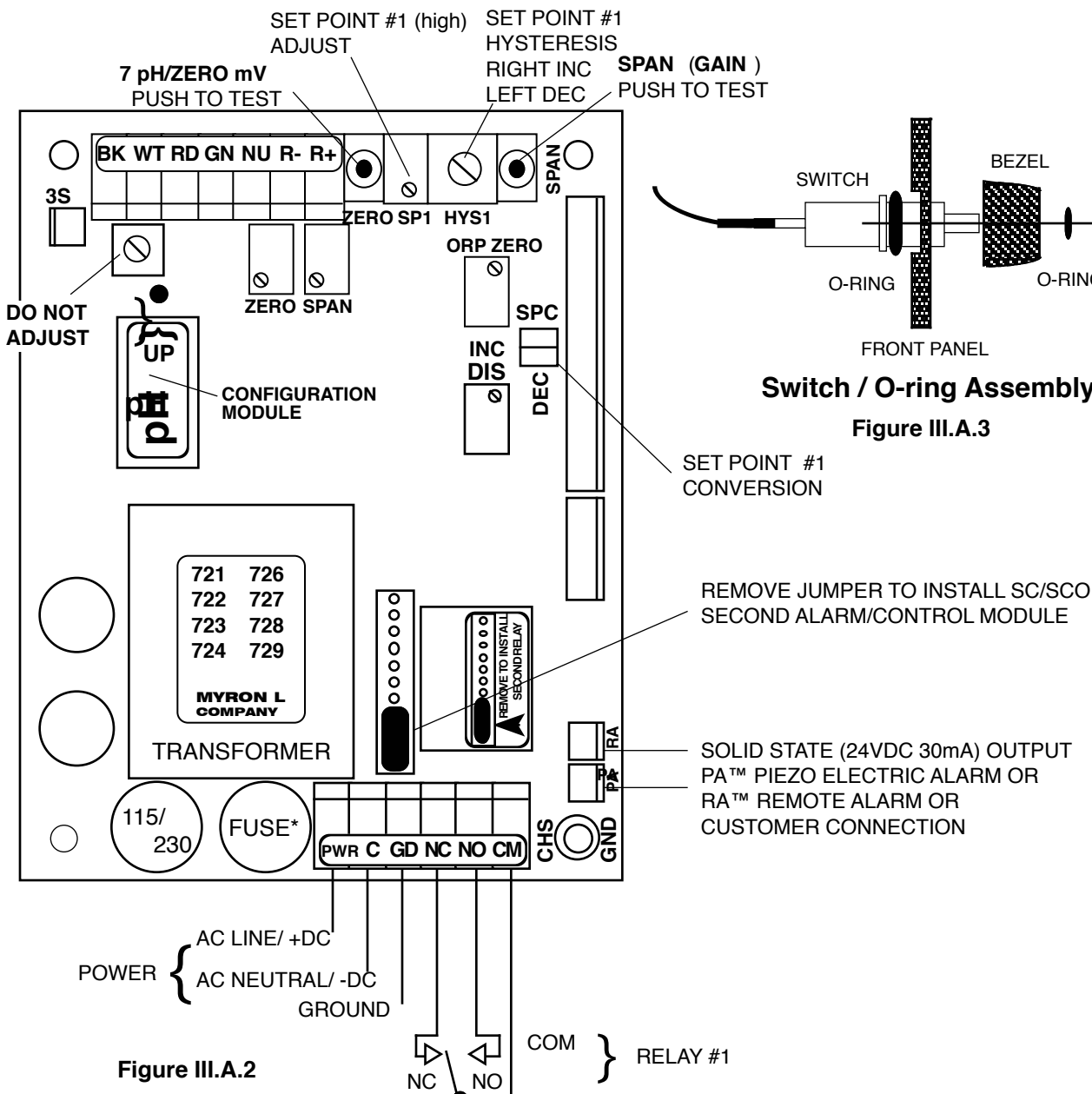
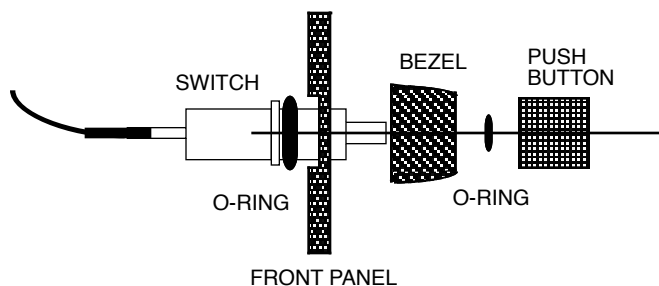


Figure III.A.2



Switch / O-ring Assembly

Figure III.A.3

The following instructions describe the steps for converting the Monitor/controller. Refer to figure III.A.4 for the location of the SPC(s) on your Monitor/controller. If unnecessary, skip to Set Point Adjustment.

1. Ensure power is **OFF**.
2. Locate the SPC jumpers for the alarm to be configured, see figure III.A.4.
3. Make a note of the current orientation of the SPC jumpers.
4. Remove both jumpers. This is easily done by hand. Take care not to crush the jumpers if using pliers.
5. Rotate the jumpers 1/4 turn (90°) and reinstall them on their posts.
6. Continue with Set Point adjustment.

b. Set Point Adjustment

Set point #1 (LOW) must be adjusted **BEFORE** adjusting set point #2 (HIGH).

1. Turn power **ON**.
2. While depressing the lower "SET POINT" switch, turn the Set Point #1 control adjustment, figure III.A.4 until the desired set point value is indicated on the display.
3. Repeat for Set Point #2 by depressing the upper "SET POINT" switch and adjusting the SP2 on the SC/SCO Module as shown in figure III.A.4.
4. Turn power **OFF**.
5. Continue or reinstall the front panel and tightly secure retaining screws, see REASSEMBLY, page 22.

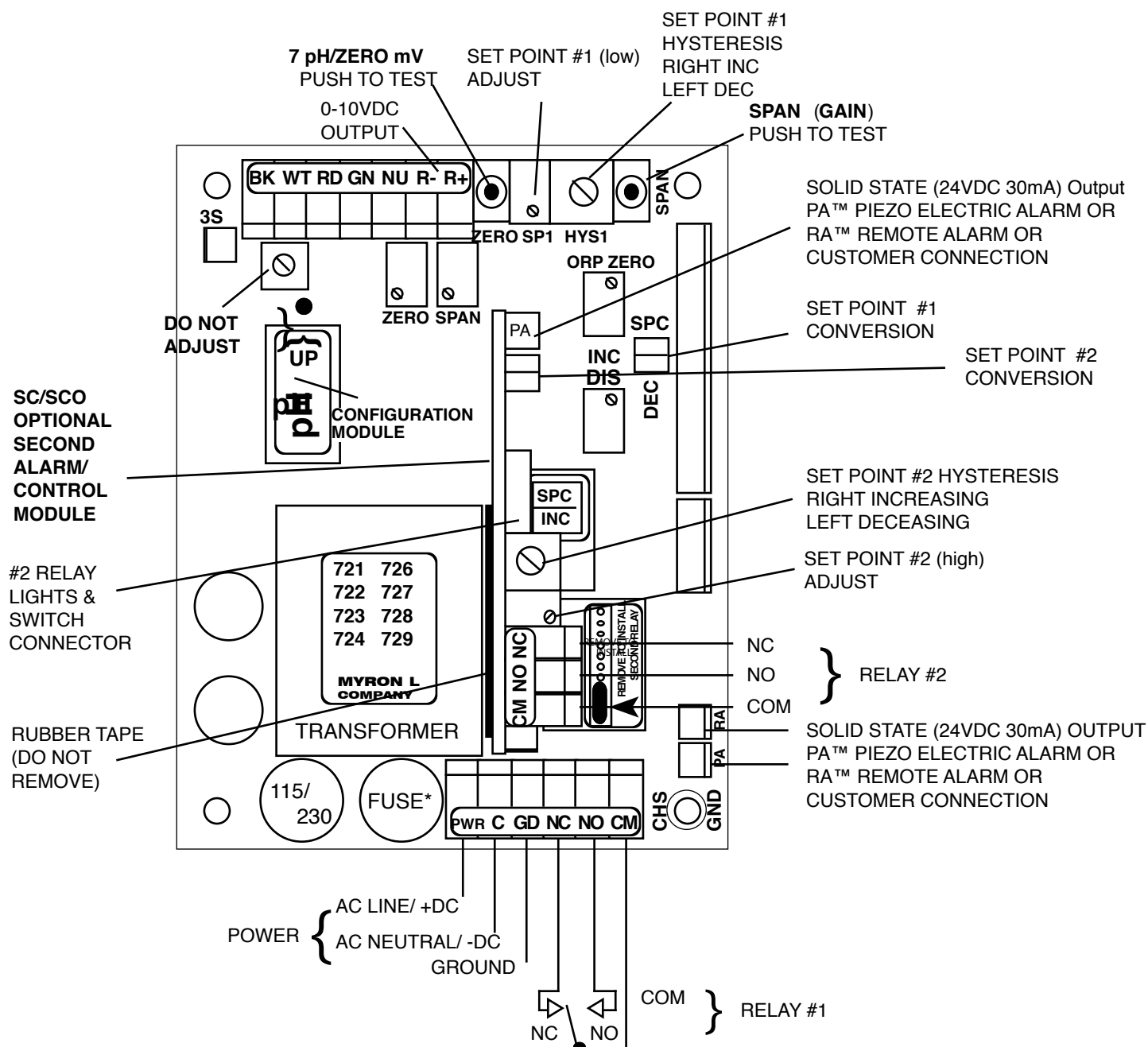


Figure III.A.4

c. Hysteresis (Dead Band) Adjustment*

The hysteresis or dead band is approximately $\pm 3\%$ of the set point at full scale as it leaves the factory. Under normal (most) conditions it will not be necessary to adjust. However, if you desire to make an adjustment please keep the following in mind.

The adjustment is very simple and is based on set point location.

If the set point* is in the upper 75-100% of the scale, the hysteresis control pot should be turned fully to the right.

If the set point is in the lower portion of the scale, i.e. 5-25% of scale, the control pot may be turned fully to the left.

If you are operating in the center, 25-75% of scale, the control pot may be adjusted in the center.

Or the hysteresis or dead band may be adjusted to tighten the control of a particular process.

CAUTION: Adjusting the hysteresis too narrow may cause the alarm to fluctuate (on-off) due to flow, chemical mixing or bubbles causing the relay to chatter. This condition is to be avoided, it could damage your valves, pumps, etc. and will eventually damage the relay.

* Applies to both set points.

The following is assuming the front panel is already removed and the set points have been set, if not see "Set Point Adjustment".

1. Turn power **ON**.
2. Locate the Hysteresis Control (HYS1) located next to the Set Point #1 (SP1) adjustment - it is a single turn pot. See figure III.A.4.
3. Adjust as described in "Hysteresis (Dead Band) Adjustment" or as desired.
4. Press set point test switch on the front panel to verify Hysteresis is set as desired.
5. Repeat for SCO Module. See figure III.A.4.
6. Press set point test switch on the front panel to verify Hysteresis is set as desired.
7. Turn power **OFF**.

d. Second Relay Connection

1. Place the user supplied relay interface cable and watertight cable restraint into the enclosure's appropriate access hole.
2. Neatly connect wires to the relay connector as shown in figure III.A.4.

e. Solid State Output Options

24VDC Unregulated 30mA max.

Same as 4. above, SOLID STATE OUTPUT.

1. Piezo Electric Alarm - PA (option)

Plug PA connector to CB as shown (See Figure III.A.4).

2. Remote Alarm - RA™ (option)

Plug RA connector to CB as shown (See Figure III.A.4).

3. Connect to your own alarm

Ensure your requirements do not exceed the 24VDC Unregulated 30mA maximum.

Ensure the polarity is correct.

Attach your wires.

Attach harness connector to controller connector (RA) per figure III.A.4.

If necessary, you may order connector with 8" Harness

part #RAH, from the Myron L® Company.

REASSEMBLY:

1. Carefully reinstall the front panel, bottom first. Ensure no wires have been pinched between enclosure and front panel.
2. Reinstall the screws and tighten.
3. To operate, turn power **ON**.

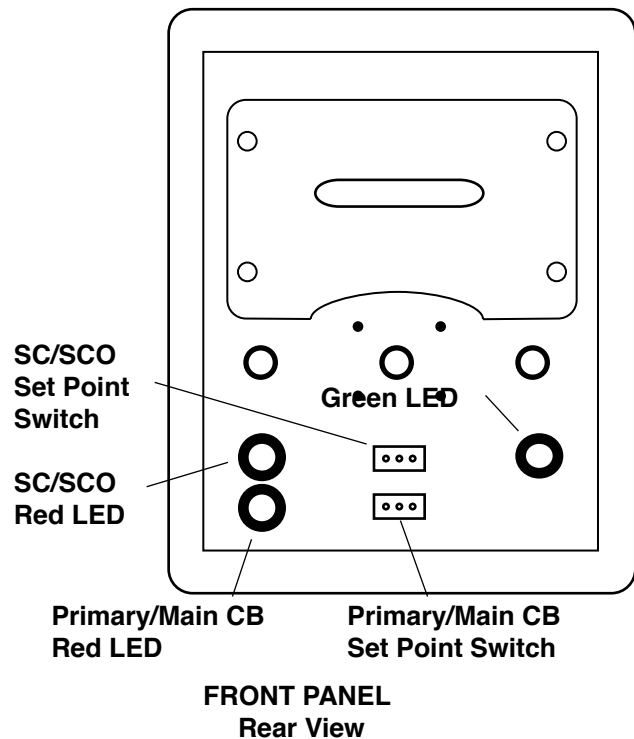


Figure III.A.5

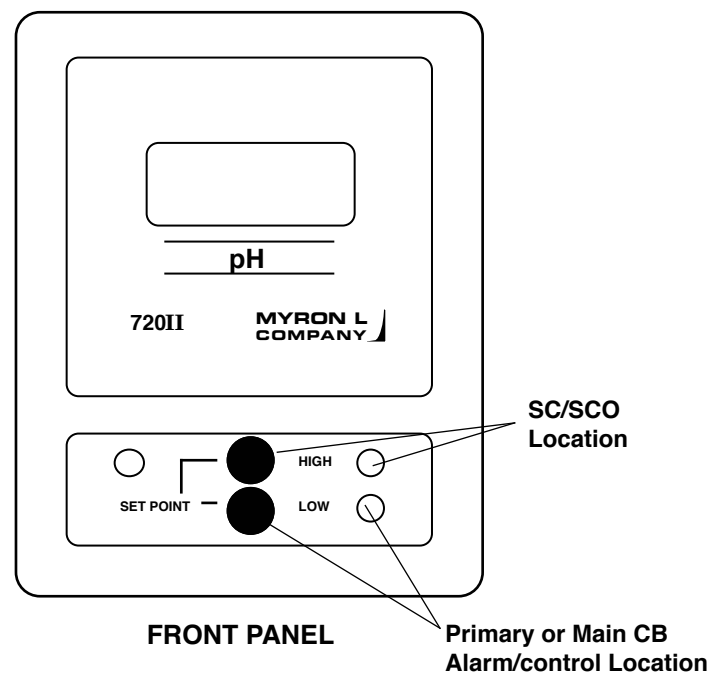


Figure III.A.6

B. 4A/4AO MODULE (4-20mA OPTION)

Available only on the digital models 728II, 729II, 723II and 724II, or analog and digital OEM.

- 4A 4-20mA Self/Remote-powered Isolated output module ordered with Monitor/controller.
- 4AO 4-20mA Self/Remote-powered Isolated output module ordered separately (includes harness).

1. DESCRIPTION

The 4-20mA option gives the Series II Monitor/controller the ability to send a signal very long distances with minimal interferences and signal degradation. The output is an Isolated 4-20mA signal that corresponds to the full scale range of the Monitor/controller into which it is installed. This output is easily configured to be either self-powered or remote-powered as required for your particular application.

NOTE: The maximum impedance of the user's current sensor should not exceed 400 ohms.

as 10Ω. This "-4A" option will drive any impedance from 0 to 600Ω without any degradation of performance.

There are two modes in which current loop transmitters operate; Self-Powered and Remote-Powered.

Self-Powered — the transmitter provides the power to drive the 4 to 20 mA current. See figure III.B.1.

Remote-powered — the receiving instrument provides the power to drive the 4 to 20 mA current. See figure III.B.2.

Specifications

Self-Powered and Remote-Powered

Drive Impedance — 0 to 600Ω

Common Mode Maximum — 120VAC @ 60 Hz

Isolation — 100pf max. to Model 750II circuit common
100pf max. to input power line

Calibration

Two multi-turn pots — Factory Set.

4mA = Zero (0)

20mA = Full Scale

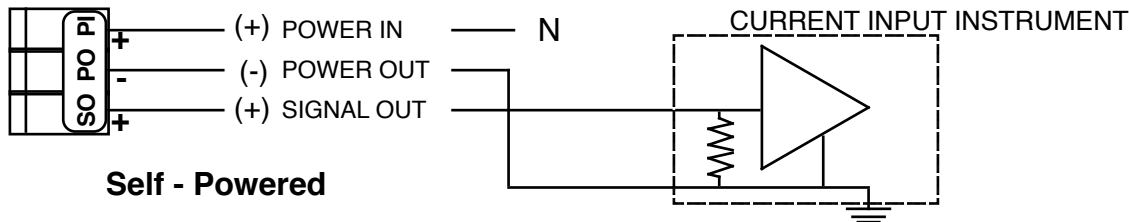


Figure III.B.1

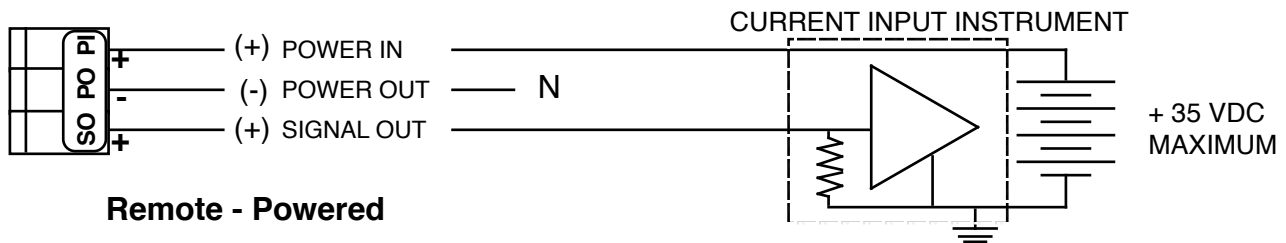


Figure III.B.2

Since the output is an isolated current loop, it is the ideal choice for applications requiring; a control signal to be run very long distances, systems requiring a 4-20mA input or in instances where isolation is necessary.

As the output is isolated, and a current, it is useful for long distance interface, especially where wiring resistances may be high, and/or the ground potentials may differ between the sensor input ground and the current receiving instruments ground.

The 4-20mA output will not be degraded in accuracy even when the ground differences are as much as 120VAC @ 60Hz. Interface wire resistance of 350Ω will not degrade the accuracy of the output when interfaced to a typical 250Ω input impedance of a transmitter current input device.

The output is capable of driving a minimum of 600Ω worst case, therefore, will satisfy virtually all modern interface requirements. Current input devices usually have an input impedance of 250Ω, however, some older designs can have as high as 500Ω or as low

Calibration is NOT required. However, if you feel you must verify or recalibrate, see Recalibration below.

2. INSTALLATION

Briefly -

The 4-20 Module replaces the plastic display retainer plate attached to the front panel.

The 4-20 Module harness is attached to the main circuit board as marked '4-20'. See figure III.B.4.

The 4-20 output is wired as required - Self-powered or Remote-powered. See figures III.B.1 & III.B.2.



CAUTION - READ FOLLOWING CAREFULLY

WARNING: BEFORE STARTING, IF MONITOR/CONTROLLER IS INSTALLED, ENSURE THE POWER IS OFF. FAILURE TO DO SO COULD CAUSE DAMAGE TO THE INSTRUMENT, AND COULD BE HARMFUL OR

FATAL TO PERSONNEL. ONLY QUALIFIED PERSONNEL SHOULD INSTALL ELECTRICAL EQUIPMENT.

Physical

If the front panel has all ready been removed from the enclosure skip to #3.

1. Using a standard slot screwdriver remove the screws on the front panel.
2. Carefully wiggle the front panel to loosen the gasket and pull gently toward you. Do not pull more than about 8 inches/20CM or you could damage the wiring harness.
3. Turn the front panel around so that the back side is facing you.
4. Using a standard slot screwdriver remove the four (4) screws holding the plastic display retainer plate to the

2. Connect the signal and power wires as required, as shown in figures III.B.1. & III.B.2. This assumes you have already connected the other end of the wires as required.
 - a. Place the remote interface cable and user supplied watertight cable restraint into the enclosure's appropriate access hole.
 - b. Neatly connect the signal cable wires to the Monitor's appropriate connectors as shown in figure III.B.3.
3. To test, turn power **ON**.
4. Press the **SPAN** switch located on the main circuit board, see figure III.B.4, and monitor the output at your remote site, display should indicate **0** (pH) or **-2000** mV (ORP); With a DVM connected and set to DC milliamps, see figures III.B.1. & III.B.2, DVM should indicate **4mA**.

