



PNEUMATIC & HYDRAULIC ACTUATORS



B BERNARD

U117/02

In addition to the ATEX certified range of electric actuators, L. BERNARD has designed a range of specific actuators dedicated to sites where the use of electric power is strictly forbidden.

Two motor and control technologies are proposed to serve these applications : pneumatic and hydraulic power.

These equipments are an economical choice for motorisation of linear and rotary valves in highly hazardous environments.

Many LNG-tankers ships have been using these actuators since the seventies. Offshore platforms are also one of the other typical place where this type of products can be used.

The BERNARD hydraulic and pneumatic actuators are suitable for both on/off and modulating operation (cryogenic valves, choke valves, ...).

These motorisations offer the same proven level of ruggedness and reliability than the range of BERNARD electric actuators.

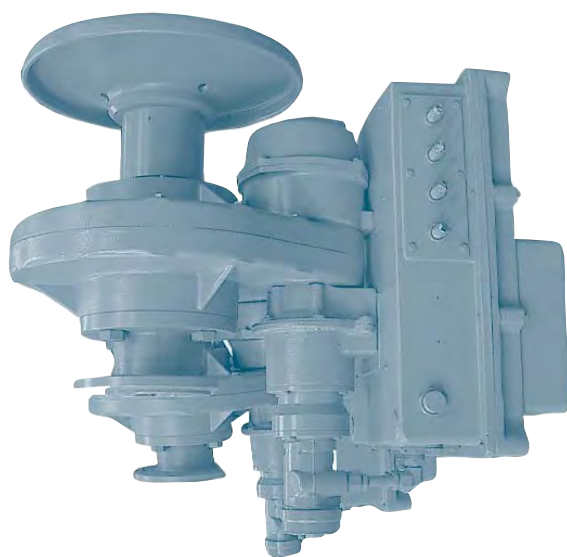
 Pneumatic actuators

 Hydraulic actuators

Part 1

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Pneumatic actuators



C type

Pneumatic actuators : introduction

Primarily designed as an integrated unit the pneumatic BERNARD actuator is driven by a rotary motor selected for its torque versus speed characteristics.

Among the numerous advantages of this equipment is the fact that the unavoidable variations in pressure supply have no effect on the setting of the opening and closing torques.

Consequently it is very well suited to the automation of valves of all types that operate in environments where the use of electricity is dangerous.

Pneumatic BERNARD actuators are particularly appreciated in mining, paper, chemical and petrochemical industries because they can be easily, rapidly and safely fitted to the many kinds of flow control devices used in these areas.

They are also recommended for liquid gas tankers and other similar ships where the risk of explosion prohibits the use of ordinary or even protected electrical motors.

Principle of operation

Upon receipt of a remote or local command, gas is sent to the motor in the selected direction for closing or opening.

The motor drives the automated device through the reduction gears.

Whenever either torque or travel switches are activated, the gas supply is automatically stopped.

In most cases,

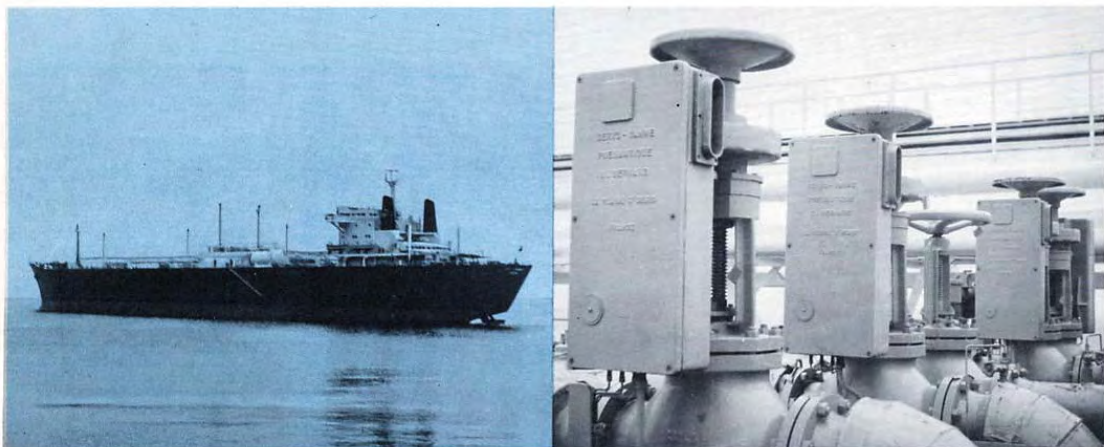
- closing is controlled by torque limitation to ensure a tight closing of the valve,
- opening is controlled by travel limitation for a better reliability.

