



# IntelliSwitch<sup>TM</sup> IIv 544 Series Electronic Switchover

## INSTALLATION AND OPERATING INSTRUCTIONS

**Carefully Read These Instructions Before Operating**

Controls Corporation of America  
1501 Harpers Road • Virginia Beach, VA 23454  
Telephone 1-800-225-0473 or 757-422-8330 • Fax 757-422-3125  
[www.concoa.com](http://www.concoa.com)

June 2024



Rev F

# Index

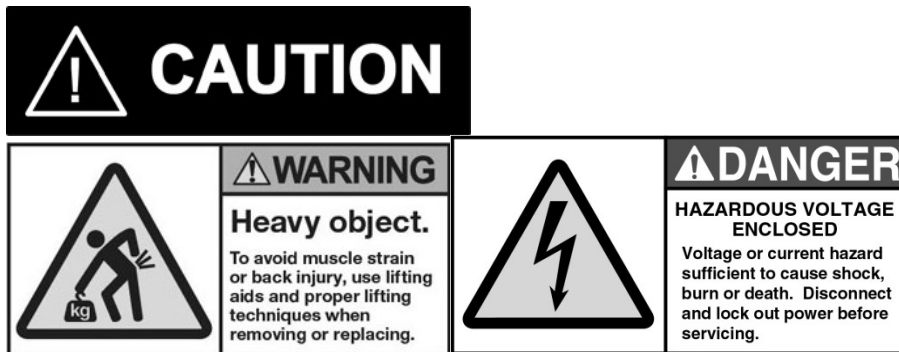
Safety .....	1
User Responsibility .....	3
Description of Product.....	4
Features .....	4
Installing the IntelliSwitch IIv™.....	7
Connecting Power .....	8
Operating the IntelliSwitch IIv™ .....	9
User Selectable Features.....	10
Setting Switchover Pressure .....	12
Setting Units of Measure .....	14
Setting Keypad Security Lockout .....	15
Connecting to a Remote Alarm.....	16
Setting Remote Alarm Outputs.....	17
Enabling Remote Setup.....	19
Setting Communication Mode .....	20
Connecting a Serial Port .....	21
Connecting the Web Server .....	22
Trouble Shooting.....	23
Error Codes.....	24
Performing Self Test .....	26
Mounting Detail .....	31
Power Requirements.....	32
Service .....	32
Self Test Worksheet .....	33
Factory Default Values.....	35
Warranty .....	36

# SAFETY

**THIS PRODUCT IS NOT INTENDED FOR USE WITH TOXIC GASES, FLAMMABLE GASES OR CORROSIVE GASES. IT DOES NOT CONTROL OUTLET PRESSURE OTHER DEVICES CONTROL FINAL OUTLET PRESSURE.**

## NOTICE

**The IntelliSwitch IIv™ is not intended for use in medical installations.**



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

- Connect the IntelliSwitch IIv™ 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.
- Install the IntelliSwitch IIv™ 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 industrial standards for the intended service and must be thoroughly cleaned before using. For the United States, some applicable safety rules and precautions are listed below:

1. American National Standards Institute standard Z49.1, Safety in Welding and Cutting, American Welding Society, 2501 NW Seventh Street, Miami, Florida 33125
2. N.F.P.A. Standard 51, Oxygen-Fuel Gas systems for Welding and Cutting, N.F.P.A., 470 Atlantic Avenue, Boston, Massachusetts 02210
3. N.F.P.A. Standard 51B, Cutting and Welding Processes (same address as #2).
4. CONCOA publication ADE 872, Safety Precautions in Welding and Cutting.
5. Local Ordinances
6. O.S.H.A. Standard 29 CFR
7. C.G.A. Pamphlet C-4, American National Standard Method of Marking Portable Compressed Gas Containers to Identify the Material Contained.
8. 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-4.1, Equipment Cleaned for oxygen service.
10. C.G.A. Pamphlet G-4.4, Industrial Practices for Gaseous Oxygen Transmission and Distribution Piping Systems.
11. C.G.A. Pamphlet G-5, Hydrogen – Information on the properties, manufacture, transportation, storage, handling, and use of hydrogen.
12. 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 G-6.1, Standard for Low Pressure Carbon Dioxide Systems at Consumer Sites.
14. C.G.A. Pamphlet P-1, Safe Handling of Compressed Gases in Containers.
15. C.G.A. Safety Bulletin SB-2, Oxygen Deficient Atmospheres.

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) 979-4341. Fax: (703) 979-0134..

## **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](mailto: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.

# DESCRIPTION OF PRODUCT

The IntelliSwitch IIv™ 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, it does not control the delivery pressure. The outlet pressure will be equal to the pressure in the side selected and will vary or decrease as that source pressure varies or decreases in the case of high pressure cylinder sources.

It consists of two electronically controlled inlet valves controlling the flow of gas into the outlet. Pressure control must be adjusted from downstream regulator or device.

Pressure coming into the IntelliSwitch IIv™ is monitored and displayed on two independent 4-digit displays. The outlet pressure of the system is the same pressure as the pressure in the side selected. When operating from the right side a “r” will be displayed on a 3-digit display when operating from the left side a “L” will be displayed on the 3 digit display. When operating from both sides in liquid cylinder service both a “r” and “L” will be displayed. Outlet pressure is controlled by other devices.

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

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

## FEATURES

### Operation from Multiple Gas Sources

The IntelliSwitch IIv™ 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. (4500 PSI option Available). The 4500 PSI option may include or be ordered with right (5449999-01-001) or left (5449999-01-002) pilot regulator and micro manifold kit. Please follow the instructions included with the kits when installing.

### Look Back

The IntelliSwitch IIv™ 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 IntelliSwitch IIv™ 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 IntelliSwitch IIv™ 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 IntelliSwitch IIv™ 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 IntelliSwitch IIv™ 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 IntelliSwitch IIv™ has predetermined settings for all three types that may be selected on the front panel of the system.

## **Settable Switchover Pressure**

The IntelliSwitch IIv™ can be configured to switch at pressures ranging from 100 to 2000 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.

## **Selectable Units of Measure**

The default units of measure for the IntelliSwitch IIv™ 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 IntelliSwitch IIv™ 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 IntelliSwitch IIv™ 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.

## **Ethernet Port – Web Server**

The IntelliSwitch IIv™ is equipped with an integral Web Server allowing for remote monitoring of functions, e-mailing, and remote configuration. For more information on the Web Server feature refer to the Web Server manual included with this product.

## **Serial Port**

The IntelliSwitch IIv™ is capable of communicating to peripheral equipment via configurable serial port. For more information on the serial port refer to the section on Setting Communication Mode in this manual.

## **High Flow Relief Valve Overpressure Protection**

The IntelliSwitch IIv™ is equipped with a high flow relief valve to protect the system from extreme pressure increases and liquid withdrawal. The IntelliSwitch IIv™ does not control outlet pressure. Pipeline or systems connected to the IntelliSwitch IIv™ must be rated for the maximum inlet pressure to the system.

