

## Reliability in critical flow control applications



### › **Reliable operation** when it matters

Assured reliability for critical applications and environments. Whether used 24/7 or infrequently, Rotork products will operate reliably and efficiently when called upon.

### › **Quality-driven** global manufacturing

Products designed with 60 years of industry and application knowledge. Research and development across all our facilities ensures cutting edge products are available for every application.

### › **Customer-focused service** worldwide support

Solving customer challenges and developing new solutions. From initial enquiry through to product installation, long-term after-sales care and Client Support Programmes (CSP).

### › **Low cost** of ownership

Long-term reliability prolongs service life. Rotork helps to reduce long term cost of ownership and provides greater efficiency to process and plant.

## Modular design providing **flexibility and configurability** to suit your application

- › **Suitable for inaccessible locations** using remote mounted Centronik controls
- › **Oil bath lubrication** for extended life and mounting in any orientation
- › **IP68 8m for 96 hours –** double-sealing as standard
- › **User friendly commissioning and configuration** with non-specialist hand tools
- › **Built in redundancy** using independent torque and position sensing
- › **Fast and efficient maintenance** due to plug and socket connections
- › **Safe motor-independent handwheel operation** available at all times
- › **Data extraction** for analysis, diagnostics and asset management
- › **Local operation, configuration and commissioning** up to 100 m from actuator, with remotely mounted Centronik module
- › Backed by **Rotork Global Support**

The CK actuator range has been designed to meet the needs of diverse actuation applications required by the valve industry and its customers. The modular design concept enables quick product configuration from stock to customer specification with a very short lead time.

The CK range provides the customer with a range of options to suit all of their actuation requirements.

CK actuators are designed for minimum user interaction. Their primary goal is to provide safe and reliable actuation in harsh environments.

The modular CK product range offers simple, robust actuators (CK/CK<sub>R</sub>) suited to harsh environments with the option for two different control packages (Atronik and Centronik) to meet exact site requirements. Atronik offers modest control and feedback for a simple integrated starter solution. Centronik offers advanced control and feedback for more complex site system integration and increased flexibility through remote mounting.



**CK** range





Standard isolating duty



Standard regulating / modulating duty



CK isolating duty actuators are designed for on/off valve types that are infrequently operated.

- Shut off valves to isolate the site process
- Safety valves for maintenance activities
- Up to 60 starts per hour at a rate up to 1 start every 6 seconds

CKR modulating duty actuators are designed for positioning valve types that are frequently operated.

- Control valves for fine adjustment of the site process flow
- Optimised fast response drive train
- Up to 1,200 starts per hour

## CK Range Universal Design Features

- CK is the solution for users with centralised motor control centres or high temperature and/or sustained vibration applications
- Mechanical or Digital Switch Mechanism (DSM)\*
- All major components of CK range actuators are modular
- Hollow output drive to accept rising valve stems
- Plug and socket electrical connection for easier field wiring
- Detachable thrust and non-thrust base options
- Modular construction facilitates:
  - Fast order turnaround and quick delivery
  - Off-the-shelf solution for spares and upgrading
  - Interchangeable motors for different speeds
  - Control package upgrades
  - Indication output changes
- Secure padlockable manual handwheel drive, fully independent of the motor drive train

\* DSM only with CKc and CKRc actuators

- Standard B1 coupling with B3, B4 and A available
- Low speed clutch operable at all times, providing a manual override even when the motor is running
- Torque protection and position limits – independent torque and position limit control for each direction of travel
- Continuous mechanical valve position indication even without power
- Watertight - IP68 (8 m / 96 hrs), NEMA 4 & 6 rating as standard providing enhanced environmental protection

## CK Range Performance Data

- Direct output torque range: 10 - 500 Nm (7 - 369 lbf.ft)
- Max. torque with standard multi-turn gearbox: 6,750 Nm (4,979 lbf.ft)
- Max. torque with standard part-turn gearbox: 205,600 Nm (151,600 lbf.ft)

## Introduction

**CKA**

Atronik isolating duty

**CKRA**

Atronik regulating / modulating duty



**CKC**

Centronik isolating duty

**CKRC**

Centronik regulating / modulating duty



CKA isolating and CKRA modulating duty actuators are equipped with the simple and robust Atronik control module.

- Atronik increases flexibility of options across the CK range
- CK Atronik provides modest integral controls to meet the standard requirements of site specification
- Digital electronic based controls with microprocessor driven easily defined functionality
- Simple control and indication configuration via on board DIP switches
- Integral local control selectors with mode and direction selection
- Simple, user friendly display interface for clear status indication
- Configurable LED colours to suit site standard form
- Optional extra relays for additional remote indication
- Optional analogue proportional control input and output transmitter (4-20 mA)
- Optional local position indicator with mechanically adjustable position
- Basic network bus connectivity
- Isolating duty Class A & B and modulating duty Class C

CKC isolating and CKRC modulating duty actuators are equipped with the intelligent Centronik control module.

