

centork®

Developing the Future



CK range



Multi-turn • Quarter-turn • Control Systems

Modular Design Electric Valve Actuators

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Centork – Valve Actuation

Centork actuators have been developed with over 20 years of experience in actuation solutions. Our valve actuation products range from standard mechanical actuators to advanced digital actuators with integral controls.

Centork has an extensive product range catering for all industries. Our actuation solutions deliver state-of-the-art performance, value and reliability to the global valve industry. We can help you through the process of product selection and specification from the installation of a single actuator up to complex system integration.

With an international network of offices and distributors we can fully support customer and end user requirements. Over 1,000 service technicians are employed by our company, partners and representatives, providing the necessary worldwide infrastructure to fully support actuators in the field.

Worldwide coverage

Our extensive international network enables us to think globally and act locally when it comes to supporting our customers. Centork provides an efficient sales service, after sales commissioning and maintenance support throughout the life of the actuator.

Global manufacturing

Product reliability and integrity are priorities in Centork product development. Our quality control teams source components from suppliers throughout the world to ensure our customers always receive first class actuation solutions.

Customer support

Centork provide service support solutions to maximise your productivity and reduce your operational risk.





Introduction

The new CK actuator range has been designed to meet the needs of diverse actuation applications required by the valve industry and its customers. The CK range 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. The product range includes simple, robust actuators (CK Standard) suited to harsh environmental conditions, through to intelligent Centronik control module (CKc) equipped actuators for applications that require enhanced actuator status, feedback and control.

Standard reliability

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

Centronik intelligence

The Centronik control module is compatible with all CK actuator configurations and can be retrofitted to CK Standard actuators to provide intelligent valve automation. Centronik is designed to work either with the CK Standard mechanical switch mechanism or the optional digital switch mechanism.

Rigorous testing

Centork products are subjected to rigorous testing procedures that age test the actuators against harsh environmental forces such as vibration, ultraviolet radiation, flooding and extreme temperatures.

Wide range of applications

The CK range has been designed to function reliably in applications and environments throughout the world. The CK range modular design embraces the collective demands of actuator user industries and provides a viable cost-effective solution to suit all applications.

CK range

- CK** Standard isolating duty actuator
- CKc** Centronik isolating duty actuator
- CKR** Standard modulating duty actuator
- CKRC** Centronik modulating duty actuator



CK range

The new Centork CK actuator range offers the following features and benefits:

- CK Standard is the solution for users with centralised motor control centres or high temperature and/or sustained vibration applications
- 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
- All major components of CK Range actuators are modular
- Modular construction facilitates:
 - Fast order turnaround and quick delivery
 - Off-the-shelf solution for spares and upgrading
 - Speed changes
 - Controls package upgrades
 - Indication output changes
- Hollow output drive to accept rising valve stems
- Plug and socket electrical connection for easier field wiring
- Detachable thrust and non-thrust base options
- Standard B1 coupling with B3 and B4 available
- Secure padlockable manual handwheel drive, fully independent of the motor drive train
- 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 valve position indication even during power loss
- Watertight - IP68 (8 m / 96 hrs), NEMA 4 & 6 rating as standard providing enhanced environmental protection
- Multi-turn output torque up to 10,800 Nm (8,000 lbf.ft)
- Quarter-turn output torque up to 205,600 Nm (151,600 lbf.ft)
- Non-intrusive setting of Centronik module via local control knobs, infra-red or optional *Bluetooth*® wireless communication
- Centronik module features:
 - 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 for digital switch mechanism only
 - Network bus connectivity
 - Datalogging and analysis with Accent software

CK and CKR

Standard isolating and modulating duty actuators



CK Standard and CKR actuators

- Torque: 10 - 500 Nm (7 - 369 lbf.ft)
- Max. Torque with multi-turn gearbox: 10,800 Nm (8,000 lbf.ft)
- Max. Torque with quarter-turn gearbox: 205,600 Nm (151,600 lbf.ft)
- Automation of gate and globe valves, as well as other multi-turn applications like sluices and weirs with large stem diameters

CKC and CKRC

Centronik isolating and modulating duty actuators

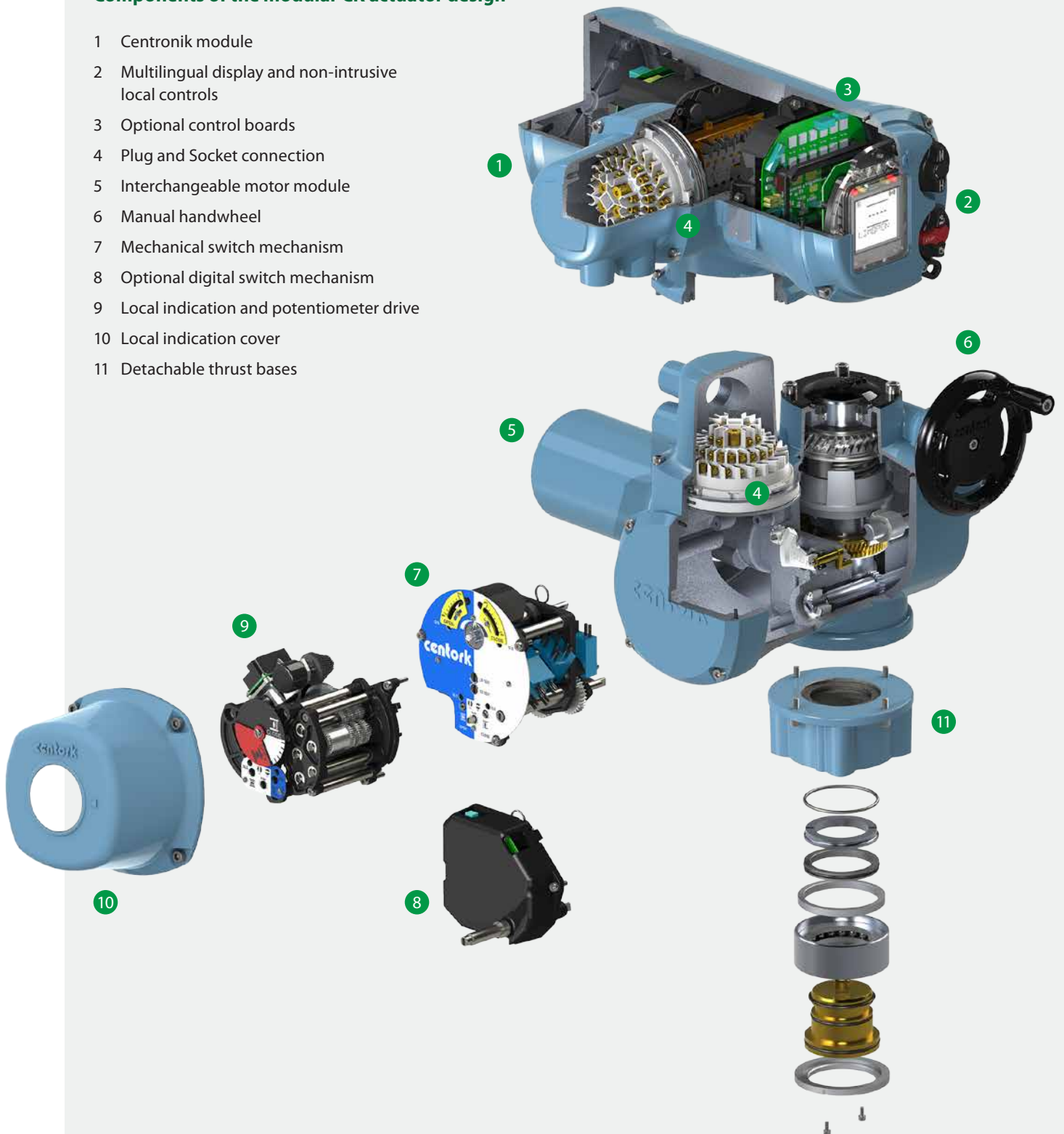


CKC and CKRC Centronik actuators

Microprocessor based controls for functionally sophisticated applications and/or for integration of actuators into fieldbus systems

Components of the modular CK actuator design

- 1 Centronik module
- 2 Multilingual display and non-intrusive local controls
- 3 Optional control boards
- 4 Plug and Socket connection
- 5 Interchangeable motor module
- 6 Manual handwheel
- 7 Mechanical switch mechanism
- 8 Optional digital switch mechanism
- 9 Local indication and potentiometer drive
- 10 Local indication cover
- 11 Detachable thrust bases



CK range



Extensive torque range

Centork CK multi-turn actuators cover a torque range between 10 and 500 Nm (7 and 369 lbf.ft). We also offer a wide range of bevel, spur and worm type secondary gearboxes. These gearboxes accommodate multi-turn applications that require up to 10,800 Nm (8,000 lbf.ft) and quarter-turn valve applications up to 205,600 Nm (151,600 lbf.ft). The large torque span available with the CK range means there is a suitable actuator for valves of any pressure and size in most power, water and industrial applications. All actuators can be integrated into an existing DCS using industry standard control technologies.