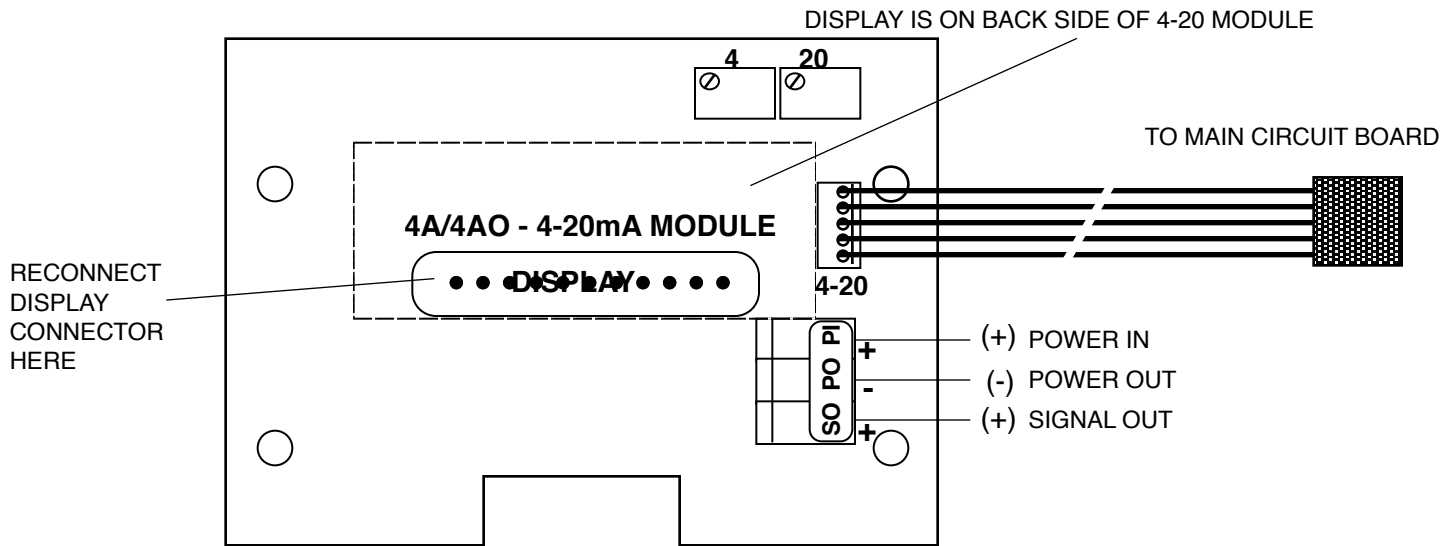


Figure III.B.3

- front panel. When the screws have been removed, the plastic display retainer plate and the display will be free from the front panel.
5. Set front panel down or carefully allow to hang from the harness. Do not drop as the harness connector will pull out allowing the front panel to fall.
6. While holding the display and the plastic display retainer plate, carefully remove the display harness connector. Do not drop the display. Remove and discard the plastic display retainer plate.
7. While still holding the display in the palm of your hand, set the 4-20 Module over it with the display pins protruding through the center opening as shown in figure III.B.3.
8. Reconnect the harness to the display as shown in figure III.B.3.
9. While holding the front panel, align the display to the opening while at the same time align the 4-20 Module mounting holes to the front panel.
10. Reinstall the four (4) screws and tighten.

Electrical

1. Connect the 4-20 Module (five) 5 wire harness to the main circuit board at the location next to the display harness marked "4-20" as shown in figure III.B.4.

5. Press the **ZERO** switch located on the main circuit board, see figure III.B.4, and monitor the output at your remote site, display should indicate **7** (pH) or **0** mV (ORP); With a DVM connected and set to DC milliamps, see figures III.B.1. & III.B.2, DVM should indicate **12mA**.
5. Turn power **OFF**.
6. Carefully reinstall the front panel, bottom first, ensure no wires have been pinched between enclosure and front panel.
7. Reinstall the screws and tighten.
8. To operate, turn power **ON**.

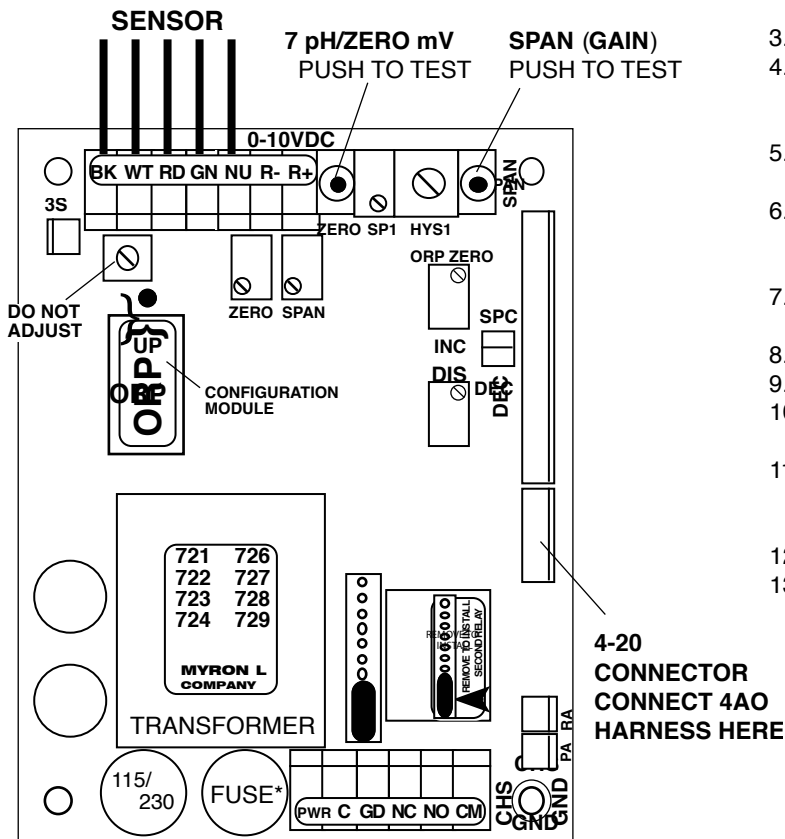
3. RECALIBRATION

The 4-20 Module was calibrated at the factory, however, if you wish to check the calibration the following procedure will help you to accomplish this task. Exercise caution while performing this procedure.

Requirements; a DVM set to DC milliamps, a tweaker or small standard slot screwdriver.

This procedure assumes the front panel is removed.

1. If sensor is connected, disconnect sensor wires from sensor terminal block.
2. Attach the DVM to the output connectors per your



MAIN CIRCUIT BOARD ASSEMBLY

Figure III.B.4

- requirements, i.e. self-powered or remote-powered, see figure III.B.5.
3. Turn power **ON**
4. Press the **SPAN** (GAIN) Test Switch with the front panel display at 0 pH (-1999 mV for ORP) the DVM should indicate 4 milliamps.
5. If not, adjust the cal control marked "**4mA**" until the DVM indicates 4mA, see figure III.B.3.
6. Press the **ZERO** Test Switch, with the display indicating 7 pH (0 mV for ORP) the DVM should indicate **12** milliamps.
7. If not, adjust the cal control marked "**20mA**" until the DVM indicates 12mA. See figure III.B.3.
8. Calibration is complete.
9. Turn power **OFF**.
10. Reconnect sensor wires to sensor terminal block as shown in figure III.B.4.
11. Carefully reinstall the front panel, bottom first, ensure no wires have been pinched between enclosure and front panel.
12. Reinstall the screws and tighten.
13. To operate, turn power **ON**.

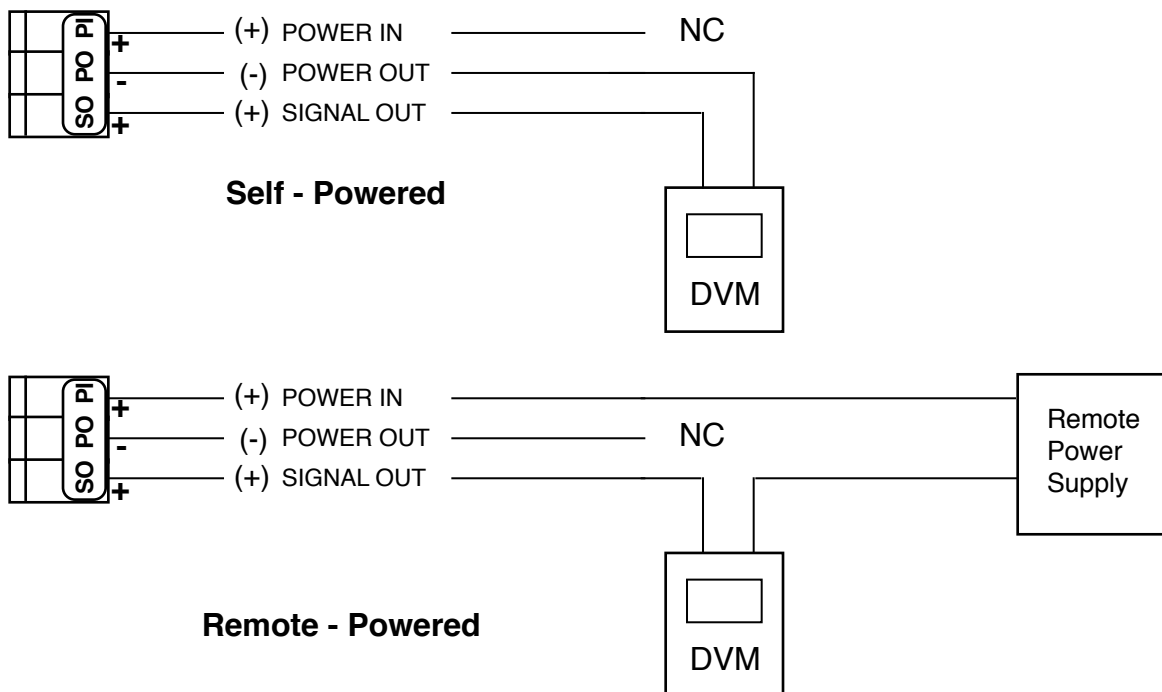


Figure III.B.5

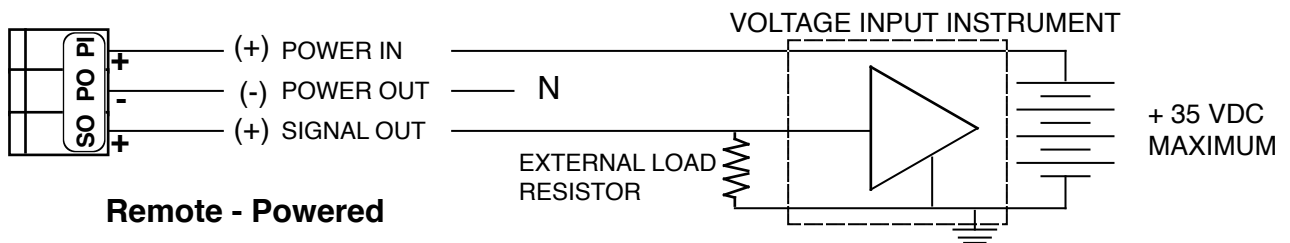
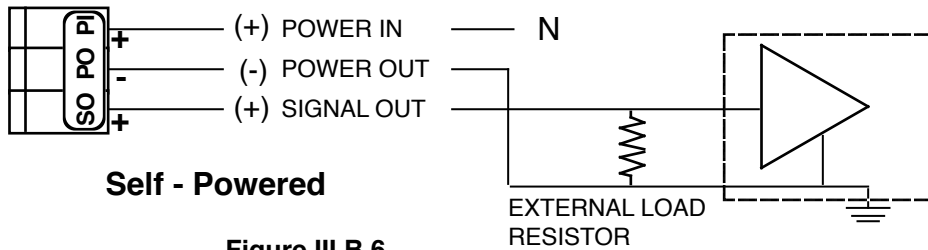
4. CONVERTING A CURRENT TO A VOLTAGE

Current measuring devices actually measure voltage, but have an internal resistor as shown in figures III.B.1 & III.B.2 and are scaled to display in current. If you have a voltage device and you wish to utilize the current from the 4A (4-20mA) Module, the following will help you to make this conversion.

To convert a 4-20 mA current output to operate or drive a voltage input device it is necessary to install a LOAD resistor across the input terminals as shown in figures III.B.6 & III.B.7. The value of the resistor is chosen to match the input voltage range, i.e. 0-10 Volts requires a 500Ω resistor and will produce a 2 to 10 input voltage. This floating zero is useful to indicate a broken 4-20 input wire when the indication is zero volts.

For an input voltage range of:

10.0 Volts	the resistor value is	500 ohms	indicates	2.0 V	@ 4 mA.
5.0 Volts	"	250 ohms	"	1.0 V	"
1.0 Volts	"	50 ohms	"	0.2 V	"
100 millivolts	"	5 ohms	"	20 mV	"
10 millivolts	"	0.5 ohms	"	2 mV	"



For other input ranges, divide the input voltage range by 0.02, the answer will be in ohms.

NOTE: The tolerance of the load resistor directly affects the accuracy of the resulting voltage, i.e. 5% resistor = 5% error.

C. TEMPERATURE MODULE

(Digital Models only)

- TP Temperature Module ordered with Monitor/controller.
- TPO Temperature Module ordered separately includes label # LTEMP.
- Requires; Separate three (3) wire 1000Ω RTD temperature sensor.

NOTE: OEM models require an additional display harness, part number TPMH. See OEM Installation.

1. DESCRIPTION

The Temperature Module (TPO) gives the Monitor/controller more flexibility for the user by being in the same package.

The Temperature Module is driven by the main display output and is very simple to install.

The Temperature Module and Temperature Sensor SYSTEM utilize a unique 3 wire technique by which errors are greatly reduced.

The Temperature Module has its own 0-5VDC output.

TPO kit comes with all items necessary to install and operate: TP Module; front panel harness with switch, bezel, cap and two O-rings (006 & 008); and TEMPERATURE label (# LTEMP).

An alarm/control function may be added to the TP by ordering the THO harness kit.

Specifications

±200°C (±200°F Special Order Only)

Accuracy: ±0.2w/ICE ±0.5 w/out ICE

Display Resolution = 0.1

Output: 0-5VDC Connections - 2

Sensor Input: Separate 1000Ω RTD temperature sensor.

Connections: Three (3) wire for increased accuracy over long distances).

Calibration

Zero and Full Scale, FS (0 & 5VDC): Factory Set Simple pots

Display (CAL): Full Scale, FS (199.9) Factory Set Simple pot

Operates on safe ±5VDC supplied by the Main CB.

2. INSTALLATION

Briefly -

The Temperature Module replaces the plastic display retainer plate attached to the front panel.

The display harness plugs into the Temperature Module instead of the display.

The sensor leads are connected to the Temperature Module. See figure III.C.1.

The display switch is installed in the upper front panel as shown in figure III.C.4.

A "TEMPERATURE" label is added to upper front panel next to the Display Select switch as shown in figure III.C.4.



CAUTION - READ FOLLOWING CAREFULLY

WARNING: BEFORE STARTING, IF MONITOR/CONTROLLER IS INSTALLED, ENSURE THE POWER IS OFF. FAILURE TO DO SO COULD CAUSE DAMAGE TO THE INSTRUMENT, AND COULD BE HARMFUL OR FATAL TO PERSONNEL. ONLY QUALIFIED PERSONNEL SHOULD INSTALL OR SERVICE ELECTRICAL EQUIPMENT.

Physical

If the front panel has all ready been removed from the enclosure slip to 3.

1. Using a standard slot screwdriver remove the screws on the front panel.
2. Carefully wiggle the front panel to loosen the gasket and pull gently toward you. Do not pull more than about 8 inches/20CM or you could damage the wiring harness.
3. Turn the front panel around so that the back side is facing you.
4. Using a standard slot screwdriver remove the four (4) screws holding the plastic display retainer plate to the front panel. When the screws have been removed, the plastic display retainer plate and the display will be free from the front panel.

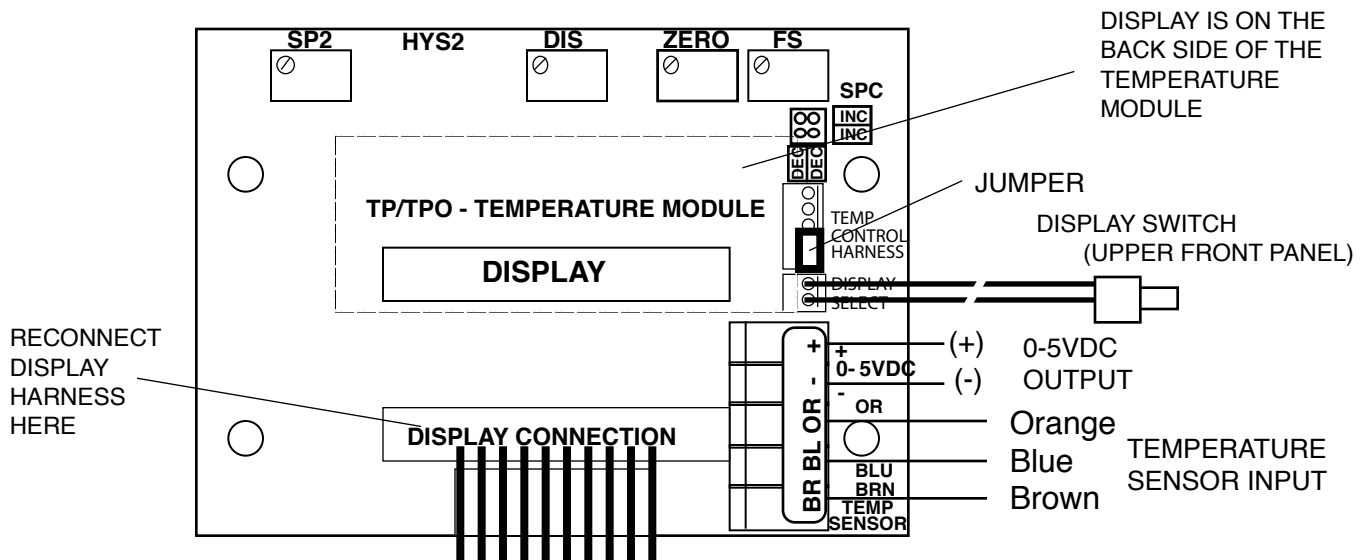


Figure III.C.1

- Set front panel down or carefully allow to hang from the harness. Do not drop as the harness connector will pull out allowing the front panel to fall.
- While holding the display and the plastic display retainer plate, carefully remove the display harness connector. Do not drop the display.
- Remove and discard the plastic display retainer plate.
- Insert display connector pins into the Temperature Module female connector. See figure III.C.1.
- While holding the front panel, align the display to the opening and at the same time, align the Temperature Module mounting holes to the front panel.
- Reconnect display harness with leads down as shown in figures III.C.1 & III.C.2.
- Reinstall the four (4) screws and tighten.

Display Select Switch installation

- Using a small sharp knife or 1/4" (6.35mm) drill, carefully cut open the hole on the right side of the front panel, when viewed from the back, just below the Sensor connectors on the Temperature module. See figure III.C.2.
- Install push-button display switch into this hole and tighten bezel. See figures III.C.2 & III.C.4.
- Install push-button/cap on switch.

WARNING: There are two (2) O-rings installed on the switch, one (1) on the threaded shank and the other is under the push button. Both of these must be re-installed to maintain IP65/NEMA 4X ratings. See figure III.C.3.

- Place "TEMPERATURE" label next to the switch. See figure III.C.4.

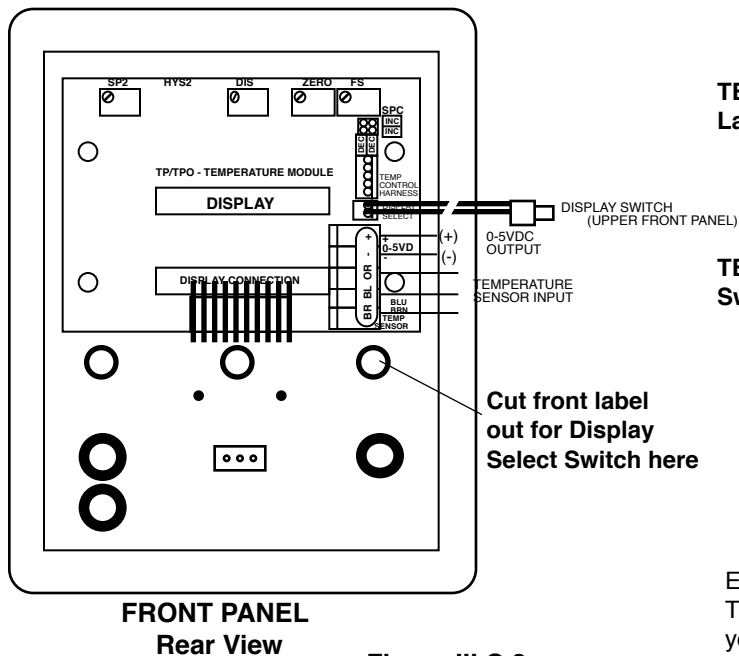
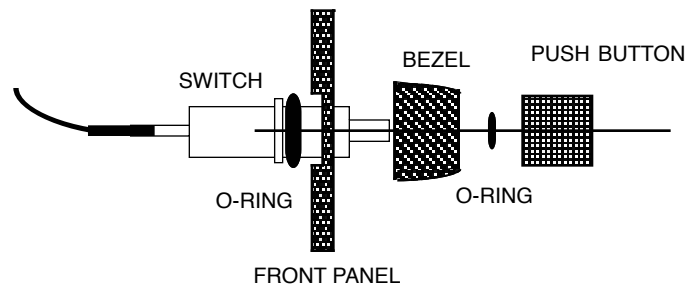


Figure III.C.2

Electrical

- Connect the display switch harness to the Temperature Module as shown in figure III.C.1.
- Connect the Temperature Sensor leads to the Temperature Module as labeled in figure III.C.1.

CAUTION: The sensor input connectors require only a small



SWITCH and O-RING ASSEMBLY

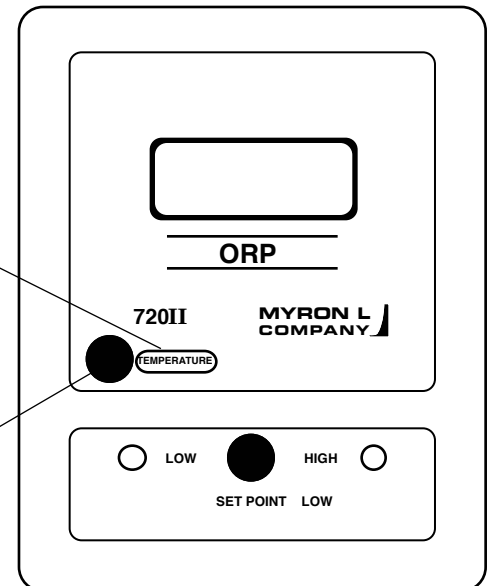
Figure III.C.3

screwdriver or a pen to push on the release levers. The release levers may be broken or damaged if not pushed straight toward the CB. DO NOT push the release levers sideways. Follow the color code as labeled.

