570 Series Medical
IntelliSwitch™
Electronic
Switchover

INSTALLATION AND OPERATING INSTRUCTIONS

Carefully Read These Instructions Before Operating

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SAFETY

THIS PRODUCT IS NOT INTENDED FOR USE WITH TOXIC GASES, FLAMMABLE GASES OR CORROSIVE GASES.

NOTICE

The Medical IntelliSwitch™ is intended for use in medical installations. This product meets NFPA-99 requirements for switchover systems. Compliance with NFPA-99 for a complete installation (i.e. Cylinders, piping, alarms, etc.) is the responsibility of the installer. Refer to NFPA-99 for complete system requirements.

Basic safety precautions must be followed to reduce the risk of fire, electrical shock or injury.

- Connect the Medical IntelliSwitch™ to the correct line voltage. A label on the product identifies what voltage it is wired for. CONNECTION TO AN INCORRECT VOLTAGE CAN CAUSE SERIOUS DAMAGE TO THE PRODUCT AND WILL VOID ANY WARRANTY.

- While the Medical IntelliSwitch™ Switchover is dust and moisture resistant, it is NOT water-proof or completely sealed. It should be installed where it will not be subjected to rain or high concentrations of dust. Never pour or spray liquids directly onto the product.

- Install the Medical IntelliSwitch™ where the ambient temperature range is between 0° F and 140° F.

- Do not install this product in a hazardous environment.

- If product appears damaged in any way, do not use and request service from CONCOA.

- Consult the cylinder distributor for the proper use of cylinders and for any restrictions on their use (such as flow rate and temperature requirements).

- Store cylinders with valve caps screwed on, and chain cylinders to a supporting wall or column.

- Handle cylinders carefully and only with valve caps screwed on. The cap will reduce the chance that the cylinder valve will break off if the cylinder is accidentally dropped or falls over. The cap also protects the cylinder valve from damage to screw threads, which could cause leaky connections.

- No smoking should be permitted near oxygen, nitrous oxide, any other oxidizer, flammable gases, or flammable mixtures, or in areas where cylinders are stored.
Where an oxidizer (such as nitrous oxide or oxygen) is used, the manifold and cylinders must be kept clean. No oil, grease, or combustible substances should come in contact with oxygen or nitrous oxide storage or handling equipment. Such materials in contact with oxygen or nitrous oxide are readily ignitable and, when ignited, will burn intensely.

Never lift gas cylinders with a magnetic lifting device.

Never use an open flame when leak testing.

Always open valves slowly when high-pressure gases are being used.

Always be sure that a cylinder contains the correct gas before connecting it to any manifold.

Always leak-test any manifold or distribution pipeline before using.

Always be sure that the gas in a pipeline is the correct gas for the intended use.

Always close all cylinder valves before disconnecting cylinders from a manifold.

Always remove all empty cylinders from a manifold before connecting full cylinders.

Always test cylinders to be sure the cylinders are full before connecting to a manifold.

All gas distribution piping systems must meet the appropriate standards for the intended service. For the United States, some applicable safety rules and precautions are listed below:

1. N.F.P.A. Standard 99, Health Care Facilities
2. Local Ordinances
3. O.S.H.A. Standard 29 CFR
5. C.G.A. Pamphlet G-4, Oxygen – Information on the properties, manufacture, transportation, storage, handling, and use of oxygen.
9. C.G.A. Pamphlet G-6, Carbon Dioxide – Information on the properties, manufacture, transportation, storage, handling, and use of carbon dioxide.
13. C.G.A. Pamphlet C-9, Standard Color Marking of Compressed Gas Containers for Medical Use.
15. C.G.A. Pamphlet E-10, Maintenance of Medical Gas and Vacuum Systems in Health Care Facilities.
19. C.G.A. Pamphlet SA-6, Safety Alert, Use of Nitrogen for Surgical Air Tools

C.G.A. Pamphlets can be obtained from the Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202-3239, (703) 979-0900. Publications: (703) 788-2700. Fax: (703) 961-1831.

USER RESPONSIBILITY

Service to this product should only be performed by CONCOA or an authorized CONCOA agent. Requests for service may be made through CONCOA CUSTOMER SERVICE at 1-800-225-0473. Written requests may be made using CONCOA’s FAX number at 1-757-422-3125 or CONCOA’s E-MAIL at info@concoa.com

CONCOA accepts no responsibility for damage or injury if this product is modified in any way.

CONCOA assumes/accepts no liability or responsibility for damage to individuals or equipment that may occur when using this product.
INSTALLING THE MEDICAL INTELLISWITCH™

Understanding the application and sizing the components properly is the key to any successful system installation.

Check that the correct Medical IntelliSwitch has been selected for the application. The Medical IntelliSwitch is shipped with “factory default” settings. Refer to the Section “Factory Default Values” to determine how the system is configured.

Figure 1a shows examples of typical installations. Figure 1b shows locations and identification of electrical connections and inlets and outlets.

The inlets, outlet, relief valve vent, and reserve gas port (option) on the Medical IntelliSwitch™ are 1/2” Female NPT fittings. These fittings have an anti-rotation plate around them to keep them from twisting during installation. However, it is strongly recommended that two wrenches be used when tightening external devices to these fittings.

DO NOT APPLY AC POWER TO THE MEDICAL INTELLISWITCH WITHOUT FIRST APPLYING INLET PRESSURE TO IT.

1. The installation of the system requires that the vent for the relief valve exhaust be piped away to a filtered, turned down port to avoid the entry of bugs and moisture.

2. Anchor the Medical IntelliSwitch™ securely to a wall or panel at a height adequate to conveniently connect a manifold or pigtail. The Medical IntelliSwitch™ uses four mounting tabs for mounting to a wall or panel. Refer to Figure 19 at the back of this manual for the dimensions of the system. THE HEIGHT SELECTED MUST MEET ALL REGULATORY REQUIREMENTS.

3. Make all mechanical connections (inlets, outlet, optional reserve) and pressurize the system to check for leaks.

4. Connect the CONCOA Remote Alarm (if used) to the Medical IntelliSwitch™. If connecting to the facility’s master alarm system the connection is made through one of the two alarm output connectors on the bottom of the enclosure. Both connectors send the same signals but are isolated from each other through different relay contacts. (Refer to Section “Connecting to a Remote Alarm” for pinouts).

5. If using the web server feature of the Medical IntelliSwitch make the connection from the web server connector on the bottom of the enclosure to the facility’s LAN (local area network). Refer to the Web Server Manual that was included with the product if this option was purchased for details on setting up the web server features.