CK multi-turn actuator CK 30 – CK 500
Torque range 10 – 500 Nm (7 – 369 lbf.ft)



Combinations with multi-turn
bevel and spur gearboxes
Maximum 10,800 Nm (8,000 lbf.ft)



Combinations with quarter-turn
worm gearboxes
Maximum 205,600 Nm (151,600 lbf.ft)

Intelligent Modular Design

CKc and CKrc controls

- All actuator configuration settings are shown in a logical menu structure on the large Centronik LCD display
- User-friendly and multilingual menu navigation to suit global markets
- Configuration via local controls or using a handheld Centork Setting Tool
- *Bluetooth* wireless connectivity is also available for the Centronik module



Reliable actuation solutions

With 20 years of actuator design experience, modern manufacturing methods and attention to quality control, Centork provide a reliable range of actuators for critical and non-critical applications.

Operational safety

In emergency situations, CK actuators have the ability to perform an emergency shutdown action when triggered by an independent remote input. This action will cause actuator movement to a predetermined position. Network communication can be combined with hardwired digital inputs to provide parallel control and feedback communication in the case of a system failure.

Enhanced manual and motorised operation

The independent hand operated drive train of CK range actuators entirely disengages the motor drive to ensure completely independent safe manual operation. Electrical operation automatically disengages the manual drive train clutch mechanism ensuring the handwheel does not move during powered operation.

Standard valve mounting

The CK range has standard actuator base dimensions and couplings (conforming to ISO5210 and MSS SP-102) for simple attachment to the valve shaft adapter flange. A standard hollow centre column offers direct mounting capability for rising stem valves.

Centronik – Advanced diagnostics capability

Centronik provides continuous recording and analysis of all effective actuator attributes and variables such as torque, position and alarm status. Plant operators can receive information about developing issues prior to system failure to ensure the correct preventative action is taken to maintain control integrity. All events and signals can be classified according to NAMUR guidelines.

Settings, operation processes and faults are recorded in time-stamped event records which can be displayed whenever required.

Centronik – Device system integration

Centronik CKc actuators are provided with up to 14 discrete command inputs and 12 potential-free output contacts to provide extensive control and feedback features for DCS integration. The Centronik module offers an interface to all the major actuation fieldbus systems including; Profibus® DP, Foundation Fieldbus®, Modbus® and HART®. Where applicable, fieldbus options support the use of FDT/DTM for easier integration with the DCS.

Centronik – Enhanced applications

- Voltage supply tolerance $\pm 10\%$
- Ambient temperatures between -30 and $+70\text{ }^{\circ}\text{C}$
- Optional low temperature build available between -40 and $+60\text{ }^{\circ}\text{C}$



Modular Design – CK Standard Range

Multi-turn actuator CK Standard

The Centork CK Standard and CK_R actuators are the simplest models in the CK range. They are designed for use with external controls and motor switchgear. CK Standard actuators comprise the following components:

- Motor, drive train and independently declutchable manual override handwheel for hand operation including padlock able 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.

To operate a CK Standard or CK_R, 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.

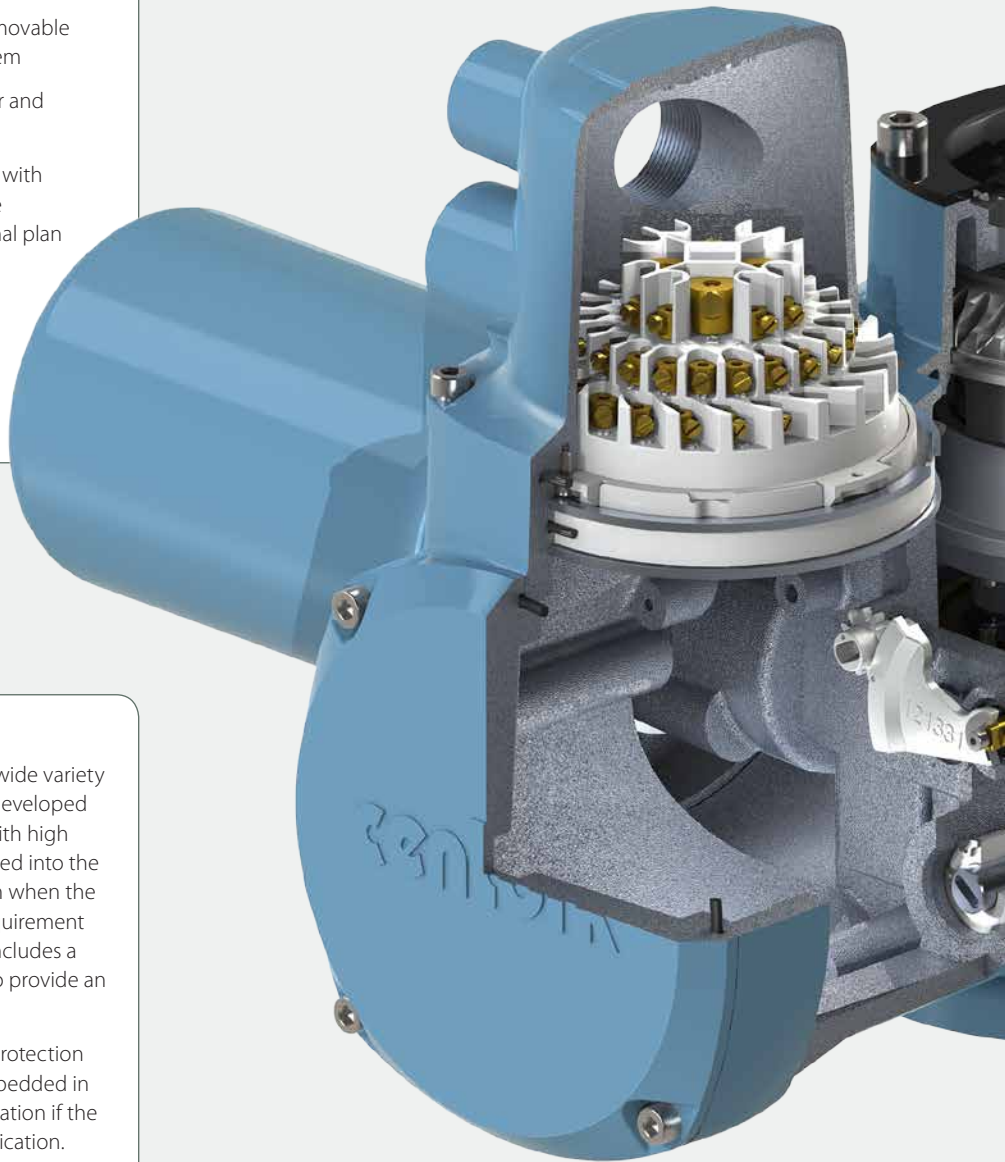
A CK Standard or CK_R actuator can be upgraded with a Centronik control module to provide a ready-to-operate actuation solution with integral controls and motor switchgear.

Motor

To meet the specific torque characteristics of the wide variety of applications in our global market, Centork 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 torque demand increases due to wear or requirement for maintenance. For isolating service valves 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.





CK range

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 type of valve 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. Depending on the customer specification, the CK range actuator will be supplied with either a mechanical switch mechanism or a digital switch mechanism.

Mechanical switch mechanism – instantaneous valve position and torque are sensed mechanically and IP67 rated micro switches provide end of travel indication as well as torque trip indication. The end of travel torque trip and position limits for both directions require mechanical setup.

An optional module can be added to provide intermediate travel switches and potentiometer to drive a continuous remote analogue signal for position feedback to the plant control room or DCS.

Digital switch mechanism – designed for use with the Centork Centronik module, enables the user to perform non-intrusive configuration of the actuator limit positions and torque trip levels.

Through the use of a multiple geared absolute encoder, Centork CK actuators can measure absolute valve position with built in redundancy and self-checking. Torque sensing is also achieved through a separate sensor, integral to the digital switch mechanism and provides accurate torque measurement up to rated torque.

Position and torque information is processed within the Centronik module for full operational control of the valve. Actuator status information is continuously monitored and recorded digitally in the actuator datalogger.