- Connect 0-5VDC output, if desired.
- To test, turn power **ON**.
- Press "TEMPERATURE" front panel switch, display will show the temperature of the sensor.
- Turn power **OFF**.
- Continue or reinstall the front panel and tightly secure retaining screws, see REASSEMBLY, page 31.

TEMPERATURE
Label Location

TEMPERATURE
Switch Location



FRONT PANEL

Figure III.C.4

3. RECALIBRATION

Electronic Calibration Only. For System Calibration, see below. The Temperature Module was calibrated at the factory, however, if you wish to check the calibration the following procedure will help you to accomplish this task. Exercise caution while performing this procedure.

Requirements:

TP Calibration Module (TPC) or

Two .1% precision resistors -

ZERO - 1000.0Ω (0°C = 0.0V)

SPAN - 1758.56Ω (200°C = 5.0V)

One (1) jumper

A DVM set to DC Volts, a tweaker or small standard slot screwdriver.

a. TPC "Calibration" Module Procedure

This procedure assumes the front panel is removed.

1. Ensure power is **OFF**.
2. Remove the sensor leads from the Temperature Module.
3. Remove the 0-5VDC leads from the Temperature Module.
4. Press TP Calibration Module (TPC) firmly into sensor input connectors as shown in figure III.C.5.
5. Attach the DVM to the 0-5VDC output on the TPC module. See figure III.C.6.
6. Turn power **ON**. The DVM should indicate **0.0** volts.
7. If not, adjust the calibration control marked "**ZERO**" (see figure III.C.1 for location) until the DVM indicates **0.0** volts as shown in figure III.C.5.
8. Press switch on the TPC. See figure III.C.6.
9. The DVM should indicate **5.0** volts. See figure III.C.6.
10. If not, while pressing the TPC Module switch, adjust the calibration control marked "**FS**" (see figure III.C.1 for location) until the DVM indicates 5.0 volts as shown in figure III.C.6.
11. Press the front panel TEMPERATURE select switch **and** the TPC Module switch, the display should indicate **199.9** as shown in figure III.C.7.
12. If not adjust the calibration control marked "**DIS**" (see figure III.C.1 for location) until the reading is **199.9** as shown in figure III.C.7.
13. Calibration is complete.
14. Turn power **OFF**.
15. Remove TPC Module by pressing on each Phoenix connector release arm*.
16. Reconnect sensor leads as labeled.
17. Reconnect 0-5VDC output leads as labeled.
18. Continue or reinstall the front panel and tightly secure retaining screws, see REASSEMBLY, page 31.

CAUTION: The sensor input and 0-10VDC output connectors require only a small screwdriver or a pen to push on the release levers. The release levers may be broken or damaged if not pushed straight toward the CB. DO NOT push the release levers sideways.

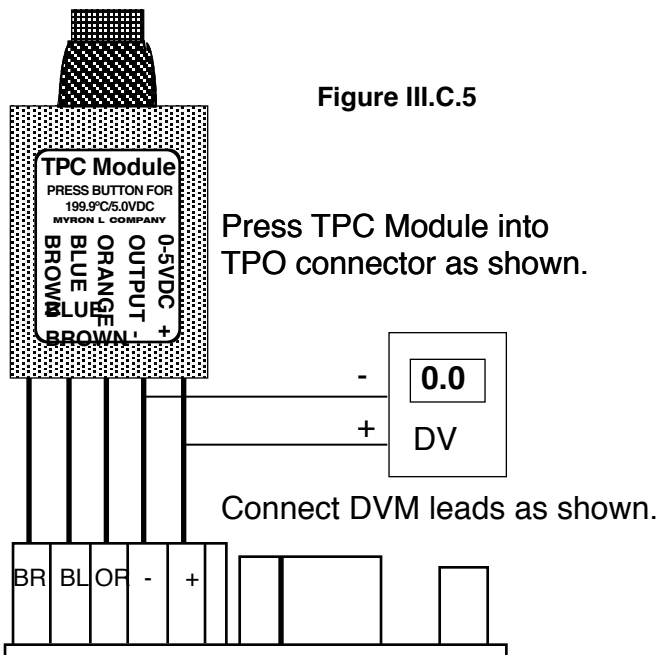


Figure III.C.5

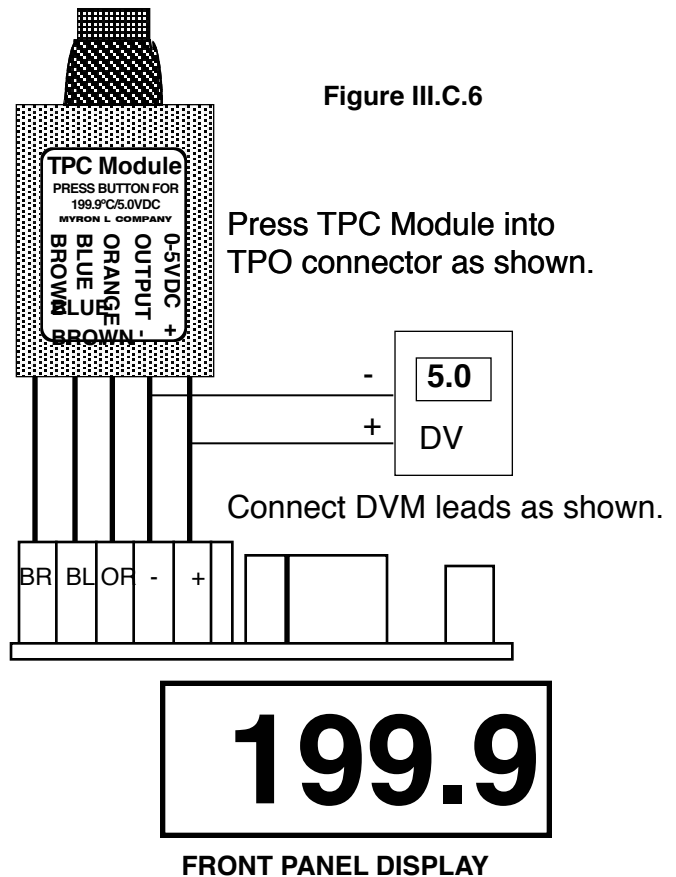


Figure III.C.6

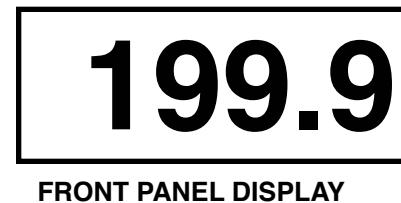


Figure III.C.7

b. Precision Resistor Calibration Procedure

This procedure assumes the front panel is removed.

1. Ensure power is **OFF**.
2. Remove the sensor leads from the Temperature Module.
3. Install ZERO resistor (1000.0Ω) across sensor terminals BL and OR. See figure III.C.8.
4. Install JUMPER between BR & BL as shown in figures III.C.8 & III.C.9.
5. Attach the DVM to the 0-5VDC output. See figures III.C.8 & III.C.9.
6. Turn power **ON**. The DVM should indicate **0.0** volts.
7. If not, adjust the calibration control marked "**ZERO**" (see figure III.C.1 for location).
8. Install SPAN resistor (1758.56Ω) across sensor terminals BL and OR. See figure III.C.9.
9. The DVM should indicate **5.0** volts.
10. If not, adjust the calibration control marked "**FS**" (see figure III.C.1 for location) until the DVM indicates **5.0** volts as shown in figure III.C.9.
11. Press the front panel TEMPERATURE select switch, the display should indicate **199.9** as shown in figure III.C.10.
12. If not adjust the calibration control marked "**DIS**" (see figure III.C.1 for location) until the reading is **199.9**.
13. Calibration is complete.
14. Turn power **OFF**.
15. Remove DVM from 0-5VDC.
16. Remove resistor and jumper by pressing on each Phoenix connector release arm*.
17. Reconnect sensor leads as labeled.
18. Reconnect 0-5VDC output leads as labeled.

19. Continue or reinstall the front panel and tightly secure retaining screws, see REASSEMBLY, page 31.

CAUTION: The sensor input and 0-5VDC output connectors require only a small screwdriver or a pen to push on the release levers. The release levers may be broken or damaged if not pushed straight toward the CB. DO NOT push the release levers sideways.

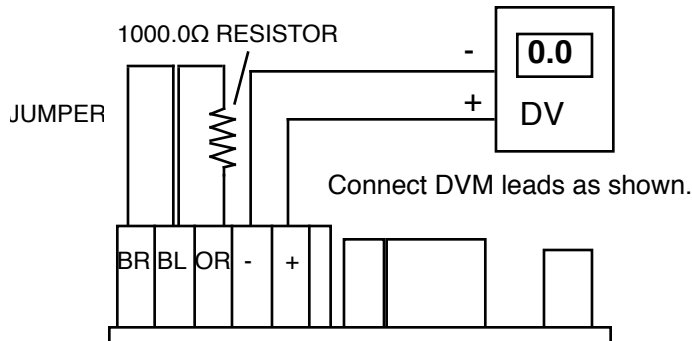


Figure III.C.8

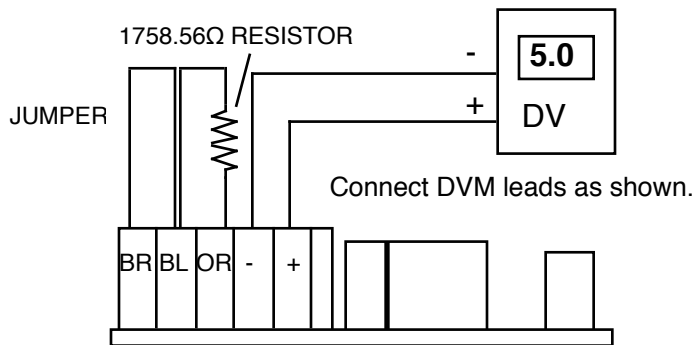
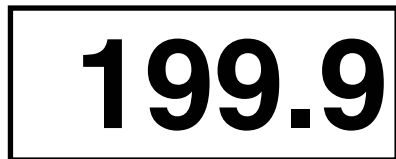


Figure III.C.9



FRONT PANEL DISPLAY

Figure III.C.10

c. System Calibration

By following these steps the complete temperature system, module and sensor, may be calibrated to better than $\pm 0.2^\circ$ centigrade accuracy. This procedure is similar to the electronic calibration except the sensor is attached and is allowed to equilibrate in "ICE" water before adjusting the ZERO calibration control.

NOTE: One of the above electronic calibration procedures, TPC Module or precision resistors, must be performed BEFORE the system calibration is performed. This is required to preset the span between zero and full scale.

1. Ice must be crushed in water to form a very thick slurry. A slurry is that condition where the water to ice ratio is such that only sufficient water is present to allow easy stirring. At this point, the temperature of the water will be 0.000°C .
2. Immerse sensor and cable approximately 2" (50mm) into

slurry.

3. Allow to equilibrate. Slurry must be constantly stirred.
4. Continue stirring until no further change in temperature is observed on the display.
5. Adjust TP Module ZERO calibration control to 000.0.
6. Continue or reinstall the front panel and tightly secure retaining screws, see REASSEMBLY, page 31.

4. ALARM/CONTROL FUNCTION

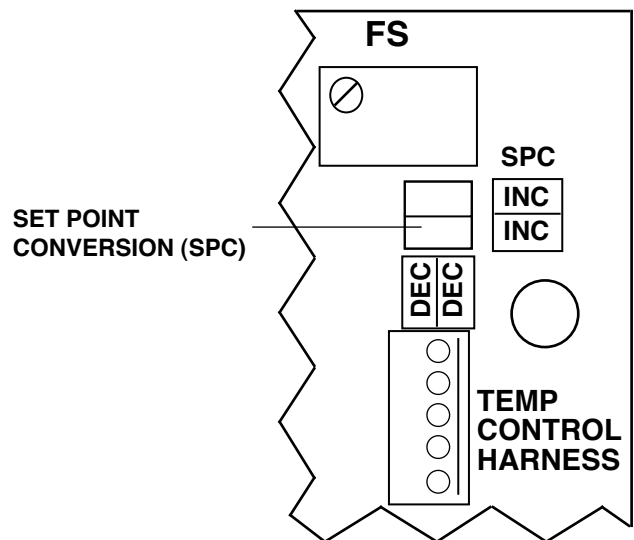
You have now completed the installation and set up of your Myron L Temperature Module option. Continue to set up and adjust the control feature of the Temperature Module option (-TH/THO & -SC/SCO), if installed. The following assumes the TH/THO option has been installed at the same time as the Temperature Module.

a. Set Point Conversion (SPC) / Reversing Set Point

As shipped from the Myron L® Company your Temperature controller is configured to ALARM/control when the temperature is to TOO HIGH. As many uses require the temperature to be controlled by the use of a heater or chiller, the TPO Module may be configured to maintain an elevated or lowered temperature as required. If the configuration is correct for your requirements skip to Temperature Set Point Adjust.

To reverse the set point ALARM/control operation:

1. Ensure power is **OFF**.
2. Locate the SPC on TP/TPO circuit board. See figures III.C.1 & III.C.11.
3. Make a note of the current orientation of the SPC jumpers.
4. Remove both jumpers. This is easily done by hand. Take care not to crush the jumpers if using pliers.
5. Rotate the jumpers $1/4$ turn (90°) and reinstall them on their posts as shown in figure III.C.12.
6. Continue with Set Point adjustment.



DETAIL OF SET POINT CONVERSION (SPC) ON TP/TPO MODULE AS CONFIGURED WHEN SHIPPED FROM THE MFR.

Figure III.C.11

b. Temperature Set Point Adjust

1. Ensure power **OFF**.
2. Ensure the SCO Module Set Point control is set to FULL counter clockwise position. If not, turn SCO Set Point control fully CCW - it may be 30 turns - or until it clicks. For location see figure III.C.13.
3. Turn power **ON**.
4. Press BOTH the Temperature Select switch and the Set Point switch on the front panel.
5. Adjust the TP/TPO Module Set Point Two (SP2) to temperature as desired. See figure III.C.1.
6. Turn power **OFF**.

c. Hysteresis

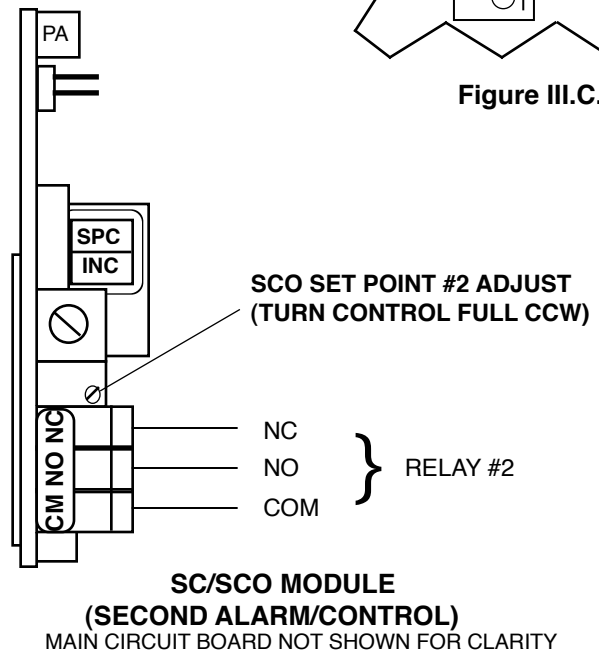
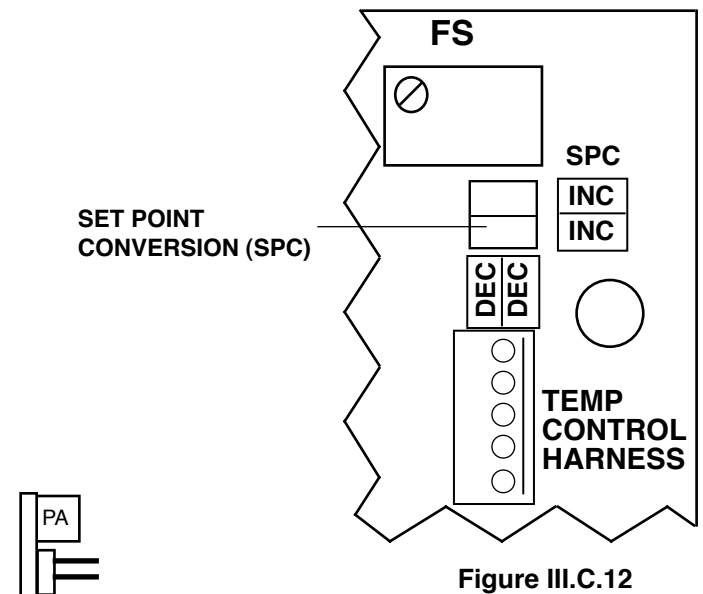
Hysteresis is fixed at $\sim \pm 6^{\circ}\text{C}$ unless Special Ordered with adjustable control.

Hysteresis with adjustable control is variable from ± 0.6 to 6°C , see figure III.C.1 for location.

CAUTION: Adjusting the hysteresis too narrow may cause the alarm to fluctuate (on-off) due to temperature variations causing the relay to chatter. This condition is to be avoided, it may damage the heater, chiller, etc. and will eventually damage the relay.

REASSEMBLY

1. Carefully reinstall the front panel, bottom first. Ensure no wires have been pinched between enclosure and front panel.
2. Reinstall the screws and tighten.
3. To operate, turn power **ON**.



5. OEM INSTALLATION

An OEM installation requires an additional display harness, part number TPMH. This harness is installed between the Temperature Module and the panel display as shown in figure III.C.14. Both connectors must be installed with the wires down or toward the bottom of the circuit board.

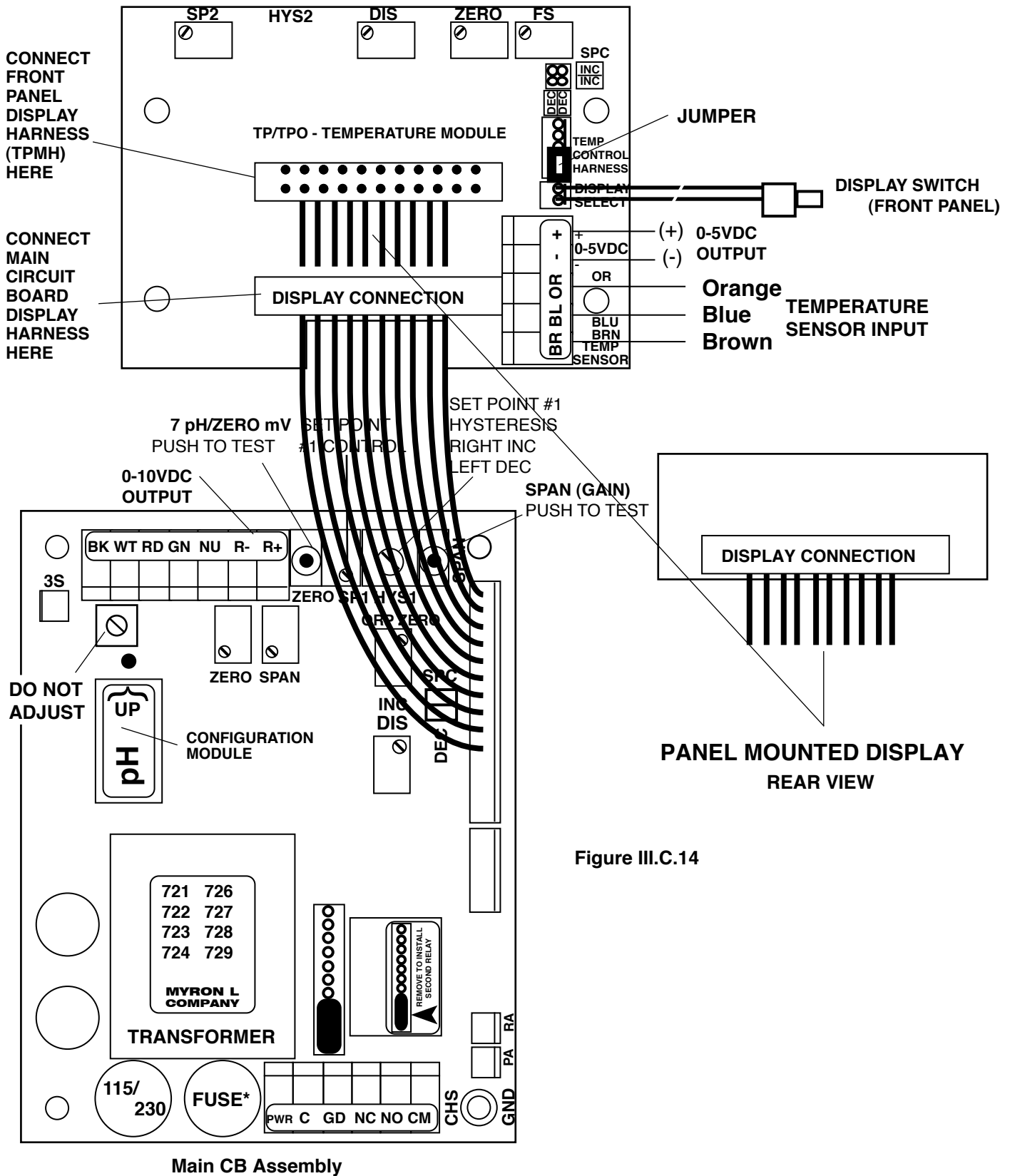


Figure III.C.14

6. OEM INSTALLATION

b. Dual Display Models SPECIAL ORDER

These models allow simultaneous display of both Cond/TDS, RES or pH/ORP and Temperature. They require two display harnesses. The Cond/TDS, RES or pH/ORP display harness is part number DH2DD without control feature, or part number DHDD with control feature. The Temperature display harness is part number TPMH.

