



Electronic Control Equipment

INTEGRAL+ *Integral Control*

B BERNARD

A115/00

Why choose an actuator with an integrated control ?

■ FOR ENGINEERINGS :

- Simplification and standardization of interface modules.
- Makes it possible to choose important functions before installation.

■ FOR INSTALLATION OF ACTUATORS :

- Easy commissioning thanks to local controls.
- Commissioning is possible with only the power connected.
- Time savings at commissioning.

■ FOR EASY USAGE :

- Capable of modifying the control functions even during usage.
- Installation of additional functions on site at lower costs.
- Easy to use thanks to local settings and controls.
- Local controls are lockable in various positions.

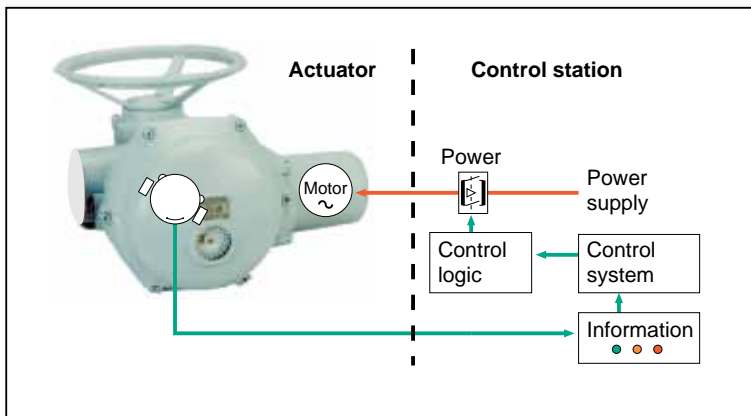
When conventional actuators equipped with position limits, torque limiters and eventually a proportional transmitter are integrated into a process, complex electrical equipment must be installed on site as follows:

- reversing starters,
- control components,
- positioners,
- optional control components,
- and so on ...

It includes an additional important savings for :

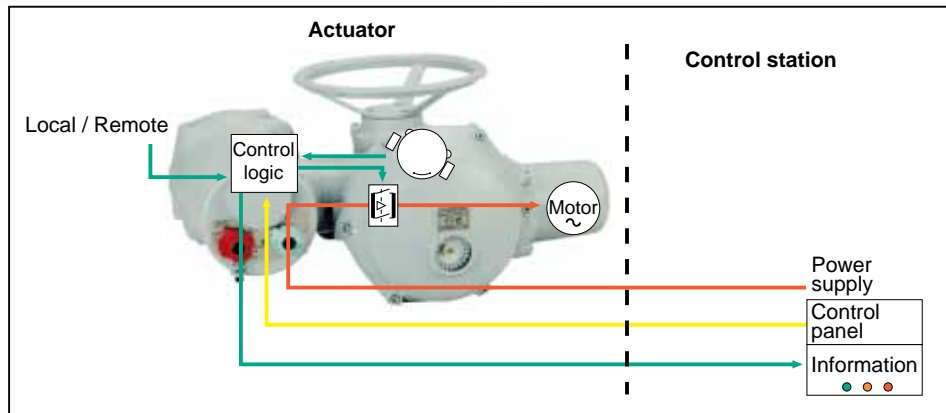
- electronic board,
- start-up,
- dimensional,
- documentation,
- study.

The INTEGRAL+ includes an important cost savings in controls because all of the control components are integrated into the actuator.