6. If using a CONCOA Reserve Gas System connect the alarm output cable from the Reserve Gas System to the Medical IntelliSwitch.

7. Finally connect AC power to the Medical IntelliSwitch™. The system is factory set to operate at either 115VAC 60 Hz or 230 VAC 60 Hz. Check the product label for the product voltage. Connection of the Medical IntelliSwitch™ to the incorrect input voltage will damage the product and void any warranty.
8. **Apply power to the Medical IntelliSwitch™.** The inlet pressure readings will appear on the two 4-digit displays. If necessary use the Bank Select pushbutton to choose the side considered to be the primary gas source. From the factory the Medical IntelliSwitch™ will default to the left inlet side as the primary side. It will also default to the left delivery regulator.

9. **Check the delivery pressure.** The value will appear on the 3-digit display. Switch between the two delivery regulators to check the pressure from each regulator using the Output Source Pushbutton on the control panel. The delivery pressure is factory set. Should it be necessary to change this value refer to the section “Setting the Delivery Regulator Pressure”.

Normal operation of the Medical IntelliSwitch™ can now begin. The “primary” or “active” side of the system, whether left or right, will have the green Ready light ON and the In-Use light ON over the source pressure. The “secondary” side or the “in-active” side will have only the green Ready light ON.

Lighted green lights above the Source Select buttons should match the types of cylinders being used by each side.

All switching is automatic. If the primary inlet gas side drops below the set switchover point, the system will transfer to the reserve inlet gas side and the status lights will indicate the transition. The Replace status light and alarm indicate the need to replenish a bank. In the case of high pressure cylinders, the system will reset when pressure has been restored to the depleted bank. In the case of liquid cylinders, the system will reset when pressure has been restored to the depleted bank and the Reset button has been depressed.

Delivery Regulator operation is similar to the inlet operation. A green In-Use light will light to the left or right of the delivery pressure display indicating which delivery regulator is in use. There is a delivery pressure tolerance feature designed into the product. It allows for the pressure to vary over a programmed range before the product indicates an error condition. If the delivery regulator in use has its pressure fall out of its programmed operating range the system will switch to the other delivery regulator automatically. At this time the red Fault light will light indicating which delivery regulator has a problem and the green In-Use light will light on the delivery regulator the system switched to. The factory default delivery pressure tolerance is +/- 7 PSI.
Figure 1b

* System may have a right side or a left side reserve inlet, not both.

Outlet Port, 1/2" NPT Female

Relief Valve Pipe-Away Conn., 1/2" NPT Female

Optional Left Side Reserve Inlet Port *, 1/2" NPT Female

Left Side Inlet Port, 1/2" NPT Female

Optional Right Side Reserve Inlet Port *, 1/2" NPT Female

Right Side Inlet Port, 1/2" NPT Female

Alarm "A" Connection

Alarm "B" Connection

Serial (RS-232) Connection

Reserve Inlet Cable Connection (Only for Models with a Reserve Inlet)

Solenoid Vent with Muffler. Muffler May be Removed to Access 1/8" NPT Female Port for Gas Pipe-Away.

Optional Ethernet Connection for Models with the Web Server Option
DESCRIPTION OF PRODUCT

The Medical IntelliSwitch™ is a device used to monitor, control and switch the flow of gas from cryogenic or high pressure cylinders from either of two independent sources to either of two independently controlled and isolated delivery regulators. In turn these regulators are connected to a single point of use output.

It consists of two electronically controlled inlet valves controlling the flow of gas into two electronically controlled valves that in turn direct the flow of gas into one of two delivery regulators.

Pressure coming into the Medical IntelliSwitch™ is monitored and displayed on two independent 4-digit displays. The outlet pressure of the system is monitored and displayed on a 3-digit display. Outlet pressure adjustment is available using an adjusting screw on the delivery regulators inside the cabinet.

A series of indicator lights show the status of the system at any given time.

The status of the Medical IntelliSwitch™ may be monitored remotely via a serial port or optional Ethernet port. In addition, the Medical IntelliSwitch™ can interface with a CONCOA Remote Alarm.

FEATURES

Operation from Multiple Gas Sources

The Medical IntelliSwitch™ is capable of operating with inlet pressure provided by 230, 350, and 500 PSI liquid cylinders, 3,000 PSI high pressure cylinders, or any combination.

Look Back

The Medical IntelliSwitch™ switches from one bank to the other based upon the pressure supplied to the selected bank. When using liquid cylinders, if the volume of the liquid in the cylinder becomes low or the gas flow becomes particularly high, it is not uncommon for the pressure to drop below the switching point even if there is plenty of gas left in the cylinder. When a typical switchover enters such a state, two undesirable situations may occur. First, the system may switch to the reserve temporarily until pressure builds on the primary enough to cause the system to switch back. This situation often leads to depleting both sides at the same time as the system rapidly alternates drawing from both sides or even draws both sides at the same time. Second, the system may permanently switch to the reserve leaving unused product in the primary and triggering a false alarm.

To avoid either of these situations, the Medical IntelliSwitch™ has a Look Back feature that allows the system to switch banks and wait a predetermined time period before checking the former primary cylinder. If the pressure has recovered enough, the system will switch back to the former primary cylinder. This look back time allows the pressure building circuit to recover and build sufficient pressure to supply the system and fully draw down the primary cylinder before an alarm is triggered indicating the cylinder is empty, allowing maximum utilization of cylinder contents. This feature is only activated when a liquid cylinder is selected for use. The look back time is factory set at 30 minutes.
Switchback Delay

Using the Look Back feature alone can result in the switchover switching back several times well after the cylinder can provide a useful gas supply. To prevent this, the Switchback Delay feature keeps track of how often the Medical IntelliSwitch™ switches back to a liquid cylinder that has been used and whose pressure has been restored to be used again.

If the system switches away from the priority side before the Switchback Delay timer has timed out, the system determines that all the useful gas has been extracted from the cylinder and switches to the auxiliary side and draws from it. This feature is only activated when a liquid cylinder is selected for use. The switch back time is factory set at 10 minutes.

Hysteresis

This feature is a pressure value added to the switchover pressure value to determine the pressure at which the Medical IntelliSwitch™ will switch back to a cylinder after the “Look Back” time has expired. This feature provides added protection against inadvertently drawing from the reserve bank when the primary still has gas. The Hysteresis pressure is factory set at 10 PSI.