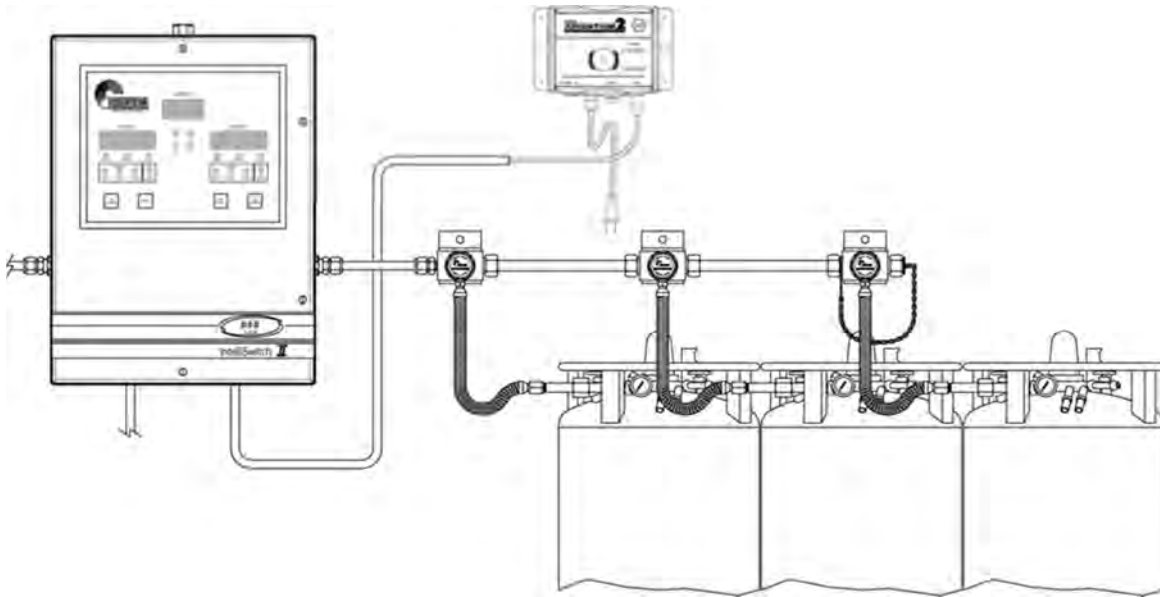


# INSTALLING THE INTELLISWITCH II<sup>v</sup>™

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

Figure 1 shows a typical installation.

Figure 1



The inlets and outlet on the IntelliSwitch II<sup>v</sup>™ are 1/2" Female NPT fittings. It is strongly recommended that two wrenches be used when tightening external devices to these fittings.

The IntelliSwitch II<sup>v</sup>™ uses four mounting tabs for mounting to a wall or panel. Refer to Figure 14 at the back of this manual for the dimensions of the system. Anchor the IntelliSwitch II<sup>v</sup>™ securely to a wall or panel at a height adequate to conveniently connect a manifold or pigtail. **THE HEIGHT SELECTED MUST MEET ALL REGULATORY REQUIREMENTS**

Once all mechanical connections are made pressurize the system and check for leaks.

Connect the Remote Alarm and serial device (if used) to the IntelliSwitch II<sup>v</sup>™.

Finally connect AC power to the IntelliSwitch II<sup>v</sup>™. The system is factory set to operate at either 115VAC 60hz or 230 VAC 60hz. Check the product label for the product voltage. Connection of the IntelliSwitch II<sup>v</sup>™ to the incorrect input voltage will damage the product and void any warranty.

## CONNECTING POWER

THERE IS NO ON/OFF POWER SWITCH FOR THE INTELLISWITCH IIv. The installer must provide any required power switching external to the product. Please ensure that wire is no longer than 5cm from the penetration of the enclosure to the EMI filter inside the box.

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. The IntelliSwitch IIv™ will default to the left inlet side as the primary side.

Normal operation of the IntelliSwitch IIv™ can now begin. The “primary” or “active” inlet 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.

# OPERATING THE INTELLISWITCH IIv™

Figures 3 & 4 identify the various locations of important features on the IntelliSwitch IIv™.

## Delivery Pressure

Delivery Pressure is not controlled by the 544 series IntelliSwitch IIv the side selected as the supply side will deliver it's inlet pressure to the outlet of the IntelliSwitch IIv. A separate downstream regulator or control device is used to set the pipeline or system delivery pressure. All components from the outlet of the 544 IIv to that device must be suitable to handle the maximum inlet pressure expected from the sources connected to the system. The source of the outlet pressure will be displayed in the center LED display. (See Figure 3).

## 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 IntelliSwitch IIv™ 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 1

Cylinder Relief Valve Pressure	Economizer Activation Pressure	Normal Value to Switch Back
230 PSI	210 PSI	190 PSI
350 PSI	325 PSI	300 PSI
500 PSI	475 PSI	450 PSI

If a liquid cylinder's pressure rises to the "activation" pressure, the IntelliSwitch IIv™ 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. The outlet pressure will equal the pressure in the bank that is selected and will display that as "r" for right bank and "L" for left bank on the outlet pressure display.

## 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) = 200 PSI. System will switch to the other side when pressure drops to 130 PSI. It will not allow switching back until the pressure reaches 210 PSI (200 PSI + 10 PSI Hysteresis pressure)

## Testing

Holding the Reset button in for 5 seconds will place the system in test mode. This diagnostic and troubleshooting tool performs 16 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 IntelliSwitch II™ allows various system parameters to be set in the field. They are:

- a. Switchover Pressure
- b. Units of Measure
- c. Keypad Security Lockout
- d. Remote Alarm Configuration
- e. Enabling Remote Setup
- f. Changing AC Input Power
- g. Communication Port