Standard actuator

Actuator with built-in control



Integral + : a specific control for each need

REMOTE CONTROL

Control by means of contacts:

- External power supply
- Electronic board with built-in power supply (24V)

Control by pulse signal :

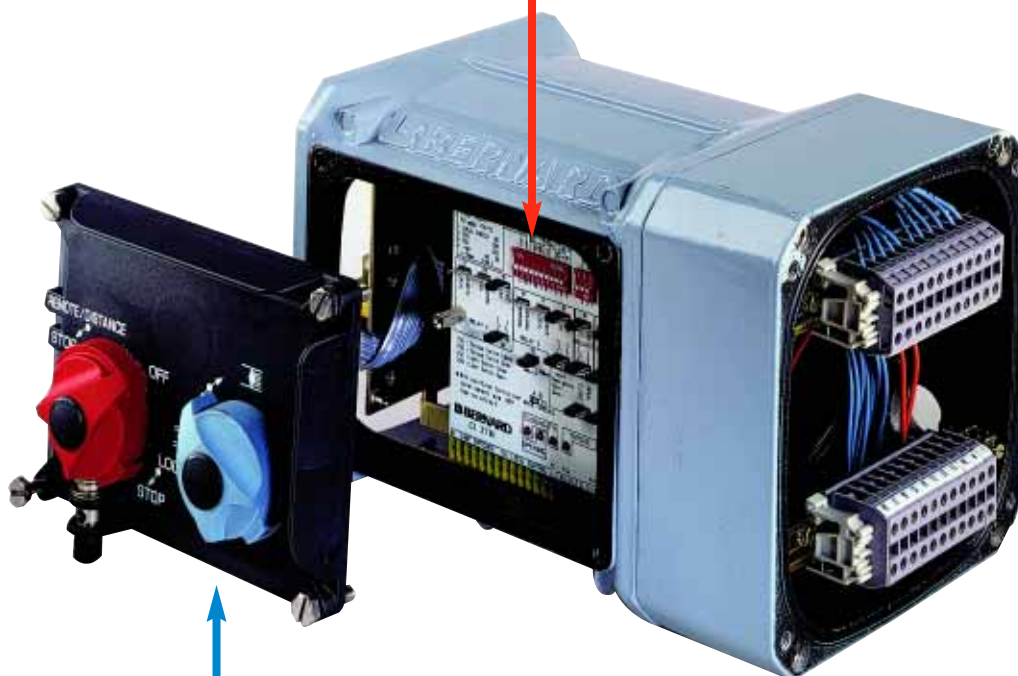
- Only one pulse required for open, close or stop

Proportional control :

- By current :
4-20 mA, 0-20 mA,
4-12 mA, 12-20 mA
- By voltage:
0-10 V

Command for local bus control:

- Simple
- Redundant



Control by maintained signal :

- Actuator continues to function as long as the signal is maintained and stops when released

Control by pulse signal :

- One pulse for open, close or stop

Selector :

- Local / Remote
Lockable selector in all 3 positions
- Remotely Allow or Prohibit local controls

LOCAL CONTROL

Descriptions of possible functions :

■ CONTROLS:

E1 ⇨ Remote control: *Pulse command*

- **by means of contacts:** external power supply or by electronic board supplying power (24V)
- **maintained signal:** one pulse for open, close or stop
- **without maintained signal:** actuator continues to function as long as the signal is maintained and stops when released

Remote control specifications

- Isolated by optocouplers
- Voltage: 10 to 250V DC/AC
- Current: 10 mA at 24V
- Minimum pulse: 100ms
- Time of rotational direction change : 50ms or 200ms

E2 ⇨ Proportional: (with positioner)

- **by current:** 4 - 20 mA, 0 - 20 mA, 4 - 12 mA, 12 - 20 mA,
- **by voltage:** 0 - 10 V

Remote selector Proportional / pulse command

ESD: Emergency Shut Down for Open. or Close.

E3 ⇨ Local control at the actuator:

- By pulse signal: one pulse for open, close or stop
- By maintained signal: actuator continues to function as long as the signal is maintained and stops when released
- Local / Remote / Off (stopping) selector lockable in all 3 positions

E4 ⇨ Local internal control: (positioner)

- For commissioning or testing
- Automatic calibration according to selected signal

Timing control (optional)

This optional card will allow extension of the valve operation speed. The actuator operates by successive pulses adjusted at the card. One part of the stroke can have a normal operating speed and the other part an extended speed control. An auxiliary limit switch gives the order to switch from normal to slow speed. The adjustments are independent in both open and close direction. The operating time for the full valve stroke can be set very long. The device is used to avoid hammer effects when opening and closing a valve.