Economizer Function

When using liquid cylinders in switchover applications, it is common for the reserve cylinder to build pressure due to the vaporization of liquid within the cylinder. When this pressure reaches the set point of the relief valve on the liquid cylinder, the relief valve will open, venting gas to the atmosphere. The Medical IntelliSwitch™ constantly monitors the reserve cylinder and, at a predetermined pressure, will change the valving to allow gas from the headspace of the reserve cylinder to feed the system, thus drawing down the pressure in the reserve cylinder. There are three pressure ratings for liquid cylinder relief valves, 230 PSIG, 350 PSIG and 500 PSIG; the Medical IntelliSwitch™ has predetermined settings for all three types that may be selected on the front panel of the system.

Settable Switchover Pressure

The Medical IntelliSwitch™ can be configured to switch at pressures ranging from 100 to 500 PSI. This value is factory set but can be changed in the field. To change this value, refer to the section on changing the switchover pressure.

Manual Bank Switching

It is possible to manually change the side that gas is being drawn from by pressing the “BANK SELECT” button provided that there is sufficient pressure on the side being switched to.

Manual Delivery Regulator Switching

It is possible to manually change which delivery regulator is in use. Simply press the “OUTPUT SOURCE” button.

Selectable Units of Measure

The default units of measure for the Medical IntelliSwitch™ are PSI. Alternate units of BAR or MPA can be selected by changing internal DIP switch settings. To change units of measure refer to the section on changing units of measure.

Security Lockout

The Medical IntelliSwitch™ has the ability to electronically lockout the front panel buttons to discourage tampering. The factory default setting is OFF or disabled. Refer to section on Keypad Security Lockout for details.
**Alarm Notification**

The Medical IntelliSwitch™ is designed to interface with CONCOA Remote Alarms and comes with the necessary mating connector for their use. Refer to the section on connecting a remote alarm for more information.

**Serial Port**

The Medical IntelliSwitch™ is capable of communicating to peripheral equipment via a standard serial port. For more information on the serial port refer to the section on connecting to a serial port.

**Ethernet Port**

The Medical IntelliSwitch™ is capable of communicating to peripheral equipment via an optional Ethernet connection. For more information on the Ethernet option refer to the section on connecting to the Ethernet.

**High Flow Relief Valve Overpressure Protection**

The Medical IntelliSwitch™ is equipped with a high flow relief valve to protect the system from extreme pressure increases and liquid withdrawal.
OPERATING THE MEDICAL INTELLISWITCH™

Figure 2 identifies and locates the various front panel and external system features.

Selecting a Gas Source

The Source Select buttons on the front panel provide flexibility in the choices of liquid or high pressure cylinders used in an application. Further, they provide choices of liquid cylinders with different pressure ratings. There are two Source Select buttons, allowing each side to be controlled independently. Green indicator lights directly above the Source Select buttons identify which cylinder choice is currently selected for the side. Each time a Source Select Button is pressed, the indicator lights above the button will shift to the next choice.

Cylinder Sizes

There are three liquid cylinder pressure ratings that can be selected. For each cylinder pressure, the Medical IntelliSwitch™ has a preset value it uses to determine when the cylinder has reached an overpressure condition in order to activate the economizer feature. Table 1 provides the cylinder pressure choices and their respective economizer pressures.

<table>
<thead>
<tr>
<th>Cylinder Relief Valve Pressure</th>
<th>Economizer Activation Pressure</th>
<th>Normal Value to Switch Back</th>
</tr>
</thead>
<tbody>
<tr>
<td>230 PSI</td>
<td>210 PSI</td>
<td>190 PSI</td>
</tr>
<tr>
<td>350 PSI</td>
<td>325 PSI</td>
<td>300 PSI</td>
</tr>
<tr>
<td>500 PSI</td>
<td>475 PSI</td>
<td>450 PSI</td>
</tr>
</tbody>
</table>

If a liquid cylinder’s pressure rises to the “activation” pressure, the Medical IntelliSwitch™ will redirect itself to draw the pressure down through the delivery stream. Once the pressure reaches a “normal” value, it will return to drawing from the previous side.

Bank Selection

The Bank Select button on the front panel allows for manually switching the active bank. The In-Use status indicator lights provide the feedback to indicate which side is selected.

Reset

The Reset button is primarily used to reset a “replace” condition when using liquid cylinders. The Replace status light can only be cleared if the side with the condition has its pressure restored to a value above the switchover (trip point) plus the Hysteresis value AND the Reset button is pushed. If the button is pushed while the condition still occurs, the system will attempt to clear the condition but will reinstate the indicators automatically. Example: Switchover (trip point) = 130 PSI. System will switch to the other side when pressure drops to 130 PSI. It will not allow switching back until the pressure reaches 140 PSI (130 PSI + 10 PSI Hysteresis pressure)

Testing

GAS WILL CONTINUE TO FLOW WHILE IN THE TEST MODE.

Holding the Reset button in for 5 seconds will place the system in test mode. This diagnostic and troubleshooting tool performs 23 different tests. Each time the Reset button is pushed again, the system will perform a different test. Continuing to press the Reset button will step through all the tests after which the system will return to normal operation. If after the test mode has been entered there is no pushbutton activity for 5 minutes, the system will return to the normal display
operation. Gas flow is maintained during the test mode. Refer to the Troubleshooting Section for details on testing.

**Keypad Lockout**

If the keypad security lockout feature is enabled, the keypad will become inoperative after approximately 5 minutes provided there has been no buttons pressed. There will be an audible beep when the keypad goes into the locked state. If the keypad becomes locked it can be re-activated by holding the Bank Select Pushbutton for approximately 4 seconds. The system will make an audible beep when it is unlocked. To enable this feature, see Section “User Selectable Features” for explanation on enabling/disabling this feature.

**USER SELECTABLE FEATURES**

The Medical IntelliSwitch™ allows various system parameters to be set in the field. They are:

a. Switchover Pressure  
b. Delivery Regulator Pressure  
c. Delivery Regulator Pressure Tolerance  
d. Units of Measure  
e. Keypad Security Lockout  
f. Remote Alarm Configuration  
g. Enabling Reserve Gas Supply  
h. Enabling Remote Setup  
i. Changing AC Input Power  
j. Communication Port
SETTING SWITTOVER PRESSURE

The switchover pressure (changeover pressure) point for the Medical IntelliSwitch™ is changeable up to a value of 500 PSI. Each system has a specific switchover pressure set at the factory based on the delivery pressure ordered. To change the switchover pressure from the factory set value, perform the following steps:

Note: In order for the DIP switches to be recognized, DIP switch SW4-3 must be OFF.

1. Turn power OFF to the system.
2. Open door by loosening the four screws holding it to the cabinet.
3. Using Figure 3, locate DIP switch SW1 at the bottom of the electronic circuit board on the door.