- Centronik module can be close coupled or remote mounted up to 100 m from actuator
- CK Centronik provides intelligent integral controls for integration with all types of site control systems
- Remotely mounted Centronik module option facilitates use in harsh environments or restricted space installations
- Microprocessor based controls for functionally sophisticated applications and/or for integration of actuators into fieldbus systems
- Non-intrusive setting of Centronik module via local control knobs, infrared or optional *Bluetooth*<sup>®</sup> wireless communication
- Multilingual user interface
- Fully configurable LCD display
- Optional analogue control input and Current Position Transmitter (CPT) 0-20 and 4-20 mA
- Optional Current Torque Transmitter (CTT) 0-20 and 4-20 mA with Digital Switch Mechanism (DSM) only
- Constant valve position monitoring with DSM even during power loss
- Network bus connectivity
- Datalogging and analysis with Insight 2 software
- Isolating duty Class A & B and modulating duty Class C

## Components of the modular CK actuator design

### 1 Atronik module



The Atronik control module provides the user with simple, robust valve control and clear valve status indication.

- 1a LED status indication display plus non-intrusive local controls
- 1b Plug and Socket connection
- 1c Double-sealing water and dust ingress protection

### 2 Centronik module



The Centronik control module provides the user with comprehensive intelligent valve control, detailed data logging and asset management.

- 2a Multilingual display plus non-intrusive local controls
- 2b Plug and Socket connection
- 2c Double-sealing water and dust ingress protection
- 2d Up to two extra option cards

### Module Compatibility Chart

Symbol	Actuator
	CK & CKR - no control module
	CKA & CKRA - Atronik control module
	CKc & CKRc - Centronik control module

### 3 Standardised motor module



Motor modules utilise the same connection method across all speeds for each size CK.

### 4 Manual handwheel



Independent manual override for emergency operation.

### 5 Double-sealing water and dust ingress protection



Proven double sealing arrangement to maintain IP68 (8m for 96 hours) protection.

### 6 Mechanical switch mechanism (MSM)



Cam engaged position and torque switches with reduction gearing for extended travel.

### 7 Digital switch mechanism (DSM)



Absolute encoder device for fully digital position and torque measurement.

### 8 Additional Indication Drive



Increases functionality beyond the switch mechanism to include local position indication, intermediate switches, potentiometer or loop powered 4-20 mA CPT.

### 9 Local indication cover



Rotate through 360° in 90° increments to suit installation in any orientation.

### 10 Detachable thrust bases



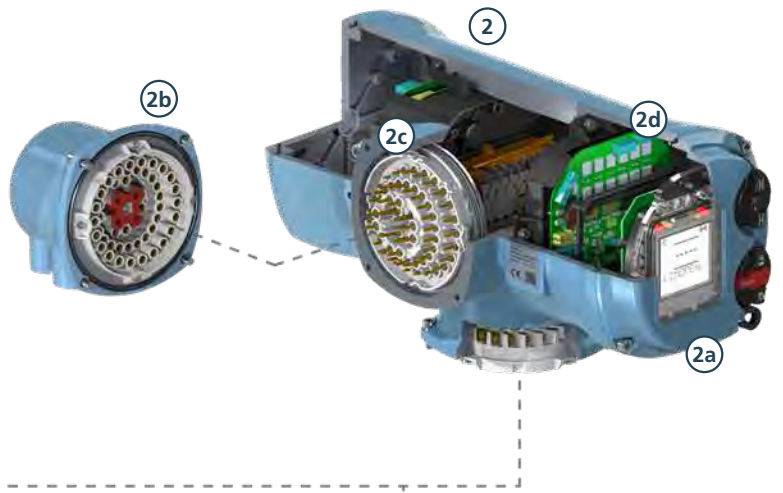
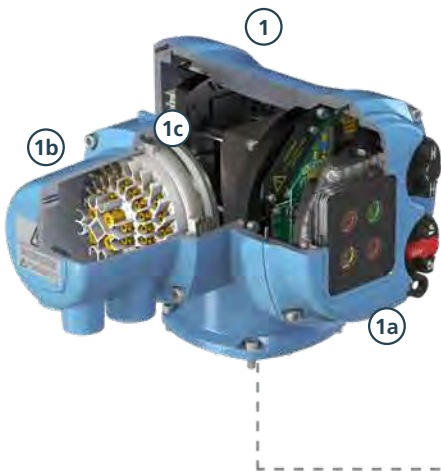
Separate the base from the actuator for faster maintenance.

