GAA

GasApps Australia P/L Spacecontroller MK4

Manual

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GENERAL DESCRIPTION

The MK4 Spacecontroller (Figure 1) is suitable for the dispensing of BOC Gases Envirosols products. These products include Insectigas, Pestigas, Deodourgas, and Bactigas. Other dispensing systems i.e. the Multitimer MKII system c/w solenoid valves can be used to dispense Pestigas, Deodourgas, and Bactigas (NOT INSECTIGAS). The Spacecontroller is typically used to dispense Pestigas in warehouses and food processing plants etc.

The MK4 Spacecontroller system remains the only FAIL SAFE system available for automatic dispensing of Envirosols. More specifically it is the only BOC Gases approved dispensing equipment for use with Insectigas. The system achieves this by completely eliminating the use of solenoid valves and prevents a direct connection between the spray nozzles and supply cylinders. This System is mandatory for all automatic spraying of Insectigas. It is also mandatory for the dispensing of Pestigas when two or more supply cylinders are connected.

Figure 1

SINGLE CHANNEL TIME CLOCK

In addition, the system makes use of a single channel digital time clock (T1), which has a 3-year backup battery. This single channel digital time clock can be programmed to release gas at specific times. For example the fumigation cycle can be programmed to release gas on a Sunday morning at 1:00am while the factory or warehouse is shutdown or closed for the weekend. The controller simply fills a dose cylinder and then dumps the contents of that cylinder through a fixed piped nozzle system installed in the building. Different capacity dose cylinders can be connected to the unit which in turn will dispense different amounts of gas. The larger the dose cylinder the greater amount of gas will be dispensed.

THREE WAY BALL VALVE

A three way ball valve is at the heart of the Spacecontroller MK4 coupled to an electric actuator, which is controlled by an electronic weekly time clock (T1) within a control panel.
The ball valve rotates through a 180° and will only stop at either the (**F**) or (**S**) position.

Port One of the ball valve is connected to the inlet manifold, which in turn is connected to the supply cylinders via flexible hoses. Port Two the centre-common-port is connected to an inverted dose cylinder sized to provide the correct dose of liquid Envirosol for the spray application. Port three of the ball valve is connected to the nozzle pipe-work installed in the factory or warehouse.

ELECTRIC ACTUATOR

The electric actuator rotates the ball valve and stops at either the Fill or Spray positions.
The normal position of the ball valve is such that the dose cylinder is open to the spray nozzle(s). This is referred to as the (**S**) for spray or home position.

The electric actuator is controlled by a digital time clock (T1), which is programmed to (**F**) fill and (**S**) spray at the appropriate times. This important advantage makes it impossible to discharge the total contents of the supply cylinders in one operation through to the nozzle system. Unlike a typical solenoid valve, the three way ball valve can't jam open or stop in a halfway position causing the contents of the supply cylinder(s) to be dumped.

When an Envirosol Fill and Spray cycle is triggered by the time clock (T1), the actuator rotates the ball valve spindle 180° to the (**F**) fill position which allows the Envirosol to decant fill from the supply cylinders into the inverted dose cylinder. The (**F**) fill time can be varied by the time clock (T1). The minimum (**F**) fill time is 1min. When the (**F**) fill time is complete the actuator will rotate the valve a further 180°

Manifold

90um filter inside

Figure 2

and stop at the (**S**) spray position, which will then release the contents of the dose cylinder into the spray delivery line and onto the nozzles.

While in the (**F**) fill position the dose cylinder will decant fill to half its volume in Kg. For example: A 10L dose cylinder will decant fill to a maximum of 5Kg. Smaller amounts of liquid can be achieved by reducing the dose/fill time and or by inserting a restrictor (#736648) into the line between the valve and the manifold.

NOZZLE SYSTEM

When the contents of the dose cylinder is released to the spray nozzle system, the liquid will be sprayed first, followed by almost pure gaseous carbon dioxide, which serves to purge the spray lines and nozzles of any remaining chemical. The weight of the carbon dioxide gas purge is approximately 15% of the dose and is in addition to the dose.
This system can provide doses ranging from as little as 50 grams at very frequent intervals to 20 kg at daily or weekly intervals. If more than 20 kg is required, double dosing should be considered.
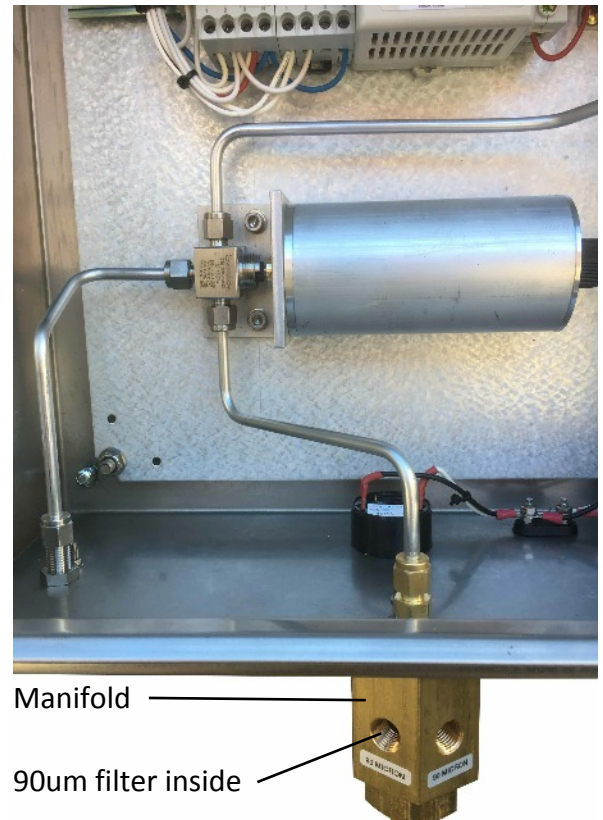
SYSTEM FEATURES INCLUDE

- Dual 7-Day electronic time clocks, one for the Valve/Actuator (T1) and one for the Strobe Lamp(s) (T2).
- Provides a completely flexible system, which can be programmed to spray on a daily or weekly basis.
- 240V/10A plug-in power supply with 12VDC internal electric actuator & controls.
- Audible alarm installed will sound for the full duration of the dose filling period. This provides a warning to all people that the system is about to fire off and release gas.
- The Stainless Steel control panel fitted with a strobe lamp that will activate for the full duration of the dispensing cycle, which is approximately 4.5 hours. There is also a provision to hook up external strobe lamp(s).
- An internal 6-Digit counter which will increment one count with each cycle.
- Maximum manifold capacity for 6 supply cylinders.
- The Manifold is fitted with a 90um internal stainless steel sintered filter.
- An access valve/port at the bottom of the manifold. This can be used to pressurise the system for leak testing and to drain off any excess pressure when required.
- The stainless steel enclosure 400 x 400 x 200 and has four wall mounting brackets, 360w x 460h.
- An ON/OFF switch and two lamps mounted on the front door.
- The left RED lamp illuminates during dose cylinder filling.
- The right GREEN lamp illuminates during dose cylinder dispensing/spraying. The green lamp also indicates the valve home position.
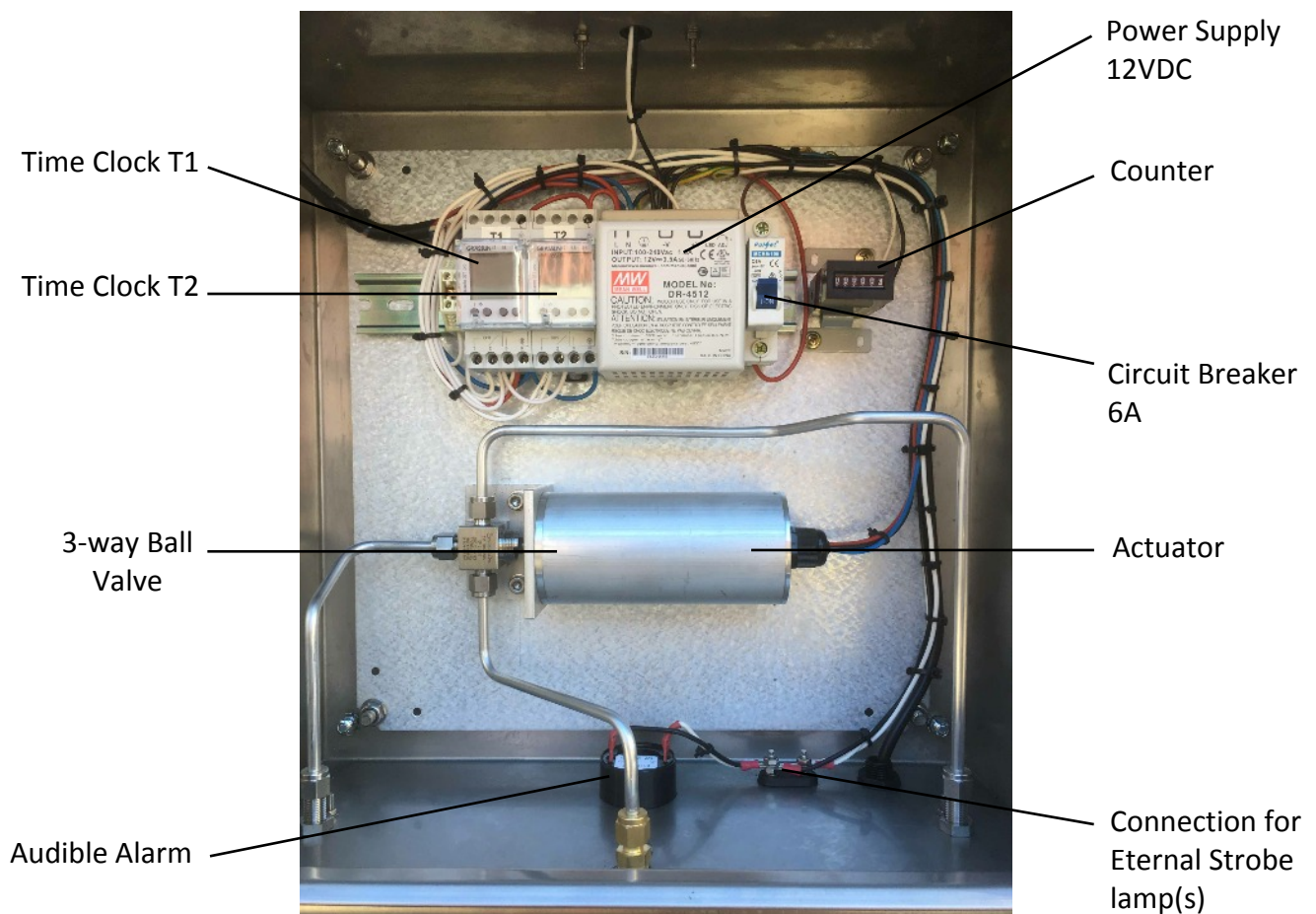- An OFF/ON switch to isolate power.

