



## **V600<sup>®</sup> DISINFECTION CONTROLLER**

## INTRODUCTION

The V600® Disinfection Controller is the latest dedicated controller designed by Evoqua Water Technologies, built on the depth of knowledge the company has acquired over many years yet incorporating advanced electronics and process control application features. The V600® Disinfection Controller is designed to optimise control for chlorination/dechlorination and chloramination control. It is suitable for use with gaseous chlorinators/ sulphonators/ammoniators or liquids using dosing pumps for commercially produced sodium hypochlorite or that derived from Evoqua Water Technologies OSEC® On-site Electrolytic Chlorination System, Sodium Bisuphite or Ammonium Sulphate solutions.

The V600® Disinfection Controller provides a comprehensive and unrivalled list of features for manual or automatic control of simple borehole applications through to complex treatment work applications.

### CONTROL SYSTEM & MOUNTING OPTIONS

The V600® Disinfection Controller system has been designed with consideration to the practicalities of site installation and site operation. The system consists of a V600® Disinfection Controller, which may be installed at the most suitable site location and a Dosing Interface Unit, which ideally should be located adjacent to the dosing apparatus. (The maximum distance between the two devices is 1000m).

The V600® Disinfection Controller provides the output to the controlling devices, information gathering and dissemination point, and the location for RS232 and RS 485 communications.

The Dosing Interface Unit (DIU) provides the link and connection point for the dosing devices and system/operational features which interface with your bespoke dosing and operational control system.

### Benefits

- Built in flexibility
- Choice of 6 control options
- Comprehensive list of features
- Simple to operate
- Variety of installation and mounting options
- Combined with the Wallace & Tiernan® ChemWeb-Server and OPC software, the system offers a wide range of remote communications options

### MOUNTING OPTIONS

Both the V600® Disinfection Controller and Dosing Interface Unit (DIU) can be supplied in the following options;

- Wall mounted plastic enclosures to IP 67
- Panel Mounting for use in customers panel. Enclosure to IP 65
- Single or Double Wall mounted steel enclosures to IP 65



Steel enclosure

## CONTROL OPTIONS

A choice of 6 control options to meet the most simple to the most demanding of applications:-

### 1. Manual control

Enables the operator to take full control and set the desired dose rate to the required value.

### 2. Control in response to flow

A 0/4-20 mA signal or 0-10V signal from a flow transmitter is fed into the controller and the dosing equipment injects chemical proportional to the treated water flow.

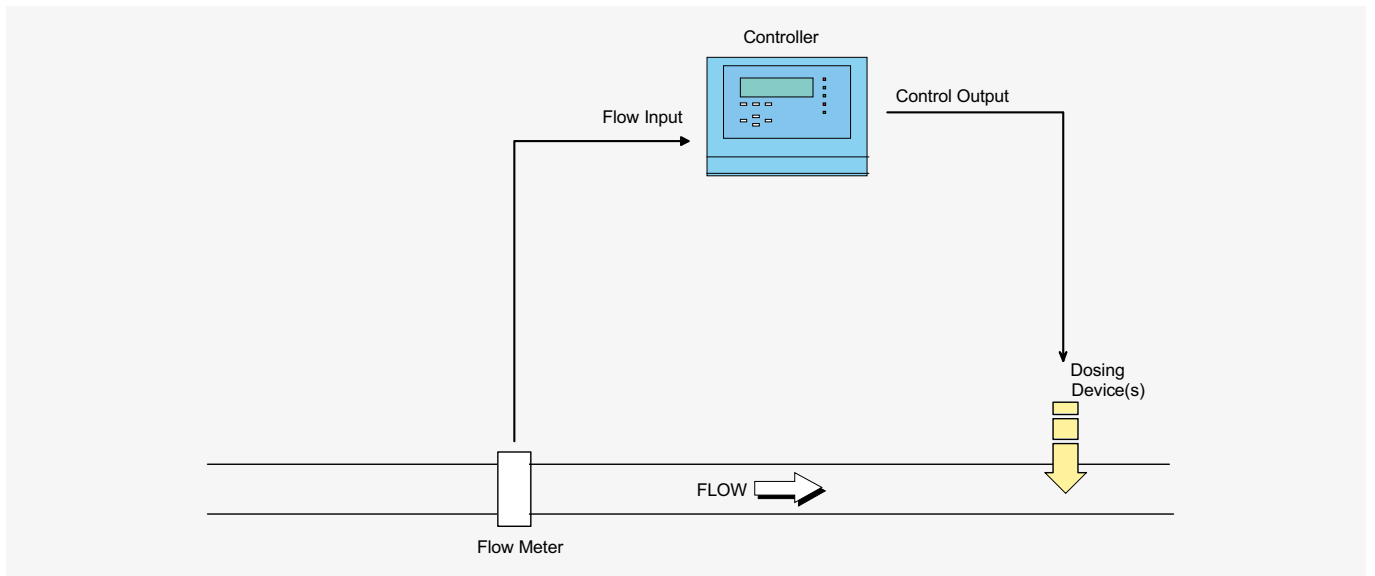
An option to accept 2 flow signals is also available. The sum of the two signals is used for the calculation of the dose rate. If this option is selected the V600® Disinfection Controller will automatically detect the two flow signals and configure the flow control accordingly.