Torque limitation is set at a higher value in the opening direction so that sticky valves can be easily unseated.

Commands sent by torque and travel control have a priority on the other controls and immediately stop the motor. The closing and opening maximum torque values are set independently for opening and closing directions by the mean of two separate springs built in the torque limit device.

The values given to these extreme torques remain strictly constant since they are completely independent of the gas pressure supply.

Whatever your automation problems are, do not hesitate to contact our specialised team to study the most suitable technical solution.



Pneumatic BERNARD actuator installed on CAFL globe valves aboard the liquefied gas transporter "Gay-Lussac" in the seventies.

Pneumatic actuators : features

STANDARD VERSION

Pneumatic BERNARD actuators combine in a single unit ready to install with all built-in components available for an efficient and durable operation.

In fact, each actuator includes :

- pneumatic motor
- reduction gear
- torque limit device
- travel limit device
- logic control circuitry
- handwheel for manual operation

Since our actuators are equipped with standard ISO flanges, installation and mechanical adaptation to the valve to be controlled are very easy.

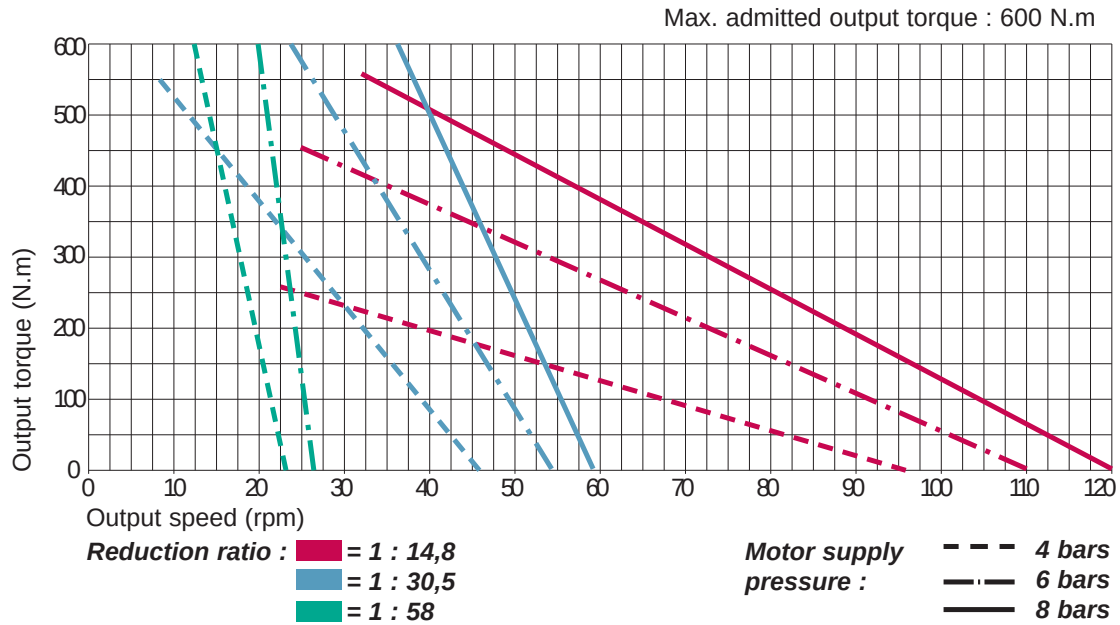
ADVANTAGES OF BERNARD PNEUMATIC ACTUATORS

- work with all gases
- special motor
- reliable and repeatable torque control by dynamometric balance
- opening and closing torque adjustable for both direction
- dependable travel control setting
- different spindle connecting devices in standard version
- lifetime lubrication
- special control circuitry can be designed on request
- all functions are possible with pneumatic power : command, control, signalling
- absolute safety in areas where use of electricity would be hazardous

