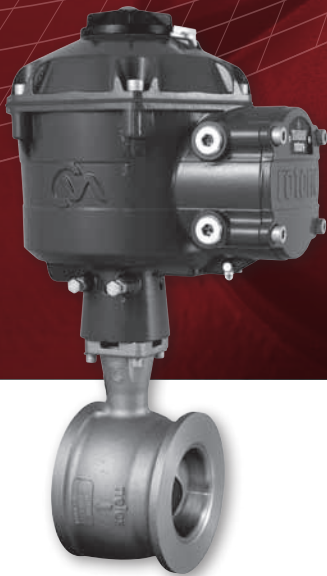


# rotork®

## Process Controls

CVA Range



Control and Monitoring Facilities

Redefining Flow Control

## Contents

# rotork® Process Controls

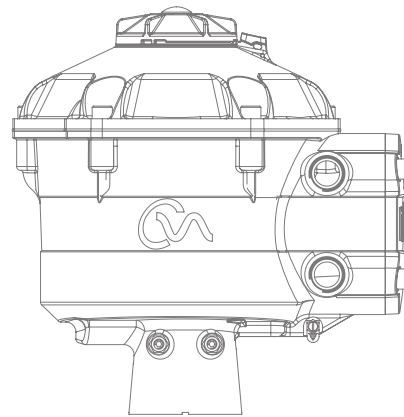
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This brochure provides a comprehensive overview of the applications and associated functions available with Rotork CVA actuators – comprising CVL linear and CVQ quarter-turn actuators.

Building on Rotork's historical success with innovative technology, the CVA offers a highly accurate and responsive method of automating control valves, without the complexity and cost of a pneumatic supply. With an increased focus on production costs and efficiency, accurate control of product through the pipeline is paramount. With resolution figures better than 0.1% and the ability to eliminate position overshoot, the Rotork CVA range helps to maximise product quality and plant capacity.

In keeping with Rotork's 'sealed-for-life' philosophy, all setup and calibration is carried out non-intrusively via a *Bluetooth*® enabled device (not supplied) using the freely downloadable Rotork Enlight software, so that no access is required to the main electronics compartment during commissioning. Additionally the terminal compartment is separately sealed, thus minimising the risk of moisture ingress during installation.



# CVA - In control

CVA – A revolution in electric control valve application, removes the need for inefficient high maintenance compressed air. Utilising *Bluetooth*® technology, all settings, diagnostics and analysis can be carried out non-intrusively using the easy-to-use Enlight software.

## Enlight – Configuration and Analysis Tool

Enlight PC and PDA software allows all CVA set-up configuration and datalogger information to be reviewed, analysed and reconfigured. This visually interactive application is a stand-alone program running under Microsoft Windows and Pocket PC operating systems. Intuitive and clear menus make analysing data from the CVA simple and fast.

## Data Logging & Configuration

Every CVA includes an on board datalogger. The datalogger captures and stores valve, actuator, control signal and status data, which can be viewed using Enlight.

## Features

- Actuator configuration
- Valve torque / thrust profile
- Number of operations
- Control option configuration
- Valve and actuator position starts log
- Operation signal log
- Status log
- Statistics

## Terminal Block

The CVA range actuators incorporate a terminal block assembly containing segregated metric screw terminal inserts. M4 pan head screws are provided for both power and control terminals.

## Control Specification

A non-intrusive selector is supplied at the top of the actuator’s control cover to chose between different modes of operation; RUN, STOP or TEST.

**RUN** – this makes the actuator available for full remote control (see available options below).

**STOP** – prevents any unwanted operation, including any command initiated by the Enlight program.

**TEST** – this initiates a short 2% step test to make sure the actuator is working correctly.

## Power Supplies

Single-phase AC – 100 to 240 VAC 50/60 Hz

Direct current – 24 VDC optional power supply can be configured on request.

## Remote Control

### Analogue and network control

The standard form of control is via a 4 to 20 mA current loop. Feedback is achieved by a loop powered 4 to 20 mA signal and one volt free contact for status. Other optional control methods are available including Pakscan, Profibus®, Foundation Fieldbus®, Modbus and HART®. These network type options are covered by the relevant systems publications.

### Hardwired discrete control

For discrete hardwired control, the optional RIRO (Remote in Remote out) card can be fitted. The option allows the user to hardwire a discrete digital control (24 VDC nominal or 120 VAC nominal) for open and close operation. The option also allows up to four extra relay contacts to be available.