Figure 3

GENERAL SPECIFICATIONS

Overall Dimensions	: 400mm wide x 590mm high x 220mm deep
Wall Mount Centres	: 4off x 8mm - Centres 360W x 460H
Weight	: 14kgs
Power Requirements	: 240VAC 10AMP
Power Connections	: 2m Lg power lead with 240VAC Plugtop
Protection	: Enclosure IP56
T1 Valve Clock	: 7-Day Electronic, 10A, 3yr battery, Talento 371 pro
T2 Strobe Clock	: 7-Day Electronic, 10A, 3yr battery, Talento 371 pro
Counter	: Electronic 6-Digit, 12VDC
Strobe Lamp Output	:12VDC,1AMP Max
Dosing Siren	: Electronic, two-Tone, 12VDC,94db
Internal Controls	: 12VDC internal electrics
Valve	: 3-Way Low Temperature SS Ball Valve, ¼" Swagelok
Valve Motor	: 12VDC Geared Motor, Ratio 1/3000, 6.0 kg-cm, 2rpm
Manifold Block	: 6-Port (¼" BSPT) Hexagon Brass Block (# 736459)
Manifold Seal	: Teflon Seal (# 736729)
Service Valve	: Brass Needle Valve 1/4" Male NPT (# 737078)
Filter Element	: 90 micron Stainless Steel Sintered (# 736460)
Retaining Spring	: Stainless Steel compression type (# 736461)

ON/OFF switch

RED fill Lamp

GREEN Spray Lamp

Power for Strobe

Connection to Nozzles

Mounting Bracket

Connection to Dose Cylinder

6-Point Manifold With Filter Inside
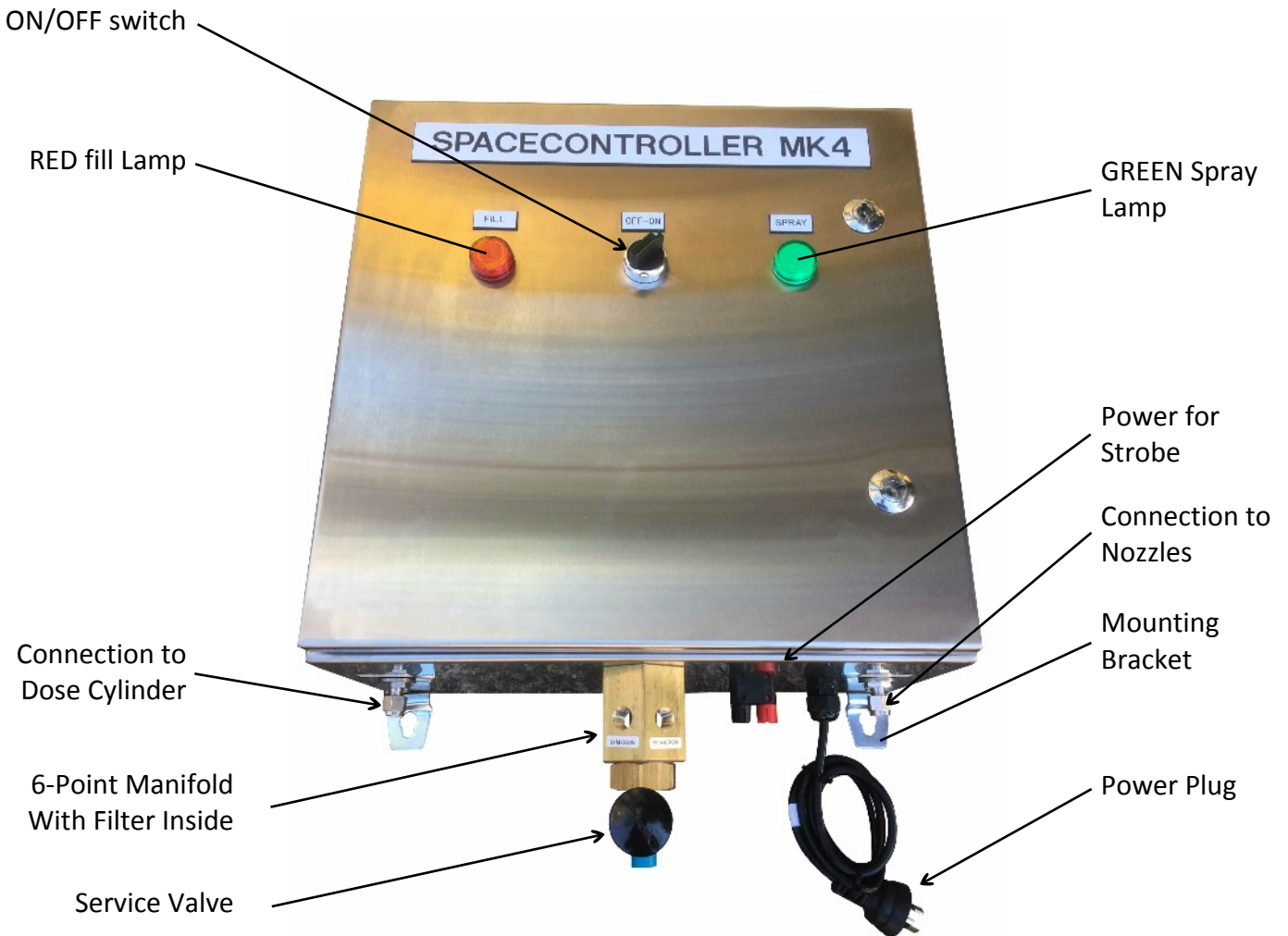
Service Valve

Power Plug

Figure 4

INSTALLATION INSTRUCTIONS

IMPORTANT
It is essential that all Envirosol installations are carried out by BOC or GasApps approved installers.

MOUNTING THE SPACECONTROLLER AT CUSTOMER PREMISES

The MK4 Spacecontroller is a weatherproof system. However, it is recommended that the system be installed undercover and in a well ventilated security enclosure.

Spacecontrollers installed indoors must be well-ventilated and the supply cylinders should NOT be located inside enclosed areas where people work and or congregate. Dangerous levels of carbon dioxide (CO_2) can build up if a gas leak were to occur when equipment and gas cylinders are installed inside enclosed areas.

All Envirosol supply cylinders and the dose cylinder must be located out of direct sunlight and away from other sources of heat to ensure that the temperature of equipment and cylinders do not exceed +45°C, otherwise, the design pressures of equipment may be exceeded.
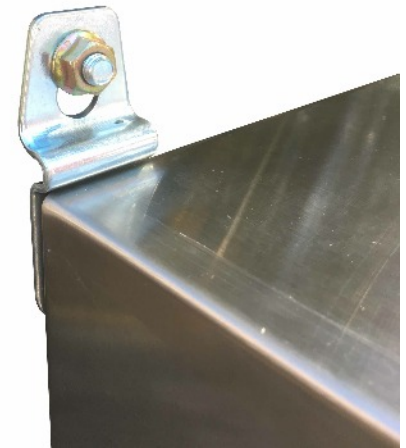

Figure 5

The Spacecontroller panel should be mounted in a vertically upright position approximately shoulder height using the four mounting brackets provided in the back of the enclosure. The four mounting-hole centres are 360W x 460H, use 8mm bolts.

DOSE CYLINDERS

Small dose cylinders (up to size D) can be mounted directly onto the side of the Spacecontroller control panel (Drawings 3,4,5), however large dose cylinders (size E and greater) need to be separately wall mounted (See Drawing 6). Large dose cylinders should be installed as close as possible to the Spacecontroller panel. All dose cylinders need to be mounted in an inverted orientation where the cylinder neck and fittings are at the bottom.

POWER SUPPLY

The Spacecontroller system is supplied with a 10 AMP 240V power lead 2m Lg with plug-top. This will need to be plugged into a 220-240VAC 10AMP, 50-60 Hz power-outlet socket.

STROBE LAMPS

Additional external blue strobe lamp(s) #737186 can be connected to the Red and Black connection posts on the bottom of the control box. This is a 12VDC output controlled by the Strobe Time Clock (T2) and is capable of supplying up to 1 AMP. The blue external strobe lamp(s) will operate at the same time as the inbuilt blue strobe lamp. Additional strobe lamps should be installed over building entry doors to warn personnel of fumigation in progress.
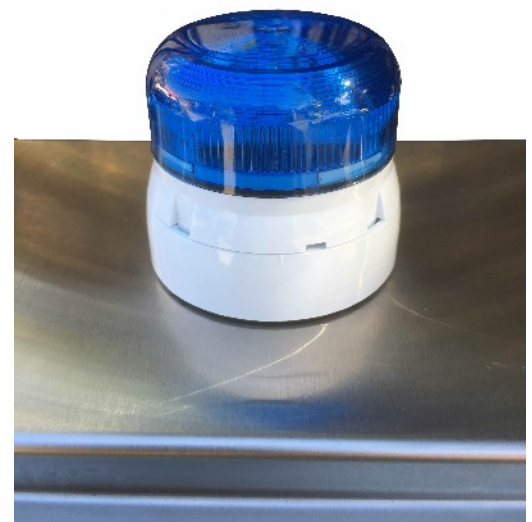

Figure 6

PIPE LAYOUT AND CONNECTION

It is essential that all pipe-work be connected and supported correctly (As per Drawing 8). All pipe-work should be blown out with liquid C02 to remove any loose material prior to final connection avoiding the risk of nozzle blockages.

The left hand 1/4" bulkhead tube fitting on the panel is connected to the inverted dose cylinder, sized to provide the correct dose of liquid Envirosol for the spray application.

The right hand 1/4" bulkhead tube fitting on the panel is connected to the pipe-work, which supplies the spray nozzle(s). (See Drawing 7)

## CONNECTING ALUMINIUM TUBE TO COMPRESSION FITTINGS

Attention should be taken when connecting the aluminium tube to twin ferrule compression fittings. The fitter should ensure that the tube is inserted into the assembly fitting until it bottoms against the inside shoulder of the fitting.