Modular Design – CK Centronik Range

Centronik

The Centronik control module comprises of 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 with a Centork setting tool. If the optional *Bluetooth* wireless module is included in the Centronik then configuration can be performed wirelessly with the Centork Setting Tool or through Accent 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

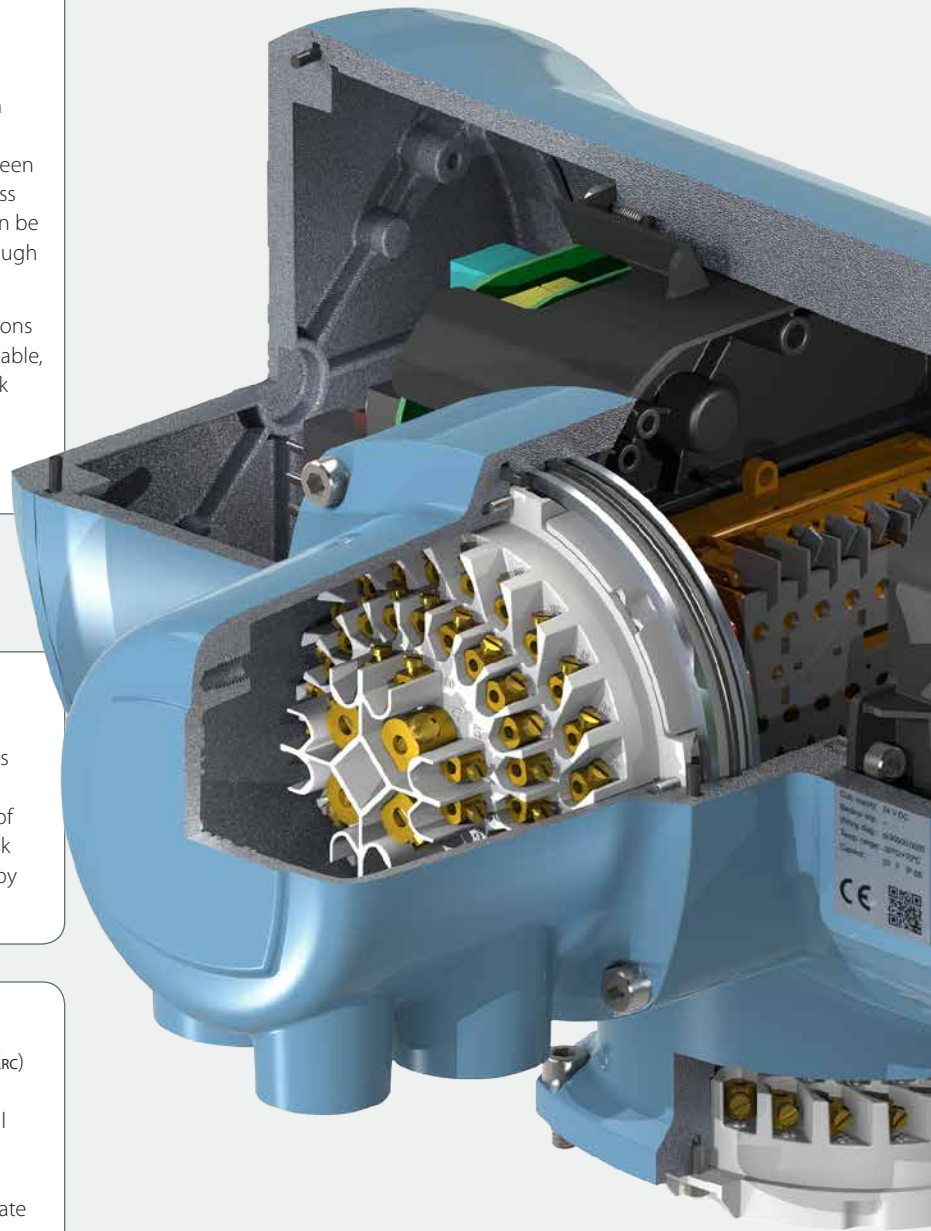
Centork provide an option to remotely mount the Centronik module of a CKc or CKrc actuator for applications where high ambient temperatures or excessive levels of vibration are present at the valve location. A cable length of up to 100 metres also enables sufficient access to Centronik equipped actuators where the valve 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.

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 Centork to determine which option best suits your application.



CK range



Electrical plug & socket connection

The Centork 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 Standard (or CK_R) 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 Standard (or CK_R) 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 Standard or CK_R actuator.

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 time and date stamped log of actuator activity that can be used for process analysis and preventative maintenance scheduling.

 Bluetooth®



Accurate Valve Control

Stopping at the valve limits

Regardless of the actuator duty cycle, the actuator must automatically stop movement at each end of travel to fully shut or open the valve. The standard mechanical switch mechanism and Centronik digital switch mechanism can both satisfy automatic motion inhibiting requirements depending on the type of valve.

Mechanical switch mechanism

- For position limit seating, pre-set limit switches will disengage the motor supply when the actuator reaches the set position.
- For torque limit seating, pre-set torque switches will disengage the motor supply when the torque delivered by the actuator reaches the set limit.



Digital switch mechanism

- For position limit seating, pre-set position values are stored as the valve travel limits. When the current position value is equal to the set limit value the motor supply will be disengaged.
- For torque limit seating, pre-set torque values are stored as the valve torque limits. When the required torque of the actuator matches or exceeds the set limit the motor supply will be disengaged.



Operation protection

Torque protection to prevent valve damage

If the operating torque output of the actuator exceeds the set torque limit during operation, the torque switch will trip, inhibiting movement in that direction. It can then only be operated in the reverse direction to potentially free the obstruction before being allowed to continue in the original direction.

Thermal motor protection

The CK actuator uses self-resetting thermo-switches embedded in the motor windings which are designed to trip as soon as the motor temperature exceeds +132 °C. Once the motor has cooled to normal operating temperature, the thermo-switch will reset and electrical operation can resume.

Control Methods

Actuator controls

Centork actuators are designed to be integrated within any automation system or application around the world. With the optional Centronik module, CKc range actuators provide an easy solution for integrally controlled actuation that avoids the lengthy process of installing external controls for each actuator on site. The integral control approach to actuation improves the ease of commissioning and integrating actuators into a DCS.

External controls

The term “external controls” refers to the controls associated with standard actuators without integral controls or motor switchgear. Only a few components are housed in the actuator enclosure to provide feedback and connectivity to the external controls.

External controls will commonly be housed in a control cabinet with a controlling system such as a PLC for actuator operation. This external controller provides the logic that oversees control and feedback signals, including motor operation in the open and closed direction, limit switch status, torque switch status, motor protection and intermediate valve position (if applicable). External motor control switchgear will normally be located in the plant’s motor control centre. Care and attention must be paid during the wiring and programming stages to ensure the control system operates the valve in the correct direction. Should additional local control for plant operation use be required, additional hardware must be installed and incorporated into the external controller programming appropriately.

Actuators that require external controls within the Centork CK range are designated as CK Standard for isolating duty and CKr for modulating duty.

Centronik

Actuators that include the integral Centronik control module are designated CKc for isolating duty and CKrc for modulating duty.

The addition of the Centronik module to the CK Standard provides intelligent, integral control for use with all site control systems. It permits the use of hardwired, network or analogue control & indication, offering cost-effective implementation with centralised control systems.

Centronik actuators allow the valve maker/integrator the ability to pre-test the motorised valve assembly using local control with no extra wiring or motor control gear required.

Configuring an actuator fitted with Centronik is easy and non-intrusive. A password protected setup menu can be viewed on the Centronik display. Standard navigation through the menu driven configuration screens is carried out using the local open/close selector. Settings can also be adjusted through the use of a Centork Setting Tool via infra-red or optional *Bluetooth* wireless communication.

The Centronik display also provides position indication, status and alarms for operation. Centronik includes data logging capabilities showing actuator starts, status and events on screen.

Integral controls

The term “integral controls” refers to actuators that contain the necessary internal motor switchgear and electronic controls to operate with just an external power supply and local command signal.

Integral controls enable the actuator to be fully configured independently of the DCS or site control system. This is important as it enables site operators to perform installation and commissioning tasks during a scheduled site down-time period.

Networks

Modern facilities require seamless control and feedback from the actuator to the control room plus asset management data. Plant managers need operational data in real time. Process operators need full control of their facilities at all times. Maintenance managers need asset management data so that they can plan maintenance outages efficiently. To meet these requirements, digital communication networks allow electric actuators and other field devices to be controlled and monitored by computer. Using a fieldbus network reduces the requirement for extensive site wiring and purpose built hardware.

Centork actuators are network compatible when you select the CKc or CKrc Centronik option. Field upgrades for CK Standard and CKr actuators allow integration into existing site network systems.





Non-intrusive Control

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 position indication

In addition to the local indication LEDs, the graphical display will show the current valve 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 Centronik Setting Tool will enable setting modification using infra-red or *Bluetooth* wireless communication. For units fitted with the mechanical switch mechanism, position and torque limits require manual calibration.



Valve position display



Setting screen



Datalog screen



Actuator error

Centronik Features

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 Centork Setting Tool or via Accent 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 infra-red initiation with the Centork Setting Tool or through a *Bluetooth* wireless enabled PC running Accent PC software. Every CKc or CKac is immune to connection by non-Centork 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 screens 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. 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.