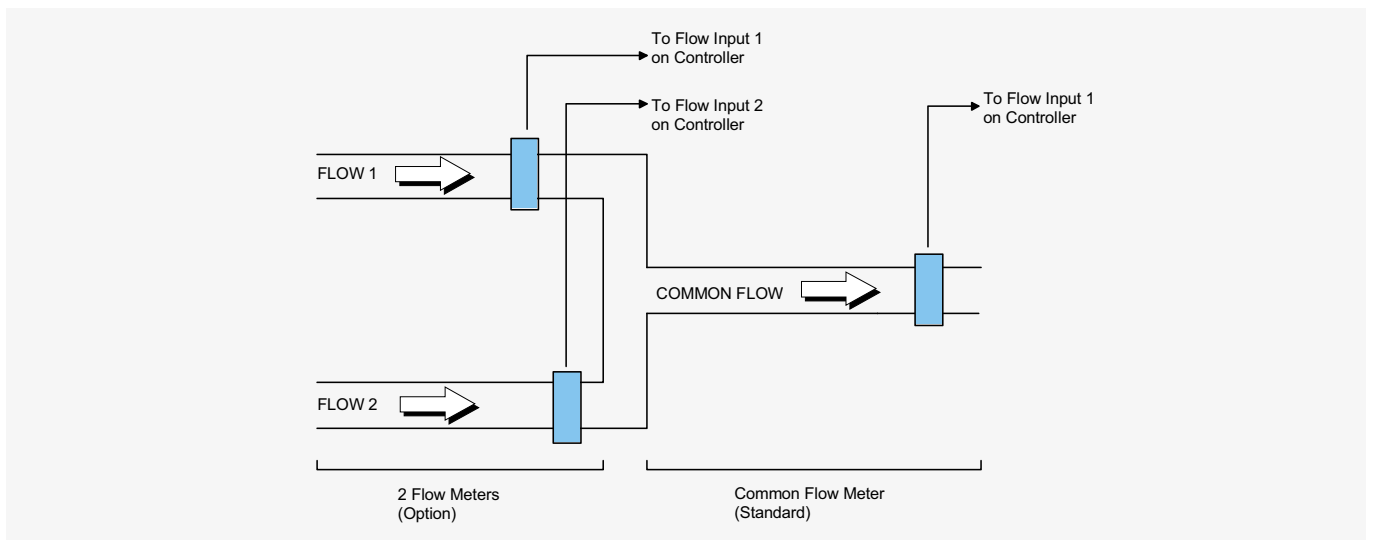
1. Manual control screen



1. Manual control screen



Control in response to flow

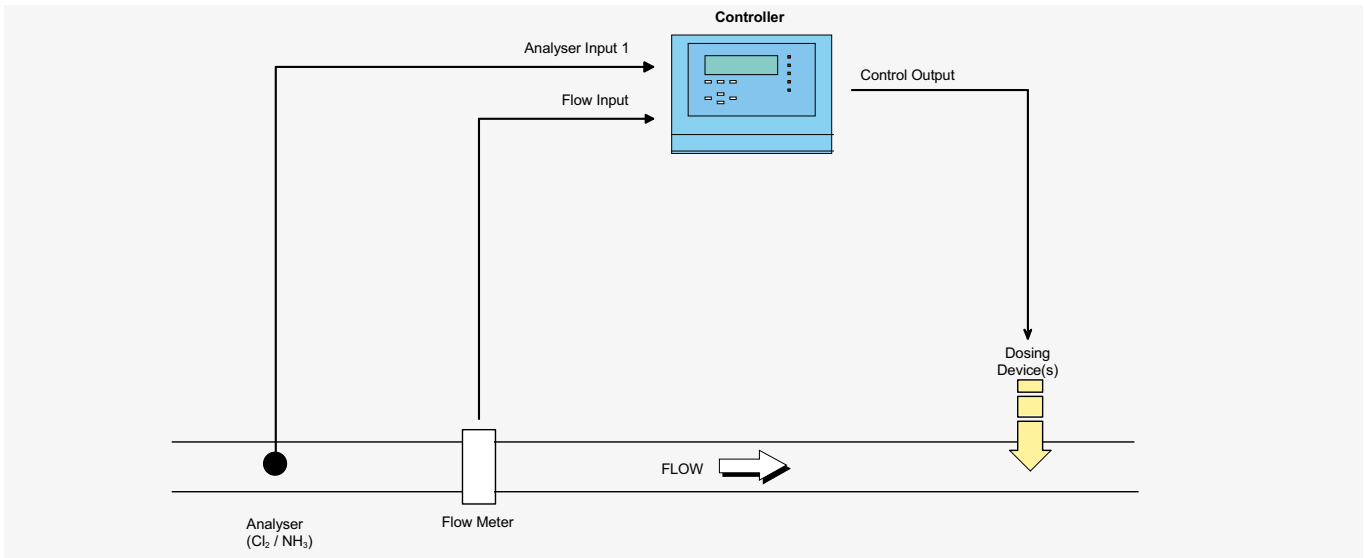


Control in response to flow

### 3. Dual feed forward control (ratio control)

Provides the opportunity to feed an input signal from an ammonia monitor or chlorine analyser to provide a ratio adjustment to increase or decrease the chlorine dose rate. The advantage of this input signal is that it initiates an immediate response to the dosage calculation without waiting for process times. The additional use of flow meter signal input is selectable.

This mode of control is used in the treatment of river water applications where a signal from an ammonia analyser will enable the controller to respond to varying ammonia levels that may necessitate significant adjustments to the chlorine dose rate. It may also be used in rechlorination schemes, enabling the controller to take into account existing varying chlorine levels arriving at the rechlorination point.