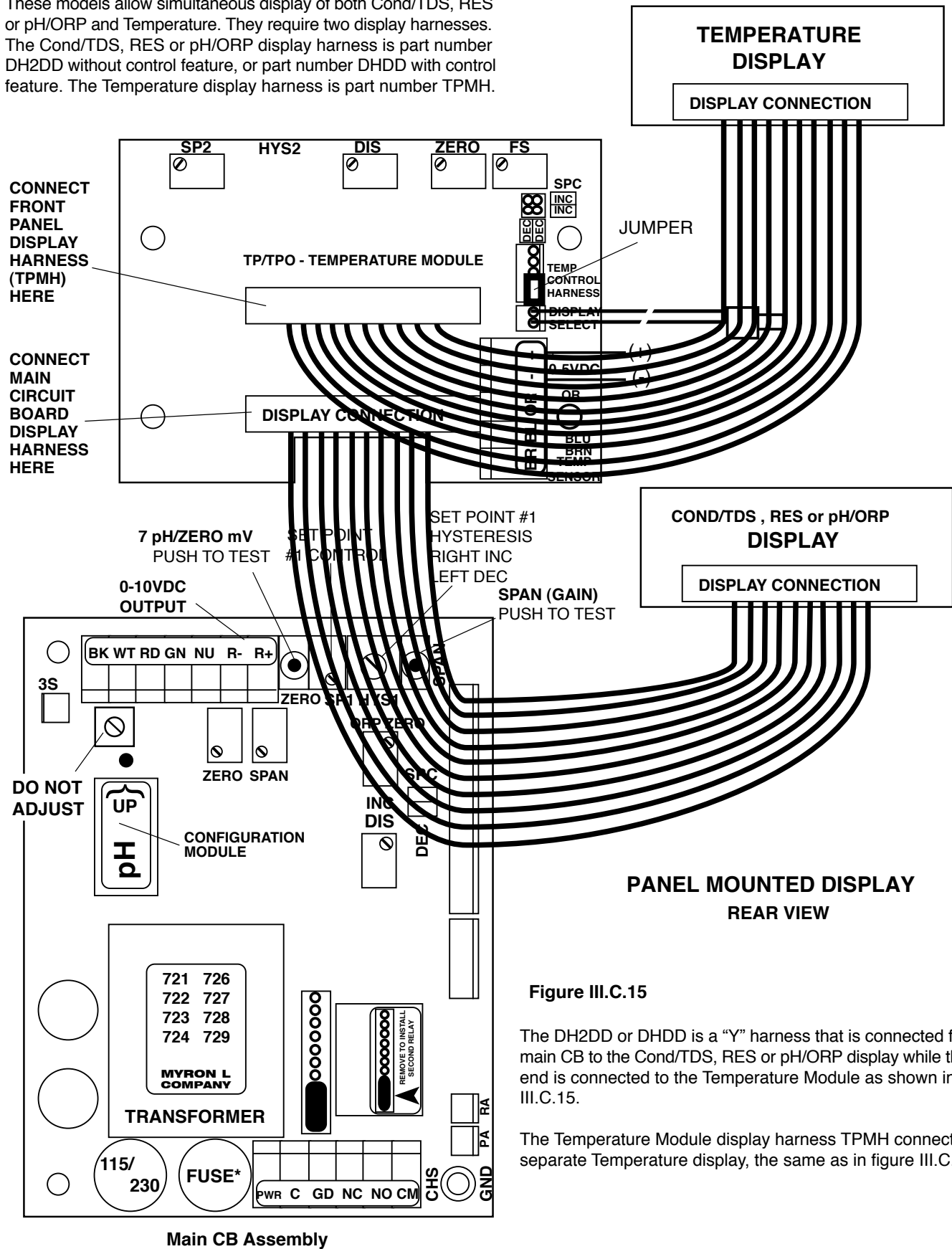


Figure III.C.15

The DH2DD or DHDD is a "Y" harness that is connected from the main CB to the Cond/TDS, RES or pH/ORP display while the other end is connected to the Temperature Module as shown in figure III.C.15.

The Temperature Module display harness TPMH connects to a separate Temperature display, the same as in figure III.C.15.

D. ALARM/CONTROL KIT (Digital & OEM Models only)

- TH Controller wiring Harness (requires second alarm/control module) ordered with Monitor/controller.
- THO Controller wiring Harness (requires second alarm/control module) ordered separately.

1. DESCRIPTION

The optional TH/THO Controller Kit adds more flexibility to the Temperature Module by adding the ability to Alarm and/or Control using the 24VDC solid state output to drive a PA - Piezo electric alarm, and/or a 10 amp relay to operate a heater or chiller as required.

Kit includes

THO kit comes with all items necessary to install and operate: Alarm/control Harness (replaces second alarm/control relay harness) with switch, bezel, cap and two O-rings (006 & 008); and TEMPERATURE label (# LTEMP).

Requirements

- SC/SCO Alarm/Control Module (#2 set point/relay) option
- TP/TPO Temperature Module option

The TH/THO uses SC/SCO Second alarm/control Module on Main circuit board [Conductivity/TDS, Resistivity, pH or mV (ORP)].

2. INSTALLATION

Briefly -

The SCH (switch and LED) harness is removed from the SC and front panel, and discarded.

The THO harness is installed to the SC, TPO or other controllable option, and front panel.

A label is installed on the front panel.



CAUTION - READ FOLLOWING CAREFULLY

WARNING: BEFORE STARTING, IF MONITOR/CONTROLLER IS INSTALLED, ENSURE THE POWER IS OFF. FAILURE TO DO SO COULD CAUSE DAMAGE TO THE INSTRUMENT, AND COULD BE HARMFUL OR FATAL TO PERSONNEL. ONLY QUALIFIED PERSONNEL SHOULD INSTALL OR SERVICE ELECTRICAL EQUIPMENT.

Physical

First, you must decide which location to install the THO harness LED and Set Point switch. This is easily determined by how the Primary or the Main CB Alarm/control is used. If the Primary Alarm/control is used as a **HIGH** control, as in Conductivity, than the THO harness is installed in the lower location - see section III.D.2.a., this page, top of the next column.

If your Primary or Main circuit board Alarm/control is used as a **LOW** control, as in Resistivity, than the THO harness is installed in the HIGH location — see section III.D.2.b, page 35, halfway down the second column.

WARNING: Before installing switch keep in mind there are two (2) O-rings installed on each switch, one (1) on the threaded shank and the other is under the push button. Both of these must be reinstalled properly to maintain IP65/NEMA 4X ratings, see figure III.D.4.

a. HIGH Primary Control

If the front panel has all ready been removed from the enclosure skip to step 3.

1. Using a standard slot screwdriver remove the screws on the front panel.
2. Carefully wiggle the front panel to loosen the gasket and pull gently toward you. Do not pull more than about 8 inches/20CM or you could damage the wiring harness.
3. Remove SCH harness from front panel and SC/SCO Second Alarm/Control Module.
 - a. Carefully remove the RED LED from the front panel

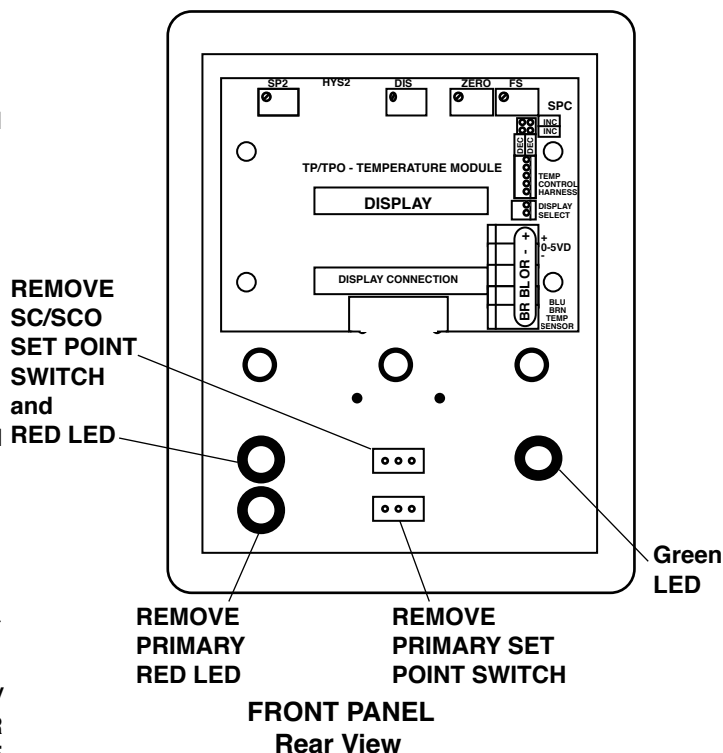
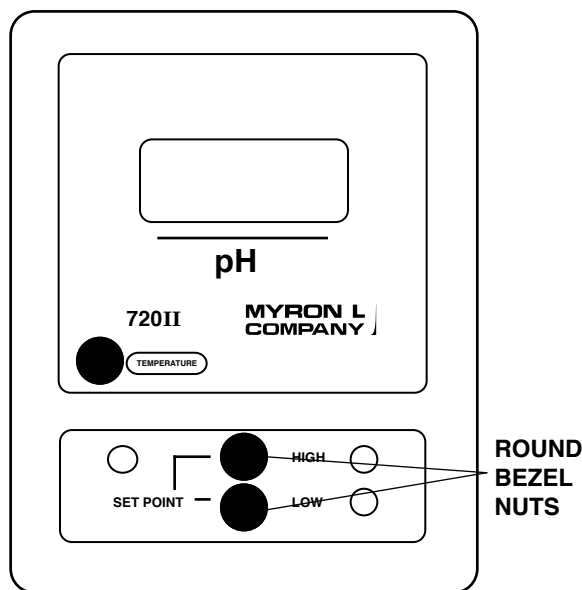


Figure III.D.1



FRONT PANEL

Figure III.D.2

by pulling lightly on the wires. It may be necessary to use a small flat screwdriver to slightly spread the retaining ring. See figure III.D.1.

- b. Remove Set Point Switch from the front panel, figure III.D.1, by rotating the round bezel nut CCW on the front as shown in figure III.D.2.
- c. Remove SCH harness from SC Module by on pulling harness.
- d. Set SCH harness aside, it is no longer used.
4. Remove Primary or Main CB alarm/control LED and Set Point Switch from lower location on front panel.
 - a. Carefully remove the RED LED from the front panel by pulling lightly on the wires. It may be necessary to use a small flat screwdriver to slightly spread the retaining ring. See figure III.D.1.
 - b. Remove Set Point Switch from the front panel, figure III.D.1, by rotating the round bezel nut CCW on the front as shown in figure III.D.2.

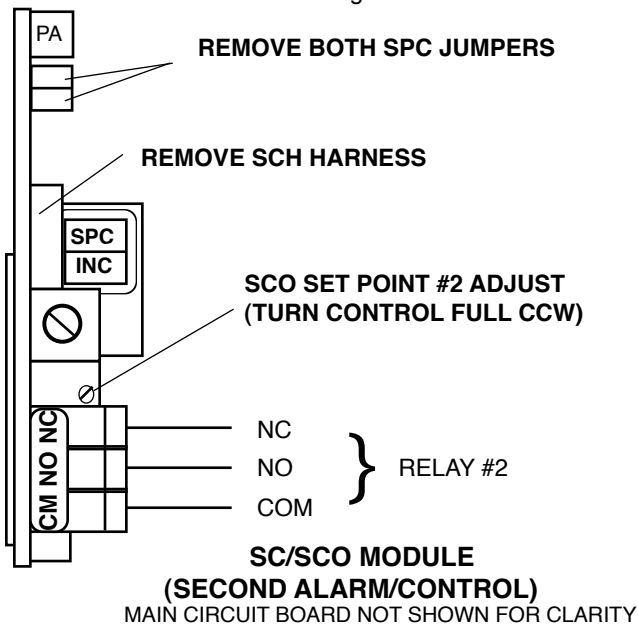


Figure III.D.3

5. Re-install Primary or Main CB alarm/control LED and Set Point Switch into UPPER location as shown in figure III.D.6.
6. Install TH/THO harness to front panel. See figure III.D.6.
 - a. Install Set Point Switch into the LOWER CENTER switch location.
 - b. Press RED LED into the LOWER location.
7. Remove SPC jumpers (2) from SC/SCO Second Alarm/Control Module, see figure III.D.3 for SPC jumper location.
8. Install TH/THO harness to SC/SCO Second Alarm/Control Module.
 - a. Attach BLACK 90° connector with four wires to SPC location with the connector 90° to the SC as shown in figures III.D.7 & III.D.8.
 - b. Press WHITE connector with two wires and one jumper into the SC - it is directional, as shown in figures III.D.7 & III.D.8.
9. Turn SCO Set Point control fully counter clockwise - it may be 30 turns - or until it clicks. See figure III.D.7 for location.
10. The GREEN LED stays in the same location.

11. Locate and remove JUMPER from the Temperature (TPO) Module as shown in figure III.D.5.
12. Attach Brown 5 wire connector to the TPO Module as shown in figure III.D.9.
13. Add TEMPERATURE label to LOWER front panel covering the "LOW" as shown in figure III.D.10.
14. Attach control leads to RELAY #2 as shown in figure III.D.3.
15. Continue to Set Point Conversion or skip to "SPECIFIC OPTION" Module Set Point adjust.

WARNING: There are two (2) O-rings installed on the switch, one(1) on the threaded shank and the other is under the push button. Both of these must be reinstalled to maintain IP65/NEMA 4X ratings. See figure III.D.4.

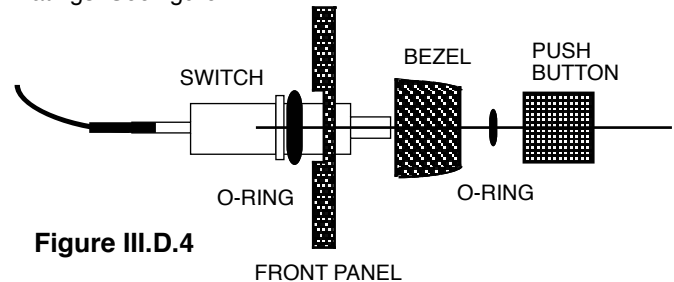


Figure III.D.4

SWITCH and O-RING ASSEMBLY

b. LOW Primary Control

If the front panel has all ready been removed from the enclosure skip to step 3.

1. Using a standard slot screwdriver remove the screws on the front panel.
2. Carefully wiggle the front panel to loosen the gasket and pull gently toward you. Do not pull more than about 8 inches/20CM or you could damage the wiring harness.
3. Remove SCH harness from front panel, figure III.D.11, and SC/SCO Second Alarm/Control Module, figure III.D.3 for locations.
 - a. Carefully remove the UPPER RED LED from the front panel by pulling lightly on the wires. It may be necessary to use a small flat screwdriver to slightly spread the retaining ring. See figure III.D.1.
 - b. Remove UPPER Set Point Switch from the front panel by rotating the round bezel nut CCW on the

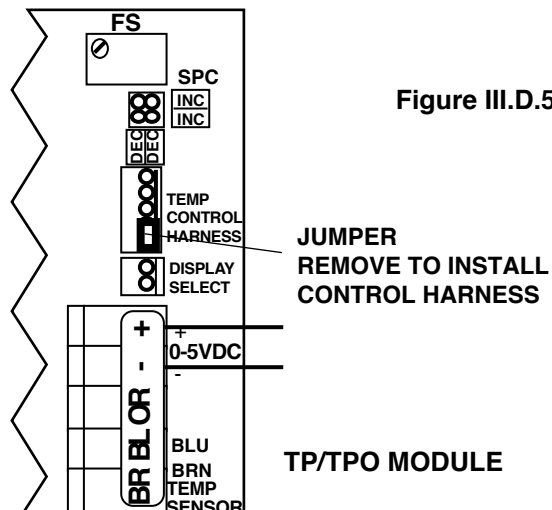


Figure III.D.5

front as shown in figure III.D.2.

- c. Remove harness from SCO Module by pulling on harness, see figure III.D.3.
- d. Set SCH harness aside, it is no longer used.
4. Remove SPC jumpers (2) from SC/SCO Second Alarm/Control Module, see figure III.D.3 for SPC jumper location.

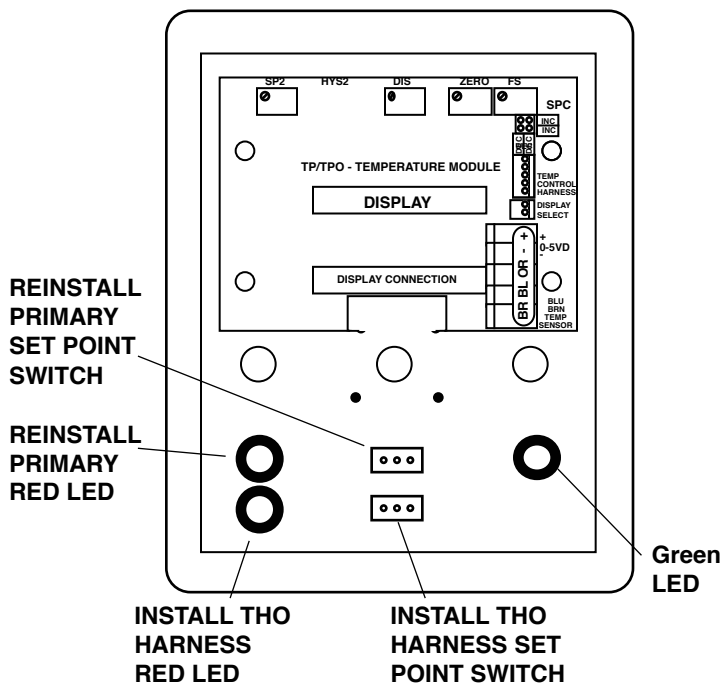


Figure III.D.6
FRONT PANEL
Rear View

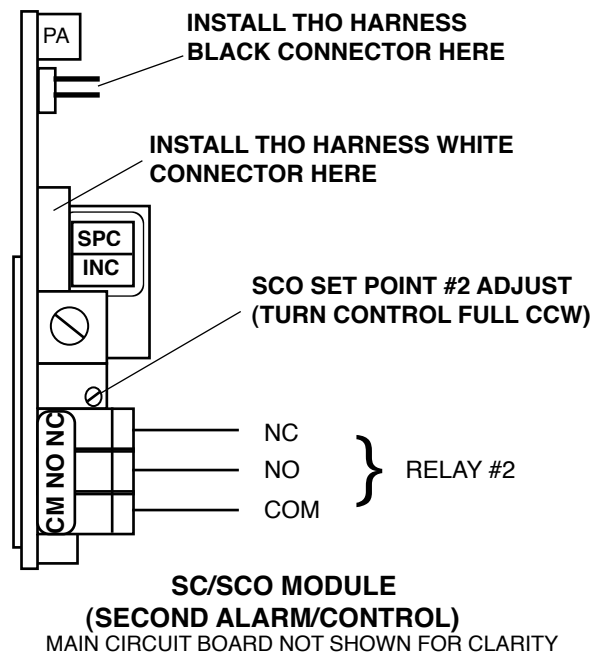


Figure III.D.7

- a. Attach BLACK 90° connector with four wires to SPC location with the connector 90° to the SCO as shown in figures III.D.7 & III.D.8.
- b. Press WHITE connector with two wires and one jumper into the SCO - it is directional, as shown in figures III.D.7 & III.D.8.

7. The GREEN LED stays in the same location.

5. Install TH/THO harness to front panel, figures III.D.12 & III.D.13.
 - a. Install THO Set Point Switch to the UPPER CENTER switch location, figure III.D.12, keeping in mind the "O-ring" warning above. See figure III.D.4 for switch reassembly.
 - b. Press RED LED into the UPPER location, as shown in figure III.D.12.
6. Install TH/THO harness to SC/SCO, figures III.D.7 & III.D.8.