### 11 Rotork Bluetooth® Setting Tool Pro



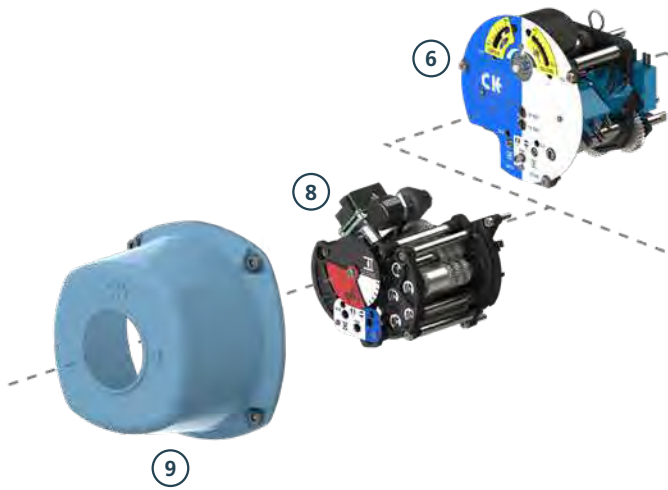
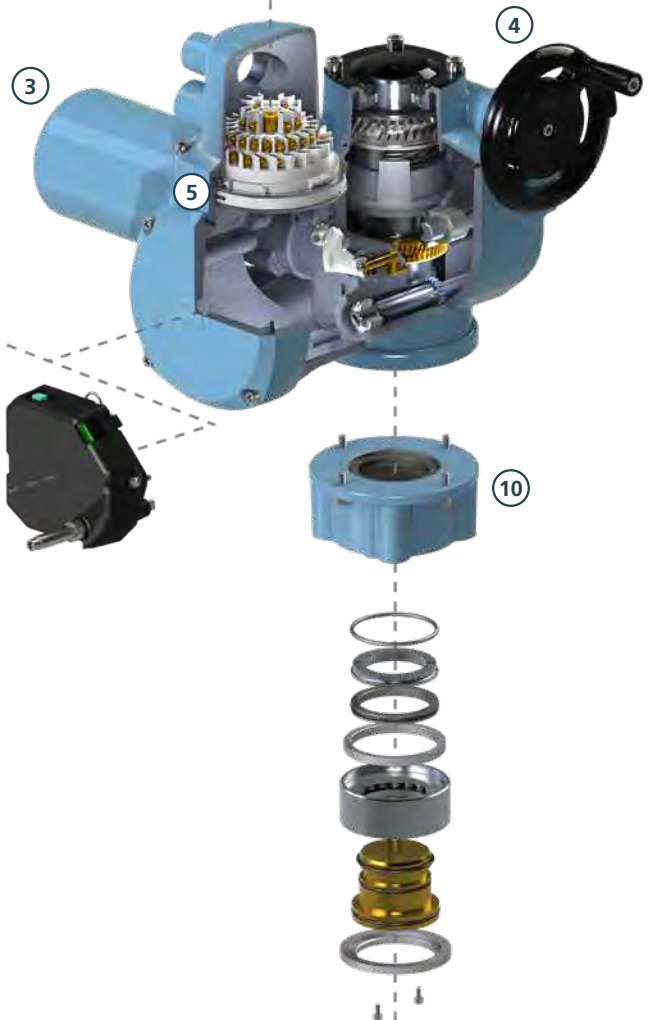
View, adjust and extract data from Centronik control modules.

# Inside the CK Range



# CK range

Modular Actuator Design



## CK Standard Range

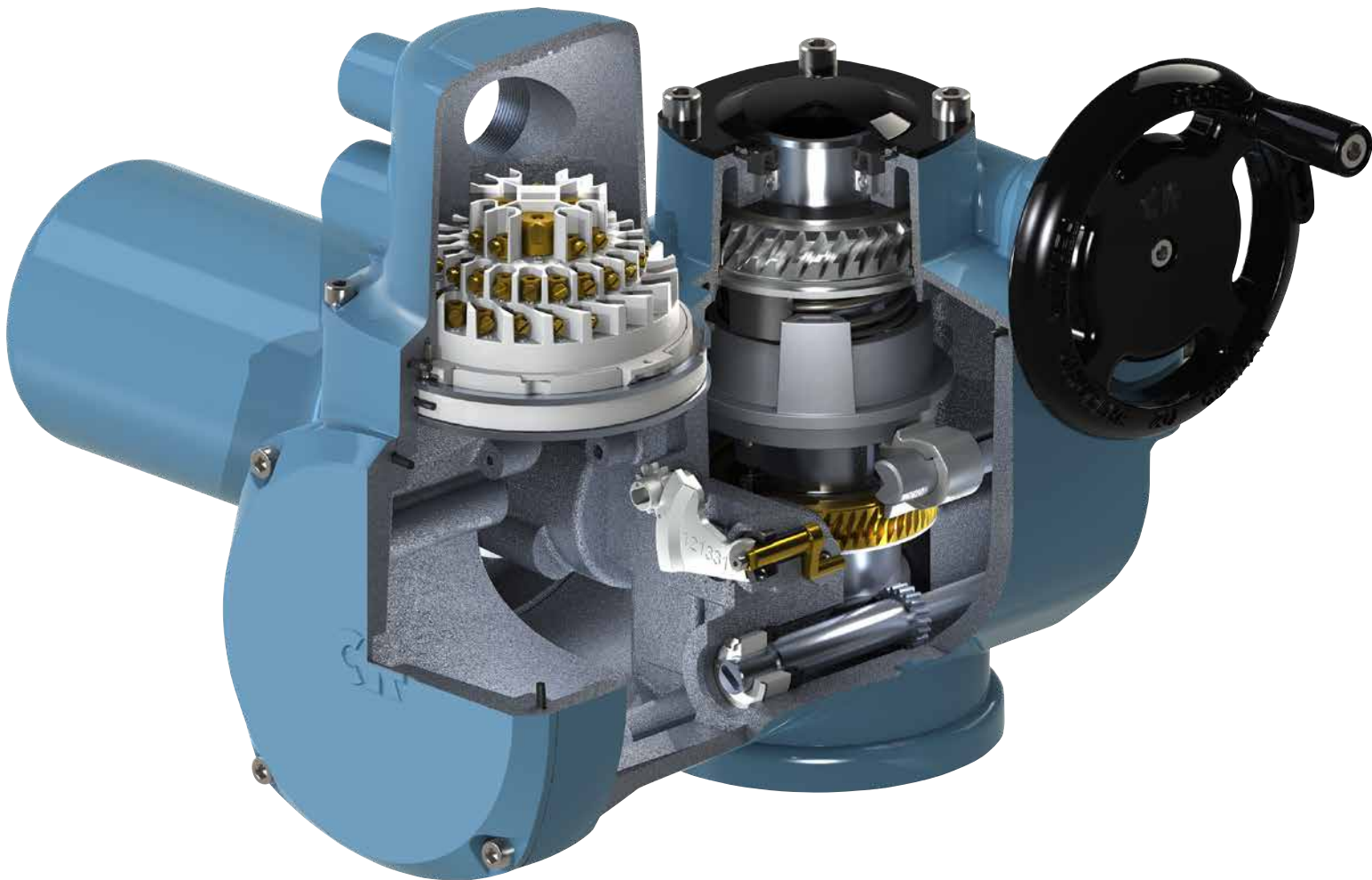
The multi-turn Rotork CK and CKR actuators are the simplest models in the CK range. They are designed for use with external controls and motor switchgear.