■ PROTECTION:

P1 ⇨ Fuses:

Protection against short circuit.

P2 ⇨ Motor temperature sensor:

Efficient protection for the motor against overheating. If the temperature in the winding is too high, the motor supply is stopped. Restarting is possible only after the temperature decreases.

P3 ⇨ Torque limiteur:

The electronic board memorizes actions of the torque limiter and prohibits restarting in the same rotational direction. This system guaranties a complete full stop even if the torque limiter pressure is released.

P4 ⇨ Phase control:

Protects against incorrect 3 phase connection and includes an automatic phase correction.

■ SIGNALING :

L1 ⇨ Fault relay

A fault signaling relay detects all malfunctions or unavailabilities and communicates this information remotely :

- Power supply failure or blown fuse
- Loss of a phase in 3 Ph
- Thermal motor protection tripped
- Selector in "LOCAL" position
- No signal 4-20mA (exception: 0-10V or 0-20mA)

Possible choices between the following faults:

- Torque limiter open / close tripped
- Selector in "LOCAL" position not available
- "No signal" not available

L2 ⇨ Remote:

- 4 options available from 16 possibilities
- 3 additional options can be added as an option: Open/Close/Supply

Local (option):

- 3 LED's for Open/Close/Supply

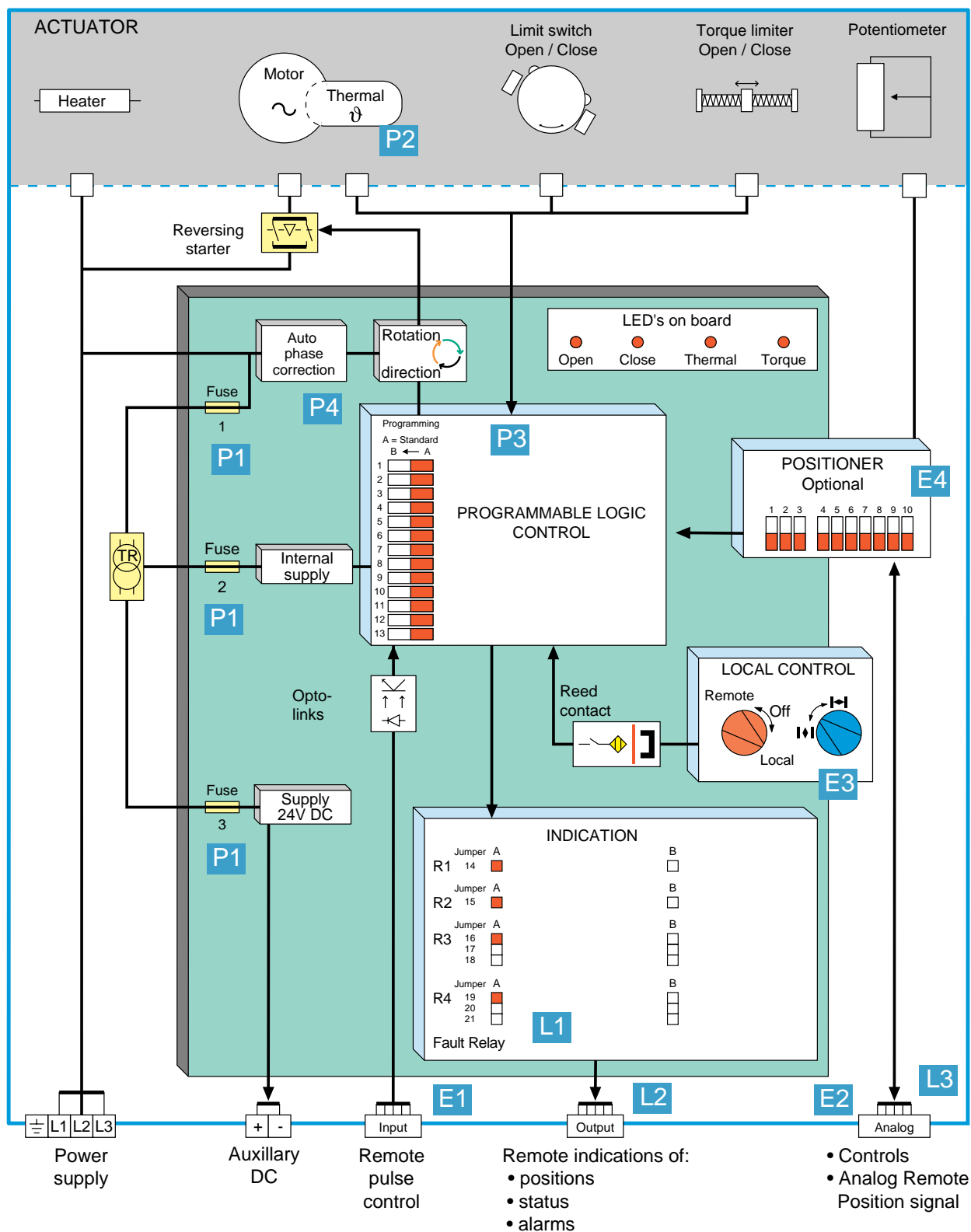
L3 ⇨ Position transmitter: (with positioner)