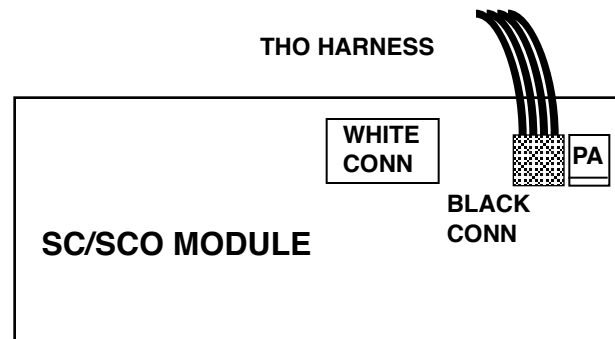


Figure III.D.8

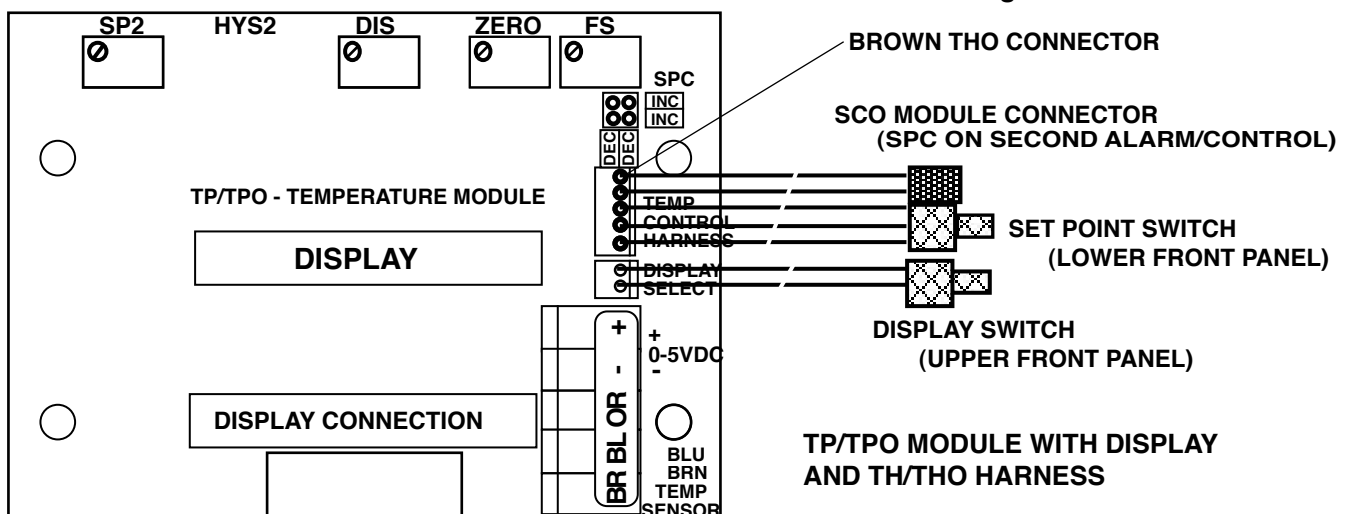
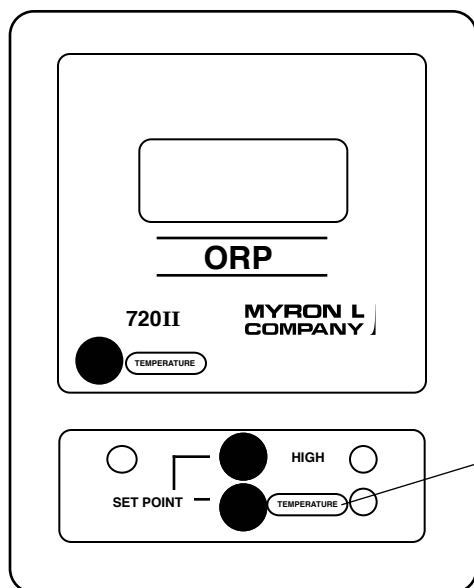


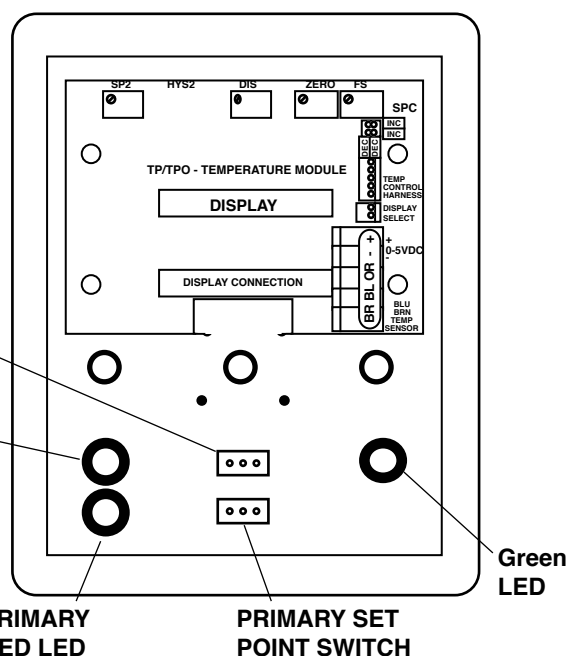
Figure III.D.9



FRONT PANEL

Figure III.D.10

REMOVE
SC/SCO
SET POINT
SWITCH
and
RED LED



**PRIMARY
RED LED**

**PRIMARY SET
POINT SWITCH**

FRONT PANEL

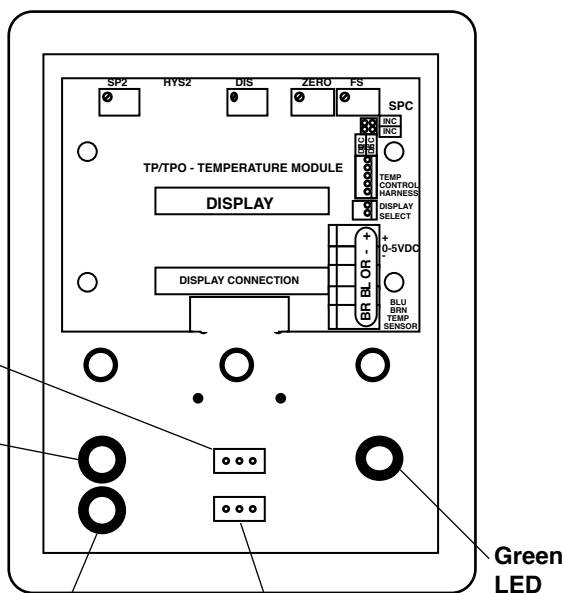
Rear View

Figure III.D.11

8. Turn SCO Set Point control fully counter clockwise - it may be 30 turns - until it clicks. See figure III.D.7 for location.
9. Locate and remove JUMPER from option to the TPO Module as shown in figure III.D.5.
10. Attach Brown 5 wire connector to option to be controlled, i.e. TPO Module as shown in figure III.D.9.

11. Add TEMPERATURE label to UPPER front panel covering the "HIGH" as shown in figure III.D.13.
12. Attach control leads to RELAY #2 as shown in figure III.D.7.
13. Continue to Set Point Conversion or skip to "SPECIFIC OPTION" Module Set Point adjust.

INSTALL
THO
SET POINT
SWITCH
and
RED LED



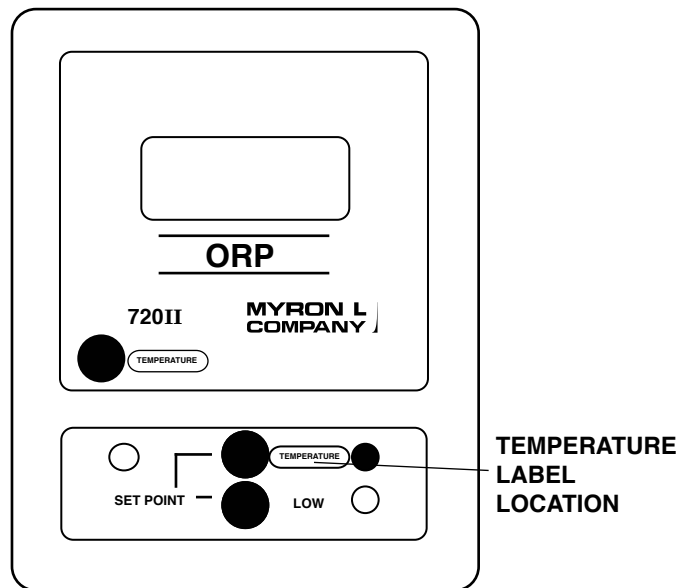
**Primary/Main CB
Red LED**

**Primary/Main CB
Set Point Switch**

**Green
LED**

Figure III.D.12

**FRONT PANEL
Rear View**



FRONT PANEL

Figure III.D.13

**TEMPERATURE
LABEL
LOCATION**

Set Point Conversion (SPC) / Reversing Set Point

The Myron L® Company ships the Temperature controller configured to Alarm/control when the temperature is TOO HIGH. If the configuration is correct for your requirements skip to Temperature Set Point Adjust.

As many uses require the temperature to be controlled by the use of a heater or chiller, the TPO Module may be configured to maintain an elevated or lowered temperature as required.

To reverse the set point/relay operation:

1. Locate the SPC on TP/TPO circuit board. See figures III.D.8 & III.D.14.
2. Remove Jumpers.
3. Reinstall Jumpers 90° as shown in figure III.D.15.

FOR TEMPERATURE MODULE

Temperature Set Point Adjust

1. Ensure the SCO Module Set Point control is set to FULL CCW position. For location see figure III.D.7.
2. Press BOTH the Temperature Select switch and the Set Point switch on the front panel.
3. Adjust the TP/TPO Module Set Point Two (SP2) to temperature as desired. See figure III.D.9.

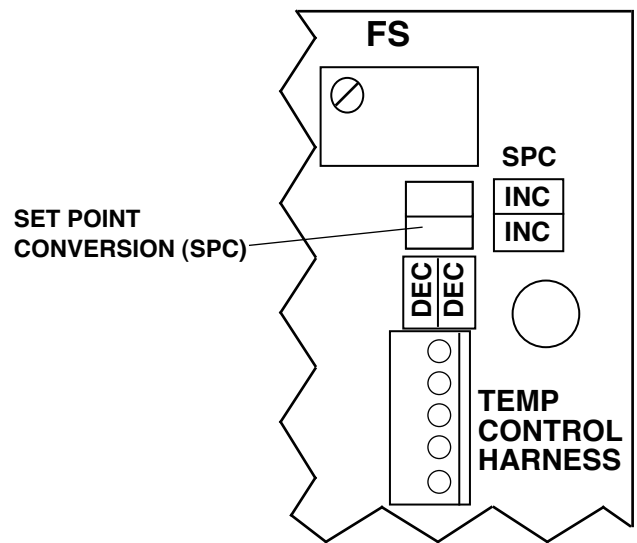
Hysteresis is fixed at $\sim \pm 6^{\circ}\text{C}$ unless Special Ordered with adjustable control.

Hysteresis with adjustable control is variable from ± 0.6 to 6°C .

CAUTION: Adjusting the hysteresis too narrow may cause the alarm to fluctuate (on-off) due to temperature variations causing the relay to chatter. This condition is to be avoided, it may damage the heater, chiller, etc. and will eventually damage the relay.

REASSEMBLY

1. Carefully reinstall the front panel, bottom first. Ensure no wires have been pinched between enclosure and front panel.
2. Reinstall the screws and tighten.
3. To operate, turn power **ON**.



**DETAIL OF SET POINT CONVERSION (SPC)
ON TP/TPO MODULE AS CONFIGURED
WHEN SHIPPED FROM THE MFR.**

Figure III.D.14

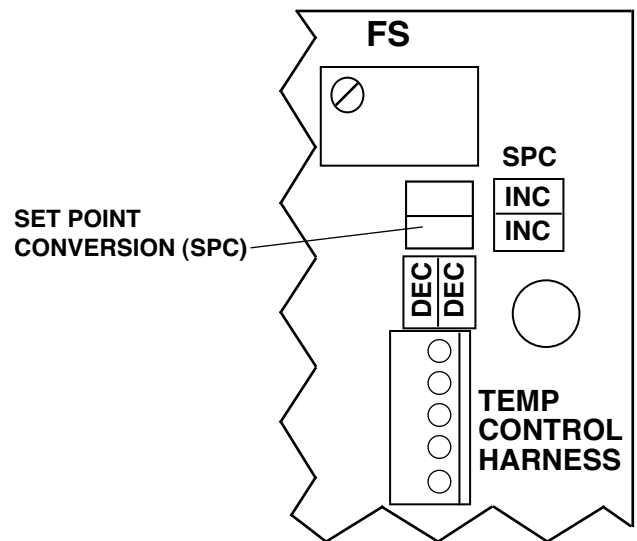


Figure III.D.15

**E. DUAL TEMPERATURE MODULE &
4-20mA OUTPUT MODULE**
(Digital and OEM Models ONLY)

-TP/TPO Temperature Module.
-4A/4AO 4-20mA Self/Remote-powered Isolated
output module.

1. DESCRIPTION

The following instructions describe how install BOTH the 4A/4AO and the TP/TPO Modules to a Digital model Monitor/controller.

Specifications

See individual Data Sheets and installation instructions.

Requires Plastic Spacers P# SP4819.

2. INSTALLATION

Briefly -

The Temperature Module replaces the plastic display retainer plate attached to the front panel as described in Temperature Module Installation Instructions except threaded plastic spacers are utilized in place of the screws.

The 4AO Module is STACKED on top of the TPO Module utilizing above spacers as shown in figure III.E.1.

Setup and operation for both modules is the same as described in their respective Data Sheet/Installation Instructions.

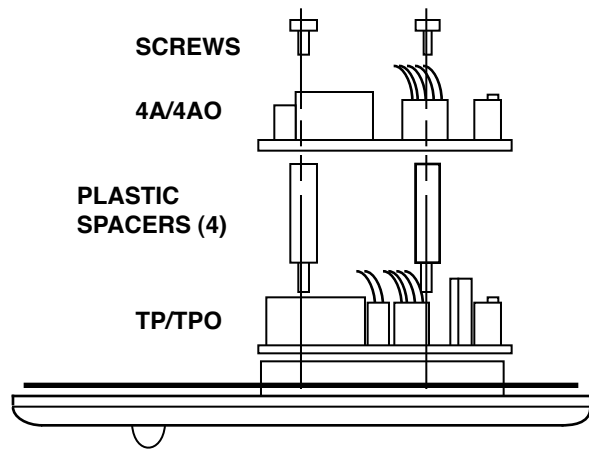


CAUTION - READ FOLLOWING CAREFULLY

WARNING: BEFORE STARTING, IF MONITOR/CONTROLLER IS INSTALLED, ENSURE THE POWER IS OFF. FAILURE TO DO SO COULD CAUSE DAMAGE TO THE INSTRUMENT, AND COULD BE HARMFUL OR FATAL TO PERSONNEL. ONLY QUALIFIED PERSONNEL SHOULD INSTALL OR SERVICE ELECTRICAL EQUIPMENT.

This procedure assumes the front panel is removed, and the TP/TPO has already been installed.

1. Install spacers as shown in figure III.E.1.
2. Attach 4AO Module five (5) wire harness, and signal and power wires as required as described in 4AO Data Sheet/Installation Instructions.
3. Carefully reinstall the front panel, bottom first. Ensure no wires have been pinched between enclosure and front panel.
4. Reinstall the screws and tighten.
5. To operate, turn power **ON**.



**FRONT PANEL
LEFT SIDE VIEW**

Figure III.E.1

F. PIEZO ELECTRIC ALARM

- PA Piezo Electric Alarm ordered with Digital Monitor/controller.
- PAO Piezo Electric Alarm ordered separately for Digital or remotely mounted Analog Monitor/controller or OEM models.

1. DESCRIPTION

The PA/PAO is an electronic sound device capable of emitting a 80dB or more @ 30cm, high pitched squeal. See figure III.F.1.

Specifications

Oscillating Frequency — 3.0 ± 0.5 KHz
Operating Voltage (750II) — 24VDC Nom. (1.5-30VDC Max.)
Sound Pressure Level (Min) 30cm/12VDC — 80dB
Current consumption (Max) @ 12VDC — 12mA
Tone — Constant
Operating Temperature — -20 - +60°C
Size — 24 x 9.5 mm

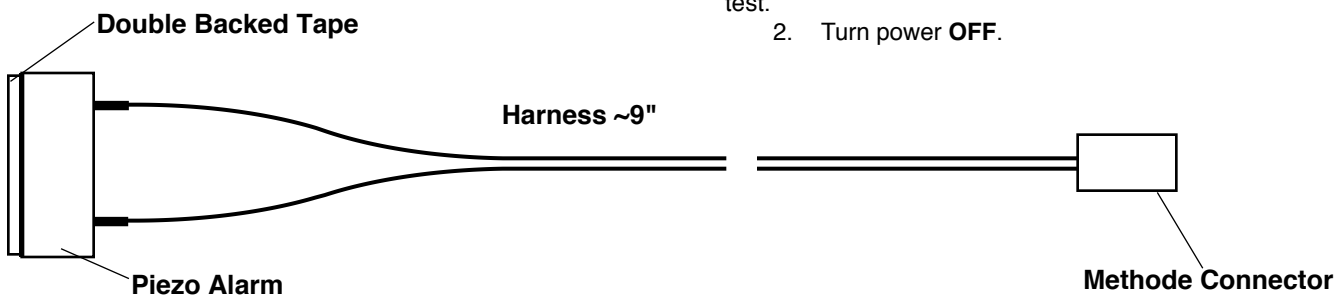


Figure III.F.1

2. INSTALLATION

Briefly -

The PA/PAO Piezo Alarm attaches to the front panel with the tape supplied, see figure III.F.3.

The wire harness plugs into a methode connector on the main CB*, see figure III.F.4.

* May also be connected to the SC Module as shown in figure III.I.5, if desired or so equipped.



CAUTION - READ FOLLOWING CAREFULLY

WARNING: BEFORE STARTING, IF MONITOR/CONTROLLER IS INSTALLED, ENSURE THE POWER IS OFF. FAILURE TO DO SO COULD CAUSE DAMAGE TO THE INSTRUMENT, AND COULD BE HARMFUL OR FATAL TO PERSONNEL. ONLY QUALIFIED PERSONNEL SHOULD INSTALL OR SERVICE ELECTRICAL EQUIPMENT.

Physical

NOTE: Remote mounting will require a .25" (6.35mm) hole, and extending the harness. Use #22 gauge speaker wire. Observe polarity.

If the front panel has all ready been removed from the enclosure skip to #4.

1. Using a standard slot screwdriver remove the

screws on the front panel.

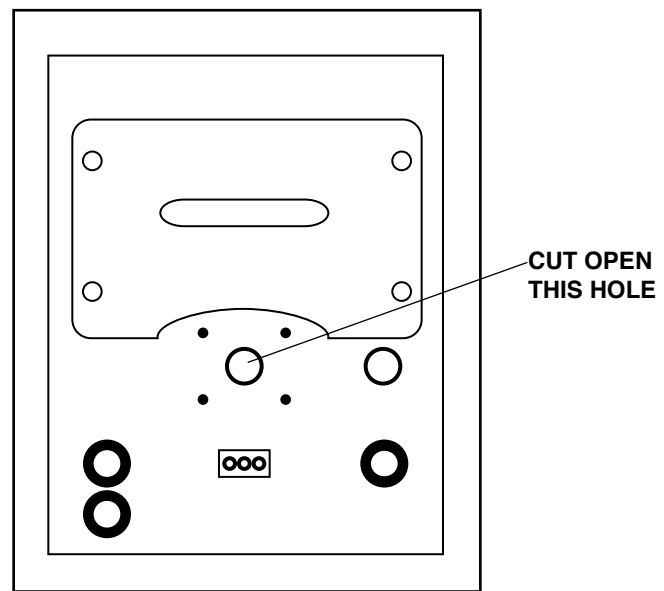
2. Carefully wiggle the front panel to loosen the gasket and pull gently toward you. Do not pull more than about 8 inches/20CM or you could damage the wiring harness.
3. Turn the front panel around so that the back side is facing you.
4. Using a 1/4" drill or a sharp knife, carefully open the CENTER front hole in the front panel as shown in figure III.F.2.
5. Peel off tape backing from PA, and install between guides as shown in figure III.F.3.
6. Set front panel aside.
7. Connect wire harness to Main CB as shown in figure III.F.4, or to SC as shown in figure III.F.5.

Test

1. To test, simply turn **ON** the controller and adjust controller set point until the alarm sounds off.

NOTE: If the sensor is connected, the solution value, set point value and Set Point Conversion (SPC) jumpers may affect the test.

2. Turn power **OFF**.



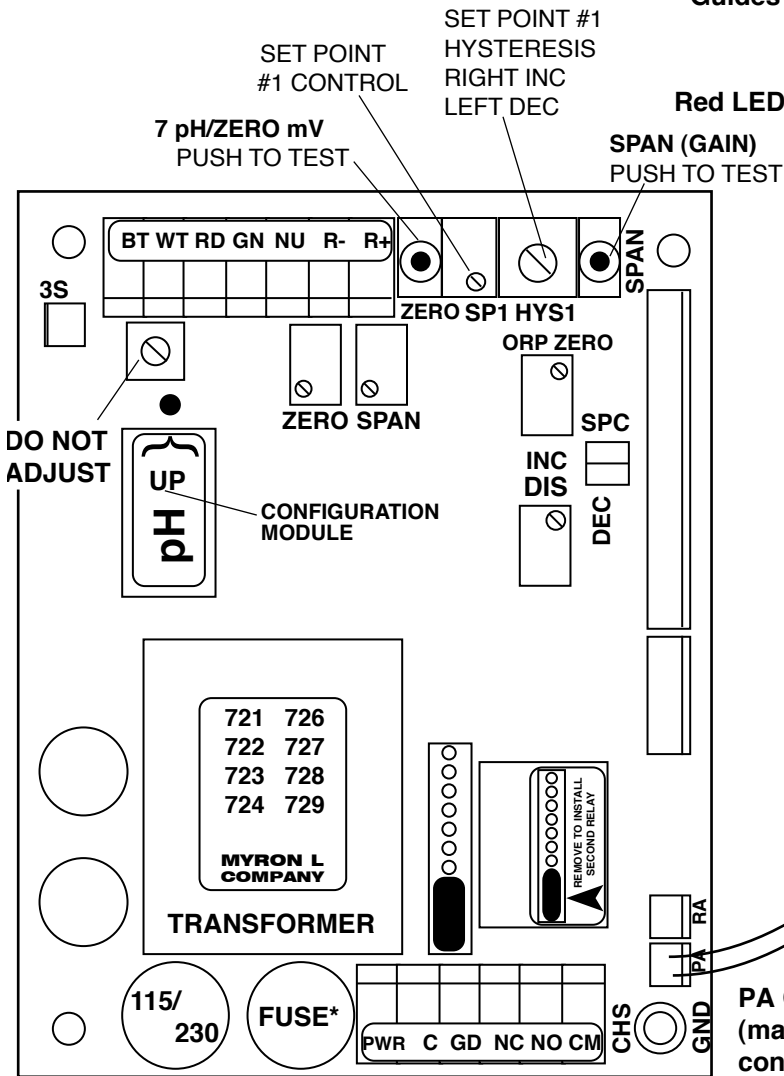
FRONT PANEL
Rear View

Figure III.F.2

REASSEMBLY

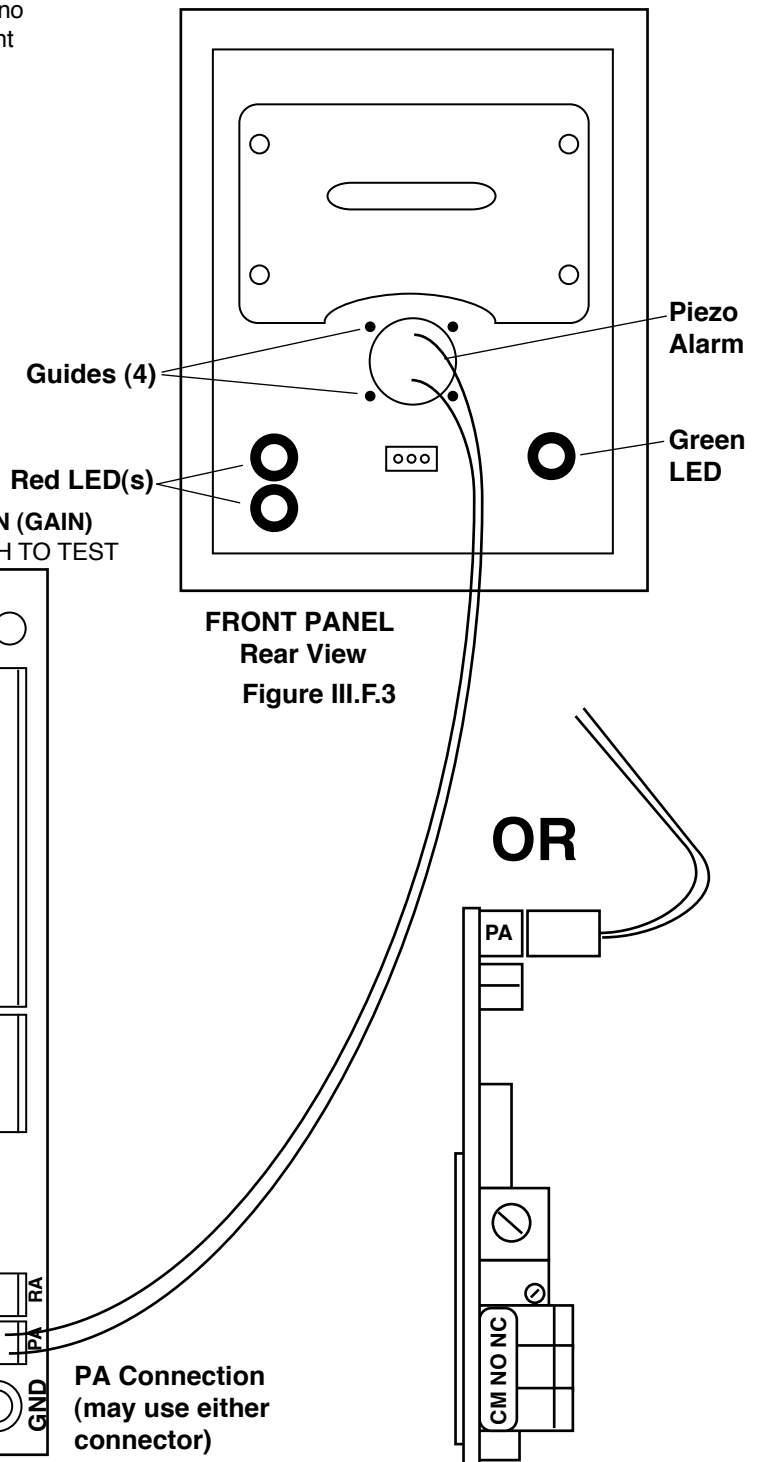
Before reassembly, ensure set point control is set to desired trip point.