The nut should then be tightened by hand and with the use of a correct sized spanner tightened clockwise a further 1-1/4 turns. After completion all fittings should be leak tested with soapy water. Care should be taken around electrical components.
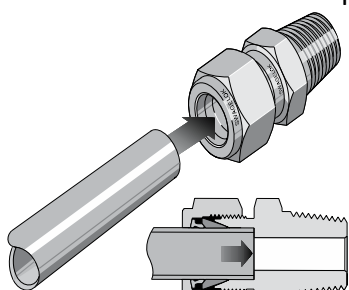
1.
Fully insert the tube into the fitting and against the inside shoulder; rotate the nut until finger-tight.
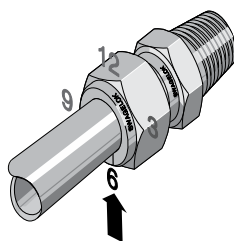
2.
Mark the nut at the 6 o'clock position.
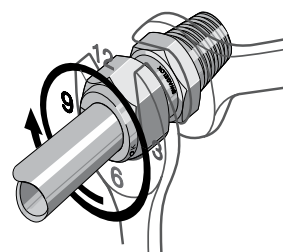
Figure 7

3.
While holding the fitting body steady, tighten the nut one and one-quarter turns to the 9 o'clock position.

MATERIALS

Envirosols	Brass where atmospheric moisture is not present	Stainless Steel Grades 316 & 304	Aluminium 1/4 or 3/8	Copper	P.T.F.E & Kel-F
Pestigas	Fitting and valves	Fitting, valves and tubing	Tubing	Tubing	Sealing materials
Insectigas	Fitting and valves	Can cause pitting	Tubing	x	Sealing materials
Bactigas	Fitting and valves	Fitting, valves and tubing	Tubing	Tubing	Sealing materials
Deodourgas	Fitting and valves	Fitting, valves and tubing	Tubing	Tubing	Sealing materials

Table 1

Prepared By GasApps Australia P/L - November 2017

PIPE THREADS AND SEALING

Due to the large number of imported valves and fittings using NPT threads, all Spacecontroller threads are NPT, and as far as possible all other pipe threads used for Envirosol systems should be NPT. Locktite 569 or Teflon tape should be used for sealing of all tapered pipe threads.

PRECAUTIONS AGAINST OVER TIGHTENING OF DOSE CYLINDER NECK FITTING

When fitting adaptors to cylinder necks, a torque wrench must be used to apply the correct torque, which is as follows:

- Stainless Steel Cylinders with 1/4" N.P.T. Neck Thread: The minimum and target torque is 47 Nm (35 Ib ft) and maximum allowable torque is 54 Nm (40 Ib ft)

- Aluminium Cylinders -Tapered Thread: The minimum and target torque is 115 Nm (85 Ib ft) and maximum allowable torque is 135 Nm (l00 Ib ft)

- Aluminium Cylinders -Parallel Thread; The minimum and target torque is 85 Nm (63 Ib ft) and maximum allowable torque is l00 Nm (74 Ib ft)

Rubber vice jaws should be used to grip the cylinder and avoid surface damage. P.T.F.E. tape should be used as the thread sealing material on all tapered threads.

Figure 8

METHOD OF DETERMINING DOSE CYLINDER SIZE

Below (Table 2) gives information in regards to dose cylinders when used with Spacecontroller installations. The method of obtaining the dose is included.

In addition to this table, repeat cycles can be used to achieve a required dose. A Spacecontroller can be programmed to spray two or three times in quick succession and the interval between spraying is dependent on dose size.
A 1kg dose can be repeated 15 minutes after the initial spray. However, 40 minutes should be the minimum interval between the first and second spray of a 20kg dose. This period is necessary to allow the temperature of the dose cylinder to return to ambient.

In table 2 the period required to fill a C or D dose cylinder has been extended to approximately the same period as for the E or G cylinder. This has been done by fitting a restrictor at the manifold of the Spacecontroller MK4 used with a C or D cylinder.

As shown in the table below, varying fill times will vary the dose quantity for cylinders, which take two minutes or more to fill. If reduced doses are required with a C or D cylinder then a restrictor part #736648 should be inserted into the ¼" Aluminum tube between the ball valve and manifold.

Dose Size (kg)	Dose Cylinder Size	Dose Period (min)
0.035	75cc Whitey Stainless Steel	1
0.07	150cc Whitey Stainless Steel	1
0.14	300cc Whitey Stainless Steel	1
0.23	500cc Whitey Stainless Steel	1
0.3	Luxfer A Aluminium Cylinder	1
0.8	1.75L WC Aluminium Cylinder	1
1.0	C Aluminium Cylinder	1
1.4	C Aluminium Cylinder	3 With Restrictor 1 with NO restrictor
1.3	D Aluminium Cylinder	1 With Restrictor
2.5	D Aluminium Cylinder	2 With Restrictor
3.6	D Aluminium Cylinder	3 With Restrictor 1 with NO restrictor
4.2	D Aluminium Cylinder	4 With Restrictor
4.6	D Aluminium Cylinder	5 With Restrictor 1 with NO restrictor
4.0	E Aluminium Cylinder	1 With Restrictor
7.0	E Aluminium Cylinder	1 With Restrictor
9.2	E Aluminium Cylinder	4 With Restrictor
9.9	E Aluminium Cylinder	4 With Restrictor
10.0	E Aluminium Cylinder	5 With Restrictor
6.0	G Aluminium Cylinder	1 With Restrictor
10.0	G Aluminium Cylinder	2 With Restrictor
13.5	G Aluminium Cylinder	3 With Restrictor
17.5	G Aluminium Cylinder	5 With Restrictor
20.0	G Aluminium Cylinder	8 With Restrictor

Table 2

METHOD OF DETERMINING DOSE REQUIRED:

The dose required is determined by the volume of the building and the product used. The larger the building the greater the dose.

The recommended dose for Pestigas is 150g per 300 cubic meters (ie. 0.5g per cubic meter).
The recommended dose for Insectigas is 200g per 300 cubic meters (ie. 0.66g per cubic meter).

For example:
A building with a volume of 40m x 60m x 10m = 24000m³. Then multiply 24000m³ x 0.5g/m³ you will get 12000g which is equal to 12kgs of Pestigas.
For the same sized building we multiply 24000m³ x 0.66g/m³ to get 15840g which equals 15.8kgs of Insectigas.

| Dose Cylinder Size	GasApps Part Number	Dose Capacity (Kg)	Water Capacity (Litres)	Max Warehouse Volume	
				Pestigas (0.5g/m3)	Insectigas (0.66g/m3)
C	737422	1.4	2.8	2840	2152
D	737362	4.8	9.5	9500	7197
E	737360	11.9	23.8	23800	18030
F	737361	17.2	34.3	34300	25985
G	737473	24	48	48000	36364

Table 3

COMMISSIONING A NEW INSTALLATION

NOZZLE DELIVERY LINE LEAK TESTING

This checks the nozzle delivery line and all associated fittings for gas leaks.
● Disconnect the aluminium nozzle line from the lower right hand side of the Spacecontroller.
● Then connect the nozzle delivery line using a test hose & gauge to a CO_2 cylinder.
● Remove the spray nozzles and replace with blanking plugs.
● Now turn on the CO_2 cylinder for 10 seconds. The gauge should show cylinder pressure of about 55 BAR
● This will pressurise the nozzle delivery line and all associated fittings.
● All fittings and connections should be checked for leaks with soapy water.
● During this time check the pressure gauge for any pressure loss.
● Following satisfactory testing, depressurise the nozzle delivery line until the pressure gauge reads zero.
● Check that all nozzles are clear, clean and in good condition before replacing them.
● Re-connect the spray delivery line to the lower right hand side of the Spacecontroller.

BALL VALVE FILL AND SPRAY POSITIONS

Valve in
FILL Position

Valve in
SPRAY Position
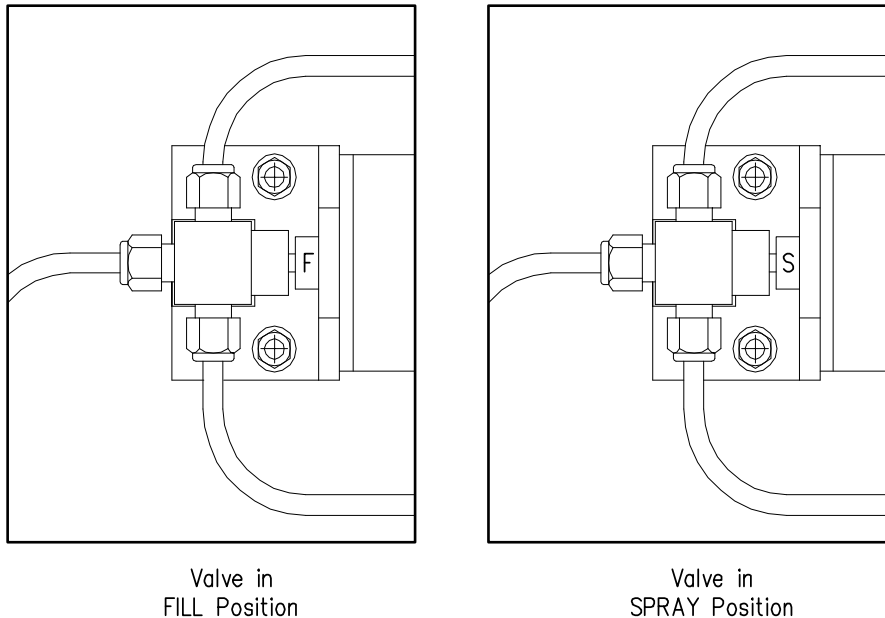
Drawing 1

CONNECT AND LEAK TEST CYLINDER CONNECTIONS

● Connect a liquid withdrawal CO2 cylinder to the Service Access Needle Valve on the bottom of the hex manifold using a test hose & gauge.

● Connect up the required number of supply cylinders. Do <u>NOT</u> open any cylinder valves yet (Supply or CO2).

● The ball valve must be in the **S** spray position before turning on the CO2 cylinder; the letter **S** on the valve coupling indicates this.

● The ball valve can be rotated by pressing the "1" button on the Valve Time Clock multiple times until the FIX 1OFF symbol appears on the clock.

● The power needs to be connected for the valve to rotate.

● Once the valve is in the **S** position turn ON the CO2 cylinder and open the service access valve to pressurise the hoses and manifold and check for gas leaks with soapy water.

● Now press the "1" button three (3) times on the Valve Time Clock until the FIX ON1 symbol appears.

● This will rotate the valve to the **F** fill position and the dose cylinder will start filling.

●After two minuets check the does cylinder tube and fittings to the control panel for leaks using soapy water. Turn OFF the CO2 cylinder.