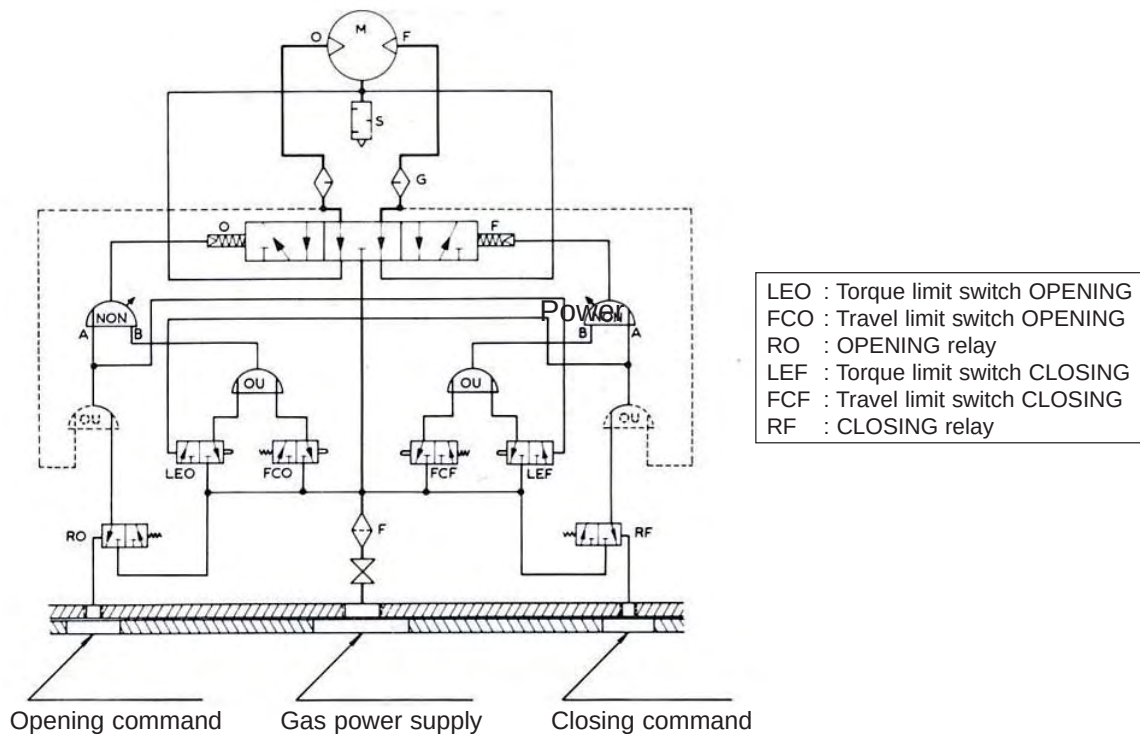
OPTIONS

- pulse or continuous command
- mechanical position indicator
- direct command through external push buttons on the actuator
- other types of signalling
- remote continuous indication of valve position
- command priorities
- automatic control
- automatic failsafe operation in case of :
 - *pressure drop*,
 - *lack of gas*,
 - *power failure*
 thanks to an independent reserve of compressed gas.
- variable speed operation

Pneumatic actuators : performance



Pneumatic actuators : controls



Part 2

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Hydraulic actuators



SR12 type

Hydraulic actuators : technical description

Our multiturn actuators are designed with an hydraulic motor and a differential type reduction gearing which drives the output sleeve with passage for a rising stem.

MAIN COMPONENT PARTS

- Main gear housing made of cast iron
- Gearings made of high tensile strength materials
- Torque limitation device adjustable for both directions of rotation
- To engage not rotating handwheel during hydraulic operation. No clutching lever for manual operation. Absolute hydraulic motor drive priority when power is ON.
- Mounting flange and coupling in accordance with ISO 5210/1 or DIN 3210 standards.
- Control box (IP67) with :
 - dry micro-switches - DIN 41635 - (rating 1A under 110 V DC, 10 A under 380 V 50 Hz AC)
 - or sealed switches filled with nitrogen gas (rating 1,5 A under 250 V)
- Separate terminal box, IP67



Example of SR50 + RR20 hydraulic actuator mounted on cryogenic valve.

Picture by courtesy of SNRI.