CK actuators comprise the following components:

- Motor, drive train and independently declutchable manual override handwheel for hand operation including padlockable hand/auto lever
- Standard valve flange mounting including removable drive nut for machining to match the valve stem
- Electric plug and socket connection for power and control wiring
- Drive train permanently immersed in an oil bath to ensure maximum efficiency and avoid the damaging tunneling effects associated with grease filled actuators.

To operate a CK or CKR, external controls with motor switchgear must be wired to the applicable actuator terminals. The wiring diagram and terminal plan will detail electrical connection requirements for operation.

A CK or CKR actuator can be upgraded with an Atronik or Centronik control module to provide a ready-to-operate actuation solution with integral controls and motor switchgear.





## CK Standard Range

### Motor

To meet the specific torque characteristics of the wide variety of applications in our global market, Rotork has developed a full range of 3-phase and single-phase motors with high starting torque. Special features have been designed into the drive train to ensure uninterrupted operation even when the valve or damper torque demand increases due to wear or requirement for maintenance. For isolating service applications this includes a hammer blow mechanism within the drive train to provide an impact force on motor start.

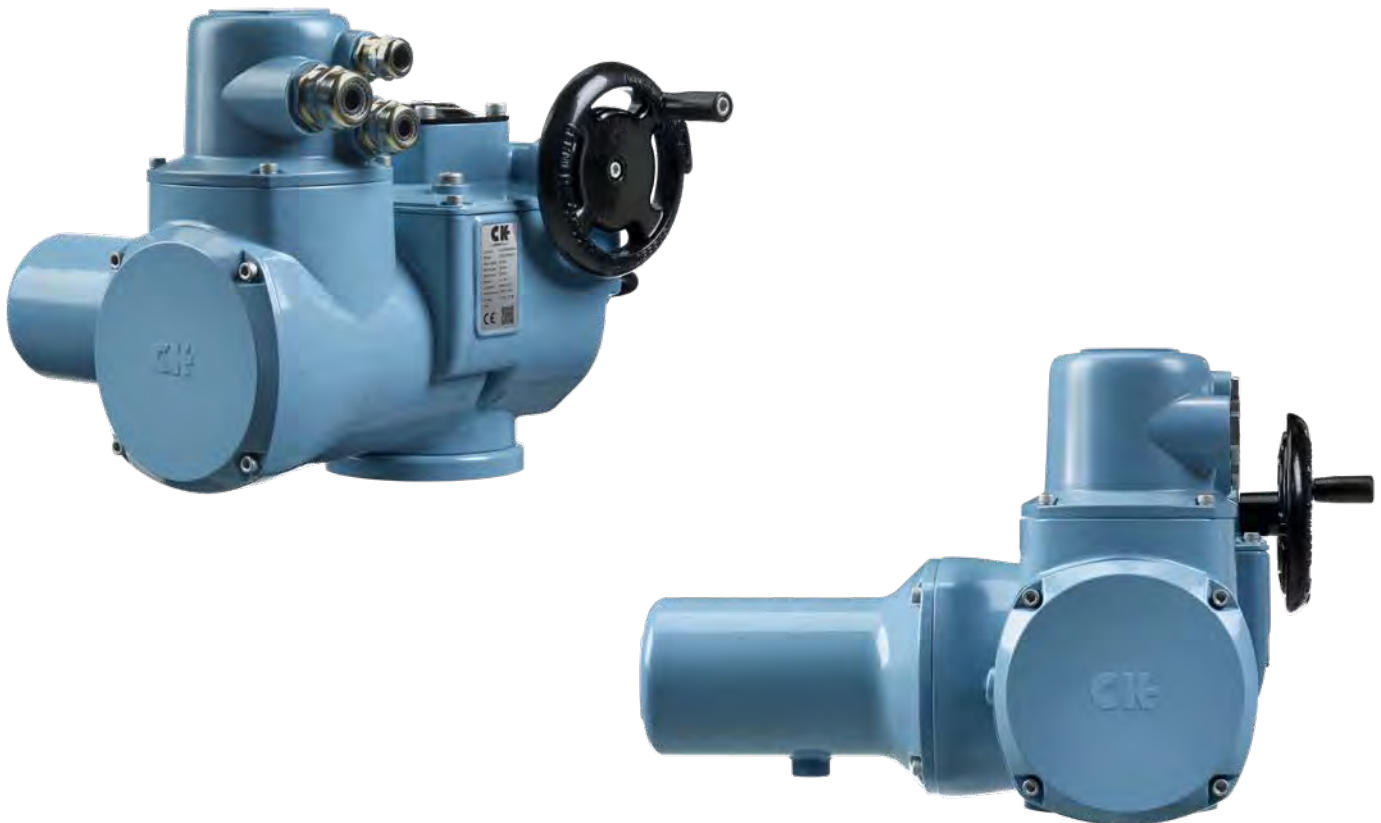
To avoid damage to the actuator motor, thermal protection is included as standard using a thermo switch embedded in the motor windings. This will inhibit actuator operation if the ambient temperature of the motor exceeds specification.