Figure 2

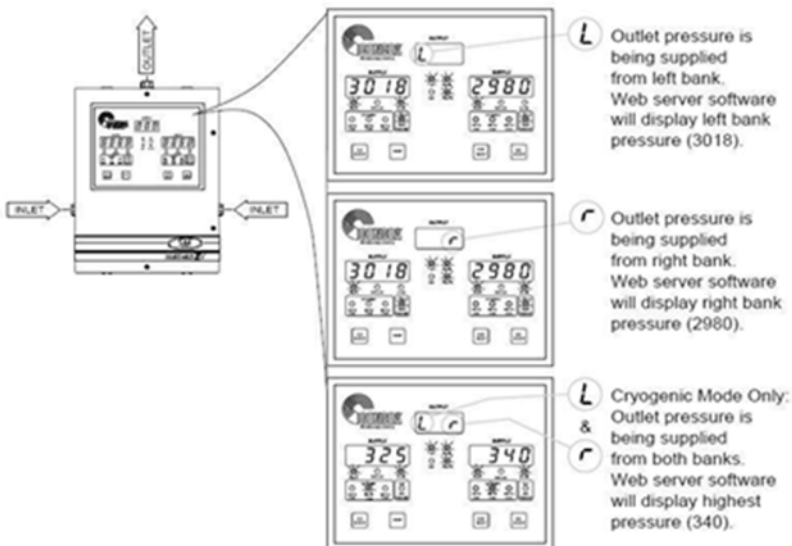
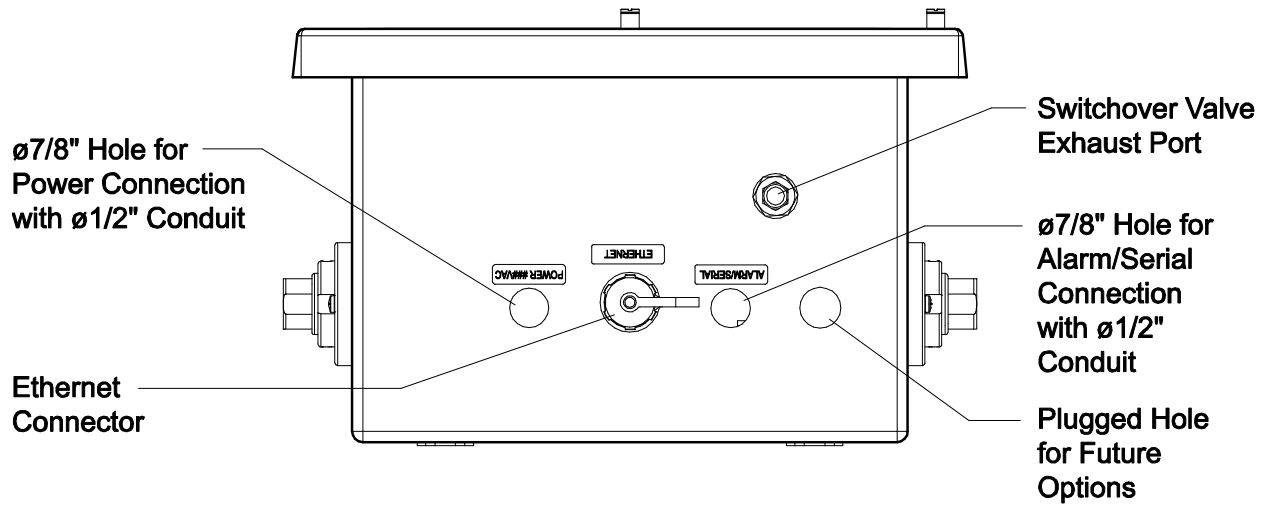
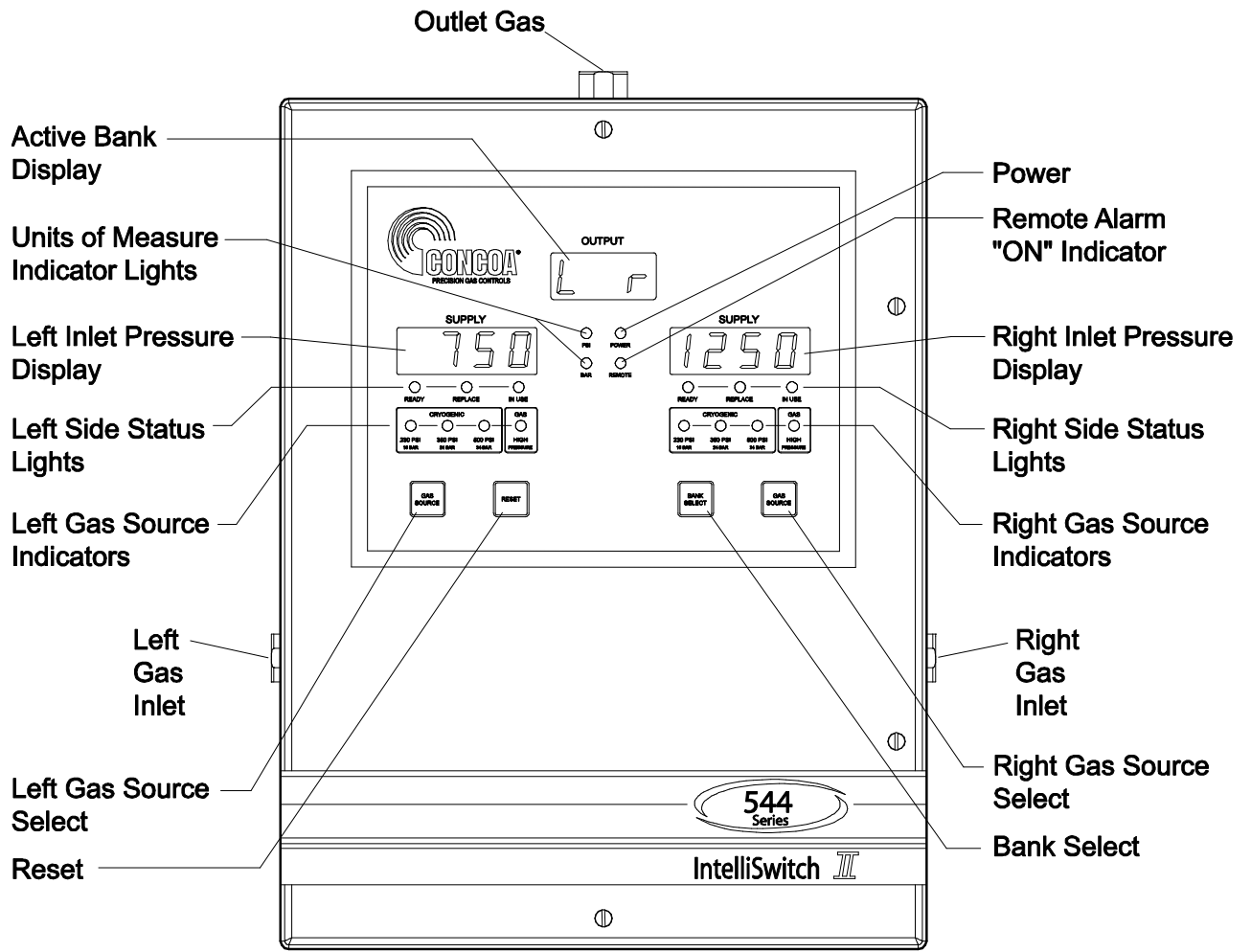


Figure 3



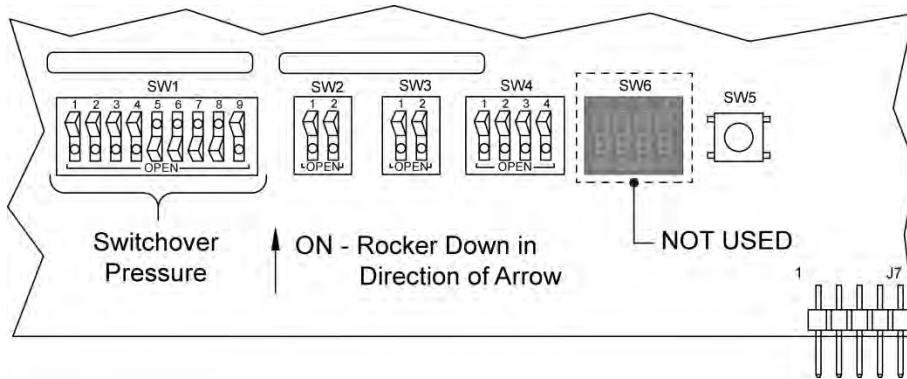
# SETTING SWITCHOVER PRESSURE

The switchover pressure (changeover pressure) point for the IntelliSwitch IIv™ is changeable up to a value of 2000 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 4, locate DIP switch SW1 at the bottom of the electronic circuit board on the door.

**Figure 4**



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**

SWITCH	VALUE
SW1-1	4
SW1-2	8
SW1-3	16
SW1-4	32
SW1-5	64
SW1-6	128
SW1-7	256
SW1-8	512
SW1-9	1024

**Note:**  
The values shown in the table are additive. Example: To set switchover pressure to 130 PSI, turn on SW1-8 (512) and SW1-2 (8). These added together equal 520 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**

<b>Switchover Pressure (PSI)</b>		<b>DIP SWITCH BLOCK SW1</b>								
		<b>Switch Number</b>								
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
		<i>If Switch is "ON", Add this Value to Switchover Pressure</i>								
		4	8	16	32	64	128	256	512	1024
<b>100</b>		1	0	0	1	1	0	0	0	0
<b>200</b>		0	1	0	0	1	1	0	0	0
<b>300</b>		1	1	0	1	0	0	1	0	0
<b>400</b>		0	0	1	0	0	1	1	0	0
<b>500</b>		1	0	1	1	1	1	1	0	0
<b>600</b>		0	1	1	0	1	0	0	1	0
<b>700</b>		1	1	1	1	0	1	0	1	0
<b>800</b>		0	0	0	1	0	0	1	1	0
<b>900</b>		1	0	0	0	0	1	1	1	0
<b>1000</b>		0	1	0	1	1	1	1	1	0
<b>1100</b>		1	1	0	0	1	0	0	0	1
<b>1200</b>		0	0	1	1	0	1	0	0	1
<b>1300</b>		1	0	1	0	0	0	1	0	1
<b>1400</b>		0	1	1	1	1	0	1	0	1
<b>1500</b>		1	1	1	0	1	1	1	0	1
<b>1600</b>		0	0	0	0	1	0	0	1	1
<b>1700</b>		1	0	0	1	0	1	0	1	1
<b>1800</b>		0	1	0	0	0	0	1	1	1
<b>1900</b>		1	1	0	1	1	0	1	1	1
<b>2000</b>		0	0	1	0	1	1	1	1	1

# SETTING UNITS OF MEASURE

The IntelliSwitch IIv™ 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:

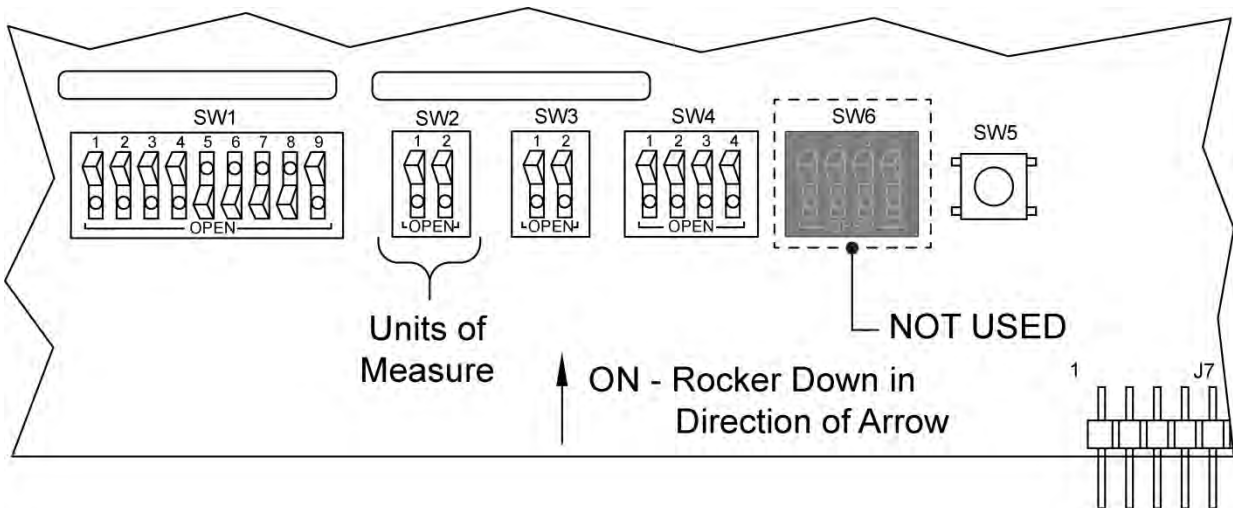
*Note: In order for the DIP switches to be recognized, DIP switch SW4-3 must be OFF.*

1. Turn AC power OFF to the system.
2. Open door by loosening the four screws holding it to the cabinet.
3. Using Figure 6, locate DIP switch SW2 at the bottom of the electronic circuit board on the door.
4. Using Table 4, set the appropriate units of measure.
5. Close system door and tighten 4 screws holding door to cabinet.
6. Turn AC power back ON. The new units of measure will take effect on power ON.
7. The indicator light 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 4**

Comm Mode	SW2-1	SW2-2	
PSI	OFF	OFF	default
BAR	ON	OFF	
MPA	OFF	ON	

**Figure 5**





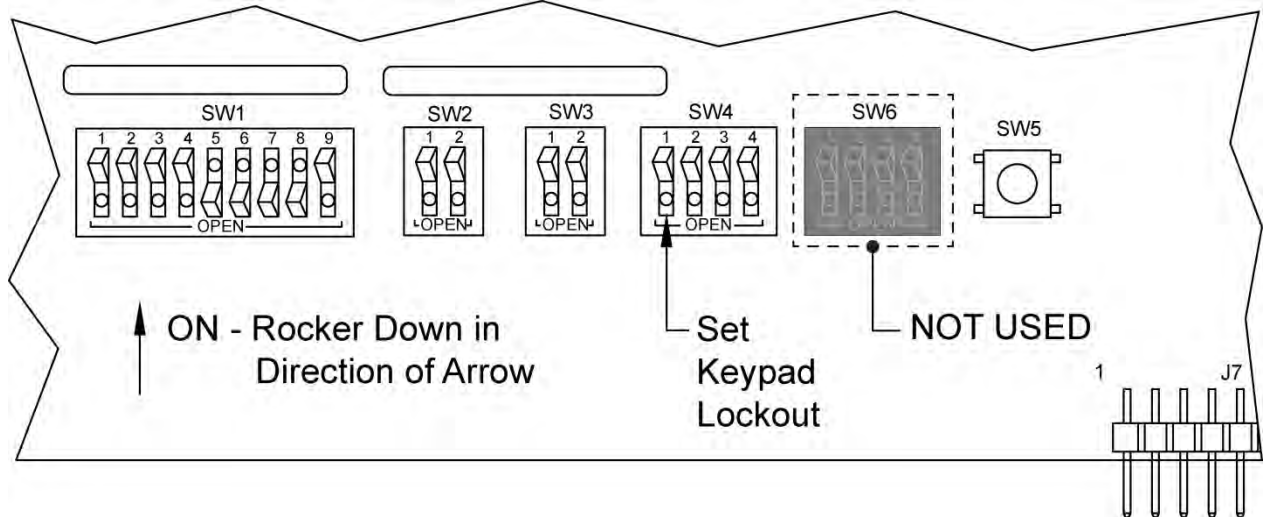
## SETTING KEYPAD SECURITY LOCKOUT

The IntelliSwitch IIv™ 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 6, 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.

If the keypad becomes locked it can be re-activated by holding the Bank Select Pushbutton for approximately 4 seconds.

Figure 6



## CONNECTING TO A REMOTE ALARM

The IntelliSwitch IIv™ is capable of interfacing to CONCOA's Advantium 2 Remote Alarm. Ready made cable assemblies for connecting the IntelliSwitch IIv™ to an Advantium 2 Alarm are available from the factory. Contact your local CONCOA Distributor or call 1-800-225-0473 for information. The other option is to build your own cable assembly to connect the two devices. The Advantium 2 Alarm comes with a mating connector that is used to attach to the remote alarm side of the cable assembly. The recommended cable for this assembly is 24 AWG, 6-conductor stranded wire (Alpha # 1216C or equivalent). The length of this cable should be limited to 1500 feet.

Using Figure 8 and Table 5 as a guide, connect the alarm wires to the terminal block. Refer to the Alarm Instruction Manual for the pin locations on the connector that mate with the alarm.

Figure 7

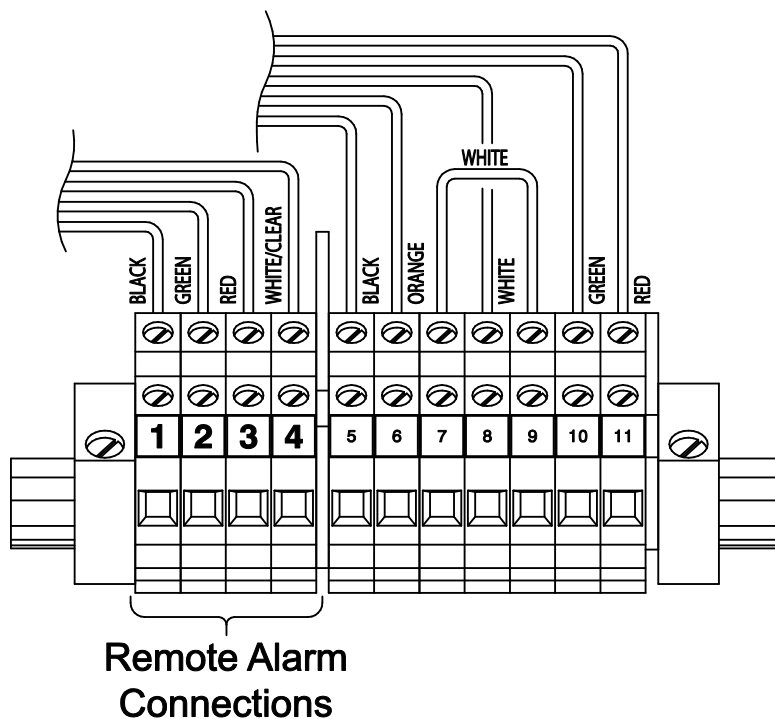


Table 5 — Terminal Block Pin Assignments for Remote Alarm Connections

Terminal Block Pin Number	5750021 Alarm Pin Number	Function
4	1	Left Inlet Status
3	3	+12v (provided by the remote alarm)
2	4	Right Inlet Status
1	6	Ground (provided by the remote alarm)

