



# ICON 2000 SERIES ELECTRIC ACTUATORS



# A WORLD OF EXPERIENCE

Biffi is a leading manufacturer of valve automation solutions with 60 years' experience and a global presence, offering a comprehensive selection of standard as well as specially designed actuation systems. The range includes electric, pneumatic, hydraulic, direct gas, gas-hydraulic, electro-hydraulic, compact, subsea actuators and control systems with a full complement of accessories suitable for a wide range of applications.

The highest standards of product reliability and quality are guaranteed by advanced manufacturing facilities combining lean principles with continuous quality auditing and a zero harm work ethic. Local presence and after sales support teams worldwide ensure meeting the day-to-day flow control requirements of every plant or process.

Biffi's commitment to the highest ethical standards in our daily business practices is recognized by the achievement of the following certifications:

**ISO 9001** – Quality management system

**SA 8000** - Social accountability standard

**ISO 14001** - Environmental management system

**BS OHSAS 18001** - Occupational health and safety assessment

# ICON 2000 THE INTELLIGENT SOLUTION

## PRECISE AND RELIABLE

With ICON 2000 not only are you assured of the most precise and reliable valve actuation but all the information you need to ensure your valves operate effectively and efficiently is at hand clearly and consistently.

Reliability is engineered through carefully-selected materials and internal components. Models are available either waterproof or explosionproof to IEC and NEMA standards.

## EFFICIENT AND COST-EFFECTIVE

Operating and maintenance costs are kept low through a minimal number of mechanical parts and an efficient design with the motor engaged directly to the gears. All internal sensors are contactless, ensuring long life and high precision. Internal wiring is also minimized through the use of a single enhanced-type terminal board and an advanced, modular electronic card. And it's future-proof, as all major optional functions are integrated into this reprogrammable card, enabling easy plug-in of future upgrades.

## SIMPLE AND SAFE

Configuring and commissioning is fast and easy, either through its user-friendly integral push-button panel or via a PDA communicating wirelessly with its Bluetooth™ radiofrequency connector.

It's also intrinsically safe, with non-intrusive set-up and operation providing personnel safety and a configurable Emergency Shutdown (ESD) feature to protect the valve and process. It is also suitable for use in SIL 2 applications.

## INTELLIGENT AND INFORMATIVE

Once installed, internal circuits monitor the system status continuously and elaborate all the information coming from the sensors. Clear messages are displayed for process diagnostic and advanced maintenance programs. These include:

- Advanced maintenance data including reports on the last opening and closing position/torque curves with relative parameters and with direct comparisons with torque signature
- Detailed and updated information on actuator internal parameters with precise and clear alarm reports, with both general and recent (partial) log

The ICON 2000 is complete with an exhaustive data log system which collects valuable data for maintenance or diagnostic programs. It provides a torque analysis of the actuated valve to assist in valve fault detection and condition monitoring, which can result in significant savings in time and cost.

In addition, essential information about the actuator and valve can be stored electronically in a non-volatile memory and downloaded.

## ADVANCED COMMUNICATION

Watertight and explosionproof PDAs are available for actuator operation, download of diagnostic information, non-intrusive upgrading of firmware and for maintenance purposes through Bluetooth™. Dedicated software for both PC and PDA gives you total and constant control whether in the field or in your office.

ICON 2000 can be upgraded easily to provide network system connectivity and supports all major fieldbus systems.



## TECHNICAL SPECIFICATIONS

### POWER SUPPLY

Three phase from:  
208 to 690 V at 50/60 Hz  
Single phase from:  
110 to 240 V at 50/60 Hz  
Direct current:  
24 to 110 V

### TORQUE OUTPUT

Multiturn actuator:  
From 30 to 334,000 Nm  
Multiturn gears:  
up to 360,000 Nm  
Quarter turn gears:  
up to 750,000 Nm

### SPEED RANGE

From 2.2 to 173 RPM at 50/60 Hz

### AMBIENT TEMPERATURE

Standard range -20°C to +85°C  
Extended temperature ranges available

### DUTIES

On / Off, inching or modulating  
S2 - 15'  
S2 - 30'  
S4 - 25%  
S4 - 50%



## ENGINEERED FOR PERFORMANCE AND RELIABILITY

### HIGH PROFILE STANDARDS

The base version is an intelligent actuator with hardwired connections which incorporates all the major features.

### ADVANCED DESIGN FEATURES

Heavy-duty simplified gearing provides exceptional efficiency and the highly precise internal sensors feature a low consumption position encoder specifically designed for electric actuators. The terminal box features a wide enclosure to facilitate wiring connection and the motor connections are simple, allowing fast removal. Opto-coupled remote controls enable the actuator to be controlled by 4,3 or 2 wires with configurable voltage-free latching relays providing status and alarm indication.