4. Using Table 2 or Table 3 set the desired switchover pressure.
5. Close system door and tighten 4 screws holding door to cabinet.
6. Turn power back ON. The new switchover pressure will take effect on power ON.

Table 2 — DIP Switch Settings

<table>
<thead>
<tr>
<th>SWITCH</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW1-1</td>
<td>1</td>
</tr>
<tr>
<td>SW1-2</td>
<td>2</td>
</tr>
<tr>
<td>SW1-3</td>
<td>4</td>
</tr>
<tr>
<td>SW1-4</td>
<td>8</td>
</tr>
<tr>
<td>SW1-5</td>
<td>16</td>
</tr>
<tr>
<td>SW1-6</td>
<td>32</td>
</tr>
<tr>
<td>SW1-7</td>
<td>64</td>
</tr>
<tr>
<td>SW1-8</td>
<td>128</td>
</tr>
<tr>
<td>SW1-9</td>
<td>256</td>
</tr>
</tbody>
</table>

Note: The values shown in the table are additive. Example: To set switchover pressure to 130 PSI, turn on SW1-8 (128) and SW1-2 (2). These added together equal 130 PSI.
Note: Tables 2 & 3 show values in PSI. If operating in BAR or MPA it will be necessary to convert the PSI units to the units being used in order to use the tables. To convert values to BAR divide the PSI value by 14.5. To convert the values to MPA divide the PSI value by 145.

Table 3 — Typical Switchover Pressure DIP Switch Settings

<table>
<thead>
<tr>
<th>PSI</th>
<th>SW1-1</th>
<th>SW1-2</th>
<th>SW1-3</th>
<th>SW1-4</th>
<th>SW1-5</th>
<th>SW1-6</th>
<th>SW1-7</th>
<th>SW1-8</th>
<th>SW1-9</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>100</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
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</tr>
<tr>
<td>125</td>
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<td>135</td>
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<tr>
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<tr>
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</tr>
<tr>
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<td>ON</td>
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</tr>
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</tr>
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<td>425</td>
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<td>OFF</td>
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<td>ON</td>
<td>ON</td>
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</tr>
<tr>
<td>475</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>500</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

default
SETTING DELIVERY REGULATOR PRESSURE

The Delivery Regulator Pressure is factory set based on the model purchased. If it is necessary to change the pressure of the regulators after installation perform the following steps:

1. Open door by loosening the four screws holding it to the cabinet.

2. Using Figure 4, locate DIP switch SW4 at the bottom of the electronic circuit board on the door. Move SW4-4 to the ON position. The front panel display will show a screen similar to Figure 5 indicating the system is in CALIBRATE mode. The front panel display will show the inlet pressure from the side that it is currently drawing from.

3. Locate the Allen wrench attached to the inside panel.

4. There is a green light to the left or right of the delivery display that indicates which delivery regulator is in use. If the left light is ON, the pressure being displayed in the delivery display is the output pressure of the left regulator. Similarly, if the right green light is ON the pressure being displayed is from the right regulator.

5. Locate the Allen wrench attached to the inside panel. Starting with the delivery regulator that is currently in use, place the Allen wrench into the set screw and adjust the pressure to the desired value. Turning the set screw clockwise increases pressure. Counterclockwise decreases pressure. The system will not decrease in pressure if there is no flow. See Figure 6 for the location of the regulators.

Figure 4

Figure 5
6. After the pressure is set to the desired value, press the Output Source Pushbutton on the front panel to switch to the other delivery regulator.

7. Place the Allen wrench into the set screw of the second regulator and adjust the pressure to the desired value.
   
   It is possible to switch back to the other delivery regulator and change its pressure by pushing the Output Source PB again. The delivery pressure for both regulators should be the same to within 1-2 PSI for best performance.

8. When the desired delivery pressure for both regulators is set, turn OFF SW4-4 on the control board. See Figure 4.

9. Locate SW5 on the control board (Figure 4) and press it once. The system should go back to normal operation showing inlet pressures on both inlet displays. If an “Err2” message appears when SW% is pressed it means that both regulators were not selected for calibration (See step 6).

10. Calibration is complete. Close door and re-attach screws.
SETTING DELIVERY REGULATOR PRESSURE TOLERANCE

The range of allowable variation in delivery regulator pressure is settable. The factory default is +/- 7 PSI. This value may be changed by setting DIP switches on the Electronic Control Board or remotely via the optional serial interface. To change this pressure tolerance, perform the following steps:

Note: In order for the DIP switches to be recognized, DIP switch SW4-3 must be OFF.

1. Turn AC power OFF to the system.
2. Open door by loosening the four screws holding it to the cabinet.
3. Using Figure 7, locate DIP switch SW6 at the bottom of the electronic circuit board on the door.

4. Using Table 4 set the pressure range tolerance.
   Note: It is highly recommended that the tolerance setting be no less than 5 PSI for proper system operation.
5. Close system door and tighten 4 screws holding door to cabinet.
6. Turn AC power back ON. The new tolerance will take effect on power ON.
## Setting Units of Measure

The Medical IntelliSwitch™ can display pressure in three different units of measure, PSI, BAR, and MPA. The factory default is PSI. To change units of measure perform the following steps:

*Note: In order for the DIP switches to be recognized, DIP switch SW4-3 must be OFF.*

1. Turn AC power OFF to the system.
2. Open door by loosening the four screws holding it to the cabinet.
3. Using Figure 8, locate DIP switch SW2 at the bottom of the electronic circuit board on the door.
4. Using Table 5, set the appropriate units of measure.
5. Close system door and tighten 4 screws holding door to cabinet.

### Table 4
**Delivery Pressure Tolerance**

<table>
<thead>
<tr>
<th>Pressure Tolerance</th>
<th>SW6-1</th>
<th>SW6-2</th>
<th>SW6-3</th>
<th>SW6-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>2</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>3</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>4</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>5</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>6</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>7</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>8</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>9</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>10</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>11</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>12</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>13</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>14</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>15</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

### Figure 8

- **ON** - rocker down in direction of arrow
- **Units of Measure**

---

20
6. Turn AC power back ON. The new units of measure will take effect on power ON.
7. The indicator lights on the front panel show the units of measure selected. If the PSI and BAR indicator lights are OFF, the system is displaying MPA units.