1. Carefully reinstall the front panel, bottom first. Ensure no wires have been pinched between enclosure and front panel.
2. Reinstall the screws and tighten.
3. To operate, turn power **ON**.



MAIN CB ASSEMBLY

Figure III.F.4



SC MODULE

Main CB NOT shown for clarity

Figure III.F.5

G. REMOTE ALARM - RA™

RA Ordered as an accessory, includes 8" harness with connector, and two (2) wire nuts.

1. DESCRIPTION

This remotely mounted AUDIBLE and VISUAL alarm connects to any Myron L® Company Monitor/controller, or brand "X" controller with dry contacts. When activated by the controller the Remote Alarm will provide both an audible and a visual alert at a location other than at the controller.

A mute button will silence the piezo alarm for up to 10 minutes while the LED remains illuminated. After the preset time the piezo alarm will again sound, this will repeat until the water quality is corrected. Thus allowing servicing of the system under control, while still acting as a reminder if the problem has not been corrected.

The Remote Alarm - RA™ is an inexpensive way to alert personnel of a trouble situation. For example; the Monitor/controller may be located with an RO system while the service technicians are on another floor or even in another building - great for hospitals. The AUDIBLE alarm may be silenced, but stays in alarm (RED LED is still illuminated) until the trouble is corrected. The timer may be set from 15 seconds up to 10 minutes, thereby, giving personnel the time to correct the problem while not being able to ignore the trouble because of the reoccurring AUDIBLE and VISUAL alerts.

Specifications

Audible Alert — Piezo Electric

Oscillating Frequency — 3.0±0.5KHz

Operating Voltage (720II) — 24VDC Nom. (1.5-30VDC Max.)

Sound Pressure Level (Min) 30cm/12VDC — 80dB

Current consumption (Max) @ 12VDC — 12mA

Tone — Constant

Operating Temperature — -20 - +60°C

Size — 24 x 9.5 mm

Visual Alert — Bright RED LED

Time Delay — 15 seconds to 10 minutes (USER adjustable)

Power — 24VDC (supplied from Monitor/controller)

Case Material — ABS plastic

Dimensions — 4.75L x 2.56W x 1.56H (121L x 65W x 40H)

Mounting — Double Backed Tape (supplied)

Operational Distance — Wire lengths of 500 feet (152 meters) have been tested with no adverse effects

Additional Wire available, order RAW-200. — 200 feet (61 meters)

2. INSTALLATION

Briefly —

Only 2 wires to connect from the controller to the RA.

Set the time.

Mount on the wall or on the bench.



CAUTION - READ FOLLOWING CAREFULLY

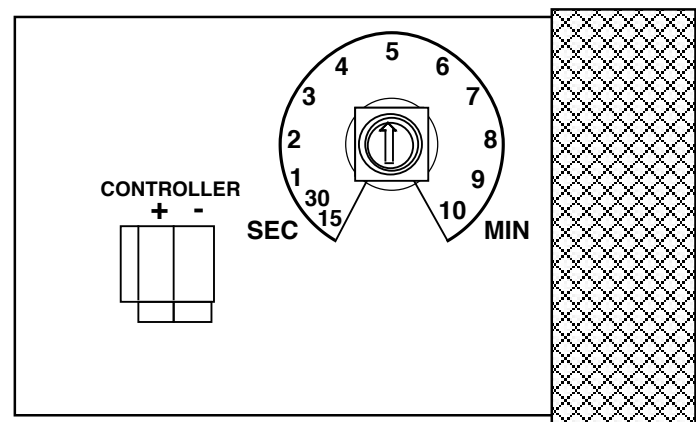
WARNING: BEFORE STARTING, IF MONITOR/CONTROLLER IS INSTALLED, ENSURE THE POWER IS OFF. FAILURE TO DO SO COULD CAUSE DAMAGE TO THE INSTRUMENT, AND COULD BE HARMFUL OR FATAL TO PERSONNEL. ONLY QUALIFIED PERSONNEL SHOULD INSTALL ELECTRICAL EQUIPMENT.

The Remote Alarm - RA connector is labeled **24VDC INPUT** and has a 8" 2 conductor wires attached — Black is Positive (+) and White is Negative (-).

When extending the wires you may use any two color wire you wish just remember the polarity — Black is Positive (+) and White is Negative (-). Wire lengths of 500 feet/152 meters have been tested and have no adverse effect on performance although a length of 500 feet/152 meters would be unusually long.

Ensure the unit is completely wired, tested and adjusted before installing RA to mounting surface as the tape will not remove from mounting surface without damaging the adhesive.

For OEM models skip steps referencing enclosure or front panel.



RA CB ASSEMBLY

Figure III.G.1

1. Run #22, 2 conductor speaker type wire, NOT supplied, from Monitor/controller to RA location as necessary. Wire may be ordered from the Myron L® Company, part #RAW-200.
2. Open the RA by removing the four screws.
3. Locate and remove the 8" 2 conductor wire with the reddish brown connector attached to the RA. See figure III.J.1.
4. At the RA, connect the extension wires to the connector on the RA circuit board — Black to Positive (+) and White to Negative (-) as shown in figure III.G.1.
5. Using a standard slot screwdriver remove the screws on the Myron L Monitor/controller front panel.
6. Carefully wiggle the front panel to loosen the gasket and pull gently toward you. Do not pull more than about 8 inches/20CM or you could damage the wiring harness.
7. Connect the extension wires to the 8" 2 conductor wire with the wire nuts provided — Black to Positive (+) and White to Negative (-). Be sure to first pass the wire through the user supplied waterproof strain relief in the enclosure.
8. Plug the reddish brown connector into the male connector on the controller circuit board marked RA (see inside case label or figure III.J.2 for location). It will only go on the connector one way.
9. To test, simply turn **ON** the controller and adjust controller set point until the alarm sounds off*. The black button on the front of the RA will mute the piezo alarm for approximately three minutes or until you improve the water quality (readjust controller set point). If three minutes muting is fine for your application, skip to #10.

10. If three minutes is too long or too short, adjust control inside RA until desired mute time is achieved (adjustable from approximately 15 seconds to 10 minutes). see figure III.G.1.
11. Replace the bottom of the RA, and secure to surface you have selected for its installation.
12. Carefully reinstall the controller front panel, bottom first. Ensure no wires have been pinched between enclosure and front panel.
13. Reinstall the screws and tighten.
14. To operate, turn power **ON**.

***NOTE:** If the RA does not sound off;

1. Check the polarity of the extension wire connections.
2. Be sure the controller is actually switching (relay will click).

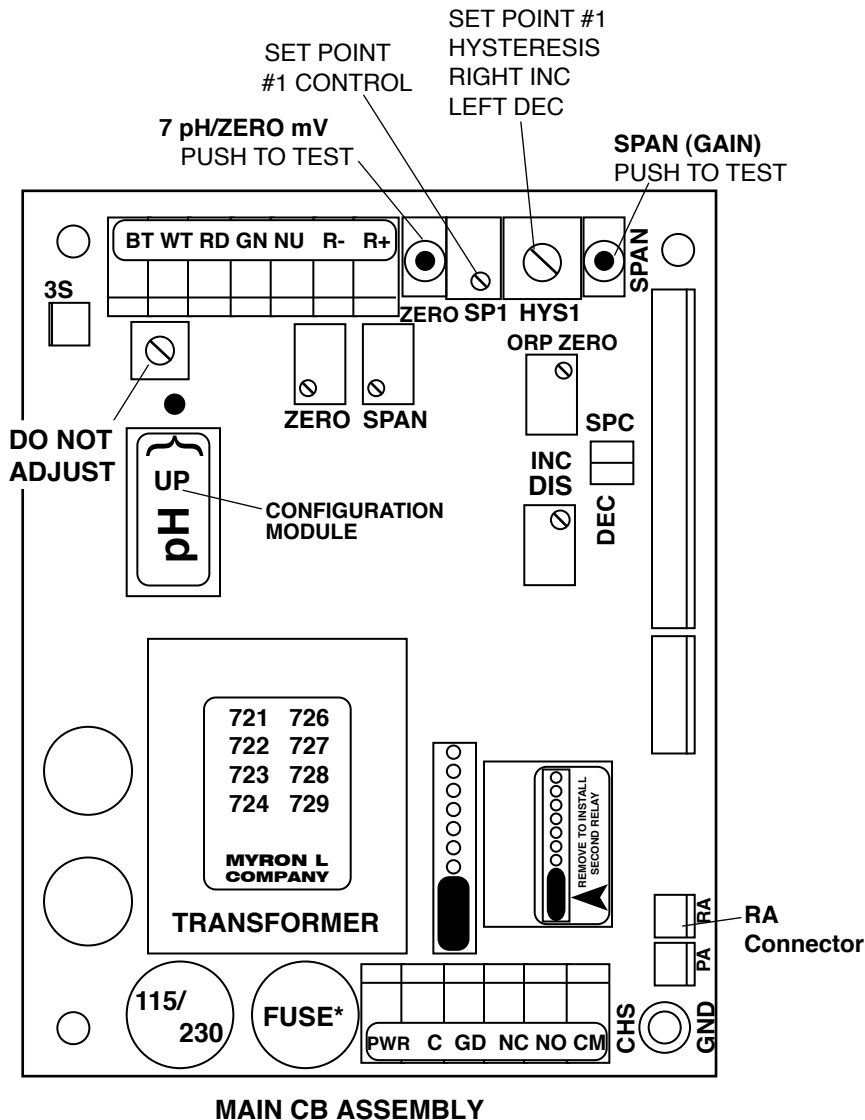


Figure III.G.2

IV. OPERATING PROCEDURES

A. FRONT PANEL

The front panel illustrations to the right, switch and indicator operational descriptions have been provided to assist the user in identifying and operating the 720 Series II Monitor/controllers. For OEM models see Section B.

Refer to Section IV.C for Setup procedures and Section IV.D for Check-Out procedures.

1. RED “HIGH SET POINT” LED INDICATOR

The red LED indicator light is ON only when the water’s pH or ORP reading is HIGH or ABOVE the set point adjustment. May be reversed if desired.

2. GREEN “LOW SET POINT” LED INDICATOR

The green LED indicator light is ON only when the water’s pH or ORP reading is LOW or BELOW the set point adjustment. May be reversed if desired.

3. “SET POINT” SWITCH(ES)

When the “SET POINT” switch is depressed, the internal set point reading is immediately displayed on the front panel display. See figures IV.A.1 thru 4.

4. ANALOG METER OR DIGITAL LCD

Front panel analog meter or digital display provide a continuous readout of the water being monitored.

pH Models 721II & 722II and ORP Models 726II & 727II are equipped with analog meter only. See figures IV.A.4 & 5.

pH Models 723II & 724II and ORP Models 728II & 729II are equipped with a 3 1/2 digit, 1/2” Liquid Crystal Digital Display, as shown in figures IV.A.1 thru 3, with a 3 1/2 digit backlit LCD as an option.

5. OPTIONAL FRONT PANEL ITEMS

TP/TPO Module Switch

A digital Monitor controller with the optional TP/TPO Temperature Module, see picture at right, has an additional switch on the front panel. This push-button momentary switch when pushed gives the user a direct reading of the temperature of the solution from 0-200°C. Additional option TH/THO includes a control function capability. Mounts in the lower left corner of the upper panel, see figure IV.A.1.

7pH or ZEROmV Test Switch (TEST)

This optional feature allows the user to see the ZERO TEST value without opening the enclosure to push the internal switch. Mounts in the lower left corner of the upper panel, see figure IV.A.3. unless ordered with TP Module than 7pH or ZEROmV Test Switch (TEST) mounts in the lower center of the upper panel, see figure IV.A.1.

Piezo Alarm

Audible alarm sounds off automatically when the set point is reached. Figure IV.A.3. shows the location of this option.

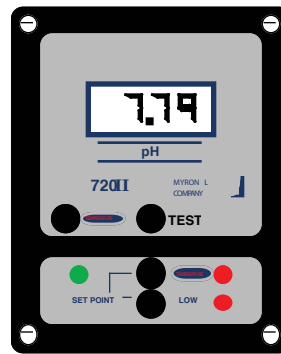


Figure IV.A.1

Digital pH
Monitor/controller
with optional Dual
Alarm/controls

723II-SC



Figure IV.A.2

Digital ORP
Monitor/controller with
optional Front Panel
Test Switch, Single
Alarm/control, and
Piezo Alarm.

728II-PTS-PA



Figure IV.A.3

Analog pH
Monitor/controller
(Single Alarm/control)

722II

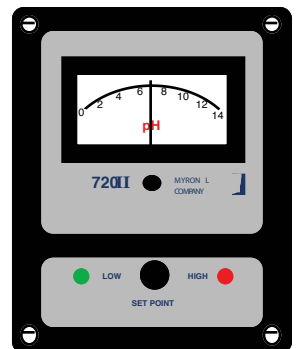


Figure IV.A.4

Analog
ORP
Monitor
726II

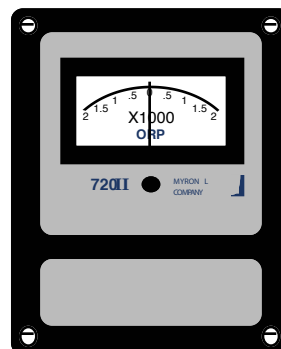


Figure IV.A.5

B. OEM FRONT PANEL INDICATORS & CONTROLS

The simulated OEM front panel illustrations to the right, and switch and indicator operational descriptions have been provided to assist the OEM user in identifying and operating the 720 Series II Monitor/controllers.

Refer to Section V.C. for Setup procedures, and Section V.D. for Check-Out procedures.

1. RED “HIGH SET POINT” LED INDICATOR

The red LED indicator light is ON only when the water’s pH or ORP reading is HIGH or ABOVE the set point adjustment. May be reversed if desired.

2. GREEN “LOW SET POINT” LED INDICATOR

The green LED indicator light is ON only when the water’s pH or ORP reading is LOW or BELOW the set point adjustment. May be reversed if desired.

3. “SET POINT” SWITCH(ES)

When the “SET POINT” switch is depressed, the internal set point reading is immediately displayed on the front panel display. See figures IV.B.1 thru 4.

4. ANALOG METER OR DIGITAL DISPLAY

Panel mounted analog meter or digital display provide a continuous readout of the water being monitored.

pH Models 721II & 722II and ORP Models 726II & 727II are equipped with analog meter only as shown in figures IV.B.4 & 5.

pH Models 723II & 724II and ORP Models 728II & 729II are equipped with a 3 1/2 digit, 1/2” Liquid Crystal Digital Display, as shown in figures IV.B.1 thru 3., with a 3 1/2 digit backlit LCD as an option.

5. OPTIONAL PANEL MOUNTED ITEMS

TP/TPO Module Switch

A digital Monitor/controller with the optional TP/TPO Temperature Module has an additional switch on the front panel as shown in figure IV.B.1.. This push-button momentary switch when pushed gives the user a direct reading of the temperature of the solution from 0-200°C. Additional option TH/THO includes a control function capability. See figure IV.B.1.

7pH or ZEROmV Test Switch (TEST)

This optional feature allows the user to see the ZERO TEST value without opening the panel to push the internal switch. See figures IV.B.1 and IV.B.3 for typical examples.

Piezo Alarm

Audible alarm sounds off automatically when the set point is reached. Mounted by OEM in any convenient location as shown in figure IV.B.3.

WARNING: THE DISPLAY WILL BE IRREPARABLY DAMAGED IF THE HARNESS IS INSTALLED UPSIDE-DOWN. THE HARNESS MUST BE INSTALLED AS SHOWN IN FIGURE II.E.3.

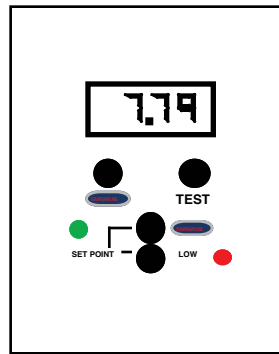


Figure IV.B.1

Digital pH
Monitor/controller
with optional Dual
Alarm/controls
723II-SC

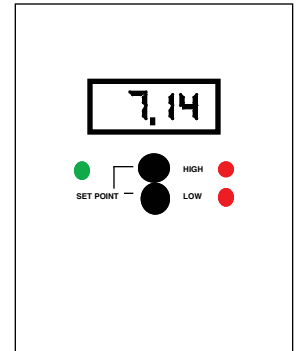


Figure IV.B.2

Digital ORP
Monitor/controller with
optional Front Panel
Test Switch, Single
Alarm/control, and
Piezo Alarm.

728II-PTS-PA

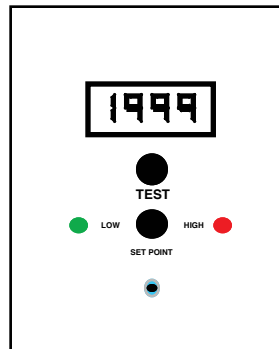


Figure IV.B.3

Analog pH
Monitor/controller
(Single Alarm/control)
722II

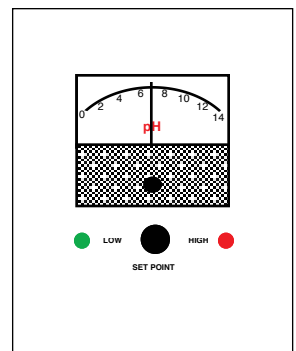


Figure IV.B.4

Analog
ORP
Monitor
726II

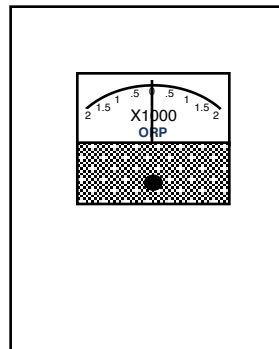


Figure IV.B.5

**NOTE: Boxes around displays
to simulate OEM panels.**



CAUTION - READ FOLLOWING CAREFULLY

C. SETUP PROCEDURES

These Setup procedures cover (1) converting the alarm circuit to trigger on a decreasing or increasing reading, (2) checking out your new Monitor/controller, (3) setting the alarm circuit set point(s), and (4) adjusting the hysteresis.

The following require that the front panel be removed. While doing so be careful not to strain the cable(s).

NOTE: A small screwdriver or tweaker will be required for several of the following operations.

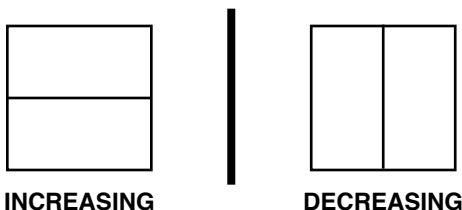
1. SET POINT CONVERSION (SPC) / REVERSING SET POINT

The alarm/control circuit(s) on all 720 Series II pH/ORP Monitor/controllers are configured to trigger the alarm relay as the reading increases.

If the user's application requires it, the alarm circuit may be easily reconfigured to trigger the alarm relay as the reading decreases. Refer to figure V.A.1. for the locations of the jumpers referred to in this section.

NOTE: These instructions describe the general procedures for converting the Monitor/controller without reference to jumper numbers or orientation.

1. Ensure power is **OFF**.
2. Locate the jumper block for the alarm to be configured.
3. Make a note of the current orientation of the jumpers.
4. Remove both jumpers. This is easily done by hand. Take care not to crush the jumpers if using pliers.
5. Rotate the jumpers 1/4 turn and reinstall them on their posts as shown in figure IV.C.1.