### IN-SERVICE PROTECTION

ICON 2000 also includes a wealth of features to protect the valve and actuator in service. Automatic phase correction protects the valve against unforeseen errors and it is also protected against jamming, hammer and instantaneous reversal. Phase failure correction and a thermostat protect the motor against overheating and a semiconductor-based temperature sensor protects the electronic card. Actuator commands are inhibited automatically if contactor failure or overtorque are recognized. This torque alarm can be by-passed to enable the actuator to win the break-to-open torque.

### INDUSTRIES

OFFSHORE PLATFORMS  
 OIL & GAS-PIPELINES AND STORAGE  
 OIL REFINERIES  
 LNG  
 PETROCHEMICALS  
 CHEMICALS  
 PHARMACEUTICALS  
 POWER GENERATION  
 MINING  
 WATER PIPELINES  
 WATER TREATMENT



### 1. CABLE ENTRIES

Three NPT cable entries are supplied as standard with an additional entry available as an option.

### 2. TERMINAL BLOCK

Located in a double sealed enclosure, it has 55 terminals for power supply and controls.

### 3. KINEMATIC REDUCTION CHAIN AND LUBRICATION

Motor power is transmitted to the hollow output shaft directly via a high torque, high efficiency worm shaft/worm wheel reduction. The output shaft's teeth are terminated to ensure torque is only transmitted to the stem nut.

Lubrication is through an oil bath with two points for filling and draining.

ISO Rc 7/1, ISO metric BS 3643, DIN 40430/PG and different diameters are also available as options.

### 4. MOTORS

The motor is engaged directly to the gears, increasing overall system efficiency and lowering operational costs. A three-phase asynchronous, squirrel cage, induction-type low-inertia balanced motor is standard, supplied with class F or H insulation and a dedicated speed and temperature sensor. A special interface enables the use of conventional asynchronous motors for single phase or direct current supply.

### 5. MANUAL OVERRIDE

All actuators are provided with a hand-wheel for manual operation. The hand mechanism disengages automatically whenever the motor is started. The de-clutch lever is padlockable in two positions (only electrical or only manual) to prevent incorrect operation.

### 6. DOUBLE SEALED ENCLOSURE

Assures protection from dust and humidity. A highly resistant aluminium alloy housing and covers with minimal joints withstand the most aggressive environments.

### 7. INTERNAL SENSORS

All internal sensors are non-contact.

**TORQUE SENSOR** provides direct measurement of motor speed reports torque to 1% resolution of nominal. Detection is based on motor torque vs. speed characteristics, compensated for voltage and temperature. The torque vs. speed curve is memorized for each motor type, enabling a new configuration to be selected from the actuator's local control panel if replacement is required.

**POSITION SENSOR (US patented)** is based on a Hall-effect incremental encoder with a 10° of output shaft rotation resolution. A dedicated low-power microprocessor counts rotations in both directions.

Position is updated, stored and displayed locally if the actuator is operated manually during power failure.

### 8. LOCAL OPERATOR INTERFACE

The local interface has been designed to be operated easily and supply a complete and clear set of information. It features a padlockable operation selector and 3 recessed pushbuttons for controls and menu navigation. The backlit and heated display is customizable in any of eight selectable languages, providing information numerically with 3½ digits for position and torque indication or graphically at 32 x 122 pixels for diagnostics.





# COMPLETE ACTUATION SOLUTIONS

## PC AND PDA MANAGER

PC and pda manager software transforms your pc, common or dedicated industrial pda into a strong tool for the complete control, set-up and diagnostics of the icon actuators.

With a smart user-friendly graphic interface, all the actuator information, set-up, configuration data, diagnostic messages and data logger information are available to view, analyse and reconfigure from your PDA or PC.

## DATA LOGGER

The inbuilt data logger collects valuable information for maintenance and diagnostic programs and can operate in:

### Recorder mode

For measuring and memorizing main actuator internal parameters. Up to 256 sets of measurements can be memorized with configurable sampling time and start date and time.

### Event mode

With memorization of open or close commands including indication of source, date and time with configurable start date and time. Up to 128 events can be memorized.

### It monitors:

- Alarms
- Torque profiles
- Torque curves and torque signatures
- Operations
- Maintenance data

## OPTIONAL MODULES

A variety of optional modules can be added to the base version.

### 4-20 MA ANALOG CARD

Necessary for actuators in modulating and inching duty.

### POWER AND HEATING

Solid state power switch over temperature (only for heavy modulation duty version) - detects the power card's maximum temperature condition and sets the relevant alarm.

Anti-condensate heater - an additional heater for use when the environment air humidity reaches critical levels.

Auxiliary battery - in an intrinsically safe enclosure to enable position to be transmitted remotely in case of power failure.

### FIELDBUS INTERFACES

The ICON 2000's modular design enables it to be upgraded easily from base-to-base to bus versions. All that is needed is to add the relevant plug-in card. A flexible interface allows connection to the major field bus available on the market:

- Foundation Fieldbus
- Profibus DPV0, DPV1 and redundant DPV1
- LonWorks
- Hart
- Modbus

## HAND WHEEL WITH REDUCTION GEARING

Side hand-wheel - with an engagement lever. The additional reduction makes the hand-wheel easier to turn.