Transmitting the proportional position signal is of the same scale as the input control signal

Example : input 4-12 mA output 4-12 mA

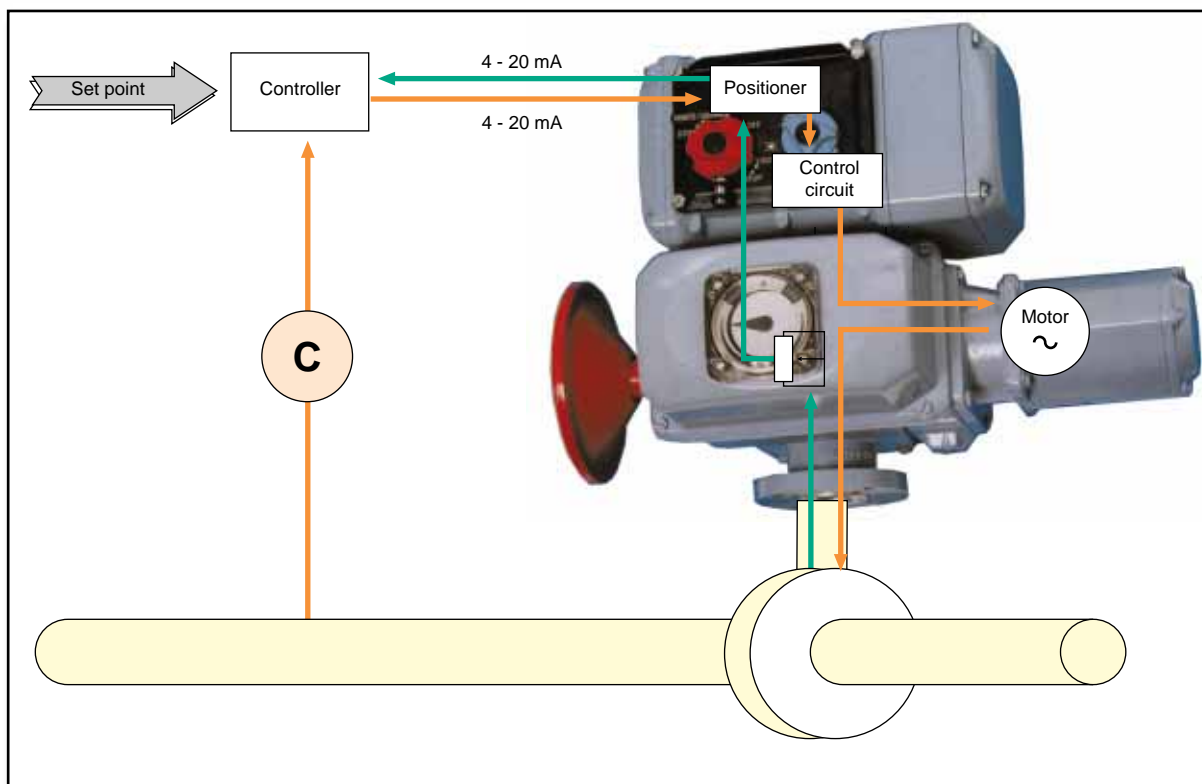
Exception : input 0-10 V output 0-20 mA

Integral+ Layout



Integrated positioner

The INTEGRAL+ card has been designed with a specialized interface module to allow usage of the analog GAM-K series positioner.



This option allows control by an analog signal in order to guarantee precision and frequency efficiencies that correspond with those defined in our classification system of modulating needs.

■ ADVANTAGES OF THE INTEGRATED POSITIONER

In addition to the INTEGRAL+ flexibility of usage and control capabilities, the addition of an integrated positioner allows many advantages over the pulse control.

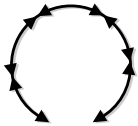
1. ► The internal control loop shown above gives the possibility of reaching the correct open position quickly by measuring the position of the valve. This will allow for a good flow efficiency through the valve without any hunting.
 - Result : Modulating is more reliable and the actuator is used less, therefore reducing the actuator and valve wear.
2. ► While positioning is made locally via the internal control loop, the operation is not damaged by possible interferences from the position signal. The actuators reaction time during operation automatically acts like a filter for the incoming signal.
 - Result : Modulating is more stable and precise.
3. ► A precise setting of the valve's position with respect to the value of the incoming control signal is required for proper operation.

The actuator can be set locally independant of the modulating system, thanks to the integrated positioner. This operation is possible without using the incoming control signal.

 - Result : Commissioning is easier and can be accomplished by one person.

Three specialized configurations

POSIGAM+ : POSITIONING EQUIPMENT FOR CLASS III ACTUATORS