### 3. Dual feed forward control (ratio control)

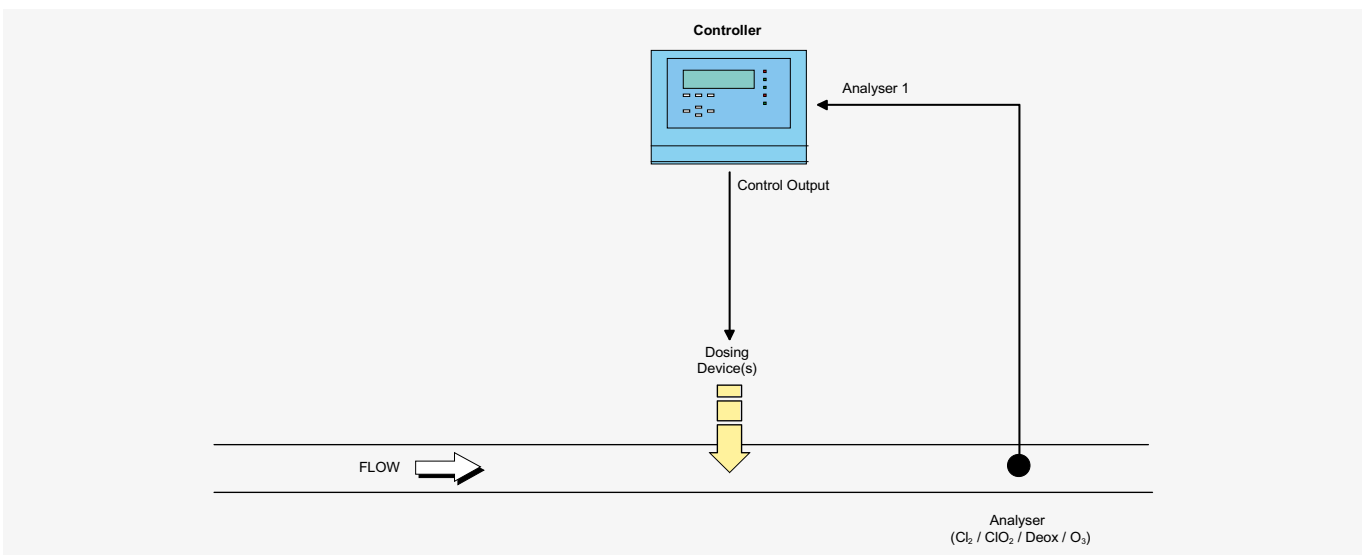
### 4. Residual Control

In this control mode, sample water is fed continuously to the analyser and transmitter which provides a 0/4-20 mA signal to the controller. The measured signal is compared with a pre-set residual and any deviation from the control set point initiates a proportional/integral correction to the chemical dosing device.

Residual control provides stable residual measurement where the quality of the

water varies but the flow variations of the treated water are relatively stable.

The V600® Disinfection Controller will accept a 0/4-20mA signal from a Chlorine/Chlorine Dioxide/Ozone or DEOX/2000® analyser. (The DEOX/2000® is a centre zero analyser for the continuous on - line measurement of dechlorination or deozoneation processes. See publication SB.50.000.GE)

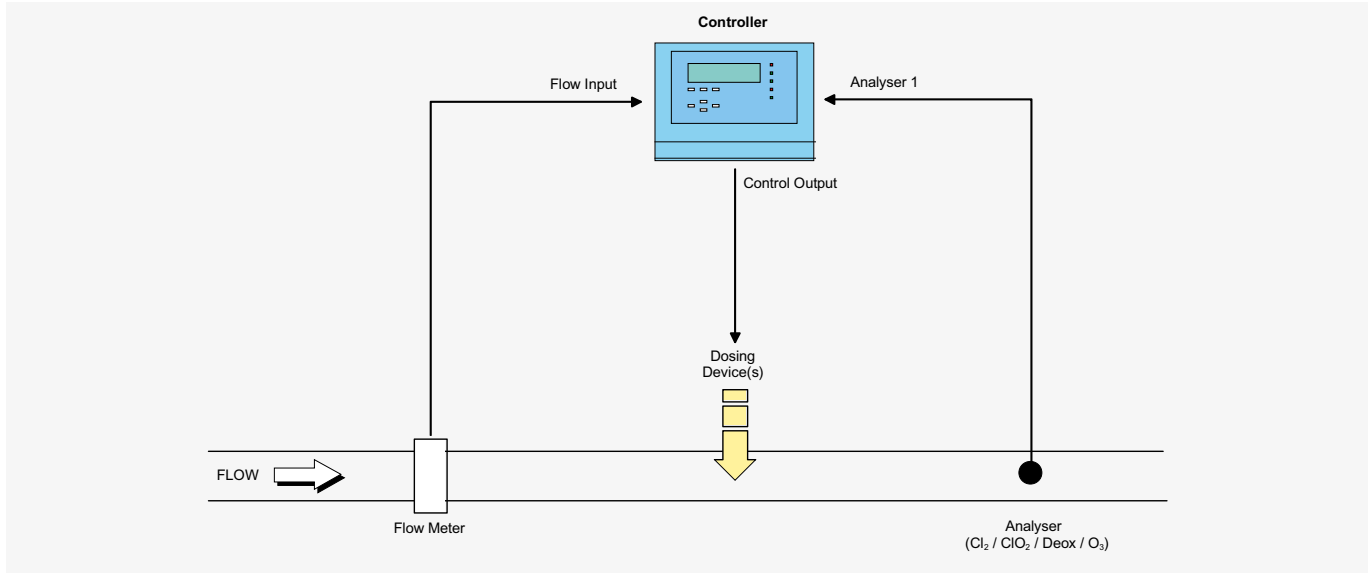


### 4. Residual control

**5. Control with flow and residual control. (Compound loop)**

Provides stable residual control where both the water quality and the treated water flows are subject to variations. The inputs are the same for those specified for No. 4. Residual Control.