<table>
<thead>
<tr>
<th>Comm Mode</th>
<th>SW2-1</th>
<th>SW2-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSI</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>BAR</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>MPA</td>
<td>OFF</td>
<td>ON</td>
</tr>
</tbody>
</table>

**Table 5**

**SETTING KEYPAD SECURITY LOCKOUT**

The Medical IntelliSwitch™ has a feature that allows locking out the keypad located on the front panel. When enabled, the keypad will become inoperative after approximately 5 minutes if no key presses are detected. The factory default for this feature is DISABLED. To enable this feature perform the following steps:

1. Turn AC power OFF to the system.
2. Open door by loosening the four screws holding it to the cabinet.
3. Using Figure 9, locate DIP switch SW4-1 at the bottom of the electronic circuit board on the door.
4. Turn switch to the ON position.
5. Close system door and tighten 4 screws holding door to cabinet.
6. Turn AC power back ON. The Keypad Lockout feature will take effect on power ON.
CONNECTING TO A REMOTE ALARM

There are two 8-pin remote alarm interface connectors located at the bottom of the Medical IntelliSwitch™ cabinet marked ALARM A and ALARM B (See Figure 20). Having two Alarm output connectors allows for connecting to two different external alarms which can be either "Master" alarms or a CONCOA alarm. For convenience, the Medical IntelliSwitch is shipped with two (2) cable connectors that mate to the alarm connectors on the cabinet. This allows for building custom cable assemblies if needed. The recommended cable for these assemblies is 24 AWG, 8-conductor stranded wire (Alpha # 1218C or equivalent).

To make a cable assembly cut the 8-conductor cable to length. Remove the outer jacket of the cable to expose approximately 3/4 inch of the internal conductors on both sides of the cable. Strip away 1/4-inch of the insulation on each of the conductors.

On the 8-pin connector, slide the protective cover, cable retainer, and locking nut over the end of the cable as shown in Figure 10.

![Figure 10: Cable Retainer Tabs, Cable Cover, Cable Retainer, Locking Nut, Plug]

![Figure 11: Rear View of Mating Connector, View is from the wire side of the Connector]
Using the pin assignments shown in Table 6 and the connector views in Figure 10 and Figure 11, solder the wires to the appropriate pins. After soldering is complete, slide the locking nut over the connector body. Snap the cable retainer into the body and then slide the protective cover over the cable retainer.

<table>
<thead>
<tr>
<th>Pin Numbers</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Left Inlet Alarm</td>
</tr>
<tr>
<td>2</td>
<td>Delivery Regulator Alarm.</td>
</tr>
<tr>
<td>3</td>
<td>+12v (provided by the remote alarm)</td>
</tr>
<tr>
<td>4</td>
<td>Right Inlet Alarm</td>
</tr>
<tr>
<td>5</td>
<td>Reserve Gas Supply Alarm.</td>
</tr>
<tr>
<td>6</td>
<td>Ground (provided by the remote alarm)</td>
</tr>
<tr>
<td>7</td>
<td>N.C.</td>
</tr>
<tr>
<td>8</td>
<td>Reserve In-Use</td>
</tr>
</tbody>
</table>

Wire terminations to the Alarm side of the cable are done in the same fashion as the Medical IntelliSwitch™ connector.

Slide the protective cover, cable retainer, and locking nut over the end of the cable as shown in Figure 10.
SETTING REMOTE ALARM OUTPUTS

The Medical IntelliSwitch™ is designed to interface to an external alarm system. Relay contacts are brought out through a connector on the bottom of the cabinet. The pin connections on this connector are set to connect directly to a CONCOA alarm. CONCOA alarms are designed such that the contacts are Normally Closed (N.C.). In an alarm condition these contacts will open. This is the factory default. It is possible to change any of these contacts to Normal Open (N.O.) Figure 13 shows the location of the jumpers on the Control Board. To change a contact from N.C. to N.O. follow the steps below:

1. Turn AC Power OFF to the system
2. Open front door by loosening the 4 screws holding it to the cabinet.
3. Locate the jumpers on the Control Board.
4. Using Table 7 and Figures 12 and 13 set the jumpers.
5. Close door and re-secure it to the cabinet.
6. Make the necessary connections to the alarm and plug the alarm cable into the alarm connector on the bottom of the cabinet.
7. Turn AC power ON.
8. Test Mode may be used to test the alarm installation.

<table>
<thead>
<tr>
<th>Jumper</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>J26</td>
<td>Reserve Gas In-Use</td>
</tr>
<tr>
<td>J25</td>
<td>Left Inlet Alarm</td>
</tr>
<tr>
<td>J24</td>
<td>Right Inlet Alarm</td>
</tr>
<tr>
<td>J23</td>
<td>Delivery Regulator Alarm</td>
</tr>
<tr>
<td>J22</td>
<td>Reserve Gas Source Alarm</td>
</tr>
</tbody>
</table>
CONNECTING TO EXTERNAL ALARMS

The Medical IntelliSwitch is configured at the factory to operate with the Advantium Rx Alarm. The Advantium Rx Alarm provides 12 vdc as a voltage source to connect to the Alarm outputs of the Medical IntelliSwitch. There is an indicator light on the front panel of the Medical IntelliSwitch that lights when an alarm is properly connected to an alarm output connector and is powered ON. This indicator light is configured to operate using the 12vdc power source. If the Medical IntelliSwitch is connected to an alarm other than one provided by CONCOA that uses greater than 12vdc it will be necessary to change a jumper setting on the control board.

IT IS HIGHLY RECOMMENDED THAT THE VOLTAGE SOURCE USED AS THE ALARM SIGNAL NOT EXCEED 24 VOLTS.

When using 24 volts it will be necessary to remove jumper J10. See Figure 14
OPERATION OF RESERVE GAS SUPPLY

The Reserve Gas Supply Option provides a means to supply pressure to the system in the event that both the left inlet and right inlet gas sources have been exhausted. The Reserve Gas Option must be installed and enabled for this feature to work properly. When the Reserve Gas Option is enabled (see Section on “Enabling Reserve Gas”) the Medical IntelliSwitch monitors both the inlet pressure and the pressure sensor coming from the Reserve Gas Supply. If the left and right gas sources have been exhausted the system will show an alarm condition on the front panel. The system will change the left and right pressure displays to read “rES” indicating that it is now receiving gas from the reserve supply. It will continue operating this way until gas is restored to either the left or right inlet. At that time the Medical IntelliSwitch will resume normal operation and the “rES” message will no longer be displayed.

If the pressure of the gas from the Reserve Supply drops below its preset value the pressure sensing switch will deactivate causing the left and right inlet displays will begin to flash.

Monitoring of the Delivery Pressure is maintained while operating from the Reserve Supply.