# Standard Control

## Standard Control Options

The following standard wiring diagram matrix allows the user to configure which controls options are required. Using the matrix a wiring diagram can be generated applicable to the relevant analogue or network control application:

	C	0	0	-	0	0
<b>CVA actuator</b>	C					
<b>Power Supply</b>		0 - AC supply 1 - DC Supply 2 - AC Supply with Failsafe 3 - DC Supply with Failsafe				
<b>Indication and Solenoid (Manual Override)</b> <small>Not applicable to CVL5000 where the lock up mechanism is standard and mechanical, select either 0 or 1</small>			0 - Normally open contact 1 - Normally Closed Contact 2 - Manual Override with Solenoid Locking & NO contact 3 - Manual Override with Solenoid Locking & NC contact			
-						
<b>Network Control</b>					0 - Basic 4 to 20 mA control & Feedback 1 - HART 2 - Pakscan 4 - Modbus 8 - Foundation Fieldbus 9 - Profibus	
<b>Spare (not used)</b>						0

# Digital Hard Wire Control, Optional RIRO Board

## Digital Hardwired Control

For digital (open/close) control, the optional RIRO (remote input, remote output) control option is available. Various control options are available with the most common types detailed below. In order to have the correct configuration set, the type of control must be detailed at time of order. Because of the limitations of 8 terminal connections in the CVA, the selection of inputs and outputs must be made in advance of orders.

Power Supply	Fail to position Supercaps	Locking solenoid for Manual override (for CVL-5000 select 'No')	4 Digital Inputs 2 Digital outputs	4 to 20 mA analogue In & Out, 2 Digital Outputs	2 Digital Inputs 4 Digital Outputs
AC	Yes	Yes	WD08708	WD08712	WD08787
		No	WD08694	WD08832	WD08758
	No	Yes	WD08876	WD08707	WD08857
		No	WD08722	WD08691	WD08727
DC	Yes	Yes	WD08877	WD08878	WD08845
		No	WD08693	WD08692	WD08865
	No	Yes	WD08879	WD08880	WD08881
		No	WD08882	WD08883	WD08884

The following table of remote inputs are available with the RIRO option:

Function	Description
Open	Actuator is driven towards the Open Limit when active
Close	Actuator is driven towards the Close Limit when active
ESD	Actuator is given an ESD command (actual action defined by the Actuator Controller)
Maintain	Travel is maintained for Open and Close when active
Test	The 2% Step Test is initiated when active

## Remote Input Electrical Characteristics

### Voltage ranges

DC – 20 to 60 V (24 V nominal)

AC – 60 to 125 V (110 V nominal)

### Voltage / Current specifications

The following table describes the requirements for correct hardwired remote control. This table allows the user to correctly specify the input voltage / current required to operate the actuator.

		Guaranteed OFF	Guaranteed ON	Maximum Permissible
DC	24 V nom	8	16	60
	mA	2	8	-
AC 50/60 Hz	110 V nom	40	80	160
	mA	2	8	-

## Signal Pulse Specification

The signal pulse duration is programmable using Rotork Enlight software. The range will be selectable between 20 ms and 1 s. Units will be shipped set to the default 20 ms.

## Relay Functions Standard Relay and RIRO Relays

Each of the four extra relays on the RIRO can be set to one of the following functions. The standard single relay functions are in the left hand column:

Standard Relay Function	RIRO Relay Function	Description
Disabled		Always de-energised to reduce power consumption
✓	Availability	Active when the CVA is available for remote control - selector set to RUN and no faults present that would inhibit operation (all critical faults)
✓	Fault	Active when a fault has been detected with the actuator, control or valve
✓	Open Limit	Active when the actuator is at the Fully Open position
✓	Closed Limit	Active when the actuator is at the Fully Closed position
✓	Opening Load Trip	Active when the opening thrust / torque (at any position) reaches the value set
✓	Closing Load Trip	Active when the closing thrust / torque (at any position) reaches the value set
✓	Thrust/Torque Trip	Active when the thrust / torque (at any position) reaches the value set -independent of direction
Supercap Power		Reserve power pack status
✓	Failsafe	Active when the actuator is performing its Failsafe action
✓	Intermediate Position	Active if the actuator passes an intermediate position (open or close direction)
	Actuator closing	Active when actuator is moving in the Close direction
	Actuator opening	Active when actuator is moving in the Open direction
	Actuator output Moving	Active when output is moving regardless of direction
	Motor Running	Active when the motor is in motion
	Motor Stalled	Active when the motor fails to move after a valid command has been sent
	Hand operation	Active when the output shaft is being driven by hand
✓	Blinker	Indicates (on and off) that the output shaft is moving
	Local Stop	Active when local STOP is selected
	ESD signal present	Active when an ESD signal is present
	Relay parity	This is a fault indication function and ensures that the number of relays that are open at any time is even
	Monitor	Active when actuator has no faults (including non-critical faults)
	Mains Fail	Active when the mains power fails
	CVA Run Selected	Active when RUN is selected on the control selector
	CVA Test Selected	Active when TEST is selected on the control selector
	CVA Test Failed	Active if a test sequence fails
	Supercap failure	'Reserve' power pack failure

# RIRO and Standard Contacts

## Contact Type

Each switch is a SPST (single pole single throw) type. For each of the above relay functions, the contact can be set to either NO (normally open) or NC (normally closed). All control and indication functions can be setup using the Enlight program available for free download at [www.rotork.com](http://www.rotork.com)

## Contact Ratings

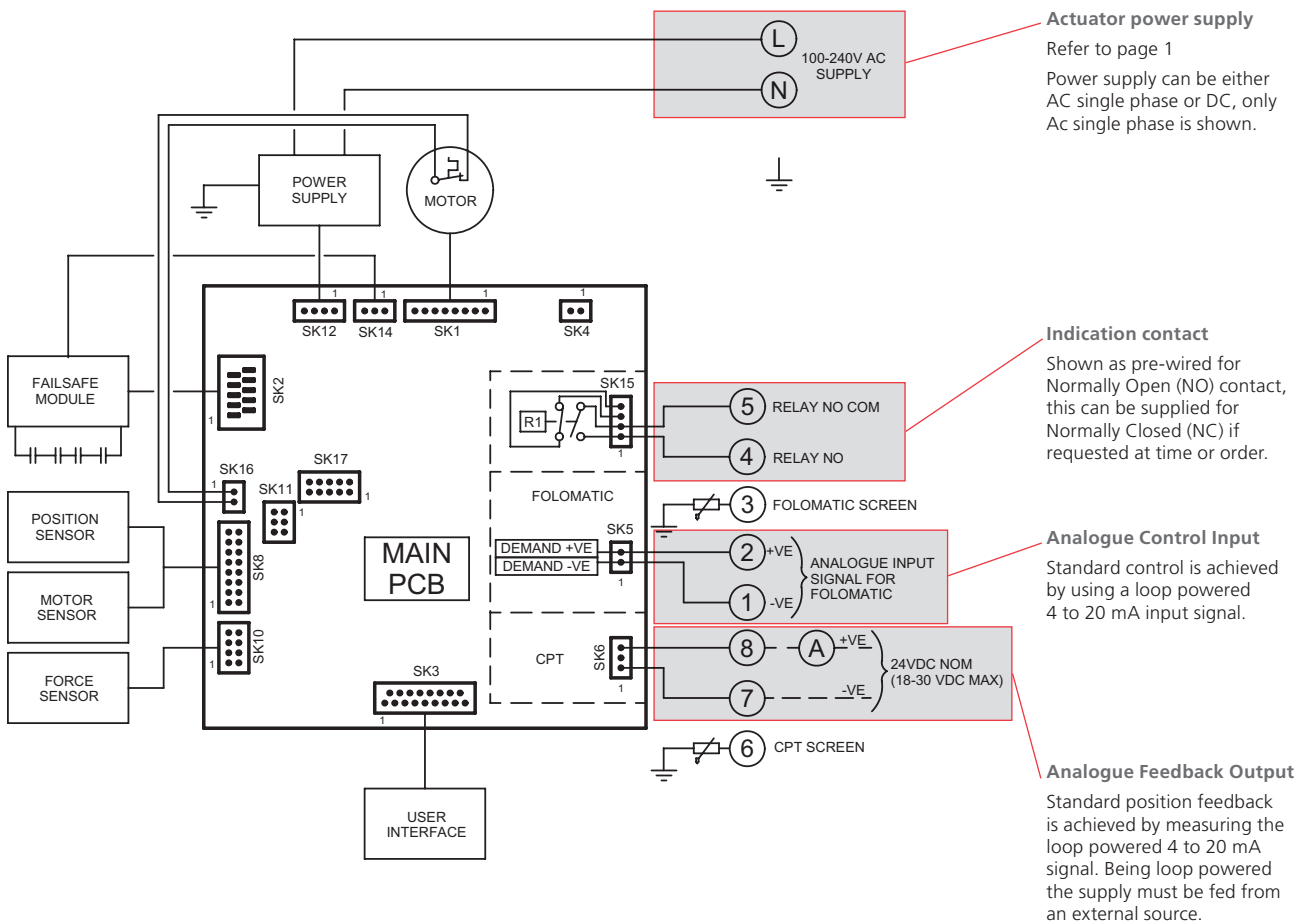
Each relay contact has a maximum rating of 250 VAC, however due to the constraints of the Low Voltage Directive; the maximum allowable voltage that can be applied to the Control & Indication terminals is 150 VAC. For DC the maximum voltage is 125 VDC and is not constrained further by the LV directive.