## SETTING REMOTE ALARM OUTPUTS

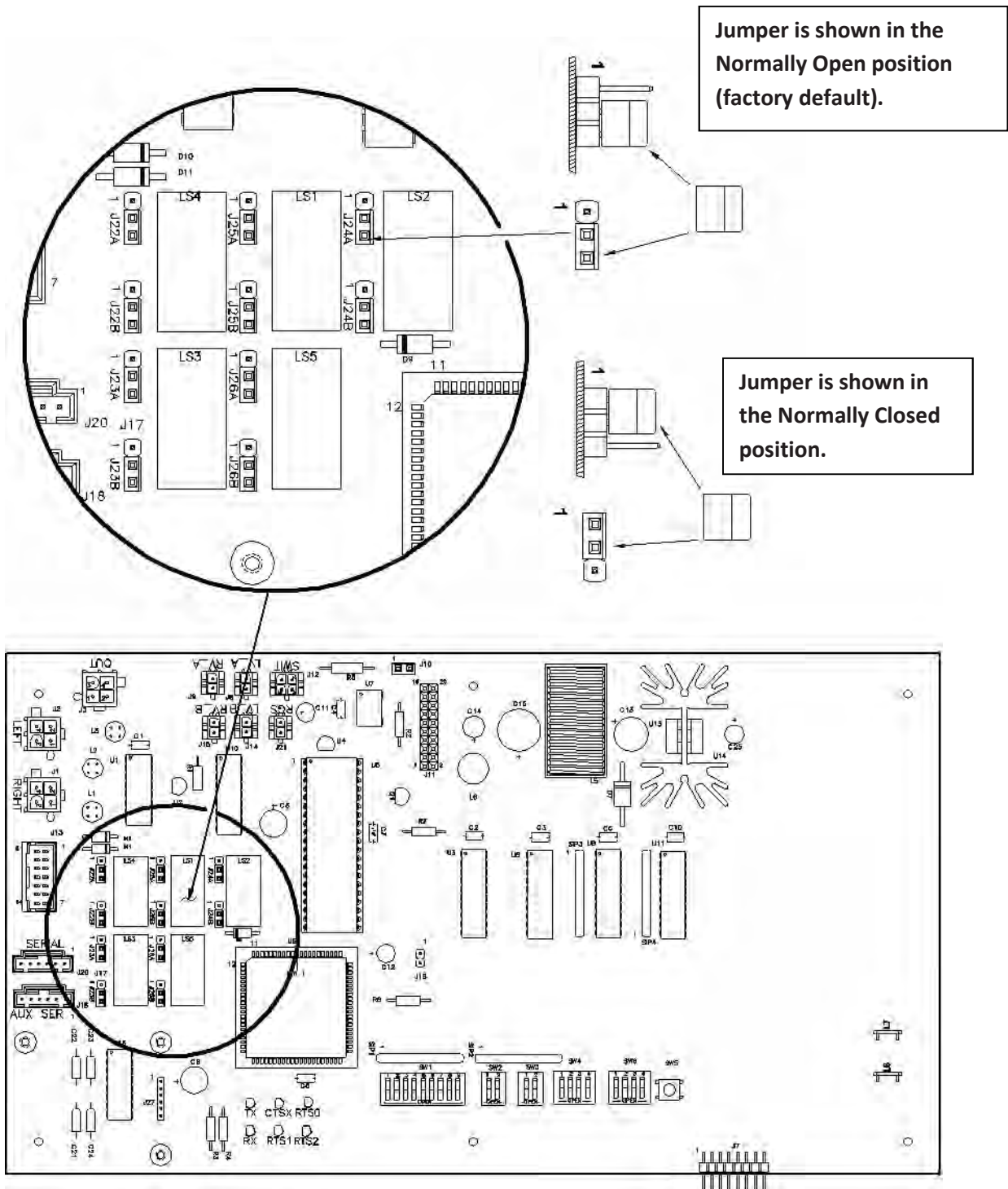
Connection to a remote alarm or alarms supplied by others is accomplished by running an appropriate cable or cables through one or both of the strain reliefs on the bottom of the enclosure (see Fig. 1, Fig. 3 & Fig. 7) up to terminal blocks on the main circuit board on the back of the system front door. With jumpers in the default position, the contacts are Normally Open (N.O.). In an alarm condition or loss of power, these contacts will open. It is possible to change the jumpers to Normally Closed (N.C.). Figure 8 shows the location of the jumpers on the Control Board. To change a contact from N.O. to N.C. 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 6 and Figure 8, 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 6**

<b>Jumper</b>	<b>Function</b>
J25	Left Inlet Alarm
J24	Right Inlet Alarm

Figure 8



## ENABLING REMOTE SETUP

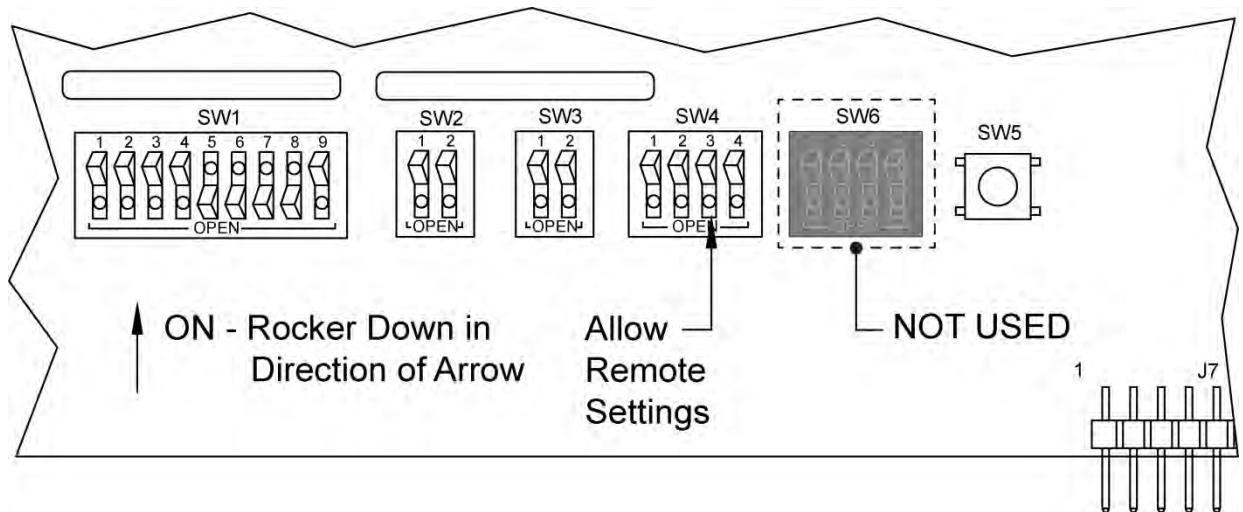
The IntelliSwitch IIv™ is equipped with a feature that allows setting of system parameters remotely via the serial port or the optional Ethernet port. **FACTORY DEFAULT IS ON.** This feature **MUST** be enabled in order for the remote setup feature to work. To disable this feature perform the following 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 SW4-3 at the bottom of the electronic circuit board on the door.
4. Turn SW4-3 to the OFF position.
5. Close system door and tighten 4 screws holding door to cabinet.
6. Turn AC power back 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 9**



# SETTING COMMUNICATION MODE

The IntelliSwitch IIv™ has the built in capability to communicate to externally via the Ethernet (Web Server) or a serial port using RS-232. The factory default value is Ethernet (Web Server). To change the device from Ethernet to serial communication follow the steps below.

1. Turn AC power OFF to the system.
2. Open door by loosening the four screws holding it to the cabinet.
3. Using Figure 13, locate DIP switch SW3 at the bottom of the electronic circuit board on the door.
4. Using Table 7 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 11

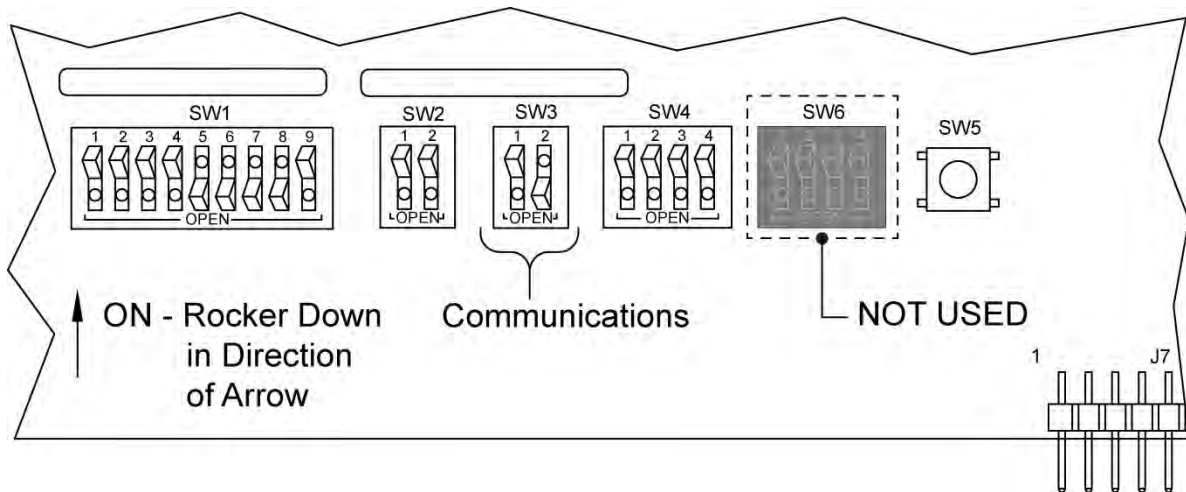


Table 7

Comm Mode	SW3-1	SW3-2
RS-232	OFF	OFF
Ethernet	OFF	ON
Auxiliary	ON	ON

default

# CONNECTING A SERIAL PORT

Provision is made within the IntelliSwitch IIv™ for connection to a serial port. Figure 12 and Table 8 show the wiring connections for a RS-232 serial device.