● Now press the 1 button once on the Valve Time Clock until the FIX 1OFF symbol appears. This will rotate the valve to the **S** position and discharge the contents of the dose cylinder through the nozzle system.

● Inspect the nozzle system including all tube fittings for leaks at this time. This process can be repeated multiple times until the complete system has been leak tested.

Be sure to depressurise the system before disconnecting the CO2 cylinder. This can be done by turning off the CO2 cylinder and pressing the 1 button a number of times rotating the valve until all the CO2 pressure has been released.
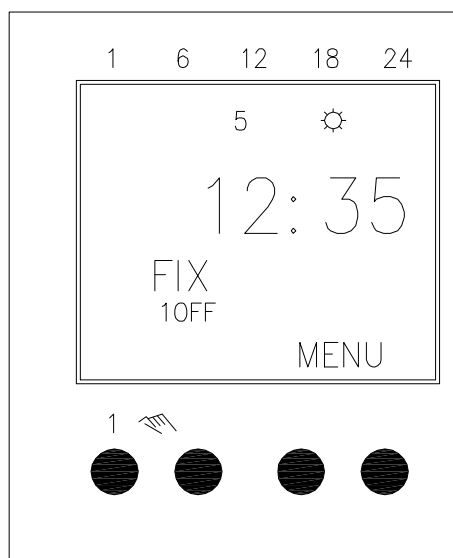

Figure 9

PROGRAMMING OF WEEKLY TIME CLOCKS

Figure 10

INTRODUCTION

There are two identical weekly time clocks fitted into the Spacecontroller MK4

T1 - Controls the Actuator Valve.
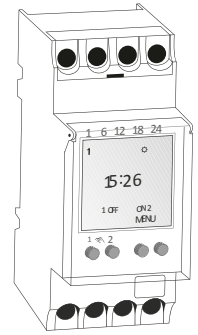
T2 - Controls the Strobe Lamps.

The seven-day single channel timer is capable of storing Seventy different programme times, ie. 70 **ON/OFF** switches. These programmes can be set to run on any individual day or any combinations of days within a week. The time clock includes four buttons on the front panel. The LCD displays 12 or 24hr Time, Day Number of the week, Switch status ie. ON or OFF, Auto, FIX ON, FIX OFF Modes.

DISPLAY AND FUNCTION KEYS

Switch-off commands have a higher priority than switch-on commands.
The central line of the display, in which the adjusted values and selected menu items are displayed larger. Flashing means that an entry is required. If you do not enter anything within two minutes, the timer switches back to automatic operation.
MAINSOFF appears on the display when the device is not supplied with power.
LOW BATT appears on the display when a battery change is required within the next two weeks.

The programs are retained after a reset, although you will need to readjust date and time. Press all 4 buttons at the same time to reset the device.

DISPLAY

A   Function displays of the two left keys
B   Switching state displays (ON/OFF/OVR/FIX)
C   3 display lines
D   Weekdays, The assignment can be changed in the DATETIME menu, for example to
     1 = Sunday, Default setting 1 = Monday
E   Programmed switching times
F   Radio antenna
G   Display of summer/winter time
H   Function displays of the two right keys

KEY INTERFACES

I   Right Keys
J   Left keys with manual switch function in automatic mode

Figure 11

FUNCTION DISPLAYS OF THE TWO LEFT KEYS:
Scroll upwards in the menu,   Scroll downwards in the menu

Accept selection/proposal

+Brief key press = +1 / long key press (about 2 sec) = fast forward

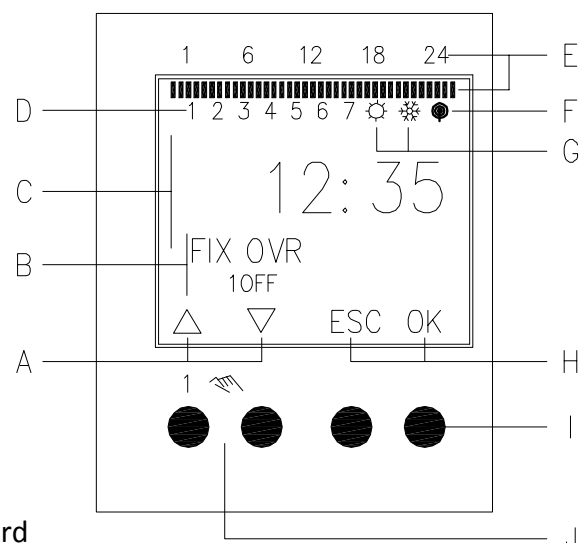-Brief key press = -1 / long key press (about 2 sec) = fast forward

FUNCTION DISPLAYS OF THE TWO RIGHT KEYS:

MENU Leaves Automatic mode and enters Programming mode
ESC Brief key press = one step backward, Long key press (about 2 sec) = Back to Automatic mode
OK Make a selection and accept
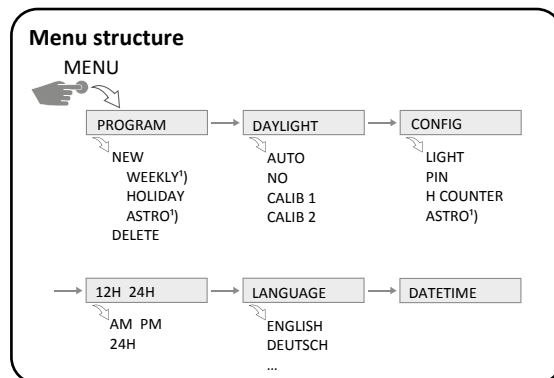**EDT** Change programs in "Read mode"
NO Do not execute command
YES Execute command
DEL Delete

MENU STRUCTURE

This diagram shows the menu structure layout of the time clock. The menu screen can be accessed by pressing any button. Press either right key once and then press the △ ▽ keys to access each parameter.
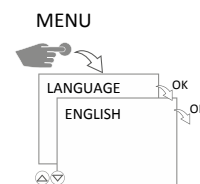

LANGUAGE MENU

Select the language parameter and press OK. This allows you to select your preferred language by pressing the △ ▽ keys, when satisfied press OK.
Note: English is the default language.

SETTING CLOCK TIME (EG, THURSDAY, 13/7/2017, 17:22)

● Press the right button > **PROGRAM**

● Press the left/UP △ button once > **DATE TIME**

● Press the OK/Right button > eg **2017:07:22**

● **YEAR** is Flashing, Press +/- to select the correct **YEAR** & then press **OK** > eg **2017**

● **MONTH** is Flashing, Press +/- to select the correct **MONTH** & then press **OK** > eg **2017:07**

● **DAY** is Flashing, Press +/- to select the correct **DAY** & then press **OK** > eg **2017:07:13**

● **DAY** number of week is Flashing, Press +/- to select the **DAY** number & then press OK > **4**

● **HOUR** is Flashing, Press +/- to select the correct **HOUR** & then press **OK** > eg **17:00**

● **MINUTE** is Flashing, Press +/- to select the correct **MINUTE** & then press **OK** > eg **17:22**

● **GMT** is flashing, Press +/- to select the correct **HOUR** & then press **OK** > eg **+10:00**

● Press **ESC** to return to the main screen
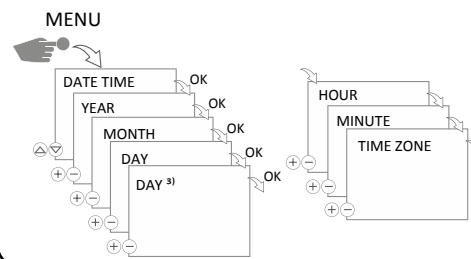
DELETE OLD PROGRAMS

All previous programmes should be deleted to avoid any confusion between old and new programs.
To clear all existing programs.
Press.. MENU > PROGRAM, OK > DELETE, OK > DELETE ALL, YES > CONFIRM, YES >ESC > ESC.

To confirm that all program locations are free
Press … > MENU > PROGRAM, OK > REVIEW, OK > ALL, OK > NO PROGRAMS (is displayed for 1s)
>ALL, ESC > NEW, ESC > PROGRAM, ESC

Delete program
Delete all programs
• Press **YES** to delete all programs.
• Press **NO** to delete individual programs.

MEN

PROGRAM   OK
DELETE   OK
DELETE ALL   YES
CONFIRM   YES

Delete individual programs
• Press △ ▽ to scroll through

DELETE   OK
DELETE ALL   NO
ONO   PO01   DEL
CONFIRM   YES

TYPICAL SPACECONTROLLER PROGRAM

Its always a good idea to first write out the correct four times on paper and then programme both time clocks to agree with those times. The list should then be attached to the inside of the Spacecontroller door which will be useful for future programming checking or modifying. See the sample time chart below. Always turn OFF all gas cylinders before attempting to set or adjust the weekly time clock. It's important to insure that the program is running correctly before gas is turned ON.
A typical program might look like this…

Strobe Time Clock ON at 12:30am Sunday (Strobe lamps ON)

Valve Time Clock ON at 1:00am Sunday (Valve ON, 30mins after the strobe lamps start, & dose starts filling)

Valve Time Clock OFF at 1:05am Sunday (Valve OFF, after 5mins, dose stops filling & nozzles start spraying)

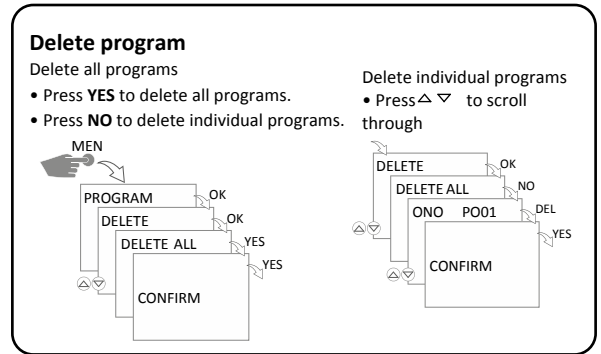Strobe Time Clock OFF at 5:05am Sunday (4 hours after gas spraying, ie lock out time)

Greate a weekly program 1)
MENU

PROGRAM   OK
NEW   OK
WEEKLY   OK
SELECT CH 1)   OK
DAY CHL ON   OK
HOUR CHL ON   OK
MIN CHL ON
+ −

DAY CHL OFF2)   OK
HOUR CHL OFF   OK
MIN CHL OFF   OK
SAVED

1. Press the **MENU KEY**.
2. Confirm **PROGRAM** by pressing **OK**.
3. Confirm **NEW** by pressing **OK**.
4. Confirm **WEEKLY** by pressing **OK**.
   ▷ Free memory locations are briefly displayed.
5. When prompted, select channels △ and confirm by pressing ü à**OK**
   ▷ The weekly display is flashing.