Therefore in this control mode, sample water is fed continuously to the analyser and transmitter which provides a 0/4-20 mA signal to the controller. The measured signal is then compared with a pre-set residual and any deviation from the control set point initiates a proportional/integral correction to the chemical dosing device.

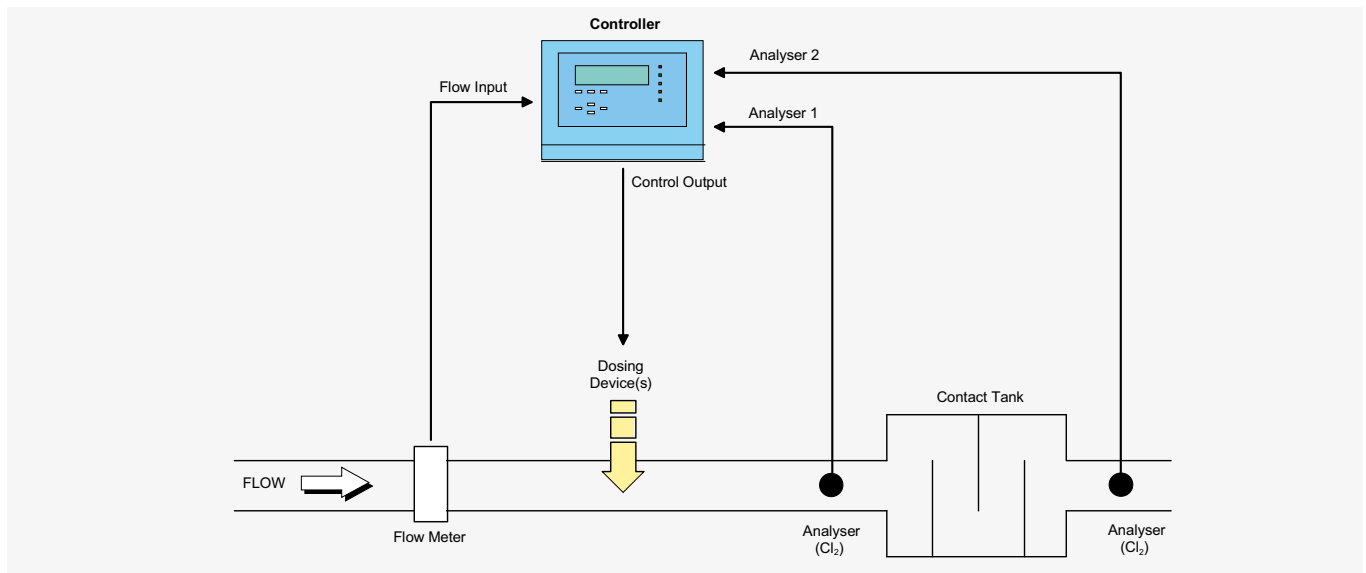


5. Control with flow and residual control (compound loop)

**6. Control with flow and residual control with set point trim**

Provides primary control as per flow and residual control outlined previously but with the added advantage of secondary control from a second analyser to compensate for any additional chlorine demand that may occur after a period of time.

Typically used in applications where responsive control is required prior to the inlet to a chlorine contact tank but there maybe continuing demand within the contact tank. Considerations should be given to the duration of both process loops and Evoqua Water Technologies would be pleased to offer advise in this application.



6. Control with flow and residual control with set point trim

## SYSTEM OPTIONS

### CHOICE OF OPERATIONAL FEATURES

A number of customer selectable options are built into the V600® Disinfection Controller system to enhance the operational efficiency of your dosing system

Injector Vacuum Line Relief (gas feed devices)

The use of remote injectors is desirable when there are long distances between the gas feed device and the injector point. It reduces the system process time, enabling quick responses to water quality or flow variations.

The use of the injector vacuum line relief option is desirable to prevent excess vacuum being formed that may occur in long injector vacuum lines.

#### Dosing Pump Vent Option

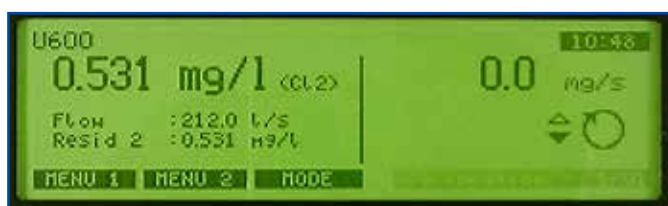
Certain liquids such as Sodium Hypochlorite, can gas lock dosing pumps at low flows. Whilst many dosing pumps can be fitted with gas venting devices, the V600® Disinfection Controller provides that added protection against this problem by providing the option to boost the pump speed at an adjustable frequency and duration or to open a solenoid valve and vent the gas back to the chemical storage tank.

#### Control of injector water supply

The V600® Disinfection Controller will control the operational of water solenoid valve or injector booster pump.



LED display



Main screen

## V600® DISINFECTION CONTROLLER SYSTEM - OPERATION

### CHOICE OF SYSTEM OPTIONS

The V600® Disinfection Controller is designed to provide continuous operation and provide selectable features for that added degree of security. It enables the selection and full operational use of standby plant in one of the following selectable options.

#### Duty/Standby mode

Auto duty cycling enables automatic changeover of the duty/standby dosing machines for periods varying from 1-90 days. Automatic changeover of the standby machine can be initiated by machine fault (loss of vacuum on gas machines) or low and high residuals. Automatic Return to the set duty machine once the fault is cleared.