### SPECIAL COUPLINGS

Two special couplings are available to suit specific applications and working conditions:

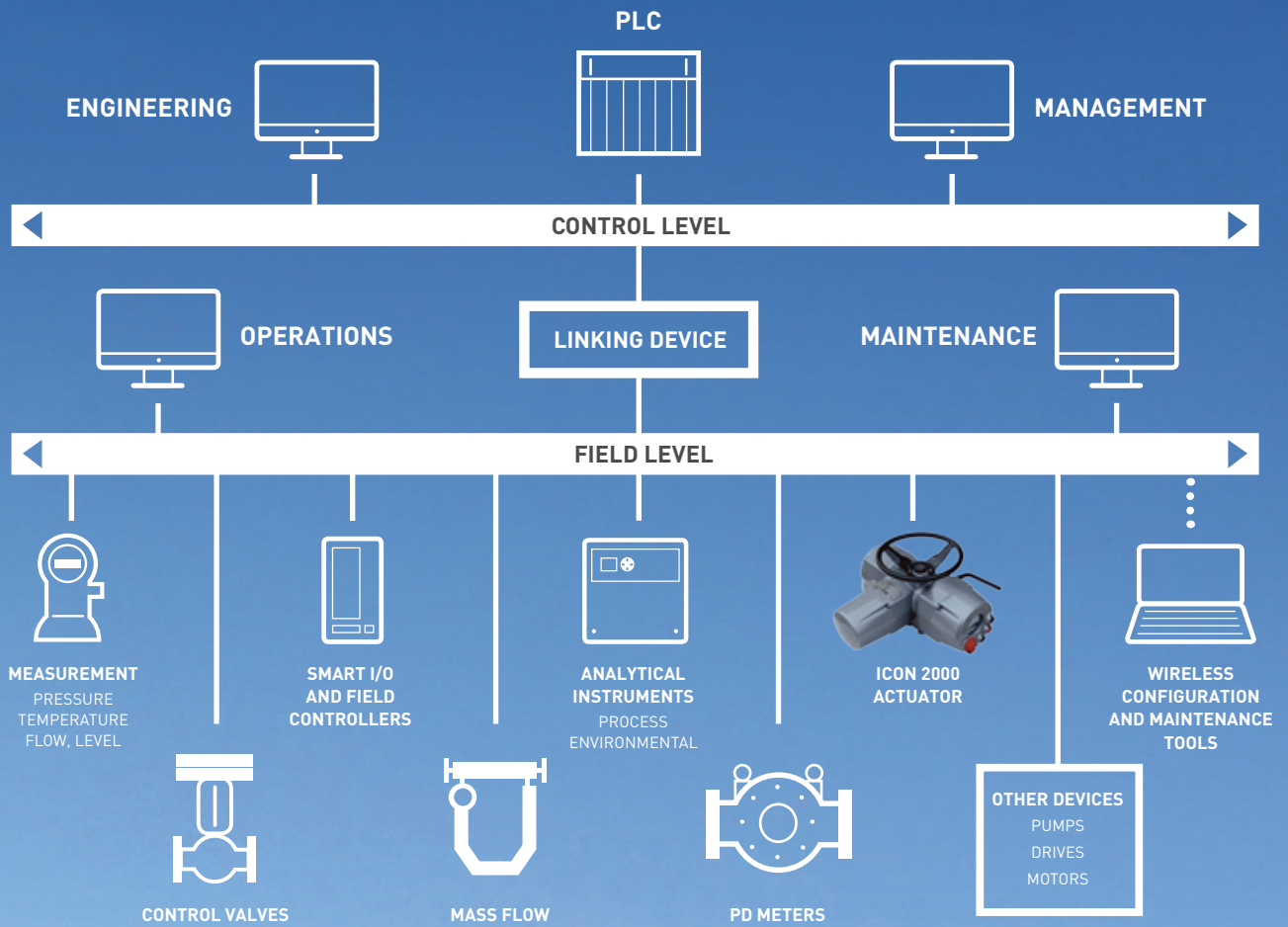
- Linear coupling designed for the actuation of valves with stem linear movement and no anti-rotational devices on the stem (e.g. modulating globe valves). It converts multi-turn actuator rotational motion into linear motion, providing extremely simple and compact actuation.
- Spring-compensated coupling ASC type. Most suited to actuators for wedge and globe valves working at high temperatures. It is designed to cope with both high and low temperatures and can also be used in high speed applications.

### GEARS

The ICON 2000 is available with a variety of supplementary gear boxes for linear and high torque multiturn/quarter turn applications.







## EXCEPTIONAL INTEGRATION CAPABILITY

Biffi has the unrivalled experience and engineering expertise to create custom-made solutions for the most demanding requirements. Tailor made solutions can be engineered working closely with customers to cover the most stringent applications and operating conditions.



Biffi reserve the the right to change product designs and specifications without notice.

**Biffi Italia S.r.L.**

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BIFPBR-09092-EN-1310