The absolute maximum current that can be switched is 5 amps, however consideration should also be made with regards to the maximum switching power: -

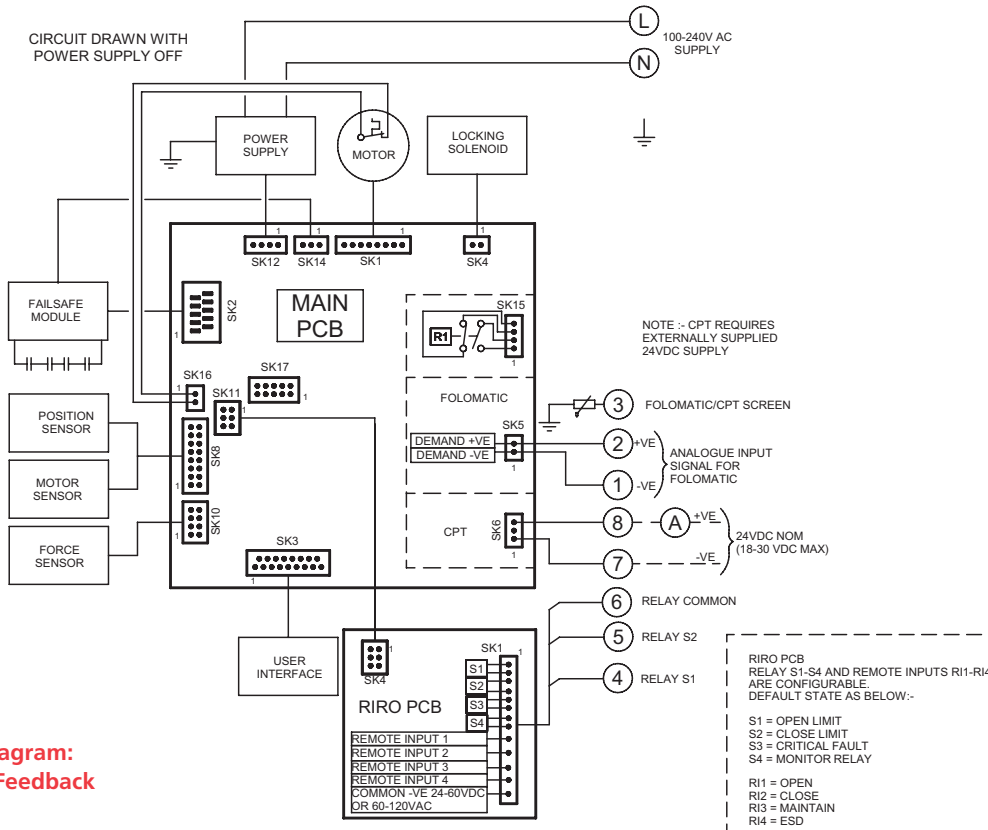
For inductive circuits this is limited to 60 W