#### Duty/Assist

Auto duty cycling enables automatic changeover of the duty/assist dosing machines for periods varying from 1-90 days. In this mode the duty machine brings in the assist machine when the high control alarm point on the duty machine is reached.

At this point both machines run at 50% of the required dose until the combined output reaches 90% of the duty machine when it reverts solely to the duty machine.

#### Duty/Duty

Provides live standby operation as each machines run at 50% of the required dose providing even wear of both machines. In the event of one machine failing, the other increases to provide the full dose. (Check that each machine is capable of providing the full dosage range required)

#### System Fault

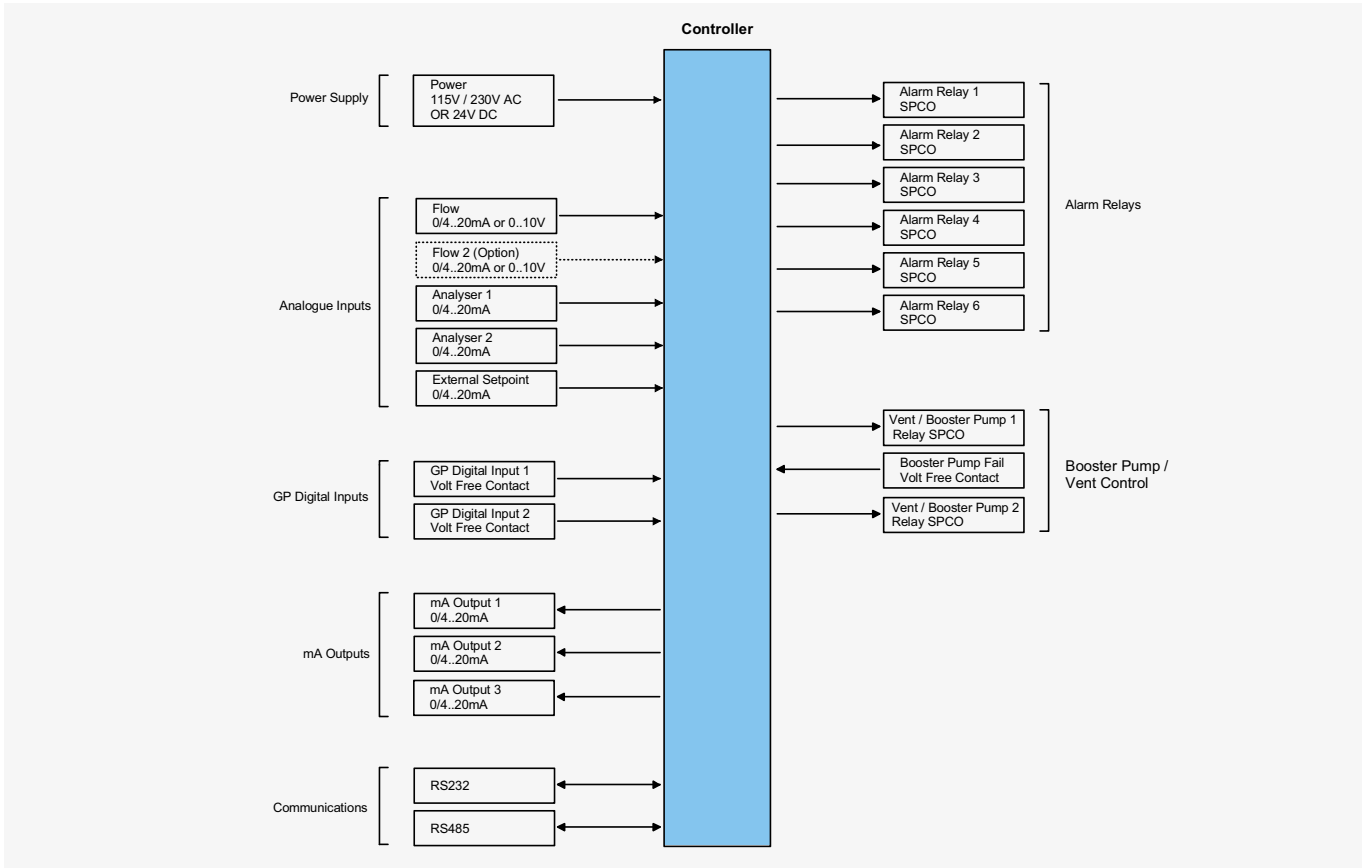
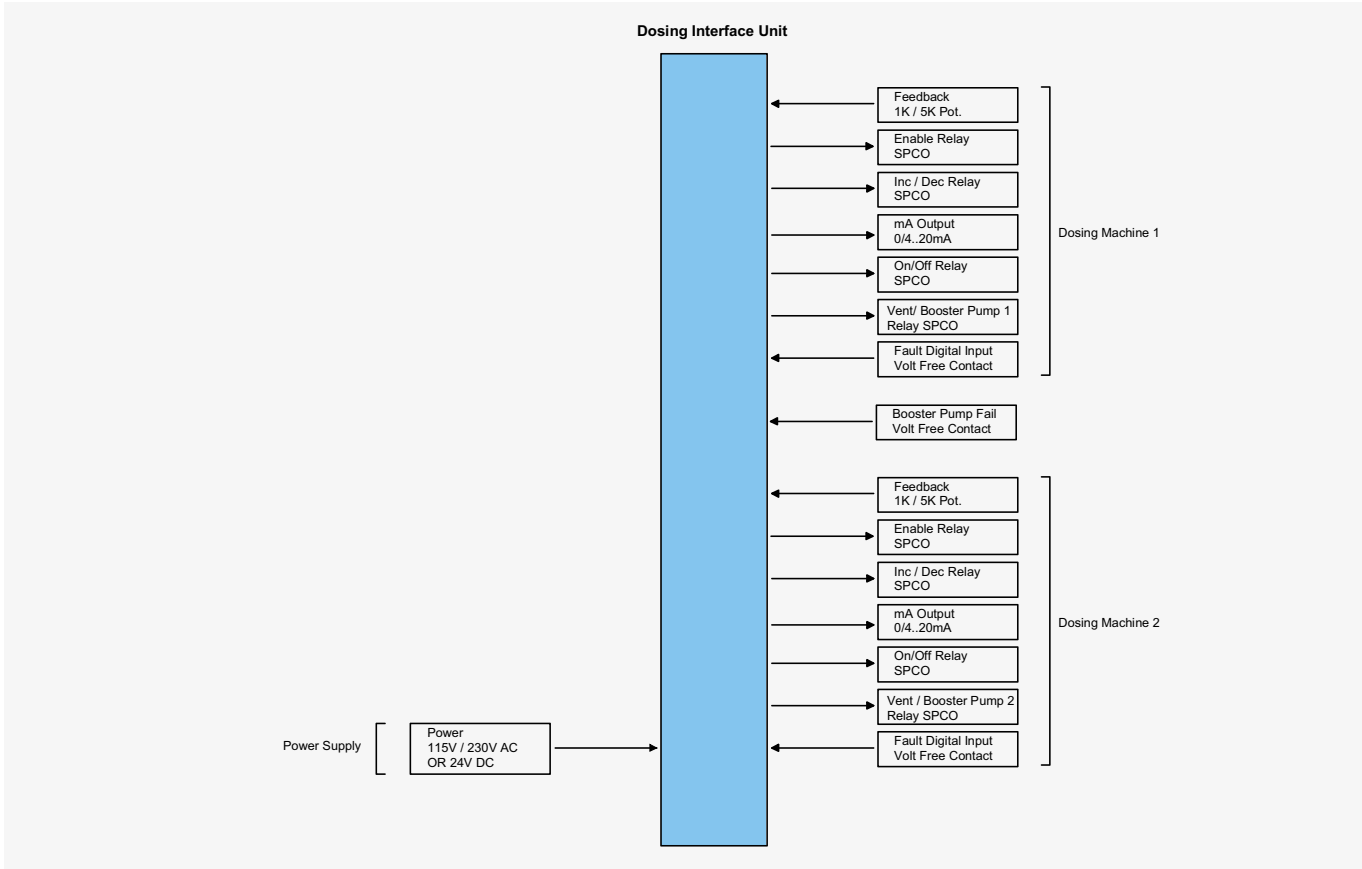
The V600® Disinfection Controller system is designed to detect a fault in the hardware of V600® Disinfection Controller and the Dosing Interface Unit. It will also alarm if there is a fault with the connection between the two units.