ON command:
6. Select the desired days △ and confirm by pressing ü à**OK**
7. Enter hour (+/-) à**OK**
8. Enter minutes (+/-) à**OK**

OFF command:
9. When prompted, select desired days △ and confirm by pressing ü à**OK**
10. Enter hour (+/-) à**OK**
11. Enter minutes (+/-) à**OK**

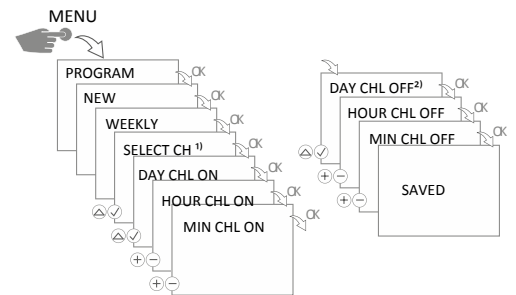| Sample time chart	Strobe ON	Valve Fill	Valve Spray	Strobe OFF
T1 Valve Clock		1:00am	1:05am	
T2 Strobe Clock	12:30am			5:05am

Table 4

PROGRAMS CAN BE VIEWED AND EDITED BY PRESSING
>MENU > PROGRAM, OK > UP ARROW > REVIEW, OK > ALL, OK
Use the up and down arrows to toggle through and view all program steps

View and edit program   MENU
Weekly, holiday and astro programs can be viewed and edited separately.
• Press △ ▽ to scroll through the different program steps.
• Press **EDT** to edit a program. This procedure is similar to creating a

PROGRAM   OK
REVIEW   OK
ALL   OK
ONO   P001   EDT/ OK
CHANNELS
1
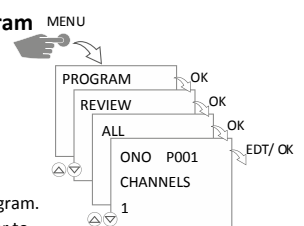
TIME CLOCK MODES

The time clocks can operate in four different modes which can be selected by the **1** key on the left hand side. The four modes are as follows…

FIX ON… This means that the relay output is **ON** permanently and ignores any programmed time switches. The Actuator/Valve will rotate to and stop at the **F** fill position.

FIX OFF… This means that the relay output is **OFF** permanently and ignores any programmed time switches. The Actuator/Valve will rotate to and stop at the **S** spray position.

OVR… The Override function (temporary program overwrite) allows the user to switch the relay **ON** or **OFF** early depending on the current channel status. The Override function applies only to the current program and remains active until the next program change. After that, the timer returns to Automatic mode.

AUTO… In Automatic mode the pre-programmed times determine when the time clock relay switches **ON** and **OFF**. This could also be the referred to normal operating mode.

Automatic/Manual mode
- Manual switch: Duration ON / Duration OFF / OVR / Automatic mode
- Left button = channel 1

Press 1x = FIX ON = Duration ON
Press 2x = FIX OFF = Duration OFF
Press 3x = OVR = Override mode
Press 4x = Automatic mode

Override mode
The Override function (temporary program overwrite) allows the user to switch ON or OFF early. This depends on the current channel status. The Override function applies only to the current program and remains active until the next program change. After that, the timer returns to Automatic mode.

BATTERY BACKUP

Both timers have 70 memory locations and a 3-year backup battery (CR2450) which can be replaced easily when a **LOW BATT** symbol appears on the screen.
The internal backup battery is capable of backing up the time, date and switching programs for a period of up to 3 years after an initial charge of 70 hours. The Spacecontroller unit will not operate without 240VAC power.

Battery change
Before changing the battery, the device must be disconnected from the power supply! Date and time will be lost!
1. Lift the battery compartment using a screwdriver.
2. Take the battery out of the support.
3. Insert new (Lithium battery type CR2032) battery into support.
   ● Observe polarity of the battery!
4. Push battery support downward until it engages.
5. Dispose of the battery in an environmentally friendly manner.
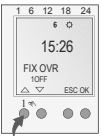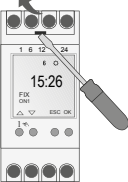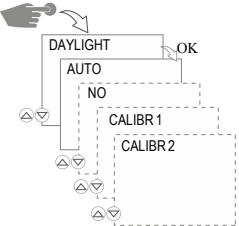
DAYLIGHT SAVING

The clocks have an automatic daylight saving capability. This is also called summer time and winter time and can be set to automatic **AUTO** or off **NO.**

Switchover summertime / wintertime
MENU

DAYLIGHT — OK
AUTO
NO
CALIBR 1
CALIBR 2

The following settings are Possible:

AUTO
In-factory default setting as specified by law (USA or EU).
It will be recalculated every year.

NO
No changeover.

CALIBR 1 (AUTO)
Manual Programming.
The programmed summer/winter time will be recalculated automatically for each year.
– The change-over always takes place on the first Sunday of the selected month, if the entered date lies between 1. and 15.
– The change-over always takes place on the last Sunday of the selected month, if the entered date lies between 16. and 31.
– The time change-over occurs on the respective Sunday from 2 to 3 o'clock (summertime) or from 3 to 2 o'clock (wintertime)

CALIBR 2 (FIX)
Manual Programming.
The change-over takes place every year always on the same date.

SAFETY AND HOUSEKEEPING:

INTRODUCTION:

BOC is a supplier of a wide range of pure gases and gas mixtures. All gases supplied by BOC are safe to handle and use provided the correct procedures are adopted and appropriate equipment and facilities are available. It is of paramount importance to ensure that personnel using gases and handling container are adequately trained.

In order to use gases safely it is essential that the properties of the gases are fully understood, the cylinders are safely store, are handled an used with the correct equipment, and that personnel handling them are trained and fully aware of the possible hazards.

This Safety Section of the manual is intended to give basic guidance for users of the BOC gases on the properties of gases, their safety storage, handling and use. Material Safety Data Sheets (MSDS) for the gases and gas mixtures supplied by BOC are also available.

DANGEROUS GOODS:

All gases are Class 2. The most common hazard is the pressure under which a gas is contained. Class 2 is divided into three sub-classes to give an idea of the chemical hazard:
1. Flammable Gas (Red diamond)
2. Non-flammable Gas (Green Diamond)
3. Poisonous Gas (White Diamond)

PRESSURE:

Envirosol cylinders are pressurised and would be typically about 50 Bar at 15°C. However the pressure does increase considerably to as much as 100 Bar during hot weather. Due to this high pressure all pipes, hoses, seals and fittings have the potential to leak.

Care should be taken while replacing and/or connecting Envirosol cylinders
- Check the condition of all sealing washers and replace when necessary, we recommend PEEK washers #736736
- When connecting cylinder hoses, don't over tighten the cylinder nut
- Slowly open the cylinder valve
- Check for gas leaks with soapy water
- Always secure and strap gas cylinders
- Use/store/transport gas in well ventilated surroundings. Ventilation prevents leaking gases from building up to hazardous concentrations.

TOXICITY:

Poisonous gases react adversely with people. They usually enter through the lungs but some may also be adsorbed through the skin
The precautions to be taken when working with toxic gases are:
- Wear protective clothing including Gloves, Goggles, Safety Boots, full cover overalls etc
- Leak check system with inert gas before connecting Envirosol gases.
- Provide good local ventilation or mechanical extraction.
- Consider atmospheric monitoring and alarm.
- Assure breathing quality air for normal operations and emergencies
- Have on hand MSDS and Emergency Equipment

FLAMMABILITY:

All Envirosol gases and non-flammable.

PERSONNEL:

Personnel who enter storage area must be:
● Responsible and trained to maintain the gas store and its contents in a safe manner.
● Trained to identify the contents of different gas containers and know their potential hazards.
● Trained in the operation and use of the safety and emergency equipment provided (Example; fire extinguishers, breathing apparatus etc.).

IDENTIFICATION OF GAS CYLINDER CONTENTS:

WARNING: If the contents of a BOC gas cylinder cannot be positively identified, the cylinder should not be used and the local BOC branch notified. Never use an unidentified cylinder and always assume the worst. e.g. It is flammable and poisonous.

There are 5 different physical features that you can look for in order to identify what gas is inside a cylinder. These are:
● Gas name identification – usually located on the shoulder of the cylinder. This identifies the product by its correct technical name and classification.
● United Nations Number (UN No.) – Appears near the gas name on all cylinders. This identifies either the exact product or the general classification of the product.
● Colour Code – Is the colour of the cylinder. This identifies if the product is a mixture of gases or a pure gas.
● Class Diamond-Hazard Identification – Exists on all cylinders either as part of the gas name label or as a separate diamond. This identifies the overall hazard of the contained contents.
● BOC Gas Code & Cylinder Size/Contents – Appears on the gas name labels on all BOC filled cylinders. This identifies the gas product and the grade of gas.

Envirosol Gases used with Spacecontrollers

Name	UN	Valve Outlet	Cas Code	Size	DG	Colour
Pestigas	1968	TYPE 42	196	G 31kg, D 6Kg	2.2	Green/Grey Moss Green Shoulder
Insectigas	1967	TYPE 40	188	G 31kg, D 6Kg	2.3	Green/Grey Golden Yellow Shoulder

Table 5

SAFETY AND HOUSEKEEPING:

SAFE STORAGE:

Gas Cylinder stores must be:
- In Compliance with statutory state requirements E.g. NSW or Victorian Dangerous Goods Act for storage and Handling.
- Constructed of fire retardant material and have firm, level floor, preferably concrete.
- Away from protected works and thoroughfares.
- Well ventilated and preferably provided with basic weather protection.
- Free from fire risk. Away from sources of artificial heat and ignition sources.
- Free from contamination (Dust, fumes, spray, chemicals).
- Designated as a 'no smoking', 'no naked flame' area.
- Clearly marked as a gas store with appropriate hazard diamond signs E.g. Poison, non-flammable compressed ect.
- Preferably clearly marked with HAZCHEM labelling. In some states this is mandatory i.e. Victoria and WA.
- Kept Clean with clear access, restricted to authorised personnel.
- Provided with appropriate safety/emergency equipment (E.g. fire extinguisher, breathing apparatus, local hosepipe or in large quantities and firehose reel, suitable personal protective clothing).
- Fenced off to secure against unauthorised entry.

STORAGE OPERATION:

Cylinders in storage must be:
- Stood upright (except dose cylinder) and properly secured to prevent toppling over to protect cylinder valve from damage and ingress of dirt.
- Kept with supplied valve protection cap or guard or gas tight valve outlet cap/plug securely in place.
- Segregated in the storage area according to the various categories (E.g. Flammable, non-flammable etc.).
- Segregated in the storage area according to content (i.e. full/empty).
- Managed to ensure that the oldest stock is used first.
- Checked periodically for general condition, leaks etc.