Should the motor require replacement, quick fit electrical connections and mechanical fittings reduce the service down time required.

### Actuator switch mechanism

The purpose of the actuator switch mechanism is to sense valve position and torque so the actuator controls can control the motor. Depending on the application, it will seat at the ends of travel either on torque or position. Therefore it is also vital that end travel torque and position limits are adjustable to suit the particular application requirements.

CK and CKR actuators are compatible with the Mechanical Switch Mechanism (MSM). Instantaneous position and torque are sensed mechanically and IP67 rated micro switches provide end of travel indication as well as torque trip indication. Torque and position switches for both directions require mechanical configuration.



## CKA Atronik Range

The close coupled Atronik control module comprises simple electronic controls with a visual user interface for status and fault information.

Rotork CKA and CKRA actuators provide reliable valve automation with built in control protection.

### Motor switchgear

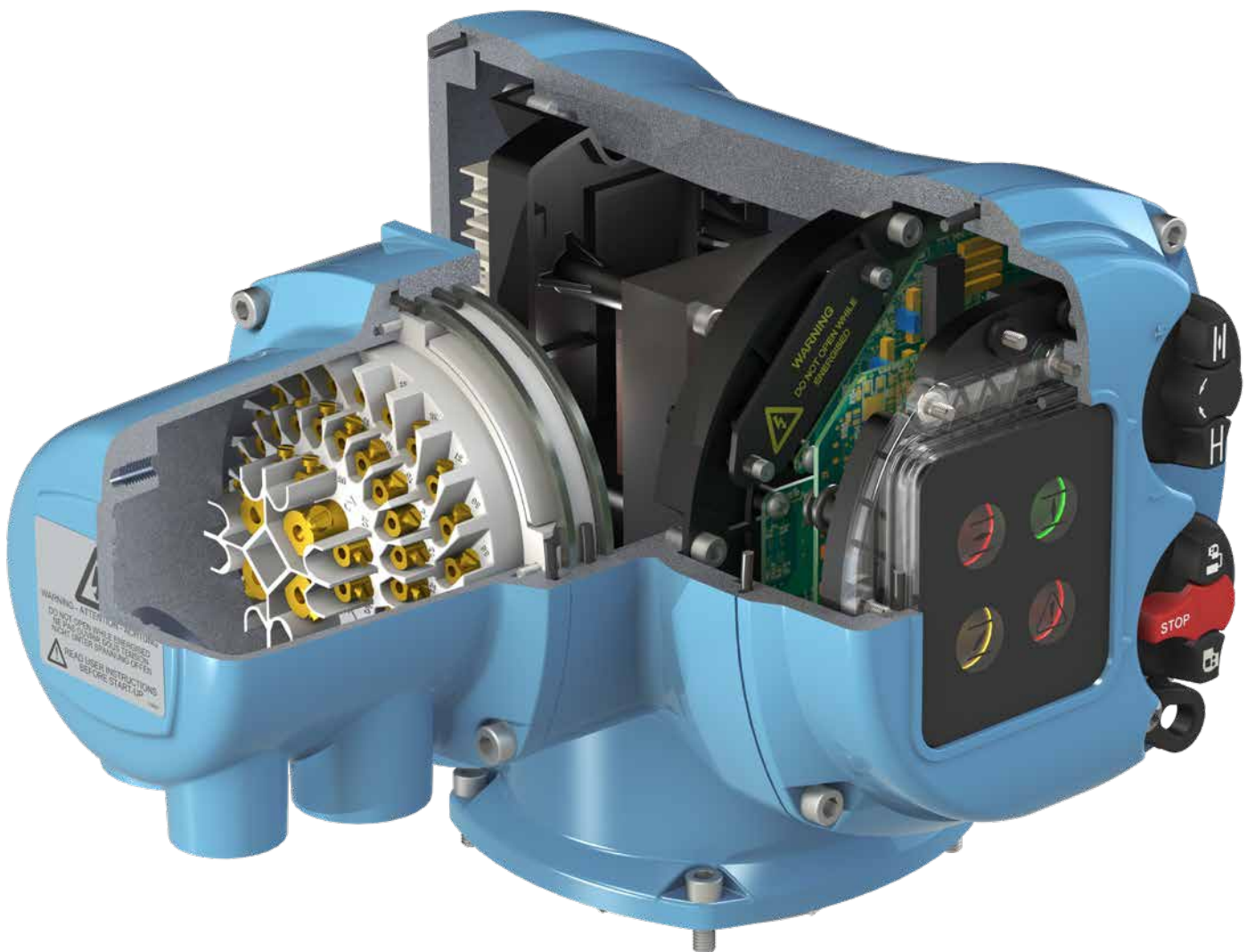
For CKA and CKRA units, the motor switching is controlled with a reversing contactor. This enables integrated directional control for isolating duty applications and proven reliability for soft modulating duty applications.