#### Automatic Control Inhibit and Auto shutdown

2 Digital inputs are provided. Input 1 can be mapped to inhibit control and alarms. The alarm inhibit and control output can be set to 0, 50 or 100%. This feature is used when residual inputs or flow measurement are unreliable for a short period of time such as during filter backwashing procedures. Digital input 2 is provided for automatic shutdown and alarm inhibit.

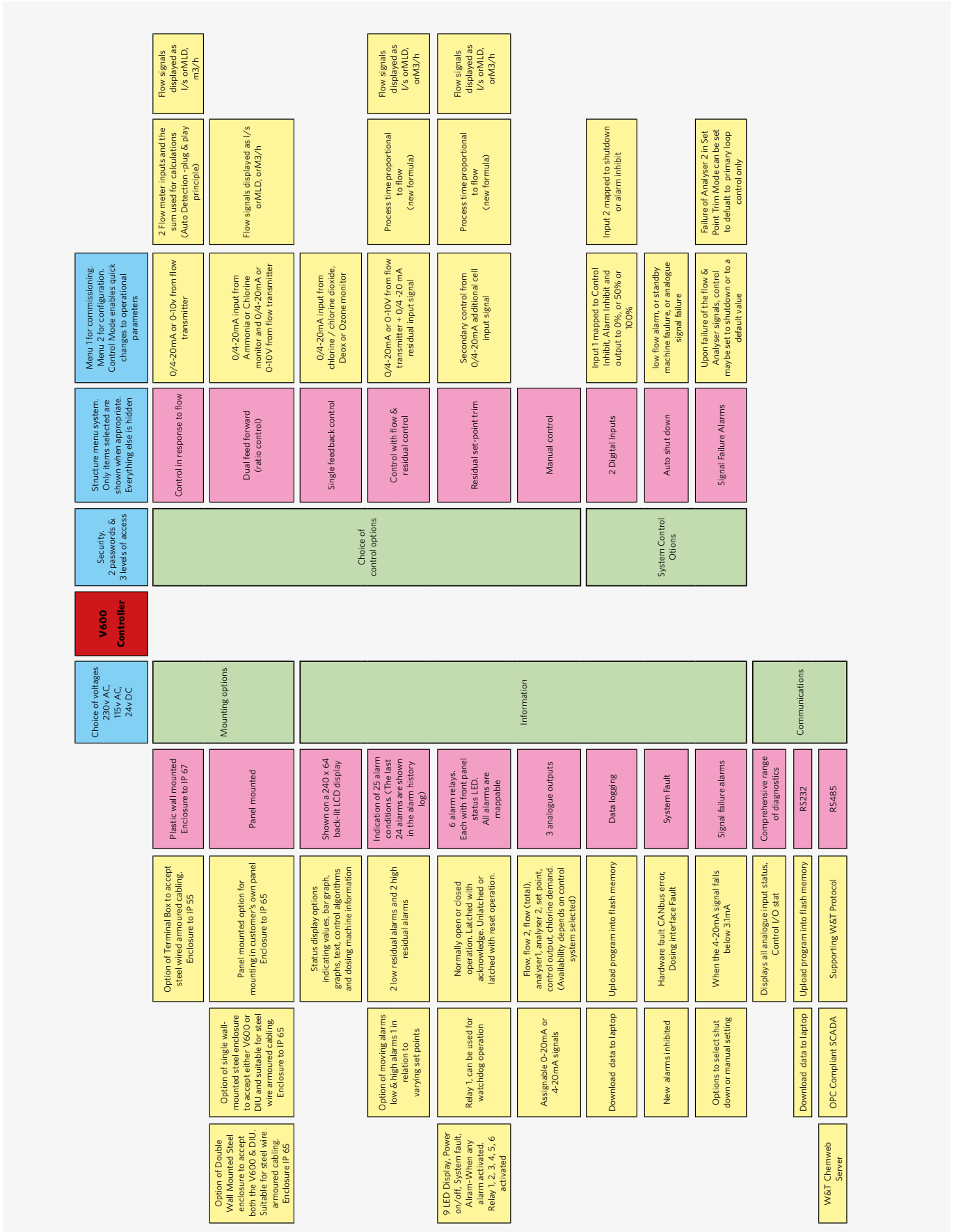
# V600® DISINFECTION CONTROLLER CONNECTION DIAGRAMS