Accent – Analysis and Configuration Software

For actuators with integral or remote mounted Centronik control, all settings can be directly performed at the actuator using the local control knobs and Centork Setting Tool. If the actuator is equipped with the optional *Bluetooth* wireless communication module, settings can be adjusted using a device equipped with Centork's Accent PC software.

The extensive Accent PC software package can be used on any CKc actuator equipped with *Bluetooth* wireless technology. It enables the operator to view the actuator configuration and data log files for review and modification purposes. If carrying a PC to the actuator in the plant is not desirable then a Centork Setting Tool can be used to transfer actuator attributes to Accent from any CKc or CKrc actuator.

Centork Accent PC software

Actuator configurations and data log information can be saved locally on any PC that has Accent PC software installed. This data will ensure replacement modules can be quickly configured with the original actuator settings.

Centork Accent diagnostics

Accent PC package is the ideal tool to view and save the time-stamped Centronik data log. This provides site plant operators with useful data to evaluate process characteristics and valve wear trends.

Wireless connection

Connection between the actuator and programming device is based on standard *Bluetooth* wireless communication protocol, supported by most laptops and PDAs. The connection is password protected to exclude any unauthorised access.

The addressed actuator indicates access via a blue indication LED visible on the actuator display. The actuator can be clearly identified on Accent by its unique serial number and user defined *Bluetooth* wireless ID tag.

Accent PC software functions

- Programming the operation settings of CKc or CKrc actuator
- Reading all current configuration settings
- Viewing the data log file of the connected actuator
- Various live actuator operations
- Saving data log and configuration data for future use
- Loading new configuration data into a CKc or CKrc

Accent PC software and Centronik display languages currently include English and Spanish. Other languages will be available in the near future. Please contact Centork for more information.



Communication Interfaces

Whilst the mechanical fittings associated with valve automation have been standardised within industry for many years, the electrical interface between the actuator and DCS have seen many changes. This is due to the migration from conventional hardwired field instrumentation to digital networks within the valve automation industry.

The CK range is designed to accommodate all system integration requirements. The modular design approach offers various levels of actuator intelligence within the CK range. A CK Standard without integral controls would be suitable for a simple hardwired control system. However the CKc actuator equipped with Centronik controls can connect to all major fieldbus networks for complex autonomous site control.

Ever changing site requirements and actuator functions have been considered with the CK range. CK Standard actuators can always be upgraded to CKc build for improved system capabilities and DCS integration.

Hardwired digital control to the DCS

The Centronik module has the facility to accommodate a number of hardwired inputs and outputs for actuator control and feedback. You will need to refer to the actuator wiring diagram and terminal plan supplied with each actuator for the specific functions and terminal allocations.

- A total of six galvanic isolated discrete command inputs are available as standard with the following functions: open, close, stop/maintain, ESD, open interlock and close interlock
- Alternatively, an analogue control option can be fitted to suit a 0-20 mA or 4-20 mA position control system
- Four galvanic isolated potential-free output contacts are provided as standard and can be fully configured for various functions and Normally Open (NO) or Normally Closed (NC)
- One change over monitor output is provided as standard to indicate actuator remote availability. This offers a NO or NC wiring possibility to suit bespoke system integration.
- An additional four potential-free contacts are supported with the Centonik Remote Output option. These are fully configurable and behave in the same manner as the standard outputs.
- An analogue feedback option can also be fitted to accompany or replace the standard digital status feedback. The operating range can be configured to 0-20 mA or 4-20 mA and set to report actuator position or actuator torque.

PROFI
BUS



Modbus

HART
COMMUNICATION PROTOCOL



PLC/DCS

CKc Field Unit



CKRc Field Unit



Communication Interfaces

Serial communication

Centork has developed the Centronik module with consideration to the continuous development of industrial network systems. With a dedicated systems support team, Centork can engineer new functionality for compatible fieldbus networks that relate specifically to valve actuation.

All fieldbus communication options for the CK range are fully upgradable to suit future firmware releases, which enable extended functionality.

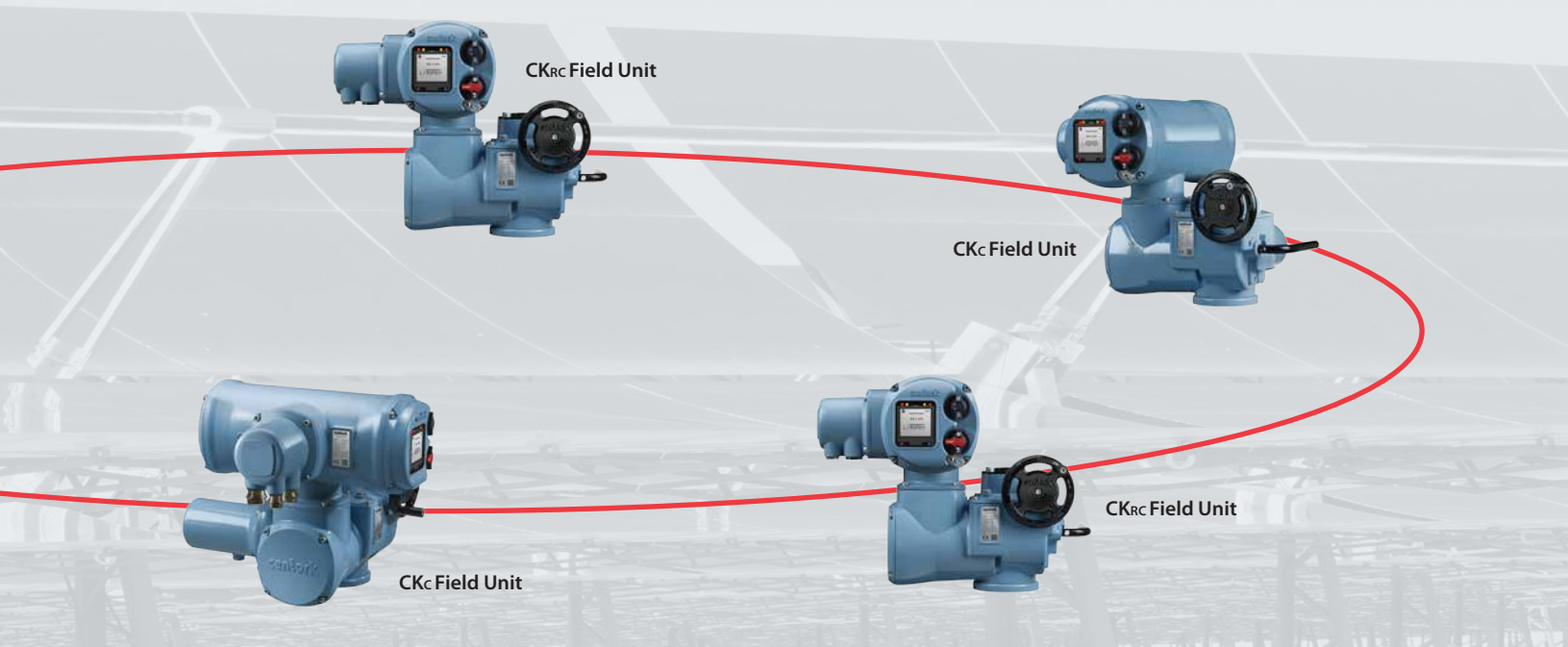
Fieldbus communication can be used independently or in conjunction with digital hardwired control systems depending on the specific application or site requirements.

Profibus®

A Profibus DP interface module is available to integrate CKc and CKRc actuators into a Profibus network. Full compatibility with EN 50170 is provided and the Profibus network allows full actuator control and feedback of data to the host. For more information please contact Centork.

Foundation Fieldbus®

An IEC 61158-2 compliant Foundation interface module allows the actuator to be connected to a Foundation network. The device has link scheduler capability as well as digital and analogue function block capability. Foundation Fieldbus actuators can communicate directly between themselves without the need for a host supervisory system. For more information please contact Centork.