SAFE HANDLING:

Personnel who regularly move/handle gas cylinders must be provided with:
- Stout gloves (E.g. Leather).
- Protective footwear (E.g. steel cap shoes).
- Trolley, barrow or other suitably designed device for transporting cylinders. There should be provisions for securing during moving (E.g. with a chain).
- Also eye protection (safety glasses), ear protection (ear plugs) and general full cover overalls are recommended.

HANDLING TECHNIQUES:

Personnel should be trained in the following key points:
- Remember the mass of the cylinder (Up to 100kgs).
- Always check that cylinder valves are OFF and valve caps and guards are in place before moving.
- To be aware of trapping fingers between cylinders whilst they are being moved.
- When it is necessary to lift heavy cylinders manually to seek help and observe the correct lifting posture.
- To use a trolley or other suitable device for the transportation of heavy cylinders, even for a short distance and to ensure the cylinder is secured.
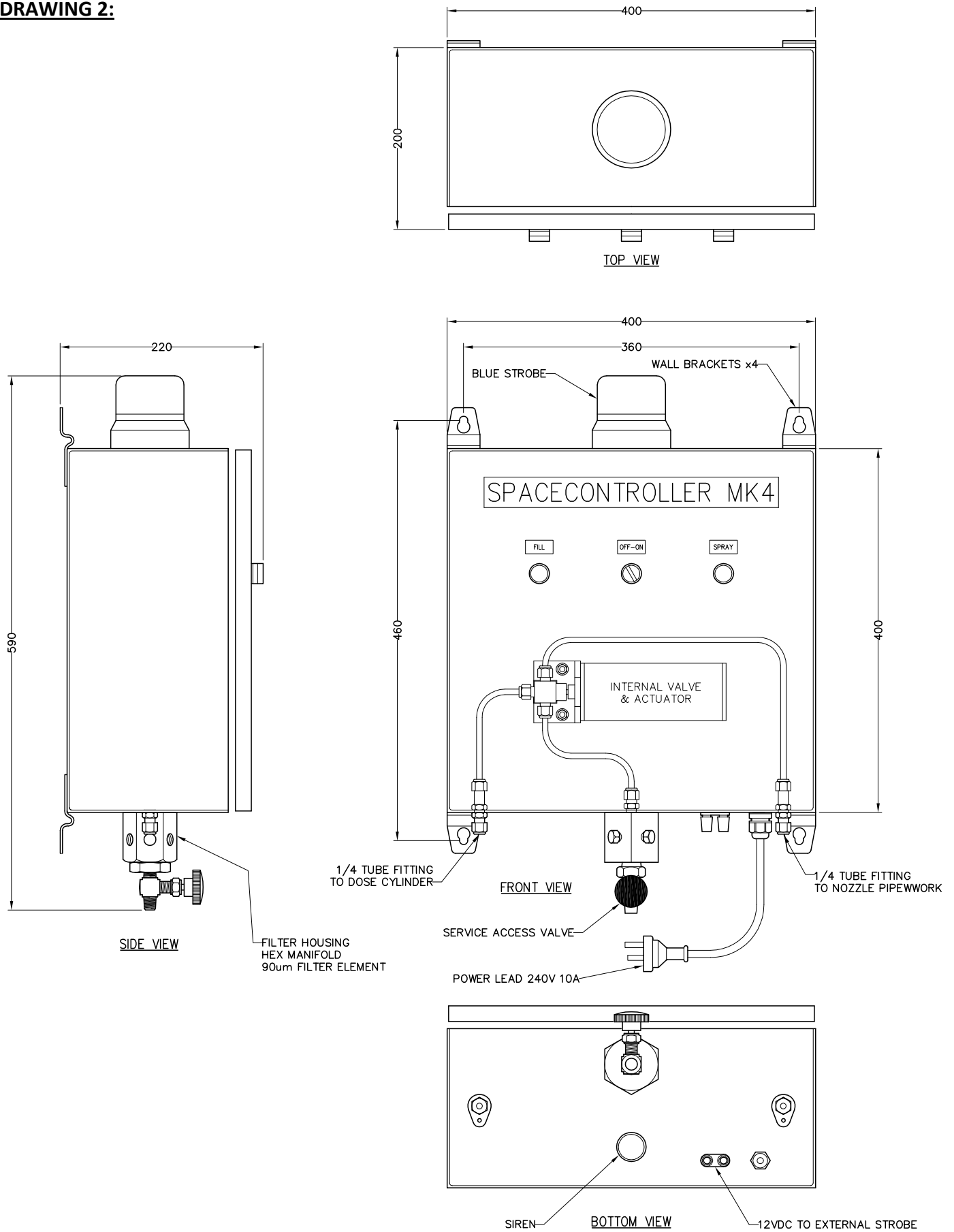
ACCESSORIES:

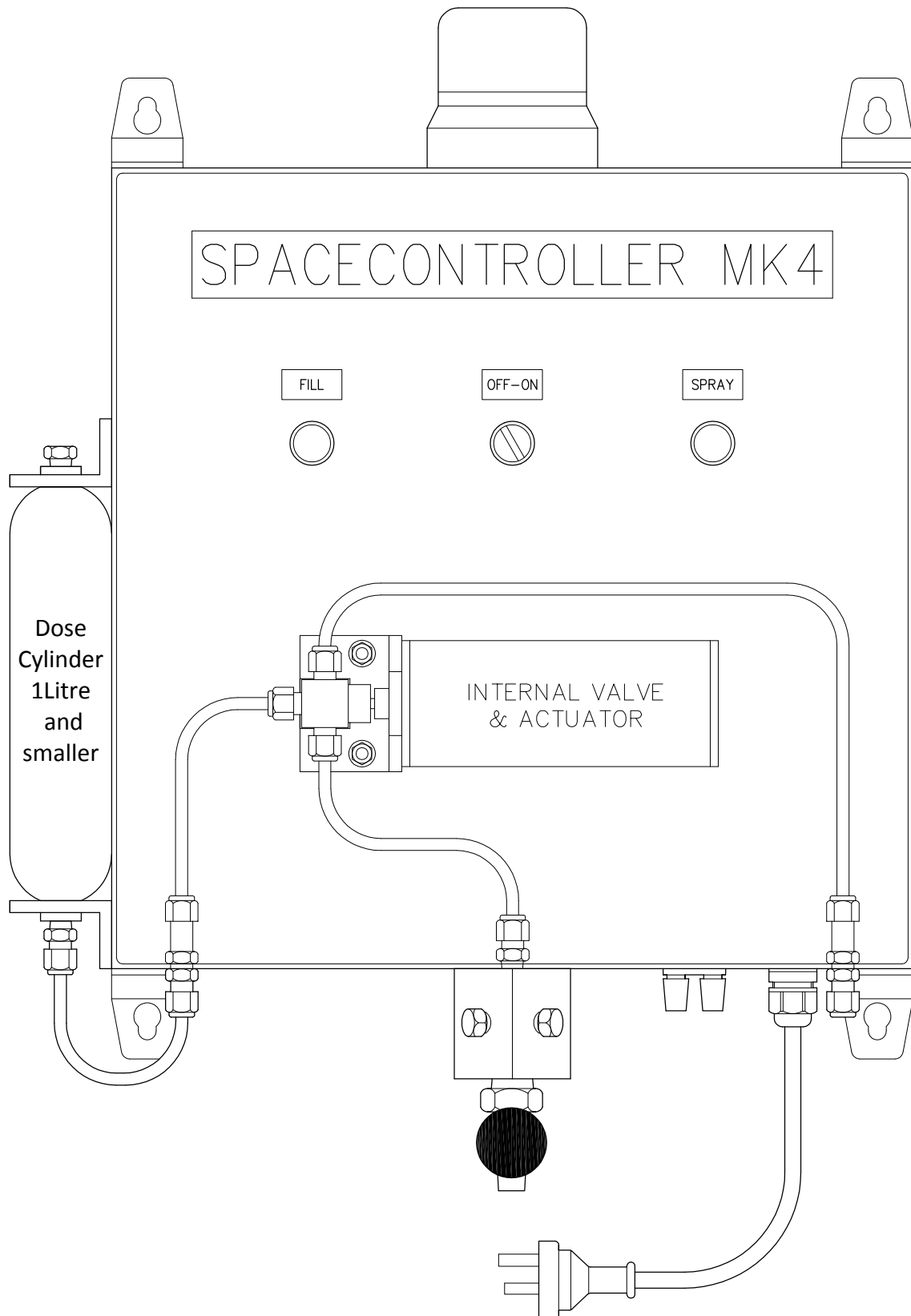|	
730002	Spigot Pestigas/Insectigas 1/4"
730004	Brass Nut Pestigas [Type 42]
730005	Brass Nut Insectigas [Type 40]
730006	Envirosol Hose 2m x 5/32" ID
730008	Cylinder Securing Strap
730012	Brass Male Connector 1/4" BSPP x 1/4" BSPT
730020	Nozzle 1/8" NPT (6g/s)
730024	Tubefit Nozzle Adapter
730025	Nozzle Fixed System (9g/s)
730026	Nozzle Block c/w Bolts
730034	1/4" Aluminium Tube 30m Lg
730036	1/4" Aluminium Tube 100m Lg
730037	1/4" OD x 1.2 WT Aluminium Tube (per m)
736459	Brass Hex Manifold Block 6 Point
736460	90 Micron S'Steel Filter Element
736461	Filter Element Retaining Spring
736588	Envirosol Hose 1/4"OD x 610mm Lg
736638	Space Control Module MK4
736648	Restrictor 1.0mm
736676	Pestigas Nut & Spigot
736677	Insectigas Nut & Spigot
736710	Dose Cylinder Adaptor C
736711	Dose Cylinder Adaptor D,E & G
736715	Dose Cylinder Mounting Bracket C
736716	Dose Cylinder Mounting Bracket D
736717	Dose Cylinder Mounting Bracket E & F
736718	Dose Cylinder Mounting Bracket G
736719	Brass Union Tee 1/4"
736720	Brass Tube Union 1/4"
736722	Brass Female Connector 1/4" x 1/8" NPT
736723	Brass Back and Front Ferrule 1/4" (Pack 10 Set)
736724	Valve Nozzle Core
736725	Nozzle Block Mounting Bracket
736736	Spigot Sealing Washer - PEEK
736867	Spigot to Cylinder Nylon Washer RG134
736890	Spigot Filter RB38
736891	Spigot Filter Retaining Screw RB39
736899	Light Series 1/4" Pipe Clamp Single Hole (Pack of 20)
737014	Co2 Cylinder Nut - Type 30
737078	Brass Needle Valve 1/4" NPT Male, Kel-F
737082	Hex Manifold Wall Mounting Bracket
737106	1/4" BSPT Brass Plug
737107	Spring Retaining Bush 3/4" x 1/4"
737138	Brass Male Connector 1/4" BSPP/60º x 1/4" OD Tube
737162	Brass Double Seated Union 1/4" BSP/60 x 1/4" BSP/60
737186	Strobe Lamp Blue, 12/24VDC, IP65