The input/output connection to the V600® Disinfection Controller are shown below.



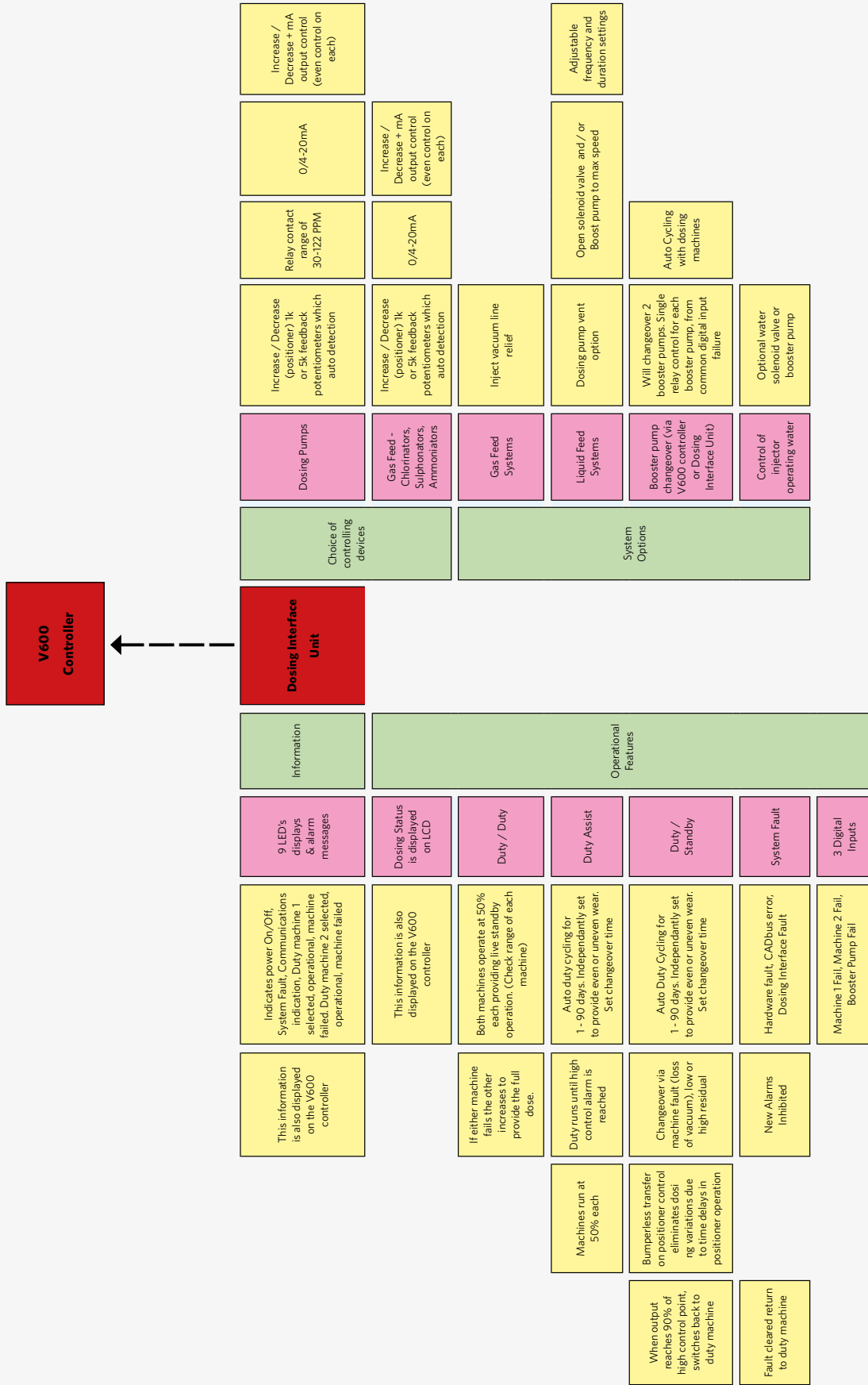
# V600® DISINFECTION CONTROLLER - SYSTEM FEATURES

The following two diagrams show the range of features built into the V600® Disinfection Controller system and indicate system potentials





# V600® DISINFECTION CONTROLLER SYSTEM FEATURES - DOSING INTERFACE UNIT



# V600® DISINFECTION CONTROLLER SYSTEM - COMMUNICATIONS AND SECURITY

## USER OPERATING AND SYSTEM INFORMATION

The V600® Disinfection Controller is designed to be easy to operate and a 240 x 64 LCD backlight display provides the user with access to system and process information.