JUMPER CONVERSION

Figure C.1

2. CHECK-OUT PROCEDURES

The following check-out procedures are used to verify that the 720 Series II Monitor/controller is operating properly. It is assumed that the Monitor/controller is powered ON, that it is connected to an appropriate Sensor, and that the Sensor is immersed in water within the range that the Monitor/controller will be required to read. Refer to figure V.A.1. for the locations of the components referred to in this section.

- a. Make a note of the reading on the display.
- b. Being careful not to strain the connecting cable(s), unfasten and remove the front panel.
- c. While pressing the ZERO Test Switch (ZERO), verify that the front panel display is indicating 7pH or 0 mV reading.

If not, see Calibration, section V.C.

- d. Press and hold the "SET POINT" switch on the front panel. Using the tweaker or a small screwdriver, adjust the Set Point trimmer adjustment screw on the circuit board to sweep the display left and right 1pH unit or 60mV on both sides of water reading. Listen for the alarm relay to click 'ON and OFF' as the alarm set point moves past the water reading.
- e. Adjust the alarm to the desired set point value. Release the "SET POINT" switch.

NOTE: For Models with SC/SCO module, repeat STEPS 4 & 5 to check out Set Point #2.

3. SET POINT ADJUSTMENT

The set point setting is based upon the user's particular water purity specifications or requirements.

NOTE: The optional **second** relay/alarm is "stacked" on the first relay/alarm, therefore, when setting the optional **second** relay/alarm Set Point, the #1 Set Point must be 'set' first.

- a. Being careful not to strain the cable, unfasten and remove the Monitor's front panel.
- b. While depressing the "SET POINT" switch, turn the Set Point #1 adjustment screw (See figure V.A.1) until the desired set point value is indicated on the display.
- c. If Hysteresis adjustment is required see below. If not, reinstall the front panel and tightly secure both retaining screws.

4. HYSTERESIS (DEAD BAND) ADJUSTMENT

The hysteresis or dead band is approximately $\pm 3\%$ of the set point at full scale as it leaves the factory. Under normal (most) conditions it will not be necessary to adjust.

However, if you desire to make an adjustment please keep the following in mind.

The adjustment is very simple and is based on set point location.

If the set point* is in the upper 75-100% of the scale, the hysteresis control pot should be turned fully to the right.

If the set point is in the lower portion of the scale, i.e. 5-25 % of scale, the control pot may be turned fully to the left.

If you are operating in the center, 25-75% of scale, the control pot may be adjusted in the center.

Or the hysteresis or dead band may be adjusted to tighten the control of a particular process.

CAUTION: adjusting the hysteresis too tight may cause the alarm to fluctuate (on-off) due to flow, chemical mixing or bubbles causing the relay to chatter. This condition is to be avoided, it could damage your valves, pumps, etc. and will eventually damage the relay.

* Applies to both set points if so installed.

The following is assuming the front panel is already removed and the set points have been set, if not see above,

1. Locate the hysteresis control adjustment located next to the Set Point #1 (SP1) adjustment - it is a single turn pot. See figure V.A.1.
2. Adjust as described above or as desired.
3. Reassemble per below.

REASSEMBLY

1. Carefully reinstall the front panel, bottom first. Ensure no wires have been pinched between enclosure and front panel.
2. Reinstall the screws and tighten.
3. To operate, turn power **ON**.

V. COMPONENT IDENTIFICATION, CALIBRATION AND PREVENTIVE CARE

A. PRIMARY COMPONENT IDENTIFICATION

As identified in Section III, the Monitors/controllers switch(es) and indicator components are mounted directly to the front panel.

The Monitor/controllers main circuit board is contained within and mounted to the back of the enclosure. Some models with options have an additional circuit board mounted behind the front panel, i.e. Model 723II-4A (4-20 Module).

Review figure V.A.1 below to familiarize yourself with the Main circuit board assembly. The following diagram has the second alarm/control module option installed.

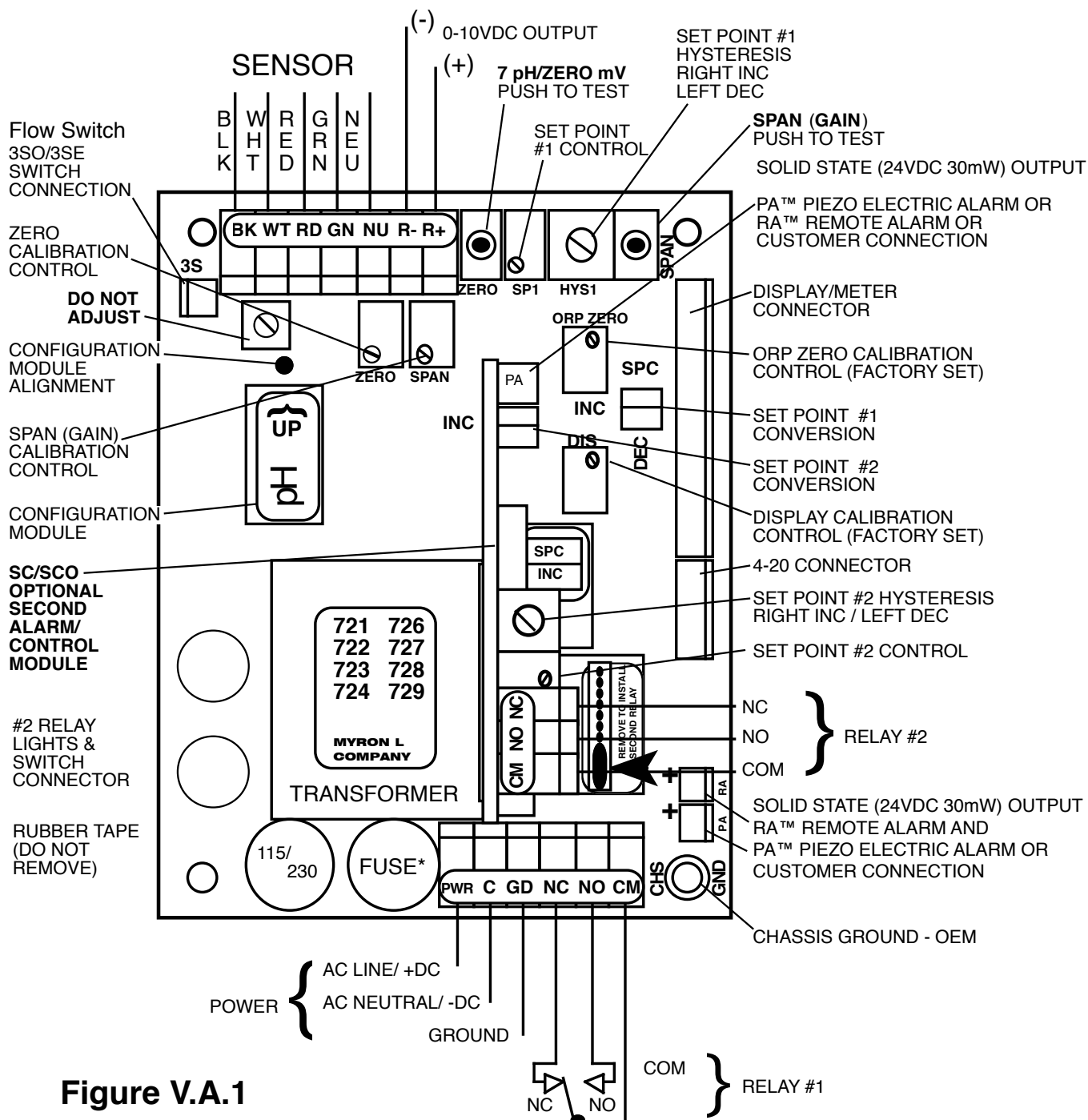


Figure V.A.1



CAUTION - READ FOLLOWING CAREFULLY

B. METER MECHANICAL ZERO PROCEDURES

ANALOG METERS ONLY

1. Ensure power is **OFF**.
2. Note the position of the meter needle. If it has come to rest pointing at the zero mark on the scale, turn the Monitor back ON and continue on to Section V.C.
3. Locate the small (approx. 1/4"), black plastic button directly below the center of the meter. Use a small screwdriver or a fingernail to gently pry it loose and remove it from the access hole. See figure II.G.9.
4. Insert a small standard screwdriver into the access hole and carefully locate the slot in the mechanical adjustment plug.
5. Turn the adjustment plug slightly until the needle rests on zero.
6. Insert the small plastic button into the access hole.
7. Turn power **ON**.

C. CALIBRATION PROCEDURES

All Myron L pH/ORP Monitor/controllers are factory calibrated prior to shipment and are ready to install without further calibration. Calibration should be checked occasionally with the internal ZERO Test switch (ZERO) to ensure continued accuracy. The following procedures are provided in the event that recalibration becomes necessary.

For electronic calibration the only equipment required is a tweaker or small screwdriver.

For wet calibrating a pH Monitor/controller the only items required is a tweaker or small screwdriver, and pH buffer solutions; 4, 7 and/or 10.

pH 7 Buffer solution is recommended to wet calibrate ORP ZERO. The electronic calibration is recommended for SPAN calibration and adjustment, as described in "SPAN (GAIN/SLOPE) Calibration" section V.C.1.b.

Refer to Figure V.A.1. to locate the components described in this section.

NOTE: When opening instrument, remove front cover with care; a ribbon cable connects the front panel and main board.

When performing calibration procedures, the technician must take extreme care to avoid contacting the circuitry other than the Calibration controls. Failure to do so could result in damage to the equipment, property and/or personal injury.

1. ELECTRONIC CALIBRATION (CIRCUIT ONLY)

This method is faster than the following method using buffer solution, but it does not include the sensor. Therefore, it should be used only in applications where the chance of sensor contamination or damage are negligible.

The **DISplay** calibration controls have been **SET** and **SEALED** prior to leaving the factory, and under normal conditions will not require readjustment. This allows the customer to use the panel meter/display to easily set the electronic calibration as described below.

NOTE: If the **DISplay** calibration controls have been adjusted it will be necessary to calibrate the RECORDER Output as described in "0-10VDC RECORDER OUTPUT Calibration" section V.C.2.

a. ZERO Calibration - 7pH or 0mV

1. Turn power **OFF**.
2. Using a standard slot screwdriver remove the screws on the front panel.
3. Carefully wiggle the front panel to loosen the gasket and pull gently toward you. Do not pull more than about 8 inches/20CM or you could damage the wiring harness.
4. Turn the front panel around so that the back side is facing you and set aside.
5. Turn power **ON**.
6. Press and hold the **ZERO** Test Switch. The display should indicate 7.00pH or 0mV (ORP). If not, set to 7.00pH or 0mV with the **ZERO calibration** control.
7. Turn power **OFF**.
8. Continue with SPAN Calibration, or re-install front panel as described in "REASSEMBLY", page 54.

b. SPAN (GAIN/SLOPE) Calibration

1. Press and hold the **SPAN** Test Switch. The display should indicate 0pH or -1999mV (ORP). If not, set to 0pH or -1999mV with the **SPAN calibration** control.
2. End of calibration, turn power **OFF**.
3. Re-install front panel as described below in "REASSEMBLY".

2. 0-10VDC RECORDER OUTPUT Calibration

For recorder output voltages other than 0-10VDC, substitute as required, i.e. 5.00VDC = 2.50VDC per Section II.F.2.

pH Models

On pH models, the **ZERO** (7.00pH) test switch and the **ZERO** calibration control are used to adjust the recorder output, 7.00pH equals 5.00VDC. The display is then adjusted to indicate 7.00pH with the **DISplay** calibration control. The **SPAN** test switch and the **SPAN** calibration control are used to adjust the span of the recorder output to 0VDC (0pH). Refer to figure V.A.1 for location of items described below. A DVM set to DC Volts is required.

1. Ensure power is **OFF**.
2. Attach DVM to RECORDER output connection.
3. Turn power **ON**.
4. Press and hold the **ZERO** test switch.
5. The DVM should indicate 5.00VDC.
6. If not, adjust **ZERO calibration** control until DVM indicates 5.00VDC.
7. Verify the panel meter/display, it should indicate 7.00pH.
8. If not, adjust **DISplay** control until display indicates 7.00pH.
9. Press and hold the **SPAN** test switch.
10. The DVM should indicate 0VDC.
11. If not, adjust **SPAN calibration** control until DVM indicates 0VDC.
12. Display does not require further adjustment.
13. Turn power **OFF**.
14. Re-install front panel as described in "REASSEMBLY", page 54.

ORP Models

On ORP models, the **ZERO** (0mV) test switch and the **ZERO** calibration control are used to adjust the recorder output, 0mV equals 5.00VDC. The display is adjusted to indicate 0mV with the **ORP ZERO** calibration control. The **SPAN** test switch and the **SPAN** calibration control are used to adjust the span of the recorder output to 0VDC (-1999mV). The display is then adjusted to indicate -1999mV with the **DISplay** calibration control. Refer to

figure V.A.1 for location of items described below. A DVM set to DC Volts is required.

- Note:** For digital panel display perform step 8.
For analog meter display adjust **DISplay** calibration control pot instead and **DO NOT** perform step 13
1. Ensure power is **OFF**.
 2. Attach DVM to RECORDER output connection.
 3. Turn power **ON**.
 4. Press and hold the **ZERO** test switch.
 5. The DVM should indicate 5.00VDC.
 6. If not, adjust **ZERO calibration** control until DVM indicates 5.00VDC.
 7. Verify the panel meter/display, should indicate 0mV.
 8. If not, adjust **ORP ZERO** control until display indicates 0mV.
 9. Press and hold **SPAN** test switch.
 10. The DVM should indicate 0VDC.
 11. If not, adjust **SPAN calibration** control until DVM indicates 0VDC.
 12. Verify the panel meter/display, it should indicate -1999mV.
 13. If not, adjust **DISplay** control until display indicates -1999mV.
 14. Turn power **OFF**.
 15. Re-install front panel as described in "REASSEMBLY", page 54.

3. CALIBRATION USING BUFFER SOLUTIONS

The **BEST** method of calibrating your pH or ORP Monitor/controller is with NIST traceable Buffer Solutions (available from the Myron L® Company). Because it includes the sensor, the entire system is calibrated.

For ORP, use 7pH buffer solution to set 0mV. Where 4 or 10 buffer is referenced substitute ORP solution, or use the internal -1999mV calibration.

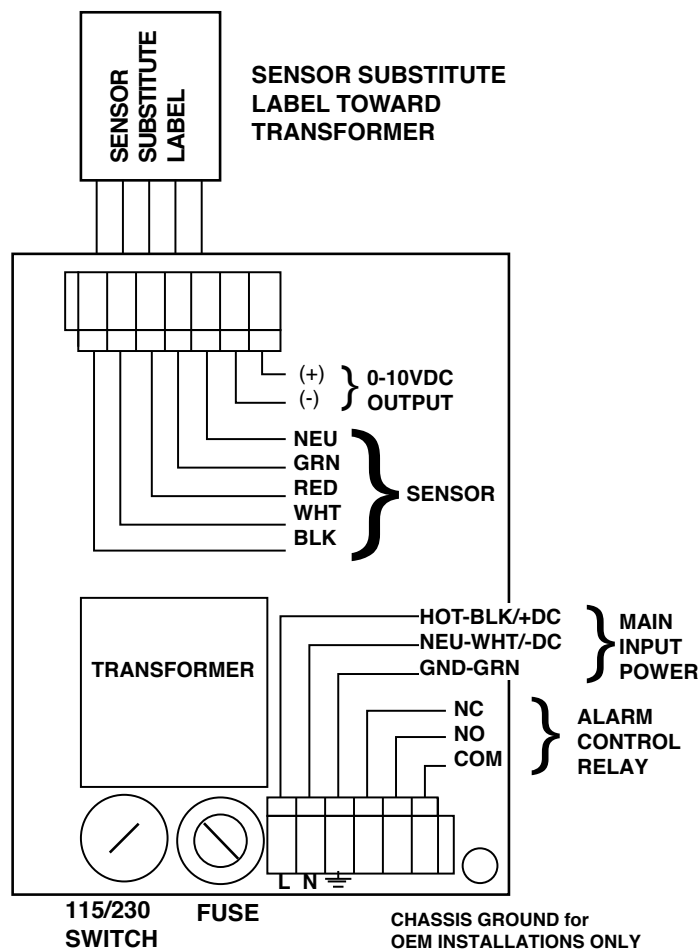
1. Rinse a clean glass beaker thoroughly with 7pH buffer solution.
2. Fill beaker with 7pH buffer solution.
3. Place sensor in the beaker of buffer solution. Level of buffer solution must be at least 1" above the sensor tip.
4. Carefully shake the sensor to remove air bubbles from around the sensor tip area.
5. Allow 5-10 minutes for temperature to equilibrate. For the quickest and the best results, both the sensor and solution should be at the same temperature.
6. Read the panel meter/display. The display should match the value and units of measure shown on the bottle of buffer solution. If the reading is different, adjust **ZERO calibration** control on the main control circuit board until reading is 7pH or 0mV.
7. Repeat steps 2 - 5. using either 4 or 10 pH buffer solution. If reading is incorrect, adjust **SPAN calibration** control on the main control circuit board until reading matches buffer solution.
8. Turn **OFF** power.
9. Re-install front panel as described in "REASSEMBLY", page 54.

4. SENSOR SUBSTITUTE CALIBRATION

A compatible NIST traceable sensor substitute or adapter is available from the Myron L® Company. This is normally not necessary due the "internal" electronic calibration. However, your requirements may be such that a crosscheck or verification is

essential. The following will step you through the procedure.
NOTE: if you have previously performed a calibration with a buffer solution this procedure will make that calibration invalid. You must decide which is more important, a true calibration with a buffer solution, or an electronic calibration.

1. Ensure power **OFF**.
2. Using a standard slot screwdriver remove the screws on the front panel.
3. Carefully wiggle the front panel to loosen the gasket and pull gently toward you. Do not pull more than about 8 inches/20cm or you could damage the wiring harness.
4. Turn the front panel around so that the back side is facing you and set aside.
5. Locate and remove the sensor leads from the sensor connector as shown in figure V.A.1.
6. Install sensor substitute as shown in figure V.C.1. with sensor substitute label toward the transformer.
7. Turn power **ON**.
8. Set substitute to 7pH or 0mV.
9. If necessary, adjust **ZERO calibration** control until reading is 7pH or 0mV.
10. Reset substitute to either 4pH or 10pH (-177 or +177mV).
11. If necessary, adjust **SPAN calibration** control until reading is 7pH or 10pH (-177 or +177mV).
12. After adjustment, turn power **OFF**.
13. Re-install front panel as described in "REASSEMBLY", page 54.



ELECTRICAL CONNECT DIAGRAM

Figure V.C.1.

5. TRANSFER STANDARD METHOD

Another method of calibrating a Monitor/controller is via the transfer standard. Instead of removing the entire Monitor/controller and sensor, and either returning it to the manufacture or sending it to a third party laboratory for recertification, the transfer standard allows for a quick check and return to service — less down time. It is very easy to perform, and may be used to check ANY manufactures Monitor/controller — pH or ORP. This method still has the benefit of third party verification, if so desired. This method works very well with an ORP Monitor/controller as span drift is usually not common in quality sensors. However, it does have its limitations, especially in a pH Monitor/controller, and can not be used if the controller is expected to operate in wide range. It is recommended that the internal electronic calibration be performed first.

NOTE: The recommendations below may not be applicable for all applications or conditions - may require experimentation for best results.

1. A high quality hand-held instrument, one capable of accurate “pH” and/or “ORP” readings, such as the Myron L Ultrameter II™ 6P or the TechPro II™ TPH1 or TH1, is calibrated using pH buffer solutions (4, 7 & 10), or if so desired, sent to a third party laboratory for calibration & certification.
2. Once the Ultrameter II or TechPro II is calibrated, the process solution is measured and recorded.
3. The Monitor/controller is then calibrated/adjusted to match the value measured by the Ultrameter.

pH Monitor/controller

- a. If the normal operating range of the is between 5 - 9 adjust the **ZERO calibration** control.
- b. If the normal operating range of the is between 0 - 5 or 9-14 adjust the **SPAN calibration** control.

ORP Monitor/controller. ORP solutions of high ionic strength and with a strong mV reading give the best results.

- a. Adjust only the **ZERO calibration** control.
4. Turn power **OFF**.
 5. Re-install front panel as described below in “REASSEMBLY”.

REASSEMBLY

1. Carefully reinstall the front panel, bottom first. Ensure no wires have been pinched between enclosure and front panel.
2. Reinstall the screws and tighten.
3. To operate, turn power **ON**.

D. PREVENTIVE CARE

The Myron L® Company recommends that the following Preventive Care procedures be observed.

1. ENCLOSURE

1. Try to prevent exposure to excessive heat and moisture.
2. The Monitor's main AC power source should be protected against excessive voltage “spikes.”
3. Take care not to damage the Monitor/controller during handling.

NOTE: Daily, weekly or monthly maintenance schedules are based upon the frequency of use and the severity of the Monitor/controller's environment and operating conditions.

4. Repeat the Monitor/controller's Check-Out procedures

to verify satisfactory operation and/or isolate possible troubleshooting symptoms.

5. Check all cable connections to ensure that they are free of moisture and contamination.
6. Inspect and replace damaged component boards and cable assemblies.

CLEANING - clean front panel with limited soap and water, and soft non- abrasive cloth. Dry.

2. pH and ORP SENSORS

Periodically remove, clean and inspect the sensor. pH and ORP sensors may be cleaned using Isopropyl Alcohol (IPA). This will remove oils that have saturated into the glass bulb and on the surface of the reference junction.

If the process will not allow sufficient down time, replace sensor with another, and clean using the procedure below. Periodic cycling of sensors may be necessary due to the process. Another effective, but less friendly method is to use 5% HCl acid. This is harsh on the sensor and can be dangerous to personnel. And it is usually not necessary unless there is excess scaling.

Depending on application, soaking in enzymes is also an effective method to clean the sensor.

Try the IPA first.