Figure 12

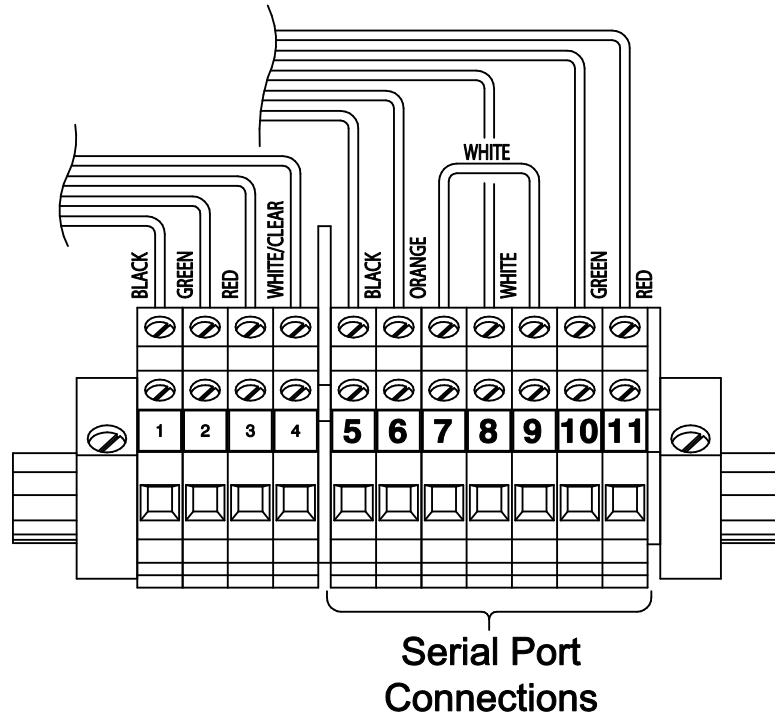


Table 8

Terminal Block Pin Number	Serial Port Function
5	CTS →
6	RTS ←
7	DTR
8	Gnd
9	DSR
10	RxD ←
11	TxD →

## **CONNECTING THE WEB SERVER**

The IntelliSwitch IIv™ is equipped with an integral Web Server device as a standard feature. Connection to the Web Server is through an RJ45 connector located at the bottom of the IntelliSwitch II™. Unscrew the protective cap that covers the connector jack to insert the cable. Connect any CAT 5 or CAT 6 cable to make this connection and connect the other end of the cable to the local area network. Refer to the Users Manual for the Web Server that was included with the IntelliSwitch IIv™ for instructions on interfacing it to the local area network and for its operation.



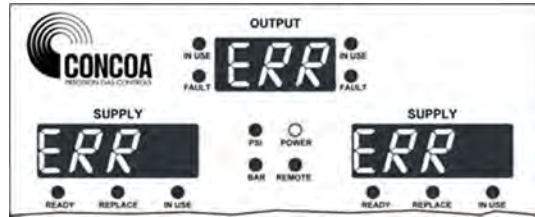
# TROUBLESHOOTING

Symptom	Possible Cause	Possible Solution
No display or status lights ON.	<ul style="list-style-type: none"> <li>No power to the system.</li> <li>Check that the power source is live.</li> <li>Check the system fuse.</li> </ul>	<ul style="list-style-type: none"> <li>Restore power.</li> <li>Replace fuse.</li> <li>Replace electronic control board.</li> </ul>
System will not switch from one side to the other automatically.	<ul style="list-style-type: none"> <li>Check that the pressure on the destination side is greater than the switchover pressure setting.</li> </ul>	<ul style="list-style-type: none"> <li>Restore pressure to proper operating level.</li> <li>Check that the switchover pressure setting is correct for the cylinder size and inlet pressures required.</li> </ul>
There are pressure readings on both inlet display shows “r” or “L” but no delivery pressure.	<ul style="list-style-type: none"> <li>This is normal the “r” means that the outlet pressure is = the right side inlet pressure “L” means the outlet pressure is = the left side inlet pressure</li> </ul>	<ul style="list-style-type: none"> <li>This is normal the outlet pressure Display shows the side running.</li> </ul>
Remote alarm does not work with the system.	<ul style="list-style-type: none"> <li>Remote alarm is not powered.</li> <li>Wiring between the IntelliSwitch II™ and the alarm is incorrect.</li> </ul>	<ul style="list-style-type: none"> <li>Check the remote alarm LED on IntelliSwitch II™ front panel.</li> <li>Check alarm is powered and on.</li> <li>Check wiring between alarm and IntelliSwitch II™</li> </ul>
Outlet pressure from the system drops below the desired value.	<ul style="list-style-type: none"> <li>Flow demands on the system are greater than the cylinders can supply.</li> <li>Cylinder pressures are too low.</li> <li>Switchover pressure set too low for the application.</li> </ul>	<ul style="list-style-type: none"> <li>Replace or resize cylinders the 544 IntelliSwitch IIv™.does not control pressure it controls what side is supplying the pressure.</li> <li>Change switchover pressure on IntelliSwitch IIv™.</li> </ul>
Gas from one side appears to be flowing to the other.	<ul style="list-style-type: none"> <li>Dirty or bad check valve.</li> </ul>	<ul style="list-style-type: none"> <li>Replace check valve.</li> </ul>
Any display shows an “Err” Code	<ul style="list-style-type: none"> <li>Refer to section on Error Codes in this manual</li> </ul>	

## ERROR CODES:

The IntelliSwitch IIv 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.

### 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:

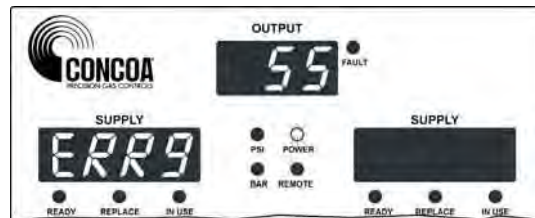
On Power Up, the Switchover checks the switchover pressure value to determine if it is set higher than the cylinder type selected on the right side. If it is, it is considered an invalid condition.

Example: Switchover pressure set to 300 PSI and the cylinder selected is 230 PSI .

#### Solution:

Refer to the instructions for [Err3 left side].

### Err9



#### Reason:

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

#### Solution:

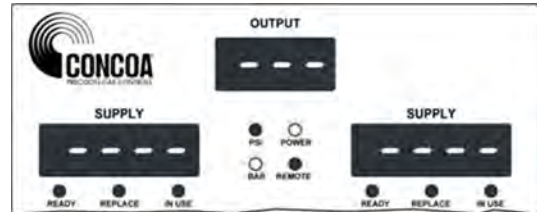
Turn off and allow system to cool down or place in a cooler environment

# 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 - 16 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.

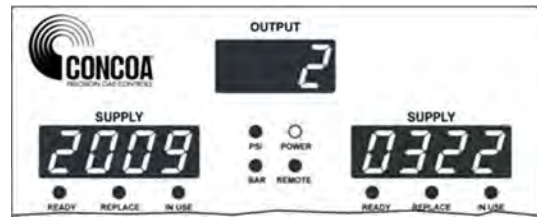
## Test 1 –Display Test

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.