### User Friendly Operation

A user friendly menu structure is provided to enable easy and quick access to the information required. Access is via 3 'soft keys. Up, down, left, right arrows and enter and escape buttons provide easy navigation to the information required.



V600® Disinfection Controller key pad

The Status Display options include the display of residual values, bar graphs, trending graphs, text, and dosing machine information.

Built in Data Logging can provide the user with one of the following selectable values to record.

- Analyser 1
- Analyser 2
- Flow (total)
- Control Output (total)

The data logging is fixed to 1 month of data at 2 minute sampling times. The data is displayed in 8 hr periods providing the user with clearly visible information.

The data may be viewed as a graph on the controller display or downloaded to a laptop via the RS 232 interface.

Alarm information provides indication of 25 alarm conditions. The last 24 alarms are shown in an alarm history log. There are 2 low residual alarms and 2 high residual alarms.

The V600® Disinfection Controller also provides a selectable option to move low and high alarm 1 in relation to varying set points.



## COMMUNICATIONS & SYSTEM SECURITY

### RS232 COMMUNICATIONS

The RS232 interface enables a standard laptop computer to be connected to the V600® Disinfection Controller. This interface may then be used to upload the main program into flash memory, or download the data logging data from the controller where it can be imported into standard software programs such as Microsoft Excel where the information can be displayed in any format.

### RS485 Communications

An RS 485 connection will allow remote access and transmission of data. When used in conjunction with the Wallace & Tiernan® ChemWeb-Server it offers an flexible choice of remote communications via modem/TCP IP and to OPC complaint SCADA systems using the Wallace & Tiernan® OPC software.

All Operation and Commissioning parameters will be accessible using the RS 485 interface and some additional variables to give status/alarm information.

### Security

Inbuilt security system to the V600® Disinfection Controller is provided by 2 passwords and 3 levels of access.

- System Password - allows access to the commissioning and operational menus
- Menu 2 password - allows access to the operational parameters only
- Manual/Auto parameters - Open access.

The 3 levels of access correspond to the 3 menu systems using the soft keys



RS232 connection to V600® Disinfection Controller

## TECHNICAL DATA

The following specifications apply to both the Controller and the Dosing Interface Unit (DIU).

### Electrical

Mains Supply:

(Voltage specified with order)

115V AC  $\pm 10\%$ , 50-60Hz, 30VA

230V AC  $\pm 10\%$ , 50-60Hz, 30VA

24V DC, 30W

Fuses F1 & F2:

115V / 230V AC 1A(T), 250V, TR5

24V DC 2.5A(T) 250V, TR5

Fuses FS1 & FS2: (Steel enclosure only)

All voltages - 3.15A(T), 250V, 5 x 20mm

Safety:

BS EN 61010

Installation category II

EMC:

BS EN 61326

### Physical

Plastic Enclosure Size:

273 x 316 x 167 (H x W x D)

Weight: 5 kg

Single Steel Enclosure Size:

600 x 435 x 279 (H x W x D)

Weight: 19 kg

Double Steel Enclosure Size:

600 x 656 x 279 (H x W x D)

Weight: 29 kg

Panel Mounting

- Bezel Size:

210 x 280 x 25 (H x W x D)

Weight: 1 kg

- Base Unit Size:

273 x 316 x 115 (H x W x D)

Weight: 4 kg

Terminal Box Size:

200 x 300 x 120 (H x W x D)

Weight: 4 kg

### Environmental

Temperature Range:

Operation 0...50°C (max 90% RH, non condensing)

Storage -20...70°C

IP / NEMA Rating:

Plastic enclosure: IP 67 / NEMA 4X

Steel enclosure: IP 65 / NEMA 13

Panel mount bezel: IP 65 / NEMA 13

Terminal box: IP 55 / NEMA 12

### Inputs/Outputs

Digital Inputs:

For use with volt free contacts only isolated voltage supplied by controller (15V DC nominal)

Relay Outputs:

Resistive rating:

5A, 250V AC, 1250VA max

5A, 220V DC, 150W max

UL/CSA Rating:

5A 1/6 HP 125,250 V AC

5A 30V DC 30W max

1A 30V DC to 0.24A 125V DC

Suppression with Schottky diodes

Analogue Inputs:

0...20 / 4...20mA and 0...5V

Input impedance 47 $\Omega$  for mA signals

Accuracy 0.5% full scale

Galvanically isolated from earth to 50V

Analogue Outputs:

0...20 / 4...20mA

Accuracy 0.5% full scale

Maximum load 400 $\Omega$  or 1K $\Omega$  (switch selectable)

Galvanically isolated from earth to 50V

Feedback Signals:

1K $\Omega$  or 5K $\Omega$  potentiometer (automatic detection)

Not isolated

RS232 Interface:

Supports Evoqua Water Technologies protocol

Not isolated

RS485 Interface:

Supports Evoqua Water Technologies protocol

Galvanically isolated from earth to 50V



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