For ORP sensors we have found, after IPA cleaning, lightly polishing the Platinum tip with emery paper will help to restore the correct indication on the Monitor/controller. Allow recovery time.

Clean using the following procedure.

1. Turn system **OFF**.
2. Carefully remove sensor from solution stream.
3. Rinse with clean water.
4. Shake dry.
5. Pour a small amount of IPA in to a beaker, glass, or cup.
6. Swish the sensor in the IPA for about 5 minutes.
7. Rinse again with clean water.
8. Shake dry.
9. Soak sensor in Myron L pH/ORP Storage Solution until sensor recovers from IPA cleaning shock.
10. Reinstall sensor in to system line with fresh thread sealant.
11. Turn system **ON**.

PLEASE NOTE THE FOLLOWING:

ALL pH and ORP sensors have a limited life.

Operating conditions; temperatures and solutions all have an effect on that life. The higher the temperatures and stronger the solutions, the shorter the life.

When not in use or in storage, sensors must be hydrated at all times with pH/ORP storage solution.

Offset and drift characteristics may be compensated for by Monitor/controller calibration, ZERO and SPAN respectively. However, calibration beyond ± 1 pH unit or ± 60 mV indicate sensor contamination or damage, sensor must be cleaned or replaced. Continued use beyond these limits could effect your systems accuracy and reliability.

VI. OPTIONS & ACCESSORIES

A. OPTIONS ORDERED WITH MONITOR/CONTROLLER

PART #	DESCRIPTION
-SC	Second Alarm/control Module
-4A	4-20mA Self-Powered Isolated Output Module (Digital & OEM Only)
-PA	Piezo Electric Alarm
-TP	Temperature Module 0-200°C, Requires Temperature Sensor (Digital & OEM Only)
-TH	Alarm/control Harness Kit (Requires -SC & -TP)
-PC	Powercord 115VAC (8 ft. with USA plug and Strain Relief) - NOT for 230VAC use.

SPECIAL ORDER OPTIONS

-24VA	24VAC Isolated Power
-PTS	Front Panel Full Scale Test Switch
-TPA	Temperature Module 0-200°C WITH Adjustable Hysteresis, Requires -TP Sensor (Digital & OEM Only)

B. OPTIONS & ACCESSORIES ORDERED SEPARATELY

PART #	DESCRIPTION
SCO	Second Alarm/control Module
4AO	4-20mA Self-Powered Isolated Output Module (Digital & OEM Only)
3SE	3 Sensor Input Module with Enclosure
3SO	3 Sensor Input Module with 3 ft/1 meter Cable*
PAO	Piezo Electric Alarm Only
TPO	Temperature Module 0-200°C, Requires -TP Sensor (Digital & OEM Only)
THO	Alarm/control Harness Kit (Requires SCO & TPO)
TPC	Calibration Module (Temperature Module)
PCO	Powercord 115VAC (8 ft. with USA plug and Strain Relief) - NOT for 230VAC use
SMP50	Surface Mounting Plate
RA	Remote Alarm - RA™ (controller models only)
RAW200	Wire, 200 ft/60 meters, Remote alarm
VR	Voltage Reduction Powersupply, 24VAC, 20VA. (Indoor use Only)
720SS	pH/ORP Sensor Substitute (NIST Traceable)
pHC	NIST Certificate pH (without sensor)
pHCS	NIST Certificate pH (with sensor using buffer solutions)
OC	NIST Certificate ORP (without sensor)
RAH	Harness; female Methode connector w/8" 2 conductor wire. For use w/ RA, PA, 3S (flow switch), etc.

* Does not fit into enclosure, must be mounted separately (Customer Installed).

C. STANDARD SOLUTIONS & BUFFERS

1. pH and ORP BUFFER SOLUTIONS

Your pH and/or ORP Monitor/controller has been factory certified to meet certain specifications based on the appropriate Myron L® Company NIST traceable buffer solutions. These same solutions are available to you.

NOTE: ORP ZERO is calibrated using 7pH buffer. SPAN may be wet calibrated using any high quality ORP mV solution.

These same buffers may be used for calibration and recertification of your Myron L or other handheld instruments.

a. pH Buffer Solutions

pH buffers are available in pH values of 4, 7 and 10. Myron L® Company buffer solutions are traceable to NIST certified pH references and are color-coded for instant identification. They are also mold inhibited and accurate to within ± 0.01 pH units @ 25°C. Order 4, 7 or 10 Buffer.

b. pH Sensor Storage Solution

Myron L Storage Solution prolongs the life of your pH or ORP sensor. Sensor must be stored in Storage Solution. It is available in 2oz bottles, quarts and gallons. Order SS2oz, SSQ or SSG.

2. CONDUCTIVITY/TDS STANDARD SOLUTIONS

For your Conductivity/TDS Monitor/controllers. Your Conductivity/TDS Monitor/controller requires the same care and calibration as your pH and ORP Monitor/controller. With the following Myron L® Company NIST traceable standard solutions it is possible for you to maintain the accuracy required in your process.

These same standards may be used for calibration and recertification of your Myron L or other handheld instrument.

DESCRIPTION

The Myron L® Company manufactures three basic types of conductivity/TDS standard solutions — KCl, NaCl and 442™. See below.

Most Myron L standard solution bottles show three values referenced at 25°C:

Conductivity in microsiemens/micromhos, while the ppm/TDS equivalents are based on our 442 Natural Water™, and NaCl standards. All standards are within $\pm 1.0\%$ of reference solutions.

a. Potassium Chloride (KCl)

The concentrations of these reference solutions are calculated from data in the International Critical Tables, Vol. 6.

b. 442 Natural Water™

442 Natural Water Standard Solutions are based on the following salt proportions: 40% sodium sulfate, 40% sodium bicarbonate, and 20% sodium chloride which represent the three predominant components "anions" in freshwater. This salt ratio has conductivity characteristics approximating fresh natural waters and was developed by the Myron L® Company over three decades ago. It is used around the world for measuring both conductivity and TDS in drinking water, ground water, lakes, streams, etc.

c. Sodium Chloride (NaCl)

This is especially useful in sea water mix applications, as sodium chloride is its major salt component. Most Myron L standard solution labels show the ppm NaCl equivalent to the conductivity and to ppm 442 values.

C.1.a. pH Buffer Solutions

pH4.0

pH7.0

pH10.0

C.1.b. pH/ORP Storage Solution

SS2oz - 2 oz bottle

SSQ - Quart/liter

SSG - Gallon

C.2.a. Potassium Chloride Standards

KCl-18

KCl-180

KCl-1800

KCl-18,000

KCl-70

KCl-700

KCl-7000

KCl-70,000

C.2.b. 442 Natural Water Standards

442-15

442-150

442-1500

442-15,000

442-30

442-300

442-3000

442-30,000

442-500

442-1000

C.2.c. Sodium Chloride Standards

NaCl-12.5

NaCl-13.4

NaCl-14.0

Customer Standard Solutions available by special order. Contact us with your request.

VII. REPLACEMENT PARTS

PART #	MONITOR/CONTROLLER MODEL
pH	
721PB	721II pH Circuit Board Analog Monitor Only
722PB	722II pH Circuit Board Analog Monitor/controller
723PB	723II pH Circuit Board Digital Monitor/controller
724PB	724II pH Circuit Board Digital Monitor Only
ORP	
726OB	726II ORP Circuit Board Analog Monitor Only
727OB	727II ORP Circuit Board Analog Monitor/controller
728OB	728II ORP Circuit Board Digital Monitor/controller
729OB	729II ORP Circuit Board Digital Monitor Only
24VA	24 VAC Isolated Power, add to above prices If VOLTAGE is not specified, 115/230 VAC will be supplied.
Above circuit board includes Configuration Module.	

CONFIGURATION MODULES

CMpH	pH Configuration Module Only (Analog or Digital)
CMpHA	With Meter Scale (Dial) for Analog Models
CMORP	ORP Configuration Module Only (Analog or Digital) See Operation Manual before installing.
CMORPD	ORP for Digital ORP Models
CMORPA	With Meter Scale (Dial) for Analog Models

DIGITAL DISPLAYS

35	3 1/2 Digit without Bezel
35B	3 1/2 Digit with Bezel (OEM Style)*
35BL	3 1/2 Digit Backlit without Bezel
35BLB	3 1/2 Digit Backlit with Bezel (OEM Style)*

METERS SPECIFY pH or ORP.

20AM (pH or ORP)	For all Enclosure Mounted Models, with Gasket**
20AMOEM (pH or ORP)	For all OEM Models, with Gasket**

HARNESS (STANDARD 9")

AH2	For 721II & 726II Analog Monitor Only
AH	For 722II & 727II Analog Monitor/controller
DH	For 723II & 728II Digital Monitor/controller
DH2	For 724II & 729II Digital Monitor Only

ENCLOSURE

720II EC	720 SERIES II Rear Housing (BOX)
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FRONT PANEL with UPPER and LOWER LABELS ONLY

pH	
721FP	Analog Front Panel
721FP-PTST	Analog Front Panel with Panel Mounted TEST Switch Label
722FP	Analog Front Panel
722FP-PTST	Analog Front Panel with Panel Mounted TEST Switch Label
722FP-SC	Analog Front Panel with Second Alarm Control Label
723FP	Digital Front Panel
723FP-PTST	Digital Front Panel with Panel Mounted TEST Switch Label
723FP-PA	Digital Front Panel with Piezo Alarm
723FP-SC	Digital Front Panel with Second Alarm Control Label

Continued

VII. REPLACEMENT PARTS Continued

PART#

pH Continued

724FP	Digital Front Panel
724FP-PTST	Digital Front Panel with Panel Mounted TEST Switch Label
723FP-SC-PA	Digital Front Panel with Second Alarm Control Label and Piezo Alarm
723FP-SC-PTST	Digital Front Panel with Second Alarm Control Label and Panel Mounted TEST Switch Label
723FP-SC-PTST-PA	Digital Front Panel with Second Alarm Control Label, Panel Mounted TEST Switch Label and Piezo Alarm

ORP

726FP	Analog Front Panel
726FP-PTST	Analog Front Panel with Panel Mounted TEST Switch Label
727FP	Analog Front Panel
727FP-PTST	Analog Front Panel with Panel Mounted TEST Switch Label
727FP-SC	Analog Front Panel with Second Alarm Control Label
728FP	Digital Front Panel
728FP-PTST	Digital Front Panel with Panel Mounted TEST Switch Label
728FP-PA	Digital Front Panel with Piezo Alarm
728FP-SC	Digital Front Panel with Second Alarm Control Label
729FP	Digital Front Panel
729FP-PTST	Digital Front Panel with Panel Mounted TEST Switch Label
728FP-SC-PA	Digital Front Panel with Second Alarm Control Label and Piezo Alarm
728FP-SC-PTST	Digital Front Panel with Second Alarm Control Label and Panel Mounted TEST Switch Label
728FP-SC-PTST-PA	Digital Front Panel with Second Alarm Control Label, Panel Mounted TEST Switch Label and Piezo Alarm

OPTIONS & ACCESSORIES

SCMO	Module only; Second Alarm/Control
SCH	Harness; Second Alarm/Control
4AMO	Module only; 4-20mA Self-Powered Isolated Output (Digital & OEM only)
4AH	Harness; 4A (4-20mA)
TPMO	Module only; Temperature 0-200°C (Digital & OEM only)
TPAMO	Above TP with Adjustable Hysteresis (Special Order)
TDH	Harness; TP and TPA (Temperature Module)
TPMH	9" Harness; OEM Temperature Module
JM4P	Jumper; in place of SC Module
3SMO	Module only; 3SO 3 SENSOR Input
3SH	Harness; 3SO 3 ft/1meter 5-Wire Sensor Cable
3SRH	Harness; 3SO 3 ft/1meter 2-Wire Disable
PAO	Piezo electric Alarm only (723II & 728II)
TPC	Calibration Module (Temperature Module)
F100	Fuse; Main Control Board, 100mA (T.10A) 5 X 20 Slow Blow/Time Delay
F250	Fuse; 24VAC Main Control Board, 250mA (T.25A) 5 X 20 Slow Blow/Time Delay
024-1	24VAC 1" Solenoid Valve
pHCRD-(length)	Cable; 5-wire sold by the foot
RAH	Harness; female Methode connector w/8" 2 conductor wire. For use w/ RA, PA, 3S (flow switch), etc.

* Shipped with mounting hardware for ease of panel mounting.

** Meter comes with proper scale (dial).

VIII. WARRANTY

All Myron L Company pH and ORP Monitor/controllers have a **TWO-year** warranty. If any Monitor/controller fails to function normally, return the faulty unit to the factory prepaid. If, in the opinion of the factory, failure was due to materials or workmanship, repair or replacement will be made without charge.

All pH and ORP sensors have a six (6) month limited warranty. If any sensor fails during that time, return the failed sensor to the factory, prepaid. If, in the opinion of the factory, failure was due to materials or workmanship, repair or replacement will be made without charge.

A reasonable service charge will be made for diagnosis or repairs due to normal wear, abuse or tampering. Warranty is limited to the repair or replacement of Monitor/controller or sensor only. The Myron L Company assumes no other responsibility or liability.

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ADDITIONAL INFORMATION

Custom Monitors/controllers available, contact us with your special needs. Price and delivery upon request.

ALL SPECIAL ORDER ITEMS ARE NON-RETURNABLE AND NON-REFUNDABLE.

Because of our policy of continuous product improvement, the Myron L® Company reserves the right to make changes in design, specifications, and prices without notice.

Minimum order \$25.00. All prices are US dollars and are F.O.B. Carlsbad, CA. USA.

Terms: 1% 10 days, net 30 days upon receipt of sufficient credit information.

Export orders: payment in advance or credit card.

IX. GLOSSARY

442™	An Internationally recognized “natural water” standard developed by the Myron L Company in 1964.
Algorithm	A procedure for solving a mathematical problem. See Addendum, Temperature Compensation and TDS Derivation.
Anions	Negatively charged ions
DVM	Digital Volt Meter
Hysteresis	Dead Band — related to alarm setpoint. The amount of delay or overlap between change from high to low or low to high.
LCD	Liquid Crystal Display
Logarithm	An arithmetic function. See Addendum, pH Units.
KCl	Potassium Chloride — used as a standard for many applications. Normally, micromhos or microsiemens are the units of measure.
NaCl	Sodium Chloride — used as a standard for sea water and other applications.
NIST	National Institute Standards & Testing
ORP	Oxidation-Reduction Potential or REDOX, See Addendum, ORP/Oxidation-Reduction Potential/REDOX.
pH	Acid or Alkaline (0-14 pH units) — See addendum.
PLC	Programmable Logic Controller
PPM	Parts Per Million — common units of measure for TDS.
PPT	Parts Per Thousand — common units of measure for TDS.
Reduce	As in ORP.
SCADA	Supervisory Control And Data Acquisition
Tempco (TC)	Temperature Compensation — See Addendum, Temperature Compensation.
TDS	Total Dissolved Solids or the Total Conductive Ions in a solution — normally displayed as ppm or ppt. See Addendum, Conductivity Conversion to TDS.
Tweaker	A screwdriver specially designed for adjusting electrical calibration controls.
μM or μS	Micromho or microsiemen — common unit of measure for conductivity.
Meg or Ωohm	Megohm — common unit of measurement for resistivity.
USP25	United States Pharmaceutical regulation, revision number 25. In part, requires Conductivity/TDS, resistivity or pH measurements be taken, recorded and/or systems controlled using equipment without temperature compensation. Requires a separate temperature measuring device (temperature measurements may be part of Cond/TDS, Resistivity or pH device but must not correct measurements for temperature errors).

X. NOTES

XI. ADDENDUM

A. pH, ORP and TEMPERATURE RELATIONSHIPS

1. pH

a. pH as an Indicator

pH is the measurement of Acidity or Alkalinity of an aqueous solution. It is also stated as the Hydrogen Ion activity of a solution. pH measures the effective, not the total, acidity of a solution.

A 4% solution of acetic acid (pH 4, vinegar) can be quite palatable, but a 4% solution of sulfuric acid (pH 0) is a violent poison. pH provides the needed quantitative information by expressing the degree of activity of an acid or base.

In a solution of one known component, pH will indicate concentration indirectly. However, very dilute solutions may be very slow reading, just because the very few ions take time to accumulate.

b. pH Units

The acidity or alkalinity of a solution is a measurement of the relative availabilities of hydrogen (H^+) and hydroxide (OH^-) ions. An increase in (H^+) ions will increase acidity, while an increase in (OH^-) ions will increase alkalinity. The total concentration of ions is fixed as a characteristic of water, and balance would be 10^{-7} mol/liter (H^+) and (OH^-) ions in a neutral solution (where pH sensors give 0 voltage).

pH is defined as the negative logarithm of hydrogen ion concentration. Where (H^+) concentration falls below 10^{-7} , solutions are less acidic than neutral, and therefore are alkaline. A concentration of 10^{-9} mol/liter of (H^+) would have 100 times less (H^+) ions than (OH^-) ions and be called an alkaline solution of pH 9.

c. The pH Sensor

The active part of the pH sensor is a thin glass surface which is selectively receptive to hydrogen ions. Available hydrogen ions in a solution will accumulate on this surface and a charge will build up across the glass interface. The voltage can be measured with a very high impedance voltmeter circuit; the trick is to connect the voltmeter to solution on each side.

The glass surface encloses a captured solution of potassium chloride, holding an electrode of silver coated with silver chloride. This is as inert a connection as can be made from metal to an electrolyte. It still can produce an offset voltage, but using the same materials to connect to the solution on the other side of the membrane allows the 2 equal offsets to cancel.

The problem is the other side of the membrane is some test solution, not potassium chloride. The outside electrode, also called the Reference Junction, is of the same construction with a porous plug in place of a glass barrier to allow the junction fluid to contact the test solution without significant migration of liquids through the plug material. Migration does occur, and this limits the lifetime of a pH junction, from depletion of solution inside the reference junction or from contamination.

d. The Myron L pH Sensor

The pH sensors for the 720 Series II Monitor/controller are a single construction in an easily replaceable package. The sensor body holds large solution supply for long life. The reference junction "wick" is porous to provide a very stable, low permeability

interface. It is located under the glass pH sensing electrode. The construction combines all the best features of any pH sensor known.

e. Sources of Error

1. Reference Junction

The most common sensor problem is usually a clogged junction. The symptom is a drift in the "zero" setting at 7 pH. This is why the Monitor/controller does not allow more than 1 pH unit of offset during calibration. At that point the junction is unreliable.

2. Sensitivity Problems

Sensitivity is the receptiveness of the glass surface, which can be diminished by a film on the surface, or a crack in the glass. These problems also cause long response time.

3. Temperature Compensation

pH sensor glass changes its sensitivity slightly with temperature, so the further from pH 7 one is, the more effect will be seen. A pH of 11 at $40^\circ C$ would be off by 0.2 units. The sensor senses the solution temperature, sends the data to the Monitor/controller which compensates the reading.

2. ORP/Oxidation-Reduction Potential/REDOX

a. ORP as an Indicator

ORP is the measurement of the ratio of oxidizing activity to reducing activity in a solution. It is the potential of a solution to give up electrons (oxidize other things) or gain electrons (reduce). Like acidity and alkalinity, the increase of one is at the expense of the other, so a single voltage is called the Oxidation-Reduction Potential, with a positive voltage showing, a solution wants to steal electrons (oxidizing agent). Chlorinated water will show a positive ORP value, for instance.

b. ORP Units

ORP is measured in millivolts, with no correction for solution temperature. Like pH, it is not a measurement of concentration directly, but of activity level. In a solution of only one active component, ORP does indicate concentration. Also, as with pH, a very dilute solution will take time to accumulate a readable charge.

c. The ORP Sensor

An ORP sensor uses a small platinum surface to accumulate charge without reacting chemically. That charge is measured relative to the solution, so the solution "ground" voltage comes from a reference junction - same as the pH sensor uses.

d. The Myron L ORP Sensor

The ORP sensors for the 720 Series II Monitor/controller are a single construction in an easily replaceable package. The sensor body holds large solution supply for long life. The reference junction "wick" is porous to provide a very stable, low permeability interface. It is located under the platinum sensing electrode. The construction combines all the best features of any ORP sensor known.

Both pH and ORP will indicate 0 for a neutral solution. Calibration at zero compensates for error in the reference junction.

A zero calibration solution for ORP is not practical, so the Monitor/controller uses the offset value determined during calibration to 7 in pH calibration ($pH\ 7 = 0\ mV$). Sensitivity of the ORP surface is fixed, so there is no gain adjustment either.

e. Sources of Error

Because sources of error are much the same as for pH. Though the platinum surface will not break like the glass pH surface, its protective glass sleeve can be broken. A surface film will slow the response time and diminish sensitivity. It can be cleaned off with IPA, detergent, or acid, as with the pH glass.

3. pH and ORP SENSOR CAUTIONS

Leaving high pH (alkaline) solutions in contact with the pH and /or sensor for long periods of time can damage it. Samples containing chlorine, sulfur, or ammonia can “poison” any pH electrode. Any sample element which will reduce (add an electron to) silver, such as cyanide, will attack the reference electrode. Fluorides in the water will reduce the life of any pH sensor.

Our unique line of pH and ORP sensors are a nonrefillable combination type featuring a porous liquid junction. It should not be allowed to dry out in use or in storage. If it does, the sensor can sometimes be rejuvenated by first cleaning the sensor with isopropyl alcohol and rinsing well. Do not scrub or wipe the sensor.

Then use one of the following methods:

1. Soak the sensor in a HOT salt solution ~60°C (140°F), preferably potassium chloride (KCl) solution — HOT tap water with table salt (NaCl) will work fine — and allow to cool. Retest.

Or

2. Soak the sensor in DI water and allow to stand for no more than 4 hours (longer can deplete the reference solution and damage the glass bulb). Retest.

If neither method is successful, sensor must be replaced.

“Drifting” can be caused by a film on the pH sensor bulb. Isopropyl alcohol may be used to clean the sensor. The sensor bulb is very thin and delicate. Do not scrub or wipe the sensor.

Replacement sensors are available only from the Myron L® Company or its authorized distributors.

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