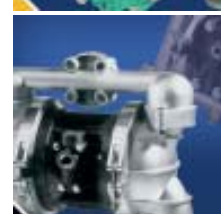
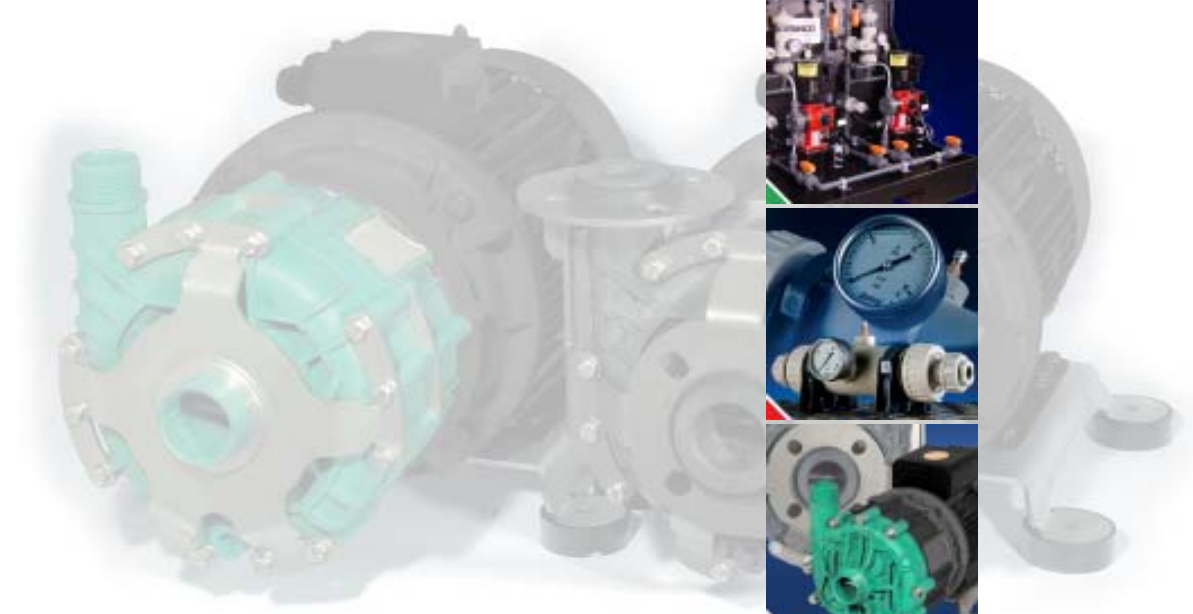