ACCESSORIES:

737212   Brass Bulkhead Female Connector 1/4Tube x 1/4"NPT

737213   Brass Male Branch Tee 1/4" x 1/4"NPT

737369   Brass Union Elbow 1/4" Tube

737373   CO2 Nut Spigot & Washer - Type 30

737382   Pestigas Nut, Spigot & PEEK Washer [No Filter]

737383   Insectigas Nut, Spigot & PEEK Washer [No Filter]

737385   Brass Union Tee 3/8"

737394   Brass Tube Reducer 3/8" Tube to 1/4" Stub

737395   Brass Tube Reducer 1/4" Tube to 3/8" Stub

737399   Light Series 3/8" Pipe Clamp Single Hole (Pack of 20)

737422   New "C" Size Dose Cylinder Aluminium, 5/8" BSPP [2.8L WC, 1.4kg Dose]

737453   "40" Series 3 Way S'Steel Ball Valve 1/4 (Low Temp, Drilled & Pinned)

737502   Brass Tube Union 3/8"

737518   New "G" Size Dose Cylinder Steel

737519   New "B" Size Dose Cylinder Aluminium, [1.8L WC, 0.9kg Dose]

737520   Dose Cylinder Mounting Bracket B

737531   Nozzle Block Port Plug 5/16" UNEF

737577   Brass Connector 1/4" BSPP/60º x 1/4" BSPP/60º

737593   4-Nozzle Block Assembly [730025x4, 730026, 736725, 737287]

737607   Brass Bulkhead Union 1/4" Tube

737627   1/4" SwageLok, 0.020" x 120mm Capillary Nozzle, 2.0g/s

737629   Brass Union Elbow 3/8" Tube

737635   Spacecontroller MKIII 24VDC Actuator/Valve 1/4"

737638   Dose Cylinder Adaptor (Parallel Thread) D,E & G c/w Teflon Washer

737639   Brass Bulkhead Union 3/8" Tube

737640   S'Steel Bulkhead Retainer - 3/8"

737642   Dose Cylinder (Parallel Thread) D,E & G Teflon Washer

737646   Grasslin Digital Weekly Timer, 1 CO, 70MEM, 240VAC

DRAWING 2:

400

200

TOP VIEW

220

590

SIDE VIEW

FILTER HOUSING
HEX MANIFOLD
90um FILTER ELEMENT

400

360

BLUE STROBE

WALL BRACKETS x4

SPACECONTROLLER MK4

FILL

OFF-ON

SPRAY

460

400

INTERNAL VALVE
& ACTUATOR

1/4 TUBE FITTING
TO DOSE CYLINDER

FRONT VIEW

1/4 TUBE FITTING
TO NOZZLE PIPEWORK

SERVICE ACCESS VALVE

POWER LEAD 240V 10A

SIREN

BOTTOM VIEW

12VDC TO EXTERNAL STROBE

Spacecontroller Overall Dimensions
and Mounting Details

DRAWING 3:

SPACECONTROLLER MK4

FILL   OFF—ON   SPRAY

Dose Cylinder 1Litre and smaller

INTERNAL VALVE & ACTUATOR

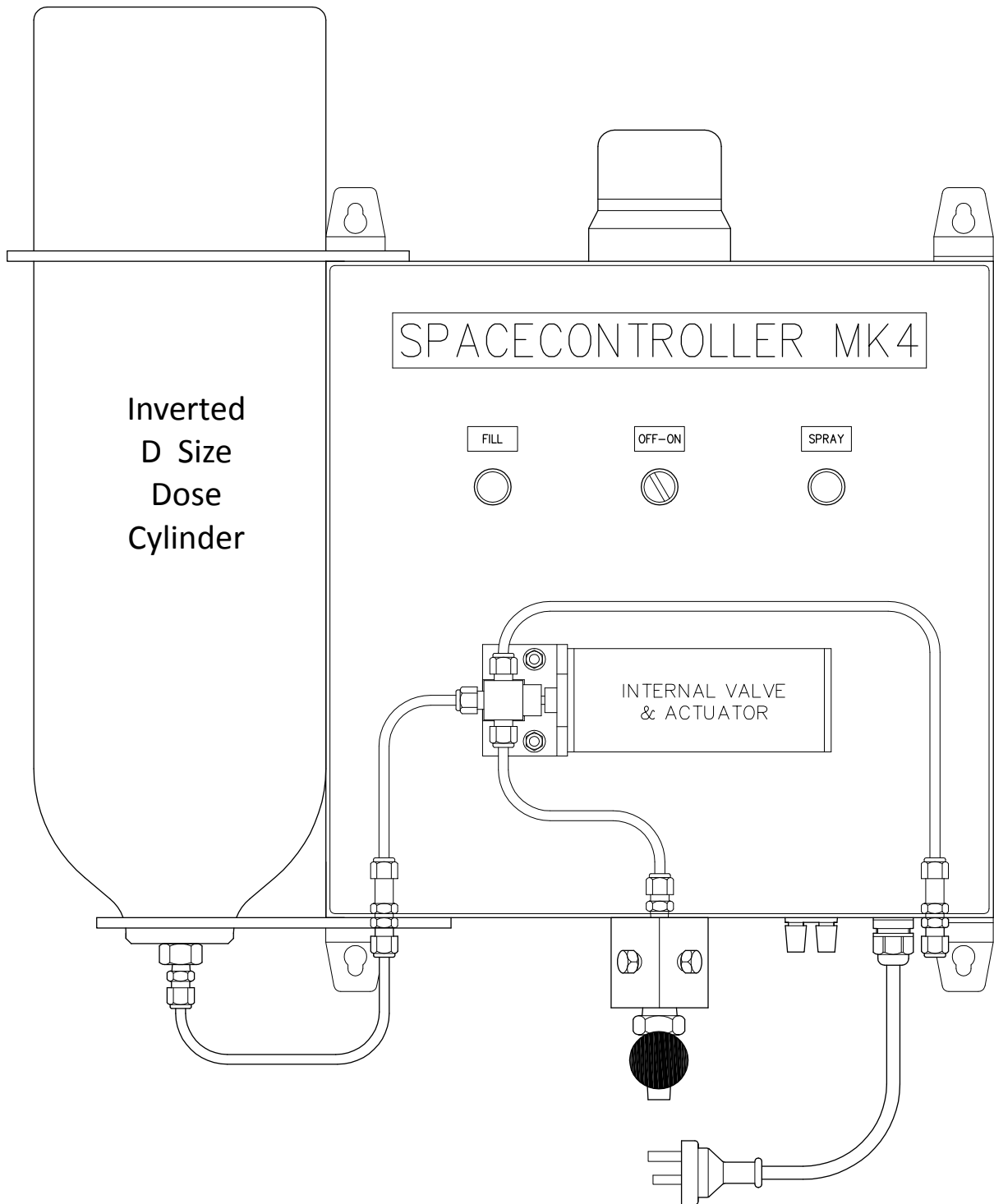## <u>Small Size Dose Cylinder</u>
<u>Mounted Directly onto the Left Side of the Spacecontroller</u>
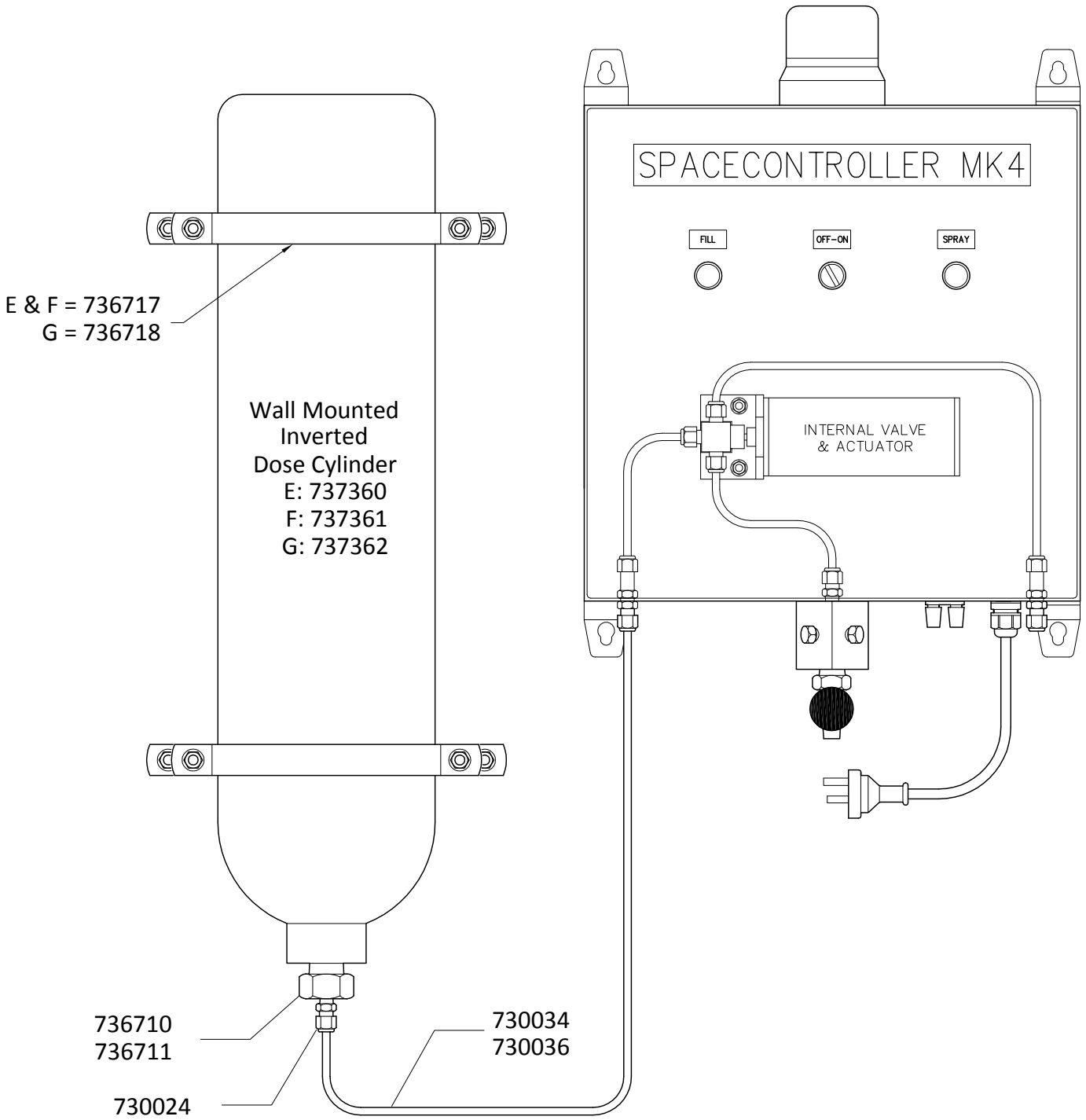
DRAWING 4:
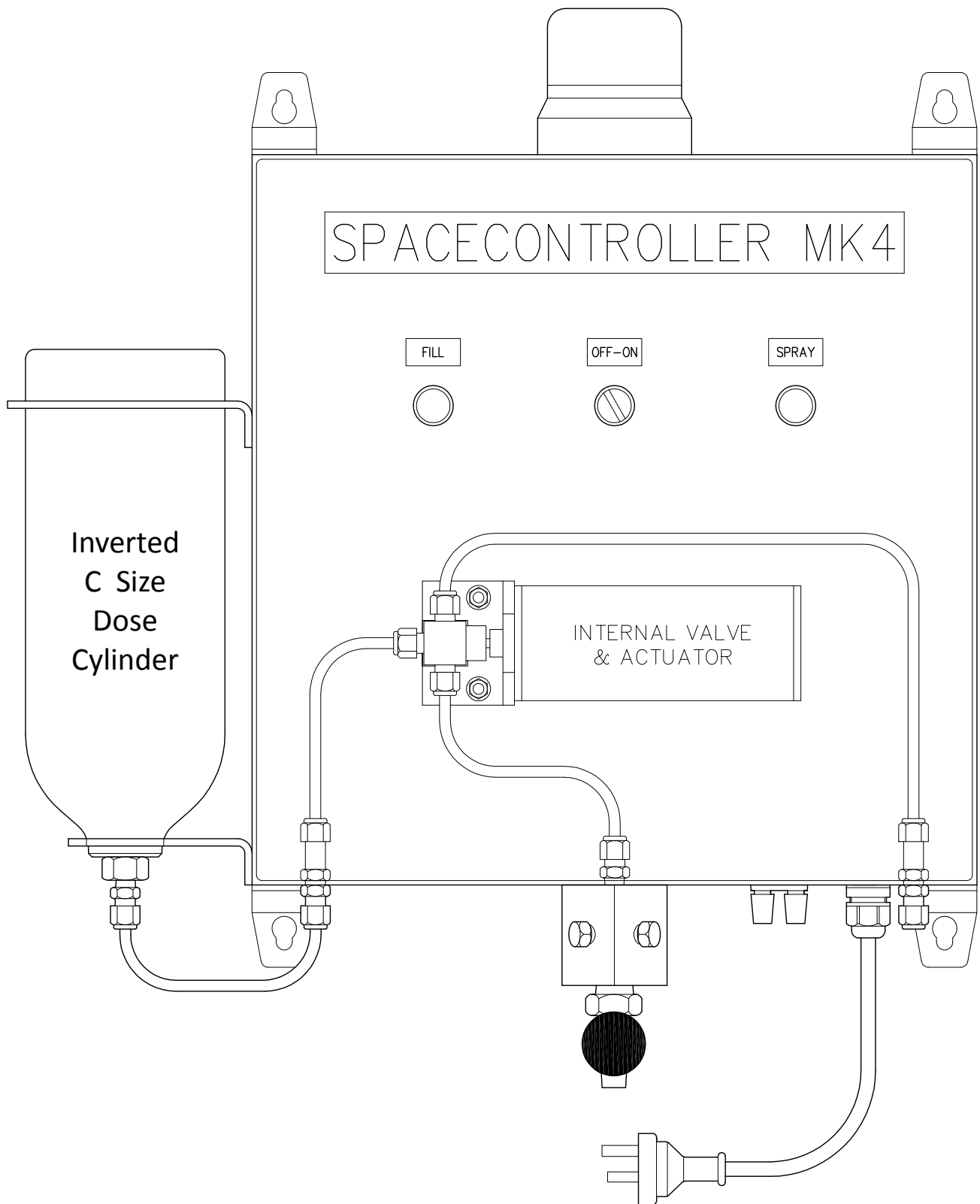
Inverted "C" Size Dose Cylinder
Mounted Directly onto the Left Side of the Spacecontroller