ENABLING RESERVE GAS SUPPLY

When the Reserve Gas Supply Option is chosen it is necessary to enable the option in the software. To enable this option perform the following steps:

1. Turn AC power OFF to the system.
2. Open door by loosening the four screws holding it to the cabinet.
3. Using Figure 15, locate DIP switch SW4-2 at the bottom of the electronic circuit board on the door.
4. Turn SW4-2 to the ON position.
5. Close system door and tighten 4 screws holding door to cabinet.
6. Turn AC power back ON. The Reserve Gas Supply Option will be enabled on power ON.
ENABLING REMOTE SETUP

The Medical IntelliSwitch™ is equipped with a feature that allows setting of system parameters remotely via the serial port or the optional Ethernet port. FACTORY DEFAULT IS OFF. This feature MUST be enabled in order for the remote setup feature to work. To enable this feature perform the following steps:

1. Turn AC power OFF to the system.
2. Open door by loosening the four screws holding it to the cabinet.
3. Using Figure 16, locate DIP switch SW4-3 at the bottom of the electronic circuit board on the door.
4. Turn SW4-3 to the ON position.
5. Close system door and tighten 4 screws holding door to cabinet.
6. Turn AC power back ON. The Reserve Gas Supply Option will be enabled on power ON.

Note:

When this feature is enabled, system setup parameters are saved to internal memory in the control electronics. The DIP switches on the control board for these setup parameters will be ignored. To allow use of the setup parameter DIP switches on the control board, SW4-3 must be in the OFF position.

![Figure 16](image-url)
CHANGING AC INPUT POWER

The Medical IntelliSwitch™ has the AC Supply Voltage factory set based on the product part number.

**CAUTION!**

Setting the AC Supply voltage incorrectly can cause permanent damage to the product. If changing the supply voltage make sure the supply switch correctly matches the AC voltage being supplied to the product.

In the event that the AC Supply Voltage needs to be changed, perform the following steps.

1. Turn AC power OFF to the system.
2. Open front door by loosening the 4 screws holding it to the cabinet.
3. Locate the AC power switch on the Control Board (Figure 17).
4. Move the switch to the proper setting. THIS SWITCH MUST BE SET TO THE AC INPUT VOLTAGE BEING SUPPLIED TO THE PRODUCT.
5. Make sure the system is correctly wired to the AC Supply Voltage.
6. Close front door and re-secure it to the cabinet.
7. Re-apply AC power to the system.

*Figure 17*
SETTING COMMUNICATION MODE

The Medical IntelliSwitch™ has the built-in capability to communicate to external devices via a serial port using either RS-232, or optional Ethernet protocol. The factory default value is RS-232.

1. Turn AC power OFF to the system.
2. Open door by loosening the four screws holding it to the cabinet.
3. Using Figure 18, locate DIP switch SW3 at the bottom of the electronic circuit board on the door.
4. Using Table 8 set the desired communication mode.
5. Close system door and tighten 4 screws holding door to cabinet.
6. Turn AC power back ON. The new communication mode will take effect on power ON.

Figure 18

Table 8

<table>
<thead>
<tr>
<th>Comm Mode</th>
<th>SW3-1</th>
<th>SW3-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS-232</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>Ethernet</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>Auxiliary</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>
## TROUBLESHOOTING

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Cause</th>
<th>Possible Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>No display or status lights ON.</td>
<td>• No power to the system.</td>
<td>• Restore power.</td>
</tr>
<tr>
<td></td>
<td>• Check that the power source is live.</td>
<td>• Replace fuse.</td>
</tr>
<tr>
<td></td>
<td>• Check the system fuse.</td>
<td>• Replace electronic control board.</td>
</tr>
<tr>
<td>System will not switch from one side to the other automatically.</td>
<td>• Check that the pressure on the destination side is greater than the switchover pressure setting.</td>
<td>• Restore pressure to proper operating level.</td>
</tr>
<tr>
<td></td>
<td>• There may be an overpressure condition on the side currently being drawn from</td>
<td>• Check that the switchover pressure setting is correct for the cylinder size and inlet pressures required.</td>
</tr>
<tr>
<td>There are pressure readings on both inlet displays but no delivery pressure.</td>
<td>• Internal regulator for the valve system is plugged or faulty</td>
<td>• Clean or replace internal regulator</td>
</tr>
<tr>
<td></td>
<td>• Isolation valves for delivery regulator are closed</td>
<td>• Open isolation valves</td>
</tr>
<tr>
<td>Remote alarm does not work with the system.</td>
<td>• Remote alarm is not powered.</td>
<td>• Check the remote alarm LED on Medical IntelliSwitch™ front panel.</td>
</tr>
<tr>
<td></td>
<td>• Wiring between the Medical IntelliSwitch™ and the alarm is incorrect.</td>
<td>• Check alarm is powered and on.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check wiring between alarm and Medical IntelliSwitch™</td>
</tr>
<tr>
<td>Outlet pressure from the system drops below the adjusted value.</td>
<td>• Flow demand on the system is greater than the cylinders can supply.</td>
<td>• Replace or resize cylinders.</td>
</tr>
<tr>
<td></td>
<td>• Cylinder pressures are too low.</td>
<td>• Change switchover pressure on Medical IntelliSwitch™</td>
</tr>
<tr>
<td>Gas from one side appears to be flowing to the other.</td>
<td>• Dirty or bad check valve.</td>
<td>• Replace check valve.</td>
</tr>
<tr>
<td>Any display shows an “Err” Code</td>
<td>• Refer to section on Error Codes in this manual</td>
<td></td>
</tr>
<tr>
<td>Delivery Regulator Alarm – System switches to other delivery regulator upon initial load draw</td>
<td>Instantaneous demand for gas that exceeds gas flow capabilities can cause the delivery regulator to fall below acceptable pressure value causing the system to think the regulator has failed.</td>
<td>• Turn pressure ON to application slowly.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increase delivery regulator alarm delay time. (factory set at 3 sec.)</td>
</tr>
</tbody>
</table>
ERROR CODES:

The Medical IntelliSwitch has built in diagnostics to assist in troubleshooting problems that may occur from time to time. In certain situations and error message can appear on one or more of the displays. The error codes and an explanation of what the code means and how to fix it are listed below.

Err

Reason:
This message appears if internal communication on the electronic control circuit board is lost.

Solution:
Temporarily this error can be corrected by turning the AC power OFF then ON again. If the problem reoccurs it will be necessary to have the product serviced. Contact your local service representative or CONCOA at 1-800-225-0473.

Err2

Reason:
This message appears when the CALIBRATE PB is pressed during calibration of delivery regulators if both regulators were not selected for calibration.