# A measured step forward™

Operations & Maintenance Manual

## CENTRAN G3



| Identification Code        |                            |                            |                            |                            |                            |                            |  |                                    |   |  |                               |                                    |  |                                     |                              |                              |
|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|--|------------------------------------|---|--|-------------------------------|------------------------------------|--|-------------------------------------|------------------------------|------------------------------|
| Pump Data                  |                            |                            |                            |                            |                            |                            |  | Motor Data                         |   |  |                               |                                    |  |                                     |                              |                              |
| Range                      | Model                      |                            |                            |                            |                            |                            | Execution                                  | O-Ring Material                    | Inside Structure                              | Connections  | rpm                           | Motor                              | Voltage/EEEx                                   | Phases                              | Powers                       |                              |
|                            | 50Hz                       |                            |                            | 60Hz                       |                            |                            |  |                                    |   |  |                               |                                    |  |                                     | kW                           | HP                           |
| G3                         | <input type="checkbox"/> N | <input type="checkbox"/> P | <input type="checkbox"/> S | <input type="checkbox"/> N | <input type="checkbox"/> P | <input type="checkbox"/> S | <input type="checkbox"/> WR<br>GFR-PP      | <input type="checkbox"/> V<br>FKM  | <input type="checkbox"/> R1<br>C/Al2O3        | <input type="checkbox"/> B BSP<br>threaded                         | <input type="checkbox"/> 1450 | <input type="checkbox"/> E<br>IEC  | <input type="checkbox"/> 0<br>without motor    | <input type="checkbox"/> 3<br>phase | <input type="checkbox"/> 2.2 | <input type="checkbox"/> 5   |
|                            | 20.15                      |                            |                            | 21.18                      |                            |                            |  |                                    |   |  |                               |                                    |  |                                     |                              |                              |
|                            | <input type="checkbox"/> N | <input type="checkbox"/> P | <input type="checkbox"/> S | <input type="checkbox"/> N | <input type="checkbox"/> P | <input type="checkbox"/> S | <input type="checkbox"/> GF<br>CFF-E-C-TFE | <input type="checkbox"/> E<br>EPDM | <input type="checkbox"/> X1<br>SiC/Al2O3      | <input type="checkbox"/> N NPT<br>threaded                         | <input type="checkbox"/> 2900 | <input type="checkbox"/> U<br>NEMA | <input type="checkbox"/> N<br>standard voltage | <input type="checkbox"/> 1<br>phase | <input type="checkbox"/> 3   | <input type="checkbox"/> 7.5 |
|                            | 20.20                      |                            |                            | 21.25                      |                            |                            |  |                                    |   |  |                               |                                    |  |                                     |                              |                              |
|                            | <input type="checkbox"/> N | <input type="checkbox"/> P | <input type="checkbox"/> S | <input type="checkbox"/> N | <input type="checkbox"/> P | <input type="checkbox"/> S | <input type="checkbox"/> GX<br>CFF-EC-TFE  | <input type="checkbox"/> K<br>FFKM | <input type="checkbox"/> N1<br>GFR-PTFE/Al2O3 | <input type="checkbox"/> Z<br>flanged<br>50/40 ISO<br>- ANSI - JIS | <input type="checkbox"/> 1750 |                                    | <input type="checkbox"/> S<br>special voltage  |                                     | <input type="checkbox"/> 4   | <input type="checkbox"/> 10  |
|                            | 20.27                      |                            |                            | 21.28                      |                            |                            |  |                                    |   |  |                               |                                    |  |                                     |                              |                              |
|                            | <input type="checkbox"/> N | <input type="checkbox"/> P | <input type="checkbox"/> S | <input type="checkbox"/> N | <input type="checkbox"/> P | <input type="checkbox"/> S |  |                                    | <input type="checkbox"/> R2<br>C/SiC          |  | <input type="checkbox"/> 3500 |                                    | <input type="checkbox"/> E<br>EEEx             |                                     | <input type="checkbox"/> 5.5 |                              |
|                            | 20.36                      |                            |                            | 21.43                      |                            |                            |  |                                    |   |  |                               |                                    |  |                                     |                              |                              |
|                            | <input type="checkbox"/> N | <input type="checkbox"/> P | <input type="checkbox"/> S | <input type="checkbox"/> N | <input type="checkbox"/> P | <input type="checkbox"/> S |  |                                    | <input type="checkbox"/> X2<br>SiC/SiC        |  |                               |                                    |  |                                     | <input type="checkbox"/> 7.5 |                              |
|                            | 30.15                      |                            |                            | 31.22                      |                            |                            |  |                                    |   |  |                               |                                    |  |                                     |                              |                              |
|                            | <input type="checkbox"/> N | <input type="checkbox"/> P | <input type="checkbox"/> S | <input type="checkbox"/> N | <input type="checkbox"/> P | <input type="checkbox"/> S |  |                                    | <input type="checkbox"/> N2<br>GFR-PTFE/-SiC  |  |                               |                                    |  |                                     |                              |                              |
|                            | 30.25                      |                            |                            | 31.30                      |                            |                            |  |                                    |   |  |                               |                                    |  |                                     |                              |                              |
| <input type="checkbox"/> N | <input type="checkbox"/> P | <input type="checkbox"/> S | <input type="checkbox"/> N | <input type="checkbox"/> P | <input type="checkbox"/> S |                            |  |                                    |   |  |                               |                                    |  |                                     |                              |                              |
| 36.30                      |                            |                            | 05.55                      |                            |                            |                            |  |                                    |   |  |                               |                                    |  |                                     |                              |                              |
| <input type="checkbox"/> N | <input type="checkbox"/> P | <input type="checkbox"/> S |                            |                            |                            |                            |  |                                    |   |  |                               |                                    |  |                                     |                              |                              |
| 4.45                       |                            |                            |                            |                            |                            |                            |  |                                    |   |  |                               |                                    |  |                                     |                              |                              |
| Year of Manufacturer       |                            |                            |                            |                            |                            |                            | Part Number                                |                                    |   | : ATEX Choose  |                               |                                    |  |                                     |                              |                              |

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| Maintenance                 |
|-----------------------------|
| Date of commissioning       |
| Position / system reference |
| Service                     |

| Dealer |
|--------|
|        |

**Tools**



- Adjustable Wrench - 13 mm

**Execution Notes**

- To facilitate the pump disassembling operations, first disassemble the Hydraulic Parts from the Motor Parts
- unscrew the connections (Pos.1)
- **Warning!** The disassembly operations of parts magnetically connected involve great opposed forces: keep the Motor Parts fixed on floor during the removing of the Hydraulic Parts.

**WARNING**

Maintenance must be performed under supervision of qualified personnel.

Before starting remember:

- cut off the power supply from the motor and disconnect the electrical wiring; pull the wires out from the terminal box and isolate their extremities accordingly
- close the suction and discharge valves; open the drain valve
- use appropriate gloves, protective glasses and acid proof-clothing when disconnecting and washing the pump
- disconnect hydraulic connections: leave enough time for the residual liquid to exit the pump casing and maintenance air to fill the empty volume
- wash the pump before starting maintenance operations
- do not splash the washing liquid in the environment
- before attempting to dismantle the pump ensure that its motor is disconnected and that it may not be started accidentally
- before the inspection, check that you have spare O-rings ready to hand for re-installing at the end of operations
- **Warning!** Operations near the magnets attract the tools. Proceed with caution to avoid damages.

For further details see paragraph 9.1 "Disassembling"

**Disassembling Steps Sequence**