### Integral controls

CKA and CKRA actuators are offered as a ready-to-operate actuation solution. The motor switch gear, power supply components and integral control logic interface allow a unit to be operated with the local controls when applying only an adequate power supply. Remote operation can be achieved using appropriate commands to the pre-defined terminals. Electrical mating between the Atronik module and CK actuator uses a plug & socket connection matching the terminal housing connector.

### Status Indication

Atronik controls offer built in fault detection with clear local LED indication. Two standard configurable relays are included to provide remote indication for position or torque limit, motor stall, thermostat trip, mode selection, ESD active, blinker moving status and manual override operation.



## CKA Atronik Range

### Electrical plug & socket connection

The Rotork plug & socket connection utilises a uniform fitment between electrical modules. This maintains the terminal pin allocations for the various actuator functions.

A plug & socket connection is used between a CK (or CKR) and the terminal housing to provide a quick disconnect method for maintenance work. This solution also prevents the field wiring connections being disturbed.

For Atronik actuators, a plug & socket connection is also used between the CK or CKR and Atronik control module. This enables quick removal and connection of the actuator controls during maintenance periods. The terminal housing plugs into the Atronik module in the same manner as a CK or CKR actuator.

### Actuator switch mechanism

CKA and CKRA actuators are compatible with the Mechanical Switch Mechanism (MSM).

Instantaneous position and torque are sensed mechanically and IP67 rated micro switches provide end of travel indication as well as torque trip indication. Torque and position switches for both directions require mechanical configuration.

### Optional extras

To further extend functionality of Atronik equipped actuators, additional option cards can be fitted to the internal electronics. Analogue control (4-20 mA, 0-5 V or 0-10 V) and feedback (4-20 mA) is available for positioning applications. Four extra configurable relays offer additional feedback contacts.



## CKA Atronik Range

### Operating control mode

The Open/Close and Local/Stop/Remote selectors are magnetically coupled to the designated switches with no physical penetration through the control cover. This further enhances the environmental protection of the CK actuator range. The Local/Stop/Remote selector defines the current actuator operating mode and is lockable in any position.

Local will provide operation via the open/close selector. Stop will prevent all actuator electrical operation. Remote will prevent local electrical operation of the actuator; operation is only viable through the hardwired digital inputs, analogue control source or network option card.

### Automatic self-test diagnostics

Actuator conditions are monitored throughout operation to ensure reliable actuation. Should an alarm condition occur, the fault condition LED will illuminate which will prompt the operator to investigate.

### Simple configuration

Control module functions are determined by DIP switch settings. The DIP switches are positioned behind the user interface and located on the exposed electronics for easy access.



Atronik CK actuator with Additional Indication Drive (AID)

## CKA Atronik Range

Modern actuators can be adapted to a wide variety of special applications. Monitoring and diagnostic functions are an increasingly important requirement for valve automation.

Functionality of the Atronik module will vary depending on additional option cards fitted for network and analogue systems.

Atronik compatible CK and CKR actuators will only report actuator movement, position limit and torque limit status from the mechanical switch mechanism. If the optional potentiometer drive is fitted, intermediate position feedback can be communicated to the Atronik for options that use intermediate position.

### Indication LEDs

The Atronik control module includes four status indicators for position and fault indication. When a condition is active, the applicable LED will illuminate. For position feedback, open and close limit status is indicated with configurable red or green LEDs and intermediate position is indicated with a yellow LED behind the relevant position indicator. If a fault condition occurs, fault is indicated with a red LED behind the fault indicator.



**OPEN**  
position status



**CLOSE**  
position status



**INTERMEDIATE**  
position status



**FAULT**  
status



## CKc Centronik Range

The close coupled or remote mounted Centronik control module comprises intelligent electronic controls with a visual user interface for setting configuration.

When the Centronik is fitted in combination with the digital switch mechanism, all position and torque settings can be adjusted non-intrusively via the display screen. If the optional Bluetooth wireless module is included in the Centronik then configuration can be performed wirelessly with the Rotork Setting Tool or through Insight 2 PC software.