DRAWING 5:

Inverted "D" Size Dose Cylinder
Mounted Directly onto the Left Side of the Spacecontroller

DRAWING 6:

E & F = 736717
G = 736718

Wall Mounted
Inverted
Dose Cylinder
E: 737360
F: 737361
G: 737362

SPACECONTROLLER MK4

FILL   OFF-ON   SPRAY

INTERNAL VALVE
& ACTUATOR

736710
736711

730034
730036

730024

Inverted "E", "F" & "G" Size Dose Cylinders
Wall Mounted on Left Side of the Spacecontroller

MK4 Spacecontroller Various Component Options 2015

SPACECONTROLLER MK4

FILL   OFF—ON   SPRAY

Wall Mounted Inverted Dose Cylinder

'C', 'D', 'E', 'G' Dose Cylinder

240VAC 10AMP

External Strobe Lamp(s) Blue 737186

Envirosol Supply Cylinder(s) Pestigas

CO2 Cylinder Used For System Flushing and Pressure Testing
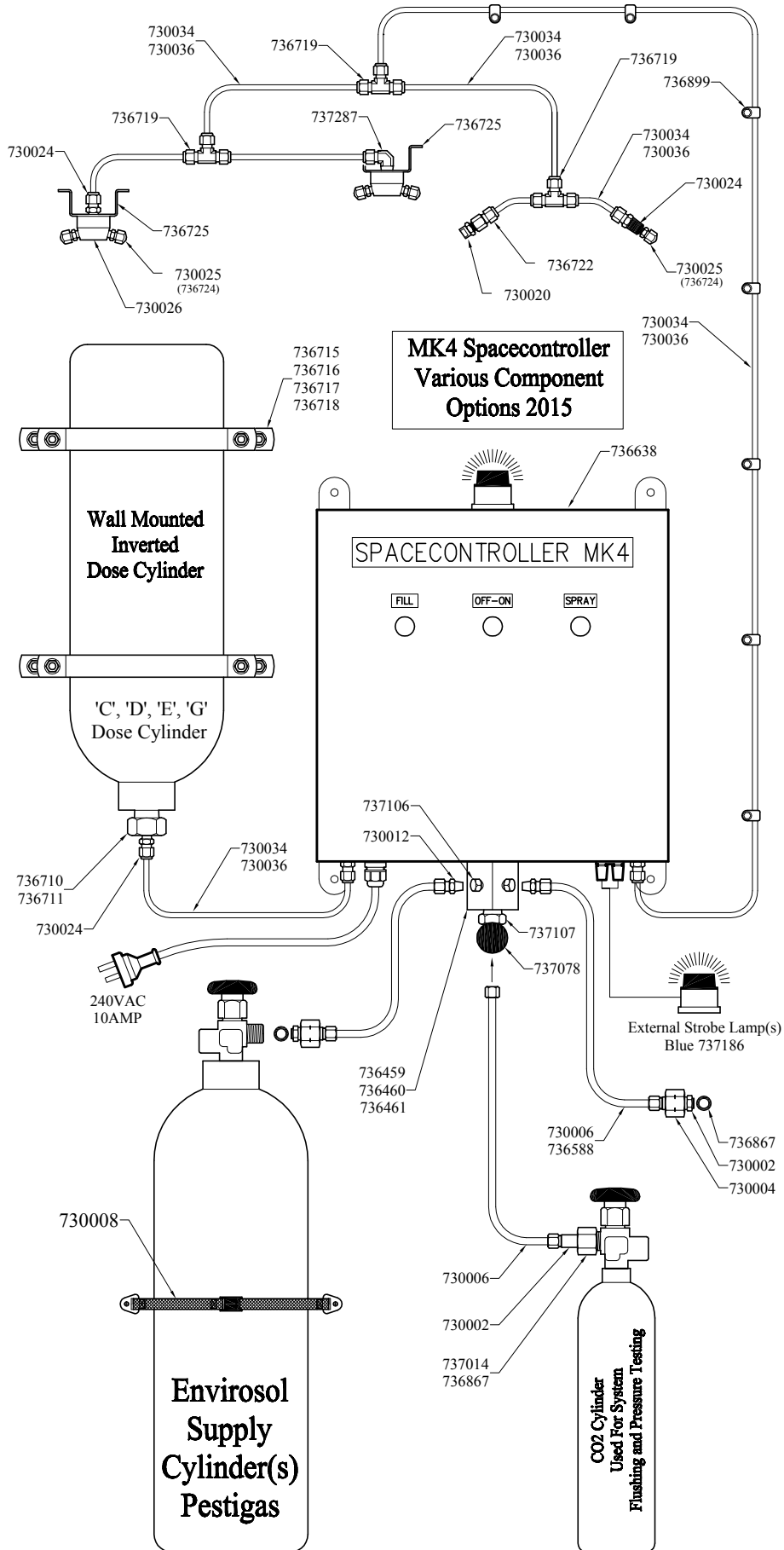
Spacecontroller Various Options

WARRANTY

GasApps Australia Pty Ltd warrants the design of the MK4 Spacecontroller System for a period of 12 months from the date of invoice. GasApps will not accept any liability whatsoever for any alterations or modifications, made to any part of the equipment supplied, without written and signed authorisation from GasApps Australia Pty Ltd. This Manual is supplied for the guidance of installers and operators to enable them to install and operate the equipment in accordance with its design specifications. The long-term operation of the components and the unit as a whole depends highly on maintenance proceedures and gas quality. This is solely dependent on the operator or buyer. GasApps Australia Pty Ltd will not accept any liability for equipment failure due to poor quality gas and lack of maintenance. Installation of electrical and gas connections must be made in accordance with BOC and GasApps specifications. GasApps Australia Pty Ltd accepts no liability whatsoever for the consequences of any actions by persons other than GAA employees, which are not in accordance with the procedures set out in this Manual.