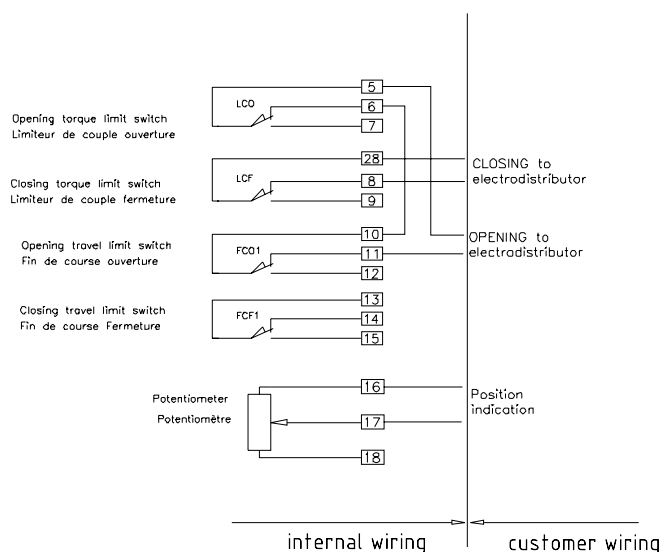
Hydraulic actuators : performances

Type	Output speed rpm	Max torque & supply gas pressure N.m/bar	Internal socket	Max thrust with integrated nut (daN)	Output flange ISO
SR6/24	12,5	51/110	40	4000	F 10
SR12	10,4	180/135	40	4000	F 10
SR50/29	12,25	490/135	56	15000	F 16
SR50/124 + RR10	10,8	1170/130	56	17000	F 16
SR50/124 + RR20	10,8	1250/120	65	26000	F 25

(some typical configurations given as an example)

Hydraulic actuators : controls

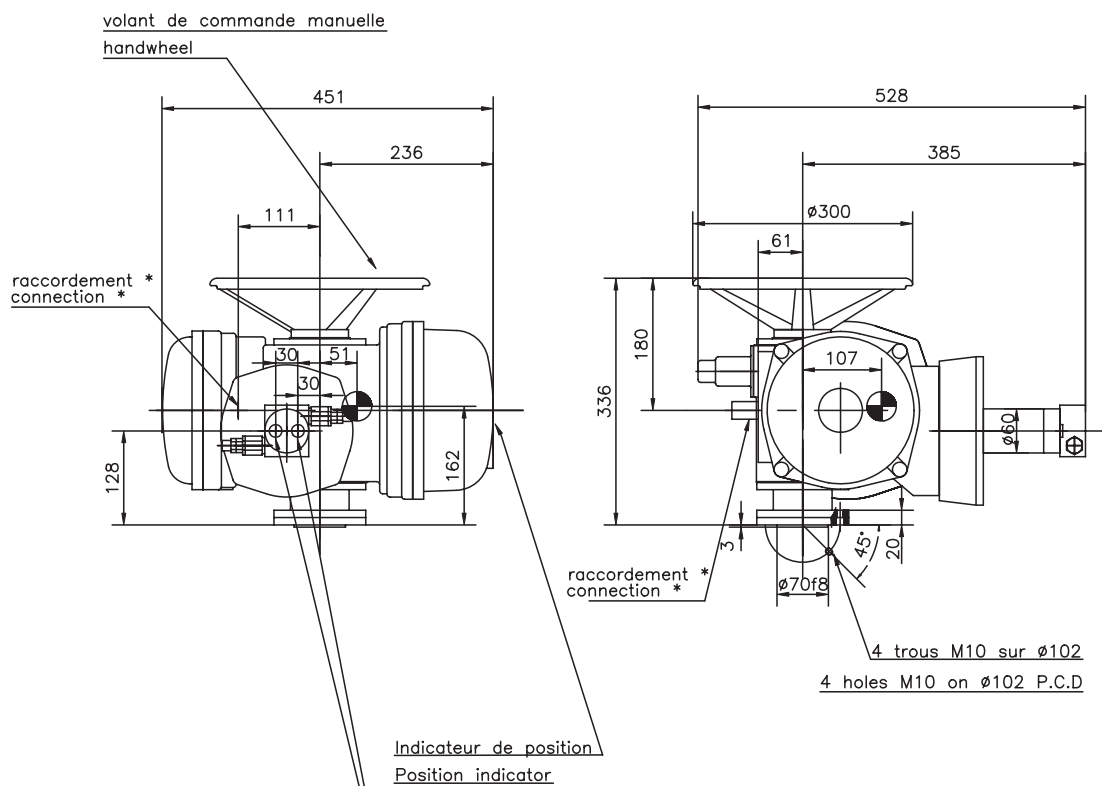
SCHEMA DE CABLAGE - SERVOMOTEUR TYPE SR HYDRAULIQUE
WIRING DIAGRAM - HYDRAULIC ACTUATOR MODEL SR