For resistive circuits this is limited to 150 W

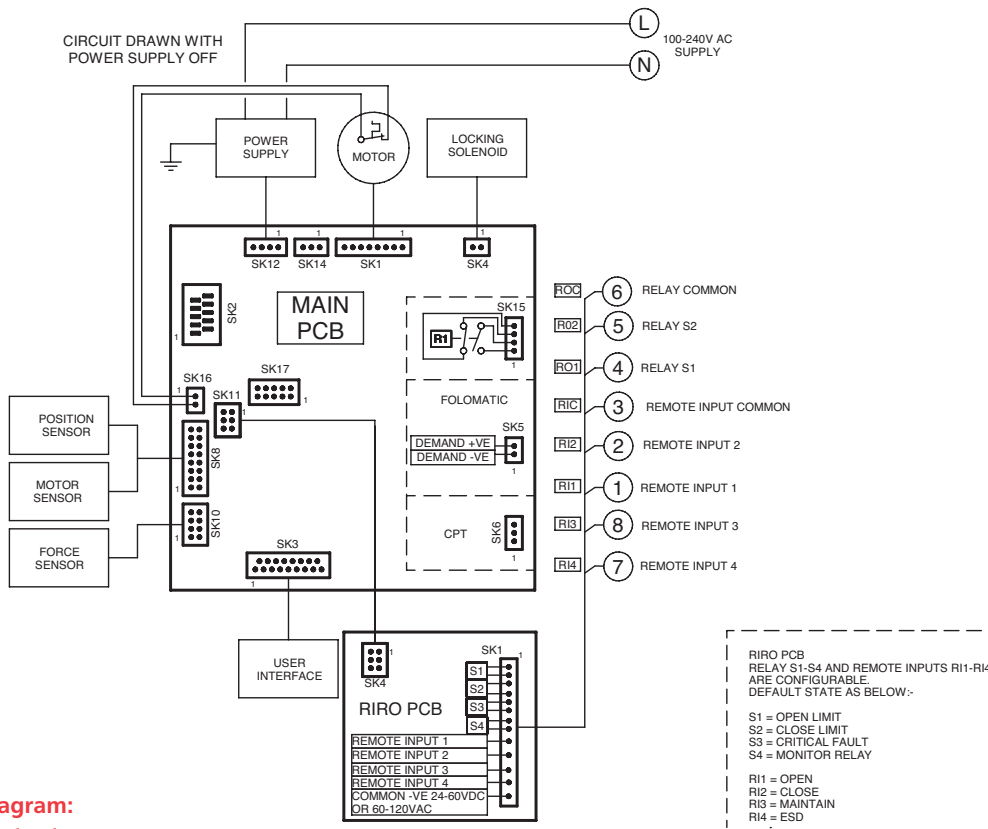
Standard Control Wiring Diagram without RIRO card



