”Flexicon” FL2Lite Controller.

Installation, Commissioning & Operating Instructions.

General.

This unit has been developed to bring an up-to-date feel, and added functionality, to the "Two pressure switches in a box" type of controller. It is intended to enable the entry level for Compressed Air System Energy Control, to be much lower, opening up an area of the market, previously unviable.

The heart of the controller is a printed circuit board(PCB), which carries all the circuitry for the power supply, filtering, distribution, output switching, and analogue processing, required by the unit.

The “Flexicon” control board(TP2001), features an Embedded microcontroller with on board multiplexed analogue to digital to converter, which decodes the transducer value, and the setpoint values of the high, low and offset setpoint potentiometers, reads the status of the control inputs, and processes the system’s output signals, based on the control software loaded into it. The excitation voltage for the system transducer, is also generated by the board.

The four modes of operation, are accessed using the "Mode Select“ pushbutton. These are 1: Local, 2: Compressor 1 Lead, 3: Auto Changeover, and 4: Compressor 2 Lead.

Power Supply.

The controller is to be fed from a 230VAC single phase supply, via an external fused spur(Customer’s supply)which should be fused at 1amp. The controller is internally protected by a 500ma fuse on the low voltage side of the transformer.

The Live supply should be connected to field terminal L, the Neutral to field terminal N, and the earth to the dedicated earth terminal.

The system uses an internal regulated control supply of 24VDC, which can be measured on terminals 14(+ve) & 12(-ve) of the control board.
The transducer exication voltage is 24VDC and can be measured at terminal 18(+ve) and 15(0V) on the board.

External Control.

Provision is made for an external control signal to be used to create a master ON/OFF for the system as a whole. A typical example would be control from a Building management system(BMS), a remote switch, or an external time clock. Connection of the external control signal is to be by clean contact(Open for system OFF, and Closed for system ON), this should be connected to terminals 14(+24VDC) and 13(Input). The input is verified by the "Running" LED.

IMPORTANT! If this option is not used, a link should be fitted to these terminals.

Installation.

1. Location.

The controller should be wall mounted, as close to the compressors as possible, with particular attention to any other equipment, which could in any way interfere with the unit's operation, either physically or otherwise.

It is normal practise to mount the system transducer on the receiver. There is usually a valve/gauge which can be utilised as a tap in point. The transducer is a ¼ bsp thread. Particular attention should be paid to the disconnection and re-connection of the Transducer's DIN plug, should this be necessary.

2. Cabling.

As the interface between the controller and the machines is volt-free, the unit is insensitive to cable type. However it should be established with the machine manufacturer(s), whether or not there are any restrictions or specifications for their control circuits. In general, there is only a light load present in the control circuits, and a standard mains flex of 0.75 sqmm should suffice.

The system transducer comes pre-wired on 10m of screened twisted pair cable, and is generally immune to normal levels of electrical interference. If however, there are any doubts on a particular site, further levels of protection such as earthing, metal conduit, filters and or chokes may be prudent.

3. Machine Wiring. (Ingersoll - Rand Intellisys type 22kw and above)

There are two separate signals required to for an Intellisys machine to be controlled remotely, an enable signal and a load signal. These should be connected in the following way, for each of the machines. (See connection diagram).

IMPORTANT! Before these signals can be used by the machine, an Electronic option key must be inserted into the Intellisys controller. Contact your distributor to ensure that the key has been fitted.

The LOAD signal should be connected to the “REMOTE START” terminals, and the ENABLE signal should be connected to the”REMOTE STOP” terminals, at the machine’s auxiliary terminal block. Refer to the machine manual for terminal Nos.

4. Machine Wiring.(3 wire pressure switch control).

Provision is made to control any machine using a 3 wire pressure switch, where the Normally closed contact of the pressure switch provides a signal to load the machine, and the normally open contact puts the machine into a timed shutdown mode. In these cases the common terminal of the pressure switch is usually a control supply feed.

Note! pressure switch contacts are described with no pressure in the system.

To use the controller in this mode, the control supply feed should be removed from the common of the machine’s pressure switch and connected to terminal 4(Comp 1) or 7(Comp 2) as shown in the attached diagram.

The common of the pressure switch should now be connected to terminal 5(Comp 1) or 8(Comp 2) as shown in the attached diagram

Terminal 3(Comp 1) or 6(Comp 2) should now be connected to the pressure switch normally open contact **AS WELL AS** the existing connection.

Commissioning.