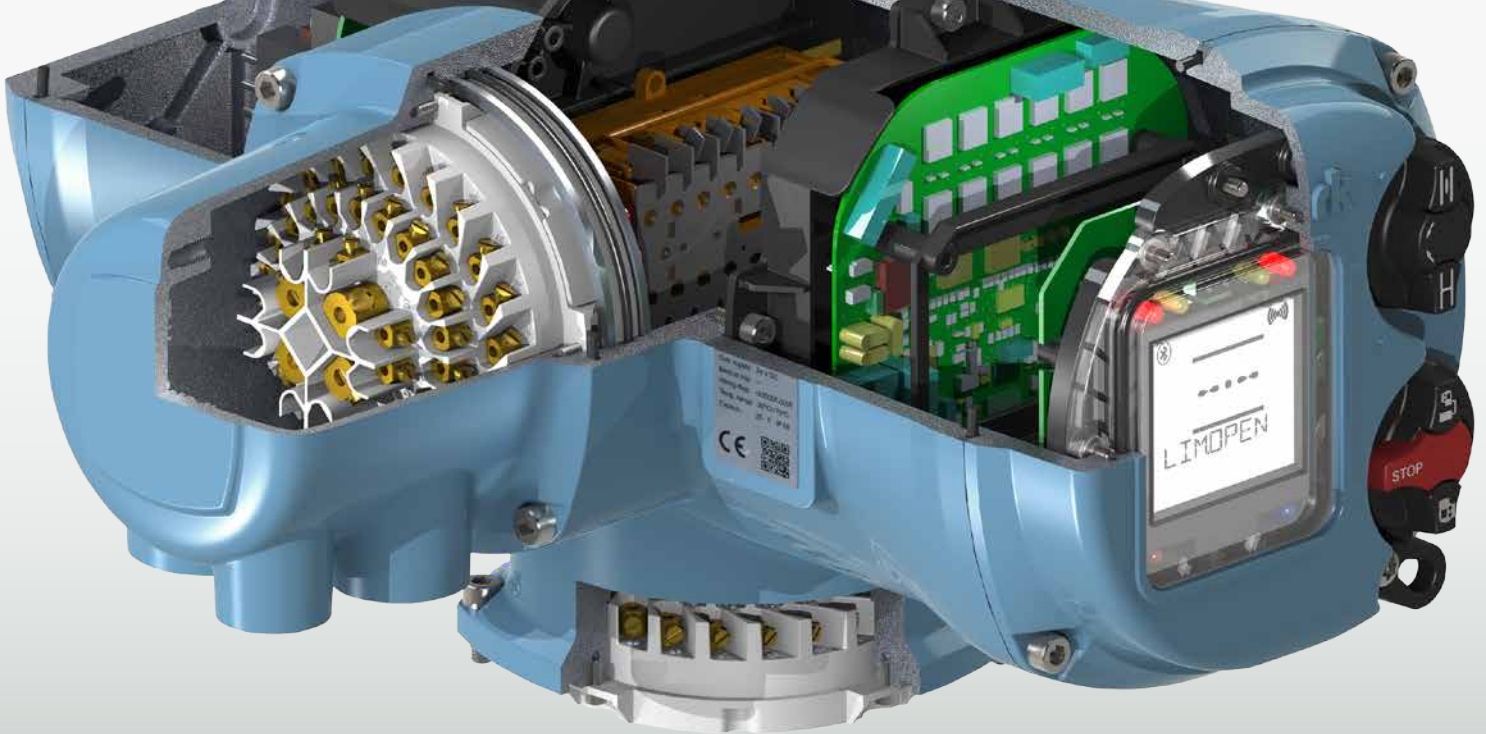


Modbus®

Modbus modules suitable for single or dual communication highways may be included in CKc or CKRc actuators and provide Fieldbus communication of all the actuator control functions and feedback data. Data is carried on an RS485 data highway and the communications protocol used is Modbus RTU. System variables such as unit address and data baud rate are programmed over the infra-red or *Bluetooth* wireless communication data link. For more information please contact Centork.

HART®

Highway Addressable Remote Transducer (HART) is a process control communication protocol. The signal consists of two parts, the analogue 4 to 20 mA current loop and a superimposed digital signal. Traditionally the 4 to 20 mA loop is used for control and the superimposed digital signal for feedback, diagnostics and configuration. Configuration and feedback using the HART digital signal can be achieved using the host connected to the actuator to select the parameters required. The majority of user configurable settings can be made over the HART communication protocol. For more information please contact Centork.



Electrical Connections

Modular electrical connections

The Centork plug & socket has been designed to work efficiently and effectively within the modular design approach for the CK range. All Centork plug & socket connections are universal within the CK range and remain uniform between CK Standard and CKc actuator types. For further details on the plug & socket connection type please refer to the actuator terminal plan.

Terminal housing

The terminal housing module for the CK range includes one plug & socket connection with separate power and control field wiring terminals. Three conduit entries are provided to suit various gland/cable size requirements. Please refer to the technical data section of this brochure for further details.

Plug & socket sealing

If the actuator IP68 rating has to be maintained whilst the terminal housing or Centronik module is unmated, a double-sealed solution can be provided to prevent fluid or dust ingress during maintenance. This option is available on any CK range actuator.





Mechanical Connections

Reliable valve mating

All Centork mounting flange dimensions are in compliance with ISO 5210 or MSS SP-102. Please refer to the technical data section of this brochure for further details.

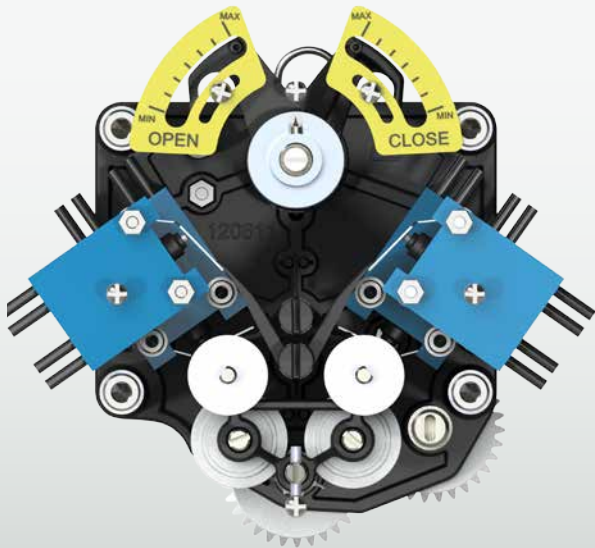
Output drive couplings

All CK range actuators have a **B1** output drive type as standard. **B3** and **B4** are available through the use of adapter sleeves designed to mate with the standard **B1** coupling.

Thrust bearing coupling

A detachable thrust base can be fitted for thrust bearing applications. The **A** type drive assembly is supplied as a self-contained cartridge assembly, facilitating quick removal and reassembly. Please refer to the technical data section of this brochure for details of maximum axial thrust ratings.





Mechanical Switch Mechanism

Setting of position and torque limits

After removal of the switch mechanism cover, limit and torque settings are easily accessed and adjusted using a flat pan screwdriver. For units fitted with the local indication cover, the indication mechanism will need to be temporarily detached to access the switch mechanism interface.

Reduction gearing

The Centork reduction gear module, within the mechanical switch mechanism, can be adjusted to suit the required output turns for full valve. The standard reduction gearing can accommodate application requirements of up to 1,500 turns.

Extended range gearing

The standard reduction gear module can be expanded to suit application requirements of up to 15,000 output turns between the OPEN and CLOSE limits.

Blinker contact for movement indication

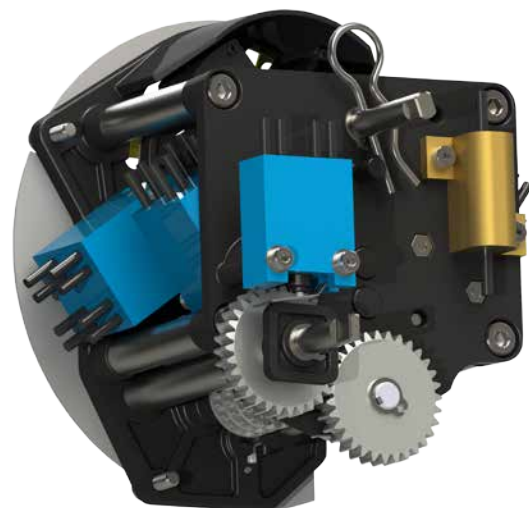
A blinker contact is fitted as standard to the mechanical switch mechanism to provide movement indication throughout valve travel. The blinker contact is separate to other micro switches.

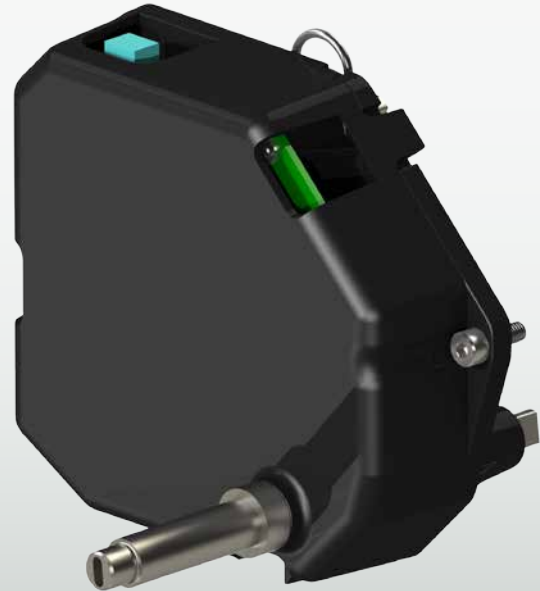
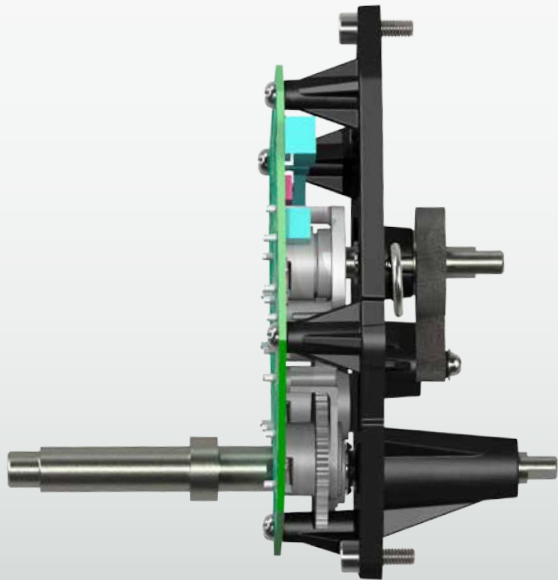
Heater

The resistive heater maintains a stable and humidity free environment for the internal switch mechanism compartment of the CK Standard actuator. This will utilise an independent power supply to ensure the integrity of the switch mechanism is maintained during a mains power loss.