# Optional RIRO Control and Feedback Wiring Diagrams

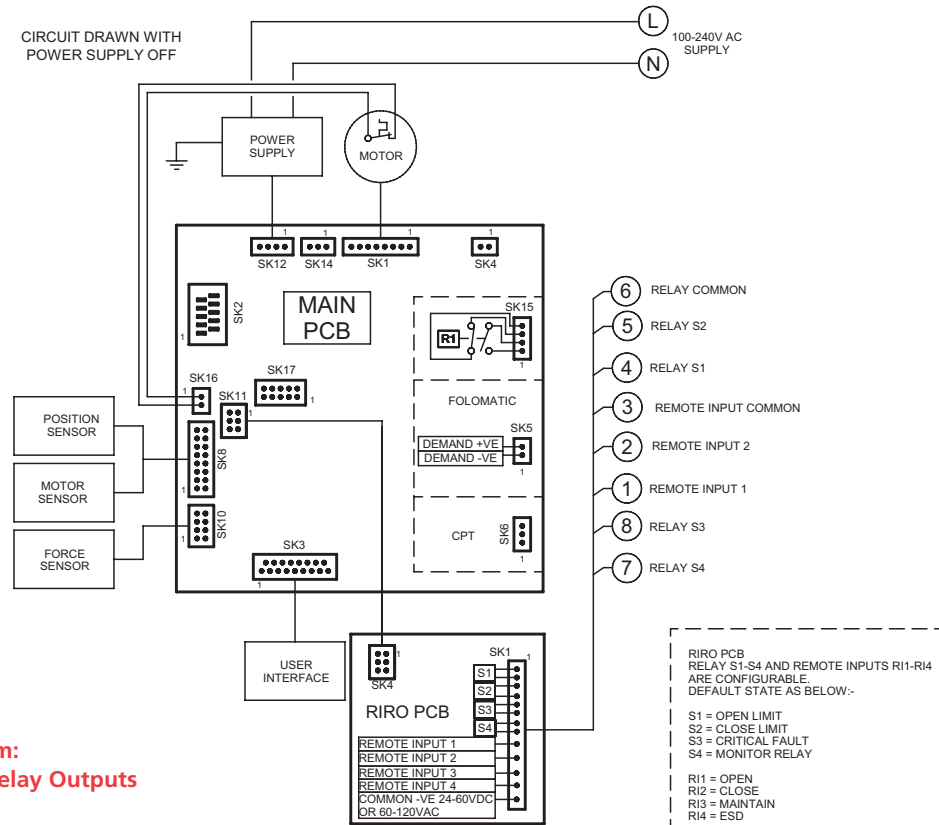


**RIRO Card Wiring Diagram:  
Analogue Control / Feedback  
& 2 Relay Outputs**

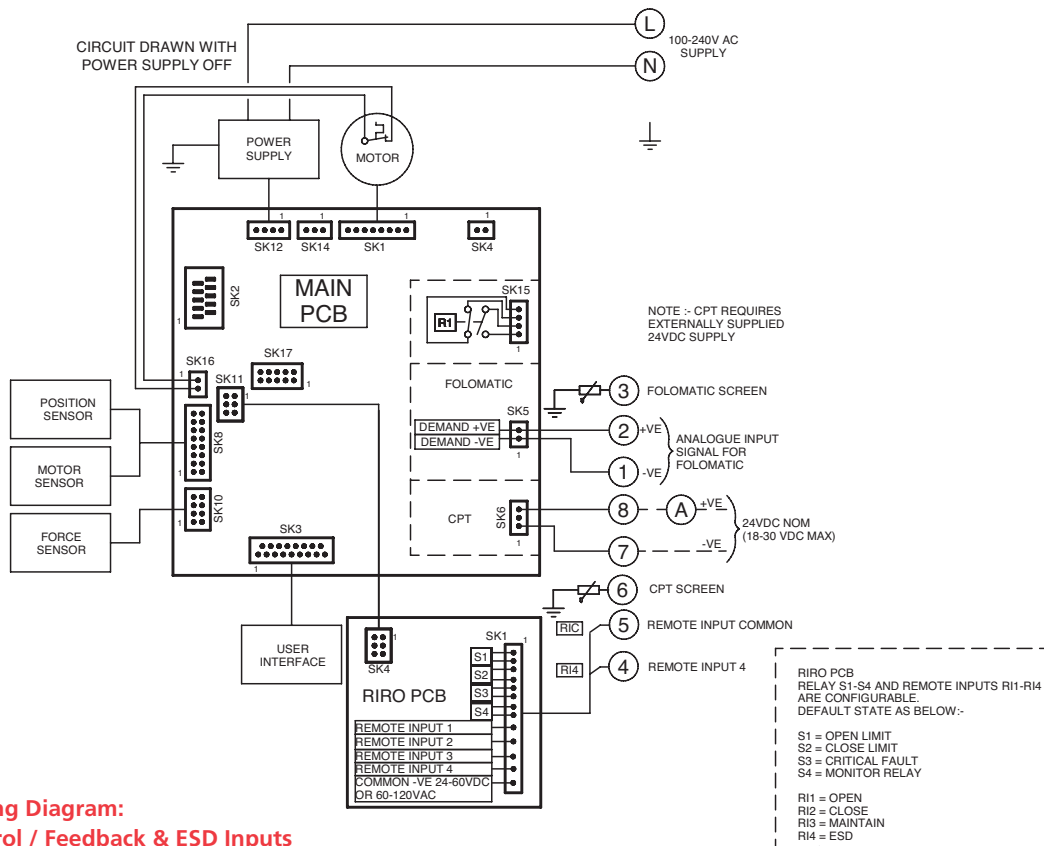


**RIRO Card Wiring Diagram:  
4 Inputs & 2 Relay Outputs**

# Optional RIRO Control and Feedback Wiring Diagrams



**RIRO Card Wiring Diagram:  
2 Hardwired Inputs & 4 Relay Outputs**



**RIRO Card Wiring Diagram:  
Analogue Control / Feedback & ESD Inputs**

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for more information on  
this product range



PUB042-002-00  
Issue 09/12

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