Solution:
Even though only one regulator may need to be adjusted, it is necessary to press the “Output Source” button to select the other delivery regulator. There is no need to adjust its pressure if it is where it is suppose to be. Press the CALIBRATE PB to complete the function.
Err3 [Left Display]

Reason:
On Power Up, the Switchover checks the switchover pressure value to determine if it is set higher than the cylinder type selected on the left side. If it is, it is considered an invalid condition.
Example: Switchover pressure set to 300 PSI and the cylinder selected is 230 PSI.

Solution:
This problem will most likely occur when using liquid cylinders.

To solve this problem you must first determine if the problem is the cylinder size selected or the switchover pressure setting. The switchover pressure MUST be lower than the cylinder size selected.

If the switchover pressure is set incorrectly (lower than the cylinder size) it must be increased. Turn power OFF to the system. Open the door and locate the switches at the bottom of the electronic circuit board. Referring to the Section “Setting Switchover Pressure” in this manual set the switchover pressure to a value above the cylinder size. Close door and turn power ON.

If the cylinder selection is incorrect turn power OFF to the system. Open the door and locate the switches at the bottom of the electronic circuit board. Referring to the Section “Setting Switchover Pressure” in this manual set the switchover pressure to 0 PSI. Turn power back ON and select the correct cylinder size by pressing the left source select pushbutton.

Turn Power OFF again and open the door and set the switchover pressure to the appropriate value. Close door and turn power ON. System should operate properly.

Err3 [Right Display]

Reason:
On Power Up, the Switchover checks the switchover pressure value to determine if it is set higher than the cylinder type selected on the right side. If it is, it is considered an invalid condition.
Example: Switchover pressure set to 300 PSI and the cylinder selected is 230 PSI.

Solution:
Refer to the instructions for [Err3 left side].
Err5

Reason:

a. The Toggle switches enabling the Left and Right Delivery Regulators are both OFF.

b. Both the Left and Right Delivery Regulators have failed (not likely).

c. The system was powered up with no inlet pressure on either side.

Solution:

a. In a normal service situation when a Delivery Regulator is removed from the system the procedure requires that the toggle switch on the inside panel near that regulator be turned OFF. This tells the control electronics that it is no longer available for use. When the Delivery Regulator is replaced this toggle switch must be turned back ON in order for the control electronics to know it is available again. Make sure the toggle switches are in the correct position.

b. When a delivery regulator can no longer maintain the set outlet pressure the system will switch to the other delivery regulator to try to maintain the outlet pressure. In this scenario there is no inlet pressure to feed the delivery regulators and the system will report this error. It is actually a false error because neither delivery regulator has failed. **Power the system OFF and restore the inlet pressure. Power the system back ON. It will enter Calibrate mode.** Refer to the section in this manual titled “Setting Delivery Regulator Pressure”.

c. A more serious situation would be that both delivery regulators have actually failed. This requires replacement of both regulators for the system to work properly. This type of failure would generally be unlikely but in the event that it has occurred, the delivery regulators must be replaced.

Err6

Reason:

An attempt is being made to select the right side delivery regulator when it is not available.

Solution:

Replace the right side delivery regulator and place it back into service.
**Err7**

**Reason:**
An attempt is being made to select the left side delivery regulator when it is not available.

**Solution:**
Replace the left side delivery regulator and place it back into service.

**Err9**

**Reason:**
The internal temperature of the product has exceeded its normal operating temperature.

**Solution:**
Turn off and allow system to cool down or place in a cooler environment
PERFORMING SELF TEST

Through the use of the Reset button on the front panel, a number of items can be observed or analyzed. A number 1 - 21 which is displayed on the output pressure display identifies each test. To enter Test Mode press and hold the Reset button for 4 seconds. The system will beep 3 times and then enter Test Mode. A description of the tests follows.

Test 1 – Display Test

This test exercises all segments of the displays and all status lights except the power and remote alarm indication. If serial communication is selected, the system will output a code indicating that a self-test is being performed.

Test 2 - Date of Manufacturing

This test shows the year, month and day the product was manufactured.

Test 3 - Software Revision

This is the revision of the software running the product.

Test 4 – Analog Channel Check

This checks the circuitry that is used to read the pressure transducers. It should display a value between 475 and 525 to be working properly.
**Test 5 - Display Switchover Pressure**

The number on the display is the switchover (changeover) pressure value that is internally set for product operation. The value is in the units of measure selected for the product (PSI, BAR, etc.).

**Test 6 – Auxiliary Settings**

Displays settings for Units of Measure, Communication setting, Keypad lockout, allow remote settings enable, Reserve Gas source enable.

Refer to Table 9 to determine what is enabled.

**Test 7 – Delivery Regulator Pressure Tolerance**

This number represents the value added or subtracted to the nominal delivery pressure of the product. It is used to determine the allowable range of operation before a delivery regulator fault condition is declared.

**Test 8 – Delivery Regulator Alarm Delay**

This value is the number of minutes the system waits before looking back.
Test 9 – Look Back Time
This value is the number of minutes the system waits before looking back.

Test 10 – Switch Back Time
This is the value, in minutes, used by the system to determine when a cylinder is truly empty and incapable of supplying sufficient gas.

Test 11 – Hysteresis
This is a pressure value used to prevent the system from inadvertently switching back and forth between inlet sides unnecessarily.

Test 12 – Offset Values
These numbers (factory set) are used to calibrate the left and right inlet pressures.
Test 13 – Calibration Values
These numbers are used to calibrate the inlet channels at zero PSI.

Test 14 – Test Left Inlet Valve
This test turns ON the left inlet valve allowing gas to flow from that side while turning OFF the right inlet valve.

Test 15 – Test Right Inlet Valve
This test turns ON the right inlet valve allowing gas to flow from that side while turning OFF the left inlet valve.

Test 16 – Test Left Delivery Regulator
This test turns ON the left delivery regulator while turning OFF the right delivery regulator.
Test 17 – Test Right Delivery Regulator
This test turns ON the right delivery regulator while turning OFF the left delivery regulator.

Test 18 – Test Left Inlet Alarm
This test activates the left inlet alarm relay contact.

Test 19 – Test Right Inlet Alarm
This test activates the right inlet alarm relay contact.

Test 20 – Test Delivery Regulator Alarm Relay and Left Alarm Fault Light
This test activates the delivery regulator alarm relay contact and lights the left delivery regulator fault light.
Test 21 – Test Delivery Regulator Alarm Relay and Right Alarm Fault Light
This test activates the delivery regulator alarm relay contact and lights the right delivery regulator fault light.

Test 22 – Test Reserve Gas Supply Alarm
This test activates the reserve gas supply alarm relay contact.