Note : Torque limit switch give maintained contact
Note : Les limiteurs de couple donnent un contact maintenu

Hydraulic actuators : dimensional drawings

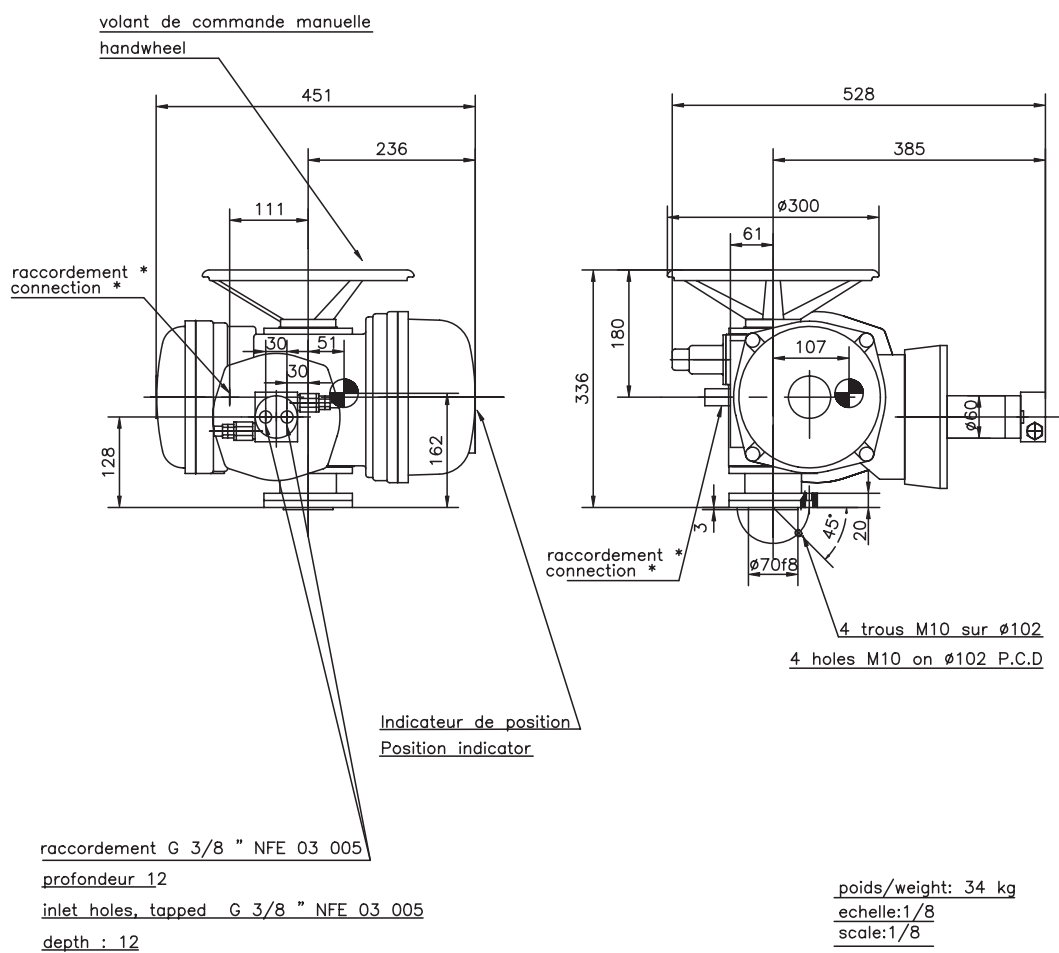
SR6



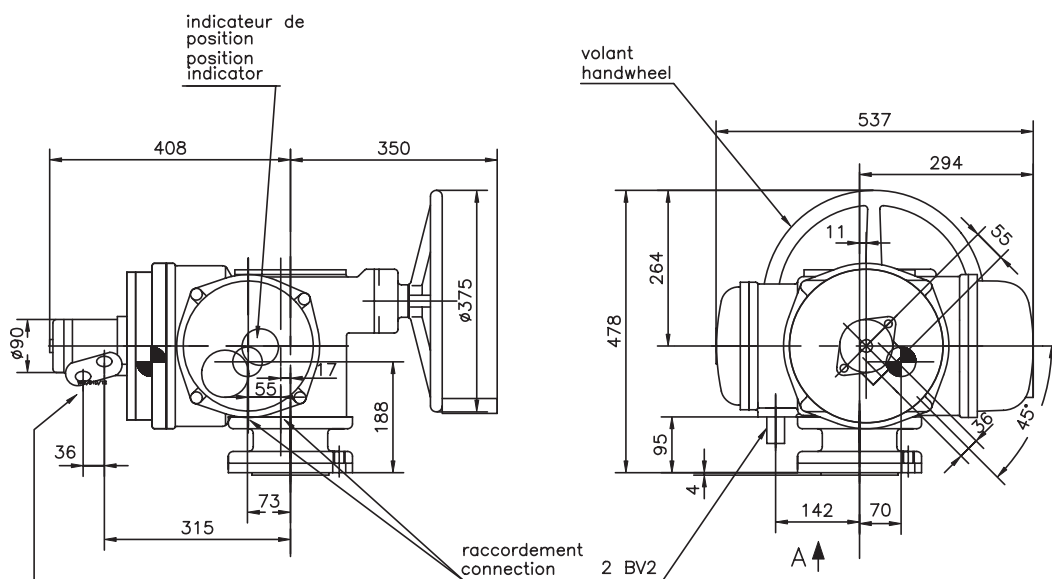
raccordement G 3/8 " NFE 03 005
 profondeur 12
 inlet holes, tapped G 3/8 " NFE 03 005
 depth : 12