Reminder :
Modulating
Class III

Select intermediate positions, with good precision (less than 2 %),
on average 360 times/day.

POSIGAM+ has proven to be the most reliable positioning equipment for Class III actuators.

It includes :

- A GAM-K positioner
- A precision feedback potentiometer of 1000 Ω , linearity < 0.5%
- A contactor based power circuit

MODUGAM+ : POSITIONING EQUIPMENT FOR CLASS II ACTUATORS



Reminder :
Modulating
Class II

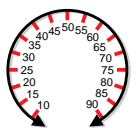
Select intermediate positions, with high precision (less than 1 %),
on a permanent basis every 2 or 3 seconds.

- A positioner for intense duty cycles
- Complete solid state power control
- Plastic track feedback potentiometer - 100 million operations

MODUGAM+ includes all of the GAM-K equipment and options.

MODUGAM+ is related to Modulating Class II actuators of the OAP, MA, MB and UX type, these actuators able to withstand the operating frequency imposed by this type of modulation.

PRECIGAM : POSITIONING EQUIPMENT FOR CLASS I ACTUATORS



Reminder :
Modulating
Class I

Fast positioning, with excellent precision (0,5 % or less),
and continuous movement.

- Fast and precise positioning
- Speed control module for a brushless DC motor with samarium cobalt magnets
- Power control module with wide pulse MOS technology
- Direct power supply: 3 phase, single phase or direct current 24 to 500 V.

Various operations are available:

- Adjustment of the proportional speed band
- Adjustment of the proportional torque band (for reversible actuators)
- Maximum torque (electronic)
- Maximum speed
- Speed reduction at the end of closing
- Torque limitation with control
- Torque holding on the motor after torque switch tripping (for reversible actuators)
- Loss of input signal, 3 possible actions: actuator stays in last position, actuator goes to open position or actuator goes to the closed position.

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