Indication and control switches

Four switches are present as standard, two for end of travel indication and two for torque trips in each direction. An additional two limit switches and two torque switches are available for applications that require dual potential switching. Four extra switches can also be added for intermediate position indication between the OPEN and CLOSE limits.





Digital Switch Mechanism

The Centork digital switch mechanism is designed for use with the Centork Centronik module. This enables the user to perform non-intrusive configuration of the actuator position limits and torque trip limits via the local display with a Centork Setting Tool.

Absolute encoder

The Centork absolute encoder is a contactless position and torque sensor using only five moving parts. Through the use of multiple gearing, Centork has been able to develop a positioning encoder that incorporates redundancy and self-checking. The orientation of the three position spur gears dictates the current actuator position between the set travel limits, up to 6,000 output turns apart. Torque sensing is performed through an integral sensor providing accurate torque measurement up to rated torque.

Local indication and potentiometer

The optional remote position transmitter provides a potentiometric output from the actuator to communicate intermediate valve position. This is also required for units with a mechanical switch mechanism to report intermediate position to a Centronik module.

Datalogging

Position and torque are monitored at all times during actuator operation. Hall effect sensors contained within the gear assembly of the absolute encoder ensure all movements are recorded in the Centronik data log. This can be used for analysis at periodic service intervals or downloaded into the Accent PC software package.





Flexible Modularity

The major advantage that a modular actuator concept provides is the ease at which site upgrades can be performed.

Remotely mounted starters

Centork provide an option to remotely mount the Centronik module of a CKc or CKkc actuator for applications where high ambient temperatures or excessive levels of vibration are present at the valve location. A cable length of up to 100 metres also enables sufficient access to Centronik equipped actuators where the valve location is restricted by site space constraints.

Centork module orientation

The plug & socket terminal housing on every CK actuator can be rotated through 360° at 90° increments to best suit the site field wiring requirements. In addition to this, CKc actuators allow the Centronik module to be rotated at 90° increments at the actuator mating face.

The Centronik user interface cover can be fitted to either end of the module and can be rotated through 360° at 90° increments to provide a wide variety of orientation configurations for the best actuation solution.

Unauthorised Operation Protection

Hand/Auto lever

The manual operation engagement lever can be padlocked in place, restricting manual operation to authorised personnel only. This will suit a padlock with hasp diameter of 6.5 mm.

Local/Stop/Remote selector switch

To prevent malicious changes to the actuator operating mode, a latch can be padlocked in place to maintain local, stop or remote operation. This will suit a padlock with hasp diameter of 6.5 mm.



Valve Protection and Diagnostics

Centork actuators have been developed with over 20 years of experience in actuation and comply with global safety standards to provide a reliable actuation solution.

Phase rotation correction

All three-phase power supplies for the Centronik range include automatic phase correction to rectify incorrect power cable connection. This is an integral feature to prevent damage to the actuator, improve the ease of commissioning and ensure correct travel direction when receiving operation commands.

Valve overload protection

CK range actuators include torque measurement and independently adjustable torque limiting, for both open and close control. Operation will be inhibited should the torque level measured during travel exceed that set with the torque limit switch for the relevant direction.

Safe manual operation

The handwheel drive is independent of the motor drive and is selected with a lockable manual operation engagement lever acting on a slow speed clutch for safe operation. When the motor runs, the actuator automatically returns to motor drive.

Signal loss failure action

CK_C and CK_{RC} actuators have the ability to assign a pre-determined function should a loss of control signal occur. This can be configured for an analogue (mA) control signal or a network communication signal (digital).

Rising valve stem protection

Cover tube adaptations are available for the CK range to suit all applications. Sizes can be specified in 6" increments depending on valve stem travel. Centork cover tubes are fully sealed to prevent operator access to a moving stem and provide environmental protection to the valve stem.

Remote operation interlocks

Separate interlock signals can be configured so that a signal must be applied to the relevant interlock and control input in order for remote operation to occur.

Centronik security

Configuration via the Centronik module on CK_C and CK_{RC} actuators will require a valid password to be entered prior to changing any of the actuator settings.

Secure Bluetooth® wireless connection

For Centronik controlled actuators with optional *Bluetooth* wireless module, configuration can be performed using a Centork Setting Tool or Accent PC Software. Both methods require a valid password to be entered to establish a full connection and every Centronik control module is immune to connection by non-Centork devices or programmes.

In order for a site to maintain low cost operation, it is important that operators can monitor each actuator performance and schedule preventive maintenance to maximise up-time. Centork customers expect CK range actuators to realise three main features: extended service intervals, long service life and reliable operation. All of these attributes aid the customer to achieve a minimal cost of operation.

Development of CK multi-turn actuators and Centronik control modules has resulted in special attention to self-monitoring and diagnostic abilities. This enables site operators to schedule adequate maintenance schemes to maximise plant operation times.

Self-monitoring

Centronik equipped actuators have automatic self-test and diagnosis functions that indicate to the user if any fault state becomes active during operation. This status is visible via the local Centronik display and remotely through a DCS. If the optional *Bluetooth* wireless module is fitted within the Centronik controls, settings can also be edited through Centork Accent PC software.

Detailed diagnostics

Fault conditions and alarm statuses can be classified into the four NAMUR categories for remote diagnosis. When an alarm condition becomes active, a maintenance engineer will attend the actuator where detailed status information is provided via the user interface or through Accent PC software. The extra diagnosis information will help to identify the issue and initiate an appropriate rectification action.

Actuator operating attributes

All major actuator operation attributes are monitored and recorded within the on board Centronik datalogger. Data for significant attributes such as operating starts, stroke torque and device temperature is collected throughout the lifetime of the actuator.

Event reporting

The Centronik control module can record information regarding warning alarms, failure conditions, operation periods, setting modifications and control command inputs in a time stamped event report. This can be used to assess a preventive maintenance scheme to maintain absolute actuator reliability.

Technical Data

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Motor duty ratings

Isolating and modulating duties subject the actuator to different operating loads and mechanical wear trends. For this reason the isolating duty CK Standard can also be offered as a CK_R modulating duty actuator.

Motor duty ratings are in compliance with EN 15714-2 and IEC 60034-1 for all CK range actuators. Further information about actuator outputs and duty cycles is available in the Motor classification section.

Isolating duty actuator model designations

- CK 30 – CK 500
- CKc 30 – CKc 500

Modulating duty actuator model designations

- CK_R 30 – CK_R 500
- CK_{Rc} 30 – CK_{Rc} 500



Technical Data

Operating environments

Centork actuators are designed for use worldwide in non-hazardous water, power and industrial applications. Focus on making the CK range resistant to the most adverse environments has resulted in exceptional IP68 (8m / 96 hrs) protection. A good level of environmental protection, wide operating temperature range and extended service intervals provide a versatile actuator suitable for most applications.

Corrosion protection

Corrosion protection is a vital part of a reliable actuation solution to ensure a long service life is achieved for the product. All CK range actuator finishes are tested in accordance with Centork 1,000 hour cyclic salt spray test procedure which is the most realistic and arduous test cycle applicable. The test combines cyclic salt spray, drying and humidity at elevated temperatures on complete factory built actuators. This procedure is designed to test the finish coatings and the various substrate materials, fixings and interfaces on an actuator. Substrate materials and finishes are selected to provide maximum corrosion resistance combined with good adhesion.

Ambient temperatures

CK range actuators can accommodate a variety of operating temperature requirements that will ensure successful actuation in the harshest non-hazardous environments. The optional low temperature CK build involves replacement seals, lubrication and bearings. The optional high temperature CK build is available upon request from Centork.

Enclosure protection IP68

Centork CK range devices are supplied as standard with IP68 enclosure protection in compliance with EN 60529. The Centork IP68 rating provides protection up to eight metres submersion for a maximum of 96 hours. Up to 10 operations can be performed whilst the actuator is submerged at the maximum immersion depth.