poids/weight: 34 kg
 echelle:1/8
 scale:1/8

SR12



SR50



raccordement G 1/2 " NFE 03 005

profondeur 15

inlet holes, tapped G 1/2 " NFE 03 005

depth : 15

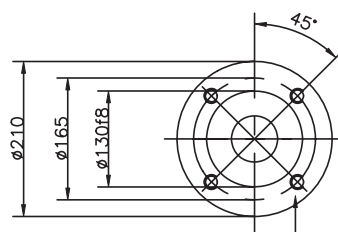
poids/weight: 108 kg

Echelle: 1/10 et 1/8

Scale: 1/10 and 1/8

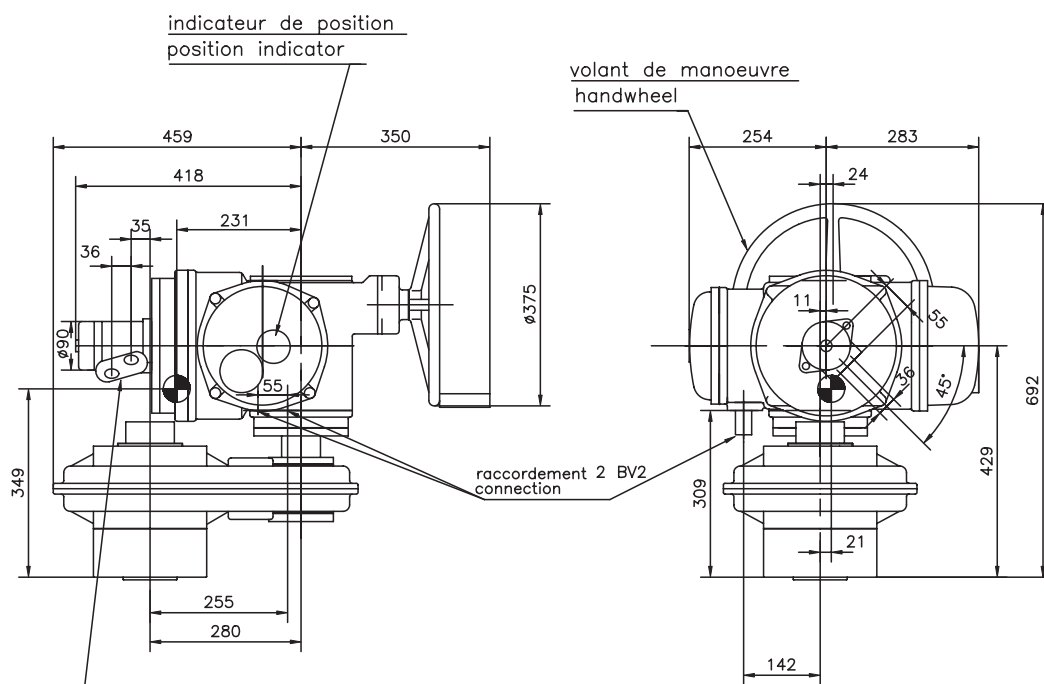
F16

Vue "A" de la bride
View "A" of flange



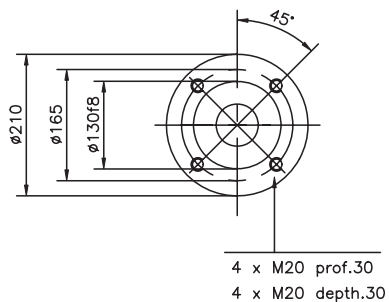
4 x M20 prof.30
4 x M20 depth.30

SR50 +RR10



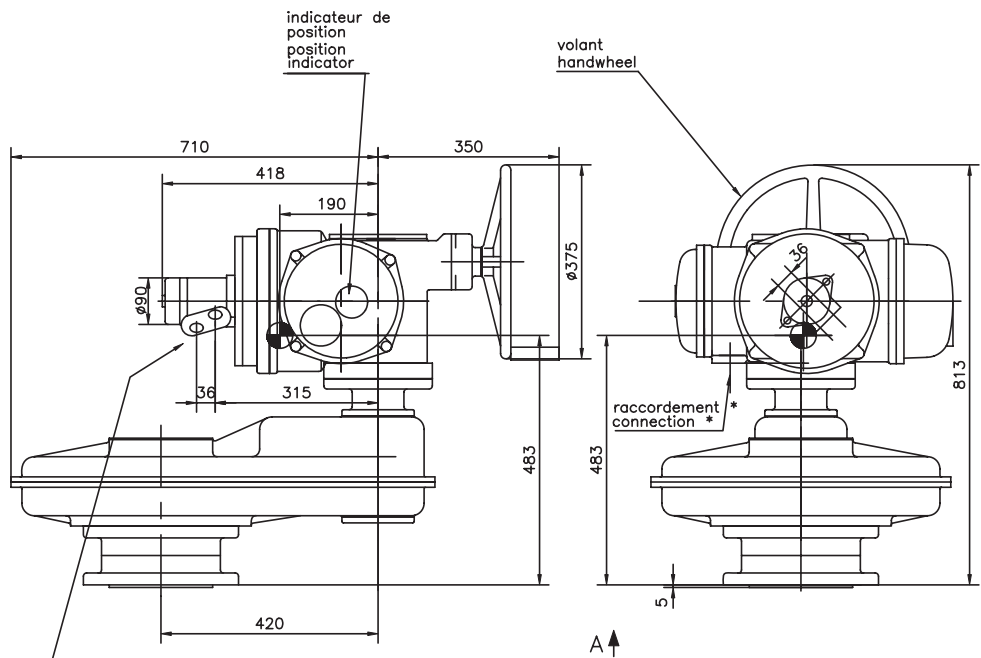
raccordement G 1/2 " NFE 03 005
profondeur 15