Test 23 – Test Reserve Gas Active Relay
This test activates the reserve gas supply active relay contact.

Test 24 – Keypad test
This test allows the testing of each function button on the front control panel and also indicates the status of the two toggle switches used to indicate the presence of the delivery regulators.
When a button is pressed and held, a segment will light on one of the displays.
<table>
<thead>
<tr>
<th>NUMBER DISPLAYED</th>
<th>PSI</th>
<th>BAR</th>
<th>MPA</th>
<th>RS232</th>
<th>ETHERNET</th>
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</table>
MOUNTING DETAIL

Figure 20
POWER REQUIREMENTS

Input Voltage: 115 VAC ± 10% 50-60Hz or 230 VAC ± 10% 50-60Hz
Power Consumption: 20 watts
Fuses: 1 amp, type 3AG normal blow

SERVICE

For Service to the Medical IntelliSwitch™ contact your local Distributor or CONCOA Customer Service at 1-800-225-0473. Please fill in the Self Test Worksheet form included in this manual before contacting CONCOA for assistance. This will ensure a more timely response to your needs. An example of how to fill in the sheet is shown in Figure 21.

![Figure 21](image-url)
<table>
<thead>
<tr>
<th>Test</th>
<th>Description</th>
<th>Data</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Display</td>
<td>Display Segments OK?  Yes  No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Indicator Lights OK? Yes  No</td>
</tr>
<tr>
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<td>Date of Manufacture</td>
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</tr>
<tr>
<td>3</td>
<td>Software Revision</td>
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<tr>
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<td>Delivery Pressure Tolerance</td>
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<td>8</td>
<td>Delivery Regulator Alarm Delay</td>
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</tr>
<tr>
<td>9</td>
<td>Look Back Time</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Switch Back Time</td>
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<td>11</td>
<td>Hysteresis</td>
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<td>12</td>
<td>Offset Values</td>
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<td>13</td>
<td>Calibration Values</td>
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</table>
### FACTORY DEFAULT SETTINGS

**Product PN:**
570xxxxxxxx

<table>
<thead>
<tr>
<th><strong>AC Supply Voltage</strong></th>
<th><strong>Switchover Pressure Point</strong></th>
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</thead>
<tbody>
<tr>
<td>2 - 120 VAC</td>
<td>2 - 155 PSI</td>
</tr>
<tr>
<td>3 - 220 VAC</td>
<td>B - 155 PSI</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Reserve Inlet</strong></th>
<th><strong>Delivery Pressure</strong></th>
<th><strong>Delivery Regulator Alarm Delay</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - None</td>
<td>2 - 55 PSI</td>
<td>3 sec</td>
</tr>
<tr>
<td>1 - Left Side</td>
<td>B - 55 PSI</td>
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</tr>
<tr>
<td>2 - Right Side</td>
<td>3 - 100 PSI</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Gas Type</strong></th>
<th><strong>Delivery Pressure</strong></th>
<th><strong>Units of Measure</strong></th>
<th><strong>Key Lock Security</strong></th>
<th><strong>Allow Remote Setting</strong></th>
<th><strong>Reserve Gas Supply</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Oxygen</td>
<td>2 - 100 PSI</td>
<td>PSI</td>
<td>Disabled</td>
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<tr>
<td>2 - Nitrous Oxide</td>
<td>C - 240 PSI</td>
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<td>3 - Nitrogen</td>
<td>D - 180 PSI</td>
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<td>4 - Carbon Dioxide</td>
<td>7 - 240 PSI</td>
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<td>5 - Helium</td>
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<td>6 - Air</td>
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</table>

**Additional Factory Default Values**

- Internal Intermediate Pressure Setting: 155 PSI (for N₂O, CO₂)
  240 PSI (for all other gases)
- Look Back Time: 30 min
- Switchback Time: 10 min
- Delivery Pressure Tolerance: 7 PSI
- Delivery Regulator Alarm Delay: 3 sec
- Communication: RS-232
- Units of Measure: PSI
- Key Lock Security: Disabled
- Allow Remote Setting: Disabled*
- Reserve Gas Supply: Disabled**

* - This will be set to “ENABLED” if the Ethernet Option is included with the System.
** - This will be set to “ENABLED” if the Reserve Option is included with the System
FAIL SAFE SETTINGS

1. Loss of Electrical Power to System:
   a. Inlet Valves open allowing sourcing of gas from both the left and right
      inlets.
   b. Delivery Regulator valves open allowing both Delivery Regulators to
      operate.
   c. Alarm outputs activate.

2. Operation in Calibration Mode
   a. Both the Left and Right inlet valves are opened providing gas from both
      sources.
   b. Gas supply to the output of the Medical IntelliSwitch is maintained.

3. Operation in Test Mode
   a. System will maintain gas flow while in Test Mode. If no keys are pressed
      for 5 minutes while in test mode the system will automatically return to
      normal operation
WARRANTY INFORMATION

This equipment is sold by CONTROLS CORPORATION OF AMERICA under the warranties set forth in the following paragraphs. Such warranties are extended only with respect to the purchase of this equipment directly from CONTROLS CORPORATION OF AMERICA or its Authorized Distributors as new merchandise and are extended to the first Buyer thereof other than for the purpose of resale.

For a period of one (1) year from the date of original delivery (90 days in corrosive service) to Buyer or to Buyer’s order, this equipment is warranted to be free from functional defects in materials and workmanship and to conform to the description of this equipment contained in this manual and any accompanying labels and/or inserts, provided that the same is properly operated under conditions of normal use and that regular periodic maintenance and service is performed or replacements made in accordance with the instructions provided. The foregoing warranties shall not apply if the equipment has been repaired: other than by CONTROLS CORPORATION OF AMERICA or a designated service facility or in accordance with written instructions provided by CONTROLS CORPORATION OF AMERICA, or altered by anyone other than CONTROLS CORPORATION OF AMERICA, or if the equipment has been subject to abuse, misuse, negligence or accident.

CONTROLS CORPORATION OF AMERICA’s sole and exclusive obligation and Buyer’s sole and exclusive remedy under the above warranties is limited to repairing or replacing, free of charge, at CONTROLS CORPORATION OF AMERICA’s option, the equipment or part, which is reported to its Authorized Distributor from whom purchased, and which if so advised, is returned with a statement of the observed deficiency, and proof of purchase of equipment or part not later than seven (7) days after the expiration date of the applicable warranty, to the nearest designated service facility during normal business hours, transportation charges prepaid, and which upon examination, is found not to comply with the above warranties. Return trip transportation charges for the equipment or part shall be paid by Buyer.

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