Adequate cable glands must be used to maintain the IP68 integrity of the CK range actuator enclosure. Glands are not supplied as standard with CK actuators. In order to maintain IP68 enclosure integrity during service down time periods an optional sealing cap can be used to cover unmated module faces.

Colour

The standard colour is a pale blue - RAL5024. Other colours are available on request, please contact Centork for more information.

Type	Version	Temperature range		
		CK Standard (without integral starter and controls)	Separate mounted Centronik - CKc	Directly mounted Centronik - CKc
Multi-turn isolating duty CK actuators	Standard	-30 to +70 °C	-30 to +70 °C	-30 to +70 °C
	Optional	-40 to +60 °C -50 to +40 °C 0 to +120 °C	-40 to +60 °C -50 to +40 °C 0 to +120 °C	-40 to +60 °C
Multi-turn modulating duty CK actuators	Standard	-30 to +70 °C	-30 to +70 °C	-30 to +70 °C
	Optional	-40 to +60 °C -50 to +40 °C	-40 to +60 °C -50 to +40 °C	-40 to +60 °C

Actuator Fixings

Frame Size	Unit	CK 30 & CK 60	CK 120	CK 250 & CK 500	
Type 'A' Coupling	Flange Size (ISO5210)	-	F07 / F10	F14	
	Flange Size (MSS SP -102)	-	FA07 / FA10	FA14	
	Stem Acceptance Rising	mm	26 / 34	40	57
	Axial Thrust Rating	kN	40	70	160
	Stem Acceptance Non-Rising	mm	20 / 26	32	45
Type 'B' Coupling	Type 'B1' (Fixed bore)	mm	28 / 42	42	60
	Type 'B3' (Fixed bore)	mm	16 / 20	20	30
	Type 'B4' (Maximum)	mm	20 / 30	30	45

Technical Data

Multi-turn CK range actuator performance

Isolating duty CK Standard and CKc actuators. The following data is valid for actuators with 3-phase or single-phase AC motors operated with an S2 – 15 minutes duty rating. For further details on the electrical specification of each actuator, refer to the CK electrical motor data sheet.

Isolating CK Standard & CKc

Size	Torque				RPM (at 50 Hz)	Actuator Output Flange	
	Maximum Nm	lb.ft	Operational Nm	lb.ft		ISO 5210	MSS SP-102
CK 30	30	22	10	7	9, 12, 18, 24, 36, 48, 72, 96, 144	F07/F10	FA07/FA10
	25	18			192		
CK 60	60	22	20	15	9, 12, 18, 24, 36, 48, 72, 96, 144	F07/F10	FA07/FA10
	50	18			192		
CK 120	120	22	40	30	9, 12, 18, 24, 36, 48, 72, 96, 144	F10	FA10
	100	18			192		
CK 250	250	22	83	61	9, 12, 18, 24, 36, 48, 72, 96, 144	F14	FA14
	200	18			192		
CK 500	500	22	167	123	9, 12, 18, 24, 36, 48, 72, 96, 144	F14	FA14
	400	18			192		

Modulating duty CK_R and CK_{Rc} actuators. The following data table is valid for actuators with 3-phase AC motors operated with an S4 – 25% duty rating. For further details on the electrical specification of each actuator, refer to the CK electrical motor data sheet.

Modulating CK_R & CK_{Rc}

Size	Torque				Max. Starts	RPM (at 50 Hz)	Actuator Output Flange	
	Maximum Nm	lb.ft	Modulating Nm	lb.ft			ISO 5210	MSS SP-102
CK _R 30	20	15	10	7	1200	9, 12, 18, 24, 36, 48, 72, 96	F07/F10	FA07/FA10
CK _R 60	40	30	20	15	1200	9, 12, 18, 24, 36, 48, 72, 96	F07/F10	FA07/FA10
CK _R 120	90	66	45	33	1200	9, 12, 18, 24, 36, 48, 72, 96	F10	FA10
CK _R 250	180	133	90	66	1200	9, 12	F14	FA14
					900	18, 24		
					600	36, 48		
					400	72, 96		
CK _R 500	360	266	180	133	1200	9, 12	F14	FA14
					900	18, 24		
					600	36, 48		
					400	72, 96		

Note: 60 Hz actuator operating speed will be 120% of 50 Hz nominal speed.

Technical Data

Supply voltages/mains frequencies

Compatible power supplies for CK range actuators are shown below. Not all actuator versions or sizes are available with all motor types or voltages/frequencies. For detailed information please refer to the separate motor data sheets.

3-phase AC Modulating Duty

Voltages	Frequency
[V]	[Hz]
220, 240, 380, 400, 415, 440	50
220, 240, 380, 440, 460, 480	60

3-phase AC Isolating Duty

Voltages	Frequency
[V]	[Hz]
220, 240, 380, 400, 415, 440, 500	50
220, 240, 380, 440, 460, 480, 600	60

1-phase AC Isolating Duty

Voltages	Frequency
[V]	[Hz]
110, 115, 220, 230, 240	50
110, 115, 220, 230, 240	60

Permissible power supply tolerances for voltage and frequency

- For all CK range actuators
 - Voltage tolerance $\pm 10\%$
 - Frequency $\pm 5\%$

Vibration resistance – According to EN 60068-2-6

The actuators are resistant to vibration up to 2 g over a frequency range of 10 to 200 Hz.

Noise level

The noise level originated by the multi-turn CK actuator range does not exceed 70 dB(A) at a distance of 1 m under normal operating conditions.

Design life – according to EN15714-2:2010

An actuator start is any operation that requires the motor to start movement in either direction. If the motor is already moving and a command to operate in the same direction is applied this will not count as a start.

CK Standard & CKc actuators for isolating duty

Type	Design life rating
CK 30 - CK 500	500,000 output turns, seating at rated torque, 33% rated torque through stroke

CK_R & CK_{Rc} actuators for modulating duty

Type	Design life rating
CK _R 30 - CK _R 500	1,800,000 starts at 50% rated torque, minimum 1° movement

Motor classification

Type of duty according to IEC 60034-1/EN 15714-2

Type	3-ph AC	1-ph AC
CK 30 – CK 500	S2 – 15 min, S2 – 30 min/Classes A, B	S2 – 15 min/Classes A, B
CK _c 30 – CK _c 500	S2 – 15 min, S2 – 30 min/Classes A, B	S2 – 15 min/Classes A, B
CK _R 30 – CK _R 500*	S4 – 25%, S4 – 50% / Class C	-
CK _{Rc} 30 – CK _{Rc} 500*	S4 – 25%, S4 – 50% / Class C	-

Information on motor duty type is subject to the following conditions: nominal supply voltage, +40 °C ambient temperature and average load of 33% rated torque.

* High speed CK_R actuators have a reduced duty cycle to reduce wear on the actuator drive train. Please refer to the multi-turn CK range actuator performance data for details of duty cycle restrictions.

Rated values for motor protection

As standard, thermo switches are used for motor protection against excessive heat rise. When a Centronik unit is equipped the motor protection signals are processed internally to initiate an alarm status within the actuator. This will prevent further operation until the thermo switch has reset within the correct operating band. Signals in the CK Standard and CK_R must be analysed with external controls.

Mounting position

Centork actuators (with or without Centronik module) can be operated without restriction in any mounting position.

Technical Data

Switch mechanism control

Valve travel limit span

	Possible valve travel	
	Mechanical switch mechanism	Digital switch mechanism
Standard	1,500	8,000
Optional	15,000	-

Digital switch mechanism

When using the digital switch mechanism, any change in position or torque will be recorded in digital form and transmitted via internal can bus to the Centronik module data logger. Position limit switches are digitally set through the integral Centronik software.

Mechanical switch mechanism

In a CK Standard or CK_R actuator, the mechanical switch mechanism is internally wired to accommodate an external control system. The terminals used for various functions are specified in the actuator wiring diagram and terminal plan. All connections are via the Centork plug and socket system for simple actuator site integration.