inlet holes, tapped G 1/2 " NFE 03 005
depth : 15

F16
ISO 5211
Vue "A" de la bride
View "A" of flange



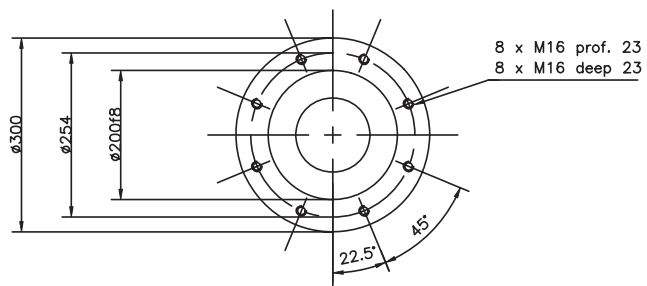
Poids/weight: 196 kg
échelle 1/10 and 1/8
scale 1/10 and 1/8

SR50 +RR20



raccordement 1/2 " GAZ
profondeur 15
inlet holes, tapped 1/2 " NPT
depth : 15

ISO 5211
Vue "A" de la bride
View "A" of flange



poids/weight: 280 kg
Echelle: 1/10 et 1/8
Scale: 1/10 and 1/8

All data in this brochure are given for information only and are subject to change without notice.

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