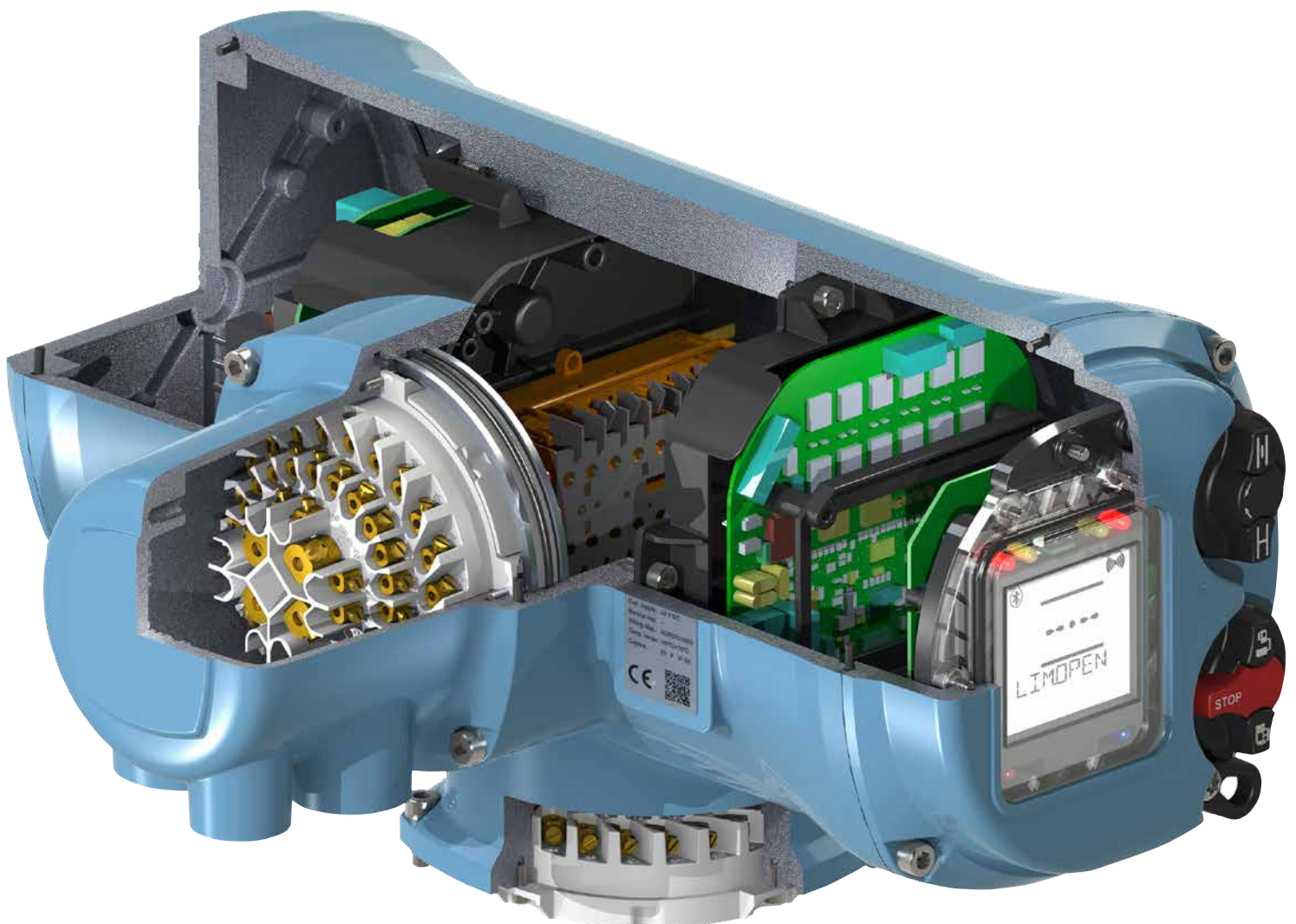
Centronik actuators (CKc and CKrc) perfectly suit site locations where complex system integration is required. When applicable, actuator configuration can be performed over the network interface. The communication options also support site asset management attributes for detailed identification and logging purposes.

### Remotely mounted electronics

Rotork provide an option to remotely mount the Centronik module of a CKc or CKrc actuator. A cable length of up to 100 m (328 ft) enables sufficient access to Centronik equipped actuators where the valve or damper location is restricted by site space constraints.

### Integral controls

Actuators equipped with the Centronik module (CKc or CKrc) are offered as a ready-to-operate actuation solution. The motor switch gear, power supply components and integral control logic interface allow a unit to be operated with the local controls when applying only an adequate power supply. Remote operation can be achieved using appropriate commands to the pre-defined terminals. Electrical mating between the Centronik module and CK actuator uses a plug & socket connection matching the terminal housing connector.



## CKc Centronik Range

### Electrical plug & socket connection

The Rotork plug & socket connection utilises a uniform fitment between electrical modules. This maintains the terminal pin allocations for the various actuator functions.

A plug & socket connection is used between a CK or CKR and the terminal housing to provide a quick disconnect method for maintenance work. This solution also prevents the field wiring connections being disturbed.

For Centronik actuators, a plug & socket connection is also used between the CK or CKR and Centronik control module. This enables quick removal and connection of the actuator controls during maintenance periods. The terminal housing plugs into the Centronik pack in the same manner as a CK or CKR actuator.

### Actuator switch mechanism

CKc and CKRc actuators are compatible with the Mechanical Switch Mechanism (MSM) and the Digital Switch Mechanism (DSM).

**MSM** – Instantaneous position and torque are sensed mechanically and IP67 rated micro switches provide end of travel indication as well as torque trip indication. Torque and position switches for both directions require mechanical configuration.

**DSM** – Position and torque is measured by Hall effect sensor absolute encoder technology. Intermediate position and torque values are transmitted to the control module for further processing. Torque and position limit values are configured non-intrusively in the control module software.