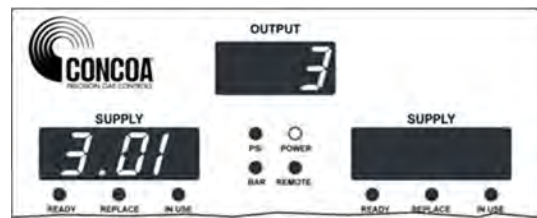
## Test 2 - Date of Manufacturing

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.



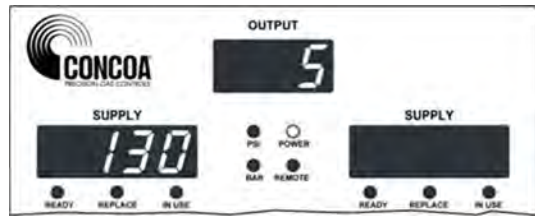
## Test 4 – Analog Channel Check

This checks the circuitry that is used to read the pressure transducers. It should display a value between 475 to 525 to be working properly.



### Test 5 - Display Switchover Pressure

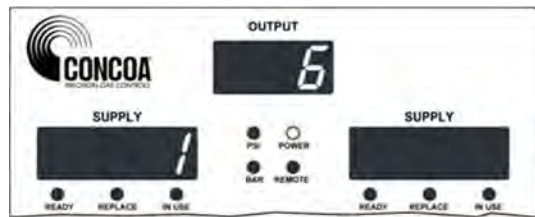
The number on the display is the switchover (changeover) pressure value that is internally set for product operation. The value is in the units of measure selected for the product (PSI, BAR, etc.)



### Test 6 – Auxiliary Settings

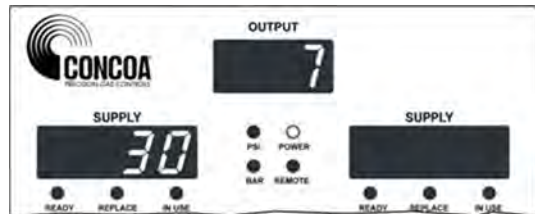
Displays settings for Units of Measure, Communication setting, Keypad lockout, allow remote settings enable.

Refer to Table 9 to determine what is enabled



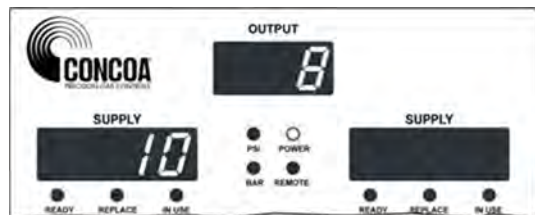
### Test 7 – Look Back Time

This value is the number of minutes the system waits before looking back.



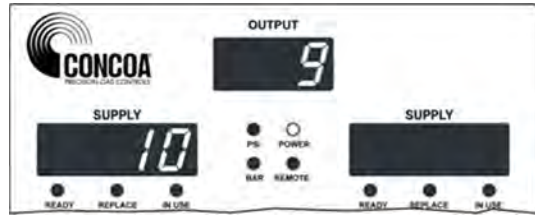
### Test 8 – Switch Back Time

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 9 – Hysteresis

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



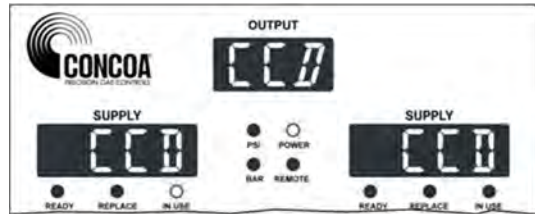
### Test 10 – Offset Values

These numbers (factory set) are used to calibrate the left and right inlet pressures.



### Test 11 – Calibration Values

These numbers are used to calibrate the inlet channels at zero PSI.



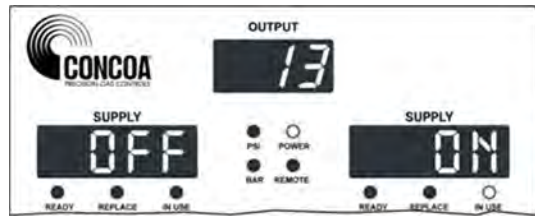
### Test 12 – Test Left Inlet Valve

This test turns ON the left inlet valve allowing gas to flow from that side while turning OFF the right inlet valve.



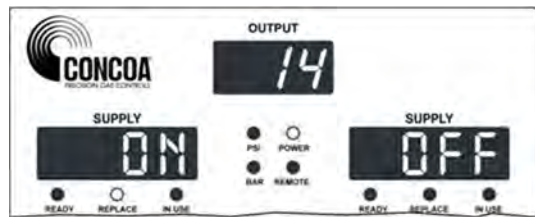
### Test 13 – Test Right Inlet Valve

This test turns ON the right inlet valve allowing gas to flow from that side while turning OFF the left inlet valve.



### Test 14 – Test Left Inlet Alarm

This test activates the left inlet alarm relay contact.



### Test 15 – Test Right Inlet Alarm

This test activates the right inlet alarm relay contact.



### Test 16 – Keypad test

This test allows the testing of each function button on the front control.

When a button is pressed, a segment will light on one of the displays.

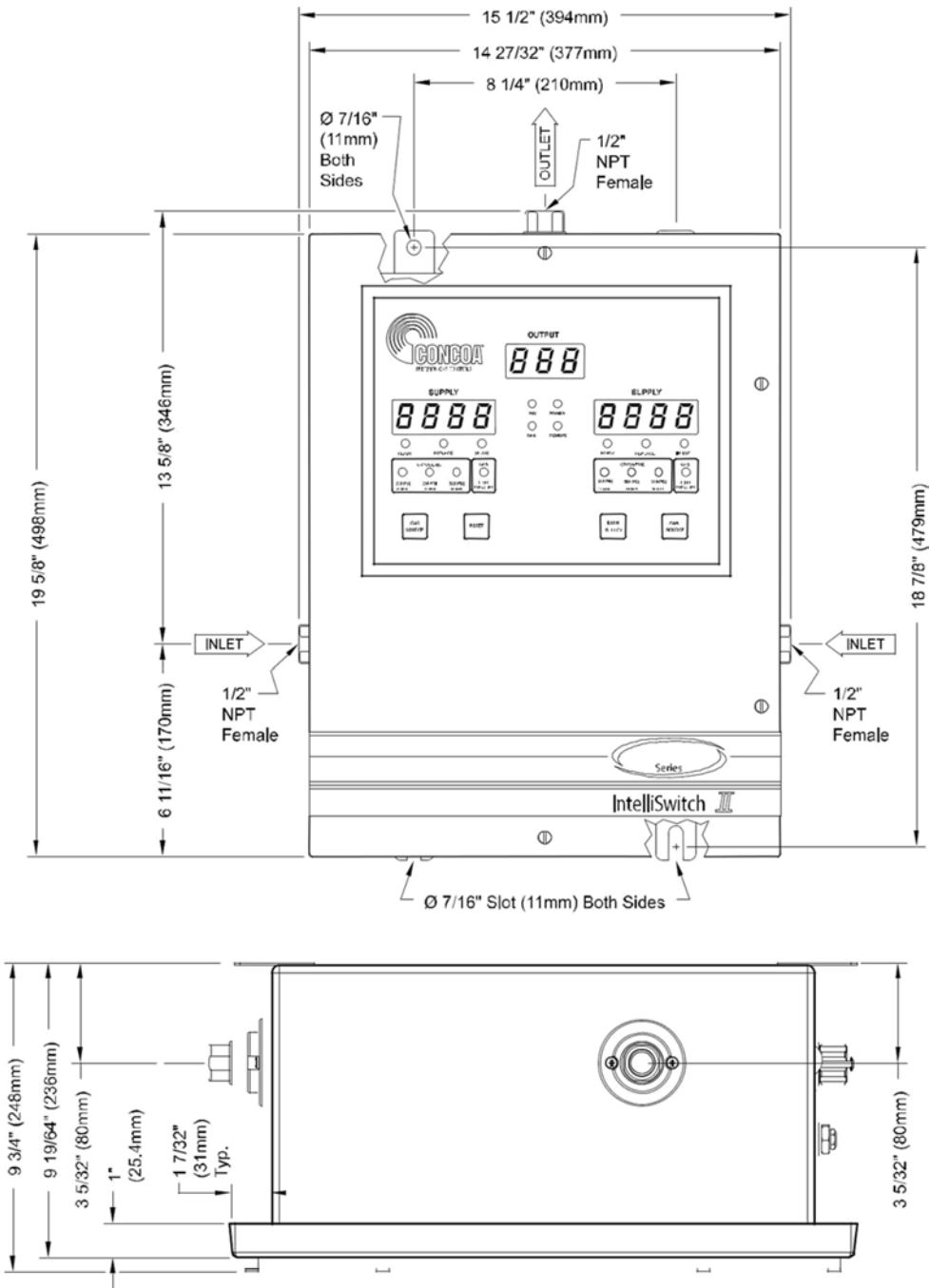


Table 9 (for Test 6)