1. Wiring / physical check.

Thoroughly check all system wiring, in particular where Intellisys machines are connected. Ensure that Intellisys machines have been fitted with the “Option key”, to allow sequence control. Important! The “Option key” must only be fitted with the machine’s power SUPPLY turned OFF, as the Intellisys controller reads the options at first time power up only. The option key may be damaged or erased by inserting with power to the machine.

2. Power up the Flexicon controller.

Once satisfied with the physical installation, turn on the power to the controller. The status at power up is “LOCAL” or stand alone mode, where the controller's output relays remain closed, and the machines run on their own pressure switches.

3. Setting up the Flexicon controller.

(i) Ensure that the master control input is in the ON state("Running" LED lit). The analogue circuitry will now be enabled,allowing it to start reading the system pressure transducer.
The installation will still be running in “LOCAL”(No Mode LEDs lit) mode at this point

(ii) Decide on the system operating pressures .ie. Lead machine 6.5 to 7bar, Lag machine offset by 1 bar. With the system running in “LOCAL” mode, you can now adjust the machine’s internal pressure switches(or other control medium) to a margin above the required operating pressure band.ie. 7.2bar.

(iii) With the controller still in “LOCAL” mode, using the adjustment pots marked "High", "Low" and "Offset", adjust the “HIGH” and “LOW” setpoint to the required pressure, for the Lead machine, and select the amount of "Offset" for the lag machine.

(iv) Press the “Mode Select" button, to step through the possible operating modes, until you reach your required setting. These are 1: Local (No status LEDs), 2: Compressor 1 Lead (C1Lead LED lit), 3: Auto Changeover (AutoCo LED plus C1 or C2 Lead LED lit, to show current order) and 4: Compressor 2 Lead (C2Lead LED lit).

(v) Referring to the customer’s normal pressure indicator, (Favourite or receiver mounted gauge) take note of the pressures at which the compressors LOAD and UNLOAD. With the pressure rising, the controller should unload a machine at your chosen high setpoint. If it does not, then as the pressure reaches your chosen value, turn the “HIGH” potentiometer gently anticlockwise until a machine offloads. Now, with the pressure falling, the controller should load a machine at your chosen low setpoint. If it does not, turn the “LOW” potentiometer gently clockwise, until a machine loads. Allow the system to achieve normal working pressure, and then finely trim the “HIGH” and “LOW” pots to achieve the desired band. Clockwise to increase pressure, anticlockwise to decrease pressure. Manually unload the Lead machine, and ensure that the Lag machine operates at the expected pressures. Adjust with the "Offset" control as required.

Technical support and commissioning.

(i) Assistance can be arranged either through your authorised distributor, selected OEM's or by calling 0161 439 1444, and asking for "Flexicon Technical support.

(iii) Commissioning / training can be arranged for a nominal charge, enabling any queries or special requirements to be easily sorted out.

(iv) Your system should be registered with the manufacturer, via your authorised distributor, to enable the warranty to be verified. Please quote the serial/batch number of the controller, and your invoice details.

(v) Extended warranty and service contract packages are available, for ongoing peace of mind, once the initial twelve month period is exhausted.

Operating Instructions.

1: Turning the package ON and OFF.

The system is turned ON and OFF by the master control input (closed for ON). With Power removed from the unit, the output relays remain closed, and the machines run on their own pressure switches.

2: Duty Cycle Rotation.

The rotation of the duty cycle is performed automatically, every 24 hours, when the unit is placed in "Auto Changeover" mode, otherwise it is selected manually by placing the unit in either C1Lead or C2Lead mode.

4: Machine Control Method.

The machines are controlled by their LOAD/UNLOAD signals, and will shutdown in Auto-restart mode, until required, by the controller. The machine's existing control medium (Pressure Switch or Transducer), is set to operate slightly above the system pressure band, acting as both safety cut - out, and LOCAL control.

5: LOCAL / Controlled States.

The system's default state is LOCAL, where the machines act independently. The controller takes over, when either C1Lead, C2Lead or Auto Changeover mode is

selected. Repeated presses of this "Mode Select" button, index the system through these options, which are indicated by the corresponding LEDs. 6: SEQUENCE operation.

In Controlled modes, the Lead machine is Loaded when the system pressure reaches the "Low" setpoint, and Unloaded when it reaches the "High" setpoint. The Lag machine is Loaded when the system pressure reaches the "Low" setpoint minus the "Offset" value, and Unloaded when it reaches the "High" setpoint minus the "Offset" value. The range of adjustment is 0 - 15 bar, and so only small increments of movement should be made, clockwise for increase in pressure, anti-clockwise for a decrease. The range of the "Offset" pot is 0-2 bar.