### Diagnostics

The intelligent Centronik module has the ability to log specific data sets that are particularly relevant to actuator operation. Attributes such as actuator build and serial number are stored as static information; while active attributes such as Open/Close operations, Open/Close limit switch trips, Open/Close torque trips, motor starts and number of actuator power cycles are collected over the lifetime of the actuator. These provide a log of actuator activity that can be used for process analysis and preventative maintenance scheduling.

### Auto limit setting

In certain applications it is useful to have an automatic limit setting function. This uses hard stops in the valve to sense the correct position limits. CK actuators equipped with the digital switch mechanism are able to perform an automatic setting process that spans the complete valve stroke. Movement continues in both directions in turn until 40% torque is measured. Once the operation is complete in both directions, the positions limits are calibrated at the measured end of travel points and the actuator is commissioned with the valve.

### Motor switchgear

For CKc units, the motor switching is controlled with a reversing contactor. This enables integrated directional control for isolating duty applications. For modulating duty applications that require a higher duty cycle we offer the CKRc actuator with an integral solid state starter. Please contact Rotork to determine which option best suits your application.



## CKc Centronik Range

### Operating control mode

The Open/Close and Local/Stop/Remote selectors are magnetically coupled to the designated switches with no physical penetration through the control cover. This further enhances the environmental protection of the CK actuator range. The Local/Stop/Remote selector knob defines the current actuator operating mode and is lockable in any position.

Local will provide operation via the open/close selector knob and allow configuration changes. Stop will prevent all actuator operation unless an ESD command is set to override a local stop condition. Remote will prevent any local operation of the actuator or modification of the setting configuration; operation is only viable through the hardwired digital inputs, analogue control source or network option card.

### Valve and damper position indication

In addition to the local indication LEDs, the graphical display will show the current position in large seven segment characters. If a mechanical switch mechanism is fitted then it must be equipped with the optional potentiometer to report position to the Centronik module.

### Control commands

Operating control commands such as intermediate analogue position and digital open/close signals can be displayed locally on the actuator to ensure correct communication with the DCS.

### Automatic self-test diagnostics

Actuator conditions are monitored throughout operation to ensure reliable actuation. Should an alarm condition occur, the graphical display will provide an alarm status description on screen that will offer the site operator a start point to continue fault finding. Alarm conditions can also be separated into the NAMUR categories to suit system integration.

### Main settings menu

The main menu provides the user with an intuitive logical structure for all actuator configuration settings.

### Non-intrusive configuration

Provided the unit is fitted with a digital switch mechanism, the end of travel position limits and torque trip limits can be set via the Centronik user interface display and local open/close selector.

The Rotork Setting Tool will enable setting modification using infrared or Bluetooth wireless communication. For units fitted with the mechanical switch mechanism, position and torque limits require manual calibration.

### Remotely mounted starters

Rotork provide an option to remotely mount the Centronik module of a CKc or CKRC. A cable length of up to 100 m (328 ft) enables sufficient access to Centronik equipped actuators where the valve or damper location is restricted by site space constraints.



Remote mounted Centronik controls



## CKc Centronik Range

Modern actuators can be adapted to a wide variety of special applications. Monitoring and diagnostic functions generate signals and collect operating feedback data.

For actuators with the optional Centronik module, accessing detailed operating data is performed via the clearly structured and intuitive multilingual user interface. Functionality of the Centronik module will vary depending on additional option cards fitted (for network and analogue systems) and the type of actuator switch mechanism fitted.

The mechanical switch mechanism will only report actuator movement, position limit and torque limit information. If an optional potentiometer drive is fitted, intermediate position feedback can be communicated to the Centronik display. Configuration of the actuator limits will require manual setup.

The digital switch mechanism can report all position and torque information to the Centronik module for data logging and operator feedback. Configuration of actuator limits can be performed through the non-intrusive display interface with a Rotork Setting Tool or via Insight 2 PC software package if the optional Bluetooth wireless module is fitted.

### Password protection

The Centronik module incorporates a password protection system to prevent unauthorised access to actuator setting modification. This is an important part of maintaining the operating site's security integrity.

### Bluetooth wireless security

For Centronik modules that include optional Bluetooth wireless technology, communication is performed via secure infrared initiation with the Rotork Setting Tool or through a Bluetooth wireless enabled PC running Insight 2 PC software. Every CKc or CKrc is immune to connection by non-Rotork devices or programmes and a valid password entry is required to edit any actuator configuration settings.

### Backlit display

The multilingual user interface display on the Centronik module shows text and numerical figures relevant to actuator operation. Graphical symbols are also visible for appropriate functions. The display backlight is designed to provide good visibility in direct sunlight or challenging weather conditions.

### Indication LEDs

The Centronik display incorporates indication LEDs that can show position, torque, alarm status and connection activity. For position feedback; open and closed limit indication is user configurable (red or green) and intermediate position is yellow. It is important that operations and maintenance personnel can safely work around the actuated valve and know its status at all times. Duplicated LEDs facilitate wider viewing angle. Alarm status will trigger a solid red LED at any point of travel. An active Bluetooth wireless connection will be indicated as a solid blue LED.

Position display



Non-Intrusive setting



Asset management



Actuator error