NUMBER DISPLAYED	PSI	BAR	MPA	RS232	ETHERNET	AUXILIARY	KEYPAD LOCKOUT	ALLOW REMOTE
0	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
2	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
3	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF
4	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF
6	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF
7	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
8	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
10	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF
11	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF
64	ON	OFF	OFF	ON	OFF	OFF	ON	OFF
66	ON	OFF	OFF	OFF	ON	OFF	ON	OFF
67	ON	OFF	OFF	OFF	OFF	ON	ON	OFF
68	OFF	ON	OFF	ON	OFF	OFF	ON	OFF
70	OFF	ON	OFF	OFF	ON	OFF	ON	OFF
71	OFF	ON	OFF	OFF	OFF	ON	ON	OFF
72	OFF	OFF	ON	ON	OFF	OFF	ON	OFF
74	OFF	OFF	ON	OFF	ON	OFF	ON	OFF
75	OFF	OFF	ON	OFF	OFF	ON	ON	OFF
128	ON	OFF	OFF	ON	OFF	OFF	OFF	ON
130	ON	OFF	OFF	OFF	ON	OFF	OFF	ON
131	ON	OFF	OFF	OFF	OFF	ON	OFF	ON
132	OFF	ON	OFF	ON	OFF	OFF	OFF	ON
134	OFF	ON	OFF	OFF	ON	OFF	OFF	ON
135	OFF	ON	OFF	OFF	OFF	ON	OFF	ON
136	OFF	OFF	ON	ON	OFF	OFF	OFF	ON
138	OFF	OFF	ON	OFF	ON	OFF	OFF	ON
139	OFF	OFF	ON	OFF	OFF	ON	OFF	ON
192	ON	OFF	OFF	ON	OFF	OFF	ON	ON
194	ON	OFF	OFF	OFF	ON	OFF	ON	ON
195	ON	OFF	OFF	OFF	OFF	ON	ON	ON
196	OFF	OFF	OFF	ON	OFF	OFF	ON	ON
198	OFF	OFF	OFF	OFF	ON	OFF	ON	ON
199	OFF	OFF	OFF	OFF	OFF	ON	ON	ON
200	OFF	OFF	OFF	ON	OFF	OFF	ON	ON
202	OFF	OFF	OFF	OFF	ON	OFF	ON	ON
203	OFF	OFF	OFF	OFF	OFF	ON	ON	ON



Figure 13



## POWER REQUIREMENTS

Input Voltage: 100-240 VAC 50/60Hz @.55A

Power Consumption: 20 watts

Fuses: 2A 250VAC

## SERVICE

For Service to the IntelliSwitch II™ 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 14.

Figure 14

Test	Description	Data												
2	Date of Manufacture	<table><tr><td><input type="text"/></td><td><input type="text"/></td><td><input type="text"/></td><td>2</td></tr><tr><td>2</td><td>0</td><td>0</td><td>9</td><td>0</td><td>3</td><td>2</td><td>2</td></tr></table>	<input type="text"/>	<input type="text"/>	<input type="text"/>	2	2	0	0	9	0	3	2	2
<input type="text"/>	<input type="text"/>	<input type="text"/>	2											
2	0	0	9	0	3	2	2							

# SELF TEST WORKSHEET – Page 1

Test	Description	Data
1	Display	Display Segments OK? <input type="checkbox"/> Yes <input type="checkbox"/> No Indicator Lights OK? <input type="checkbox"/> Yes <input type="checkbox"/> No
2	Date of Manufacture	<div style="text-align: center;"> <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%; text-align: center;"> <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> </div> <div style="width: 45%; text-align: center;"> <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> </div> </div>
3	Software Revision	<div style="text-align: center;"> <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%; text-align: center;"> <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> </div> <div style="width: 45%; text-align: center;"> <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> </div> </div>
4	Transducer Check	<div style="text-align: center;"> <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%; text-align: center;"> <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> </div> <div style="width: 45%; text-align: center;"> <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> </div> </div>
5	Switchover Pressure	<div style="text-align: center;"> <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%; text-align: center;"> <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> </div> <div style="width: 45%; text-align: center;"> <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> </div> </div>
6	Auxiliary Settings	<div style="text-align: center;"> <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%; text-align: center;"> <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> </div> <div style="width: 45%; text-align: center;"> <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> </div> </div>

**SELF TEST WORKSHEET – Page 2**

<b>Test</b>	<b>Description</b>	<b>Data</b>
7	Look Back Time	<div style="text-align: center;">□ □ □</div> <div style="display: flex; justify-content: space-between;"> <span>□ □ □ □</span> <span>□ □ □ □</span> </div>
8	Switch Back Time	<div style="text-align: center;">□ □ □</div> <div style="display: flex; justify-content: space-between;"> <span>□ □ □ □</span> <span>□ □ □ □</span> </div>
9	Hysteresis	<div style="text-align: center;">□ □ □</div> <div style="display: flex; justify-content: space-between;"> <span>□ □ □ □</span> <span>□ □ □ □</span> </div>
10	Offset Values	<div style="text-align: center;">□ □ □</div> <div style="display: flex; justify-content: space-between;"> <span>□ □ □ □</span> <span>□ □ □ □</span> </div>
11	Calibration Values	<div style="text-align: center;">□ □ □</div> <div style="display: flex; justify-content: space-between;"> <span>□ □ □ □</span> <span>□ □ □ □</span> </div>

# FACTORY DEFAULT SETTINGS

## Factory Default Values

Look Back Time	30 min
Switchback Time	10 min
Communication	Ethernet (Web Server)
Units of Measure	PSI
Key Lock Security	Disabled
Allow Remote Setting	Enabled

## **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.

**CONTROLS CORPORATION OF AMERICA SHALL NOT BE OTHERWISE LIABLE FOR ANY DAMAGES INCLUDING BUT NOT LIMITED TO: INCIDENTAL DAMAGES, CONSEQUENTIAL DAMAGES, OR SPECIAL DAMAGES, WHETHER SUCH DAMAGES RESULT FROM NEGLIGENCE, BREACH OF WARRANTY OR OTHERWISE.**

**THERE ARE NO EXPRESS OR IMPLIED WARRANTIES WHICH EXTEND BEYOND THE WARRANTIES HEREINABOVE SET FORTH. CONTROLS CORPORATION OF AMERICA MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE EQUIPMENT OR PARTS THEREOF.**



Controls Corporation of America  
1501 Harpers Road  
Virginia Beach, Va. 23454

***CE DECLARATION OF CONFORMITY***  
*In accordance with ISO/IEC 17050*

**The Intelliswitch II Series Gas Switchover System is compliant with the CE directives and standards listed below:**

**Directives:**

- **Electromagnetic Compatibility (2004/108/EC)**
- **Low-Voltage (2006/95/EC)**

**Standards:**

- **EMC: EN 61326-1:2013 Industrial**
- **Safety: EN 61010-1:2010**

**This product was tested by an ISO 17025 accredited laboratory and manufactured in accordance with ISO 9001: 2008.**

  
\_\_\_\_\_  
**QUALITY MANAGER**



**Certified ISO 9001:2000**  
Controls Corporation of America  
1501 Harpers Road Virginia Beach, VA 23454  
Telephone 1-800-225-0473 or 757-422-8330 • Fax 757-422-3125  
[www.concoa.com](http://www.concoa.com)