Position and torque limit switches

Selection	Description	Contact type
Standard – 4 switches	2 position switches - 1 for each direction 2 torque switches - 1 for each direction	Each 4-wire switch has a NO and NC contact, sealed to IP67
Optional – 6 switches	4 position switches - 2 for each direction (standard plus additional switches) 2 torque switches - 1 for each direction	Each 4-wire switch has a NO and NC contact, sealed to IP67
Optional – 6 switches	2 position switches - 1 for each direction 4 torque switches - 2 for each direction (standard plus additional switches)	Each 4-wire switch has a NO and NC contact, sealed to IP67
Optional – 8 switches	4 position switches - 2 for each direction (standard plus additional switches) 4 torque switches - 2 for each direction (standard plus additional switches)	Each 4-wire switch has a NO and NC contact, sealed to IP67

Electrical rating				Switch details		
Switch voltage	30 V	125 V	250 V	Functionality	Contact type	Contact material
AC inductive load (cos $\phi > 0.8$)	5 A	5 A	5 A	4 wire - Lever action	2 snap action contacts	Silver
DC resistive load	0.5 A	0.5 A	0.5 A			

Intermediate position switches

Electrical rating				Switch details		
Switch voltage	30 V	125 V	250 V	Functionality	Contact type	Contact material
AC inductive load (cos $\phi > 0.8$)	5 A	5 A	5 A	2 wire – Lever action	1 snap action contacts	Silver
DC resistive load	0.5 A	0.5 A	0.5 A			

Technical Data

Blinker contact for movement indication

Electrical rating				Blinker transmitter details		
Switch voltage	30 V	125 V	250 V	Functionality	Contact type	Contact material
AC inductive load ($\cos \varnothing > 0.8$)	5 A	5 A	5 A	2 wire – Rotation of indented cam	1 snap action contacts	Silver
DC resistive load	0.5 A	0.5 A	0.5 A			

Remote position indication

Precision potentiometer	
Linearity	$\leq 2\%$
Power	0.5 W
Resistance (standard)	10 k Ω
Resistance (optional)	1 k Ω , 5 k Ω

Electronic remote position transmitter CPT	
Connection	3/4 wire
Signal range	4 - 20 mA
Power supply	24 VDC, $\pm 15\%$ smoothed

Technical Data

Wiring diagrams and terminal plans

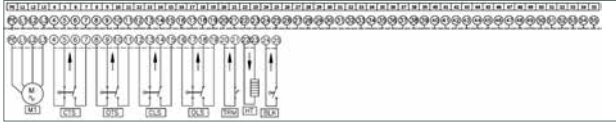
Centork CK range actuators have an assigned wiring diagram and terminal plan for the specific build of the subject actuator. These are incorporated into one document that details the electrical connections and terminal allocations within the unit. Each document will have an assigned code that will be required for actuator commissioning support.

For CK Standard and CK_R actuators, pre-defined wiring diagrams and terminal plans are available depending on customer requirements.

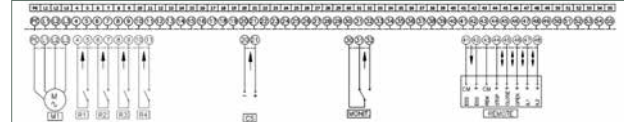
The wiring diagram and terminal plan for a CK_R 30 – CK_R 500 unit will be defined as a seven digit code e.g. k1000.000 à M000.000

For Centronik equipped CK_C and CK_{RC} actuators, wiring diagrams and terminal plans are available for a wide range of customer applications.

Terminal plans for CK_{RC} 30 – CK_{RC} 500 units will be defined as eight digit codes e.g. k3000.0000 à K000.0000.



CK Standard terminal plan.



CKc terminal plan.

Centork Plug & Socket Connector			
Detail	Motor contacts	Protective earth	Control contacts
Max. no. of contacts	3	1	52
Designation	1, 2, 3	PE	4-56
Max. rated current	20 A	-	5 A
Customer connection type	Screw	Ring Tag	Screw
Max. cross section	6 mm ²	M4 Ring Tag	1.5 mm ²
Pin socket carrier material	Polyamide	Polyamide	Polyamide
Contact material	Brass	Brass	Brass – Tin Plated

Terminal housing conduit entry thread details	
Metric threads (standard)	1 x M20 x 1.5, 1 x M25 x 1.5, 1 x M32 x 1.5
Pg – threads (option)	1 x Pg 13.5, 1 x Pg 21, 1 x Pg 29
NPT – threads (option)	2 x ¾" NPT, 1 x 1¼" NPT
G – threads	2 x G ¾", 1 x G 1¼"

Controlling interface to the DCS with Centronik module

Terminal housing conduit entry thread details	
Digital input signals	
Standard	24 VDC; OPEN, STOP/MAINTAIN, CLOSE, ESD
Option	110 VAC; OPEN, STOP/MAINTAIN, CLOSE, ESD
Intermediate position set point control	
Optional analogue input	4-20 mA
Output signals	
Standard Monitor relay	1 potential free change over contact, maximum 250 VAC, 5 A
Standard S1-S4 relays	4 output contacts with user defined trigger conditions, potential free contacts, maximum 250 VAC, 1 A
Optional S5-S8 relays	4 additional output contacts with user defined trigger conditions, potential free contacts, maximum 250 VAC, 1 A
Intermediate position feedback	
Optional analogue output	4-20 mA
Local controls	
Standard Centronik local controls	Lockable local selector switch; LOCAL, STOP, REMOTE Operation/Navigation switch; OPEN/+, CLOSE/-

Technical Data

Functions

CK Standard and CK_R actuators may require additional external wiring to achieve functions listed below:

Centork Plug & Socket Connector				
Operational Functions	CK	CKC	CKR	CKRC
Type of seating configurable	Standard	Standard	Standard	Standard
Automatic phase correction	-	-	Standard	Standard
Positioner (analogue control)	-	-	Option	Option
Intermediate position feedback configurable	Option	Option	Standard	Standard
Stopping at intermediate positions	Option	Option	Standard	Standard
Interrupter timer	-	-	Option	Option
Programmable ESD behaviour	-	-	Standard	Standard
Failure behaviour on loss of signal	-	-	Standard	Standard
Torque limit by-pass	Standard	Standard	Standard	Standard
Manual operation	Standard	Standard	Standard	Standard
Monitoring Functions				
Valve Overload Protection	Standard	Standard	Standard	Standard
Phase failure / phase sequence	-	-	Standard	Standard
Motor temperature limiting (thermostat)	Standard	Standard	Standard	Standard
Manual operation monitoring	-	-	Standard	Standard
Motion Detector	Standard	Standard	Standard	Standard
Communication to DCS via network interface	-	-	Option	Option
Signal loss monitoring	-	-	Standard	Standard
Diagnostic recording of: temperature, torque, position and vibration	-	-	Standard	Standard
Heater	Standard	Standard	Option	Option
Analogue position transmitter	Option	Option	Option	Option
Torque monitoring	Option	Option	Standard	Standard
Diagnostic functions				
Time-stamped event report	-	-	Standard	Standard
Electronic device ID	-	-	Standard	Standard
Status signals in compliance with NAMUR recommendation NE 107	-	-	Standard	Standard



Approvals

CK range electric actuators have been designed to meet the following approval procedures:

BS and DIN standards

CK range actuators comply with BS EN 15714-2, Industrial valves - Actuators - Part 2: Electric actuators for industrial valves - Basic requirements.

LVD compliance

CK range actuators comply with 2006/95/EC, safety requirements for electrical equipment for measurement, control and laboratory use: General requirements, to demonstrate compliance with this directive.

The following installation assumptions are used to derive the requirements:

- Pollution Degree 2
- Category II Overvoltage Installation Locations
- Actuator installed up to 5,000 metres

EMC compliance

CK range actuators comply with 2004/108/EC, Electrical equipment for measurement, control and laboratory use.

Machinery directive

CK range actuators are supplied with a declaration of incorporation for Machinery directive 2006/42/EC. According to the LVD and EMC directives, the actuators are labelled with the CE mark:



Manual handwheel operation

Handwheel size and mechanical advantage are generally designed in accordance with standard EN 12570 to give the most efficient compromise of force and turns for emergency operation.

Actuator drive couplings

The CK range features a removable base and coupling for all sizes. All base dimensions and couplings comply with EN ISO 5210 or MSS SP 102.

NAMUR 107 compatibility

CK actuators with the optional Centronik module provides feedback for alarm statuses in accordance with NAMUR 107 guidelines.



Failure – the actuator has experienced a failure condition and may not respond to remote control commands.



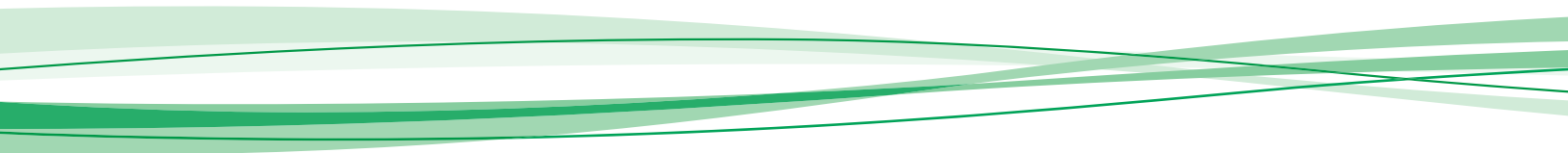
Function check – the actuator settings are being adjusted and is therefore unavailable for operation.



Out of specification – the actuator will recognise a process condition that does not match the configured setting value. Operation can commence during this alarm state.



Maintenance required – the actuator must be examined by a service technician to evaluate maintenance requirements. Operation can commence during this alarm state.



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PUB111-001-00
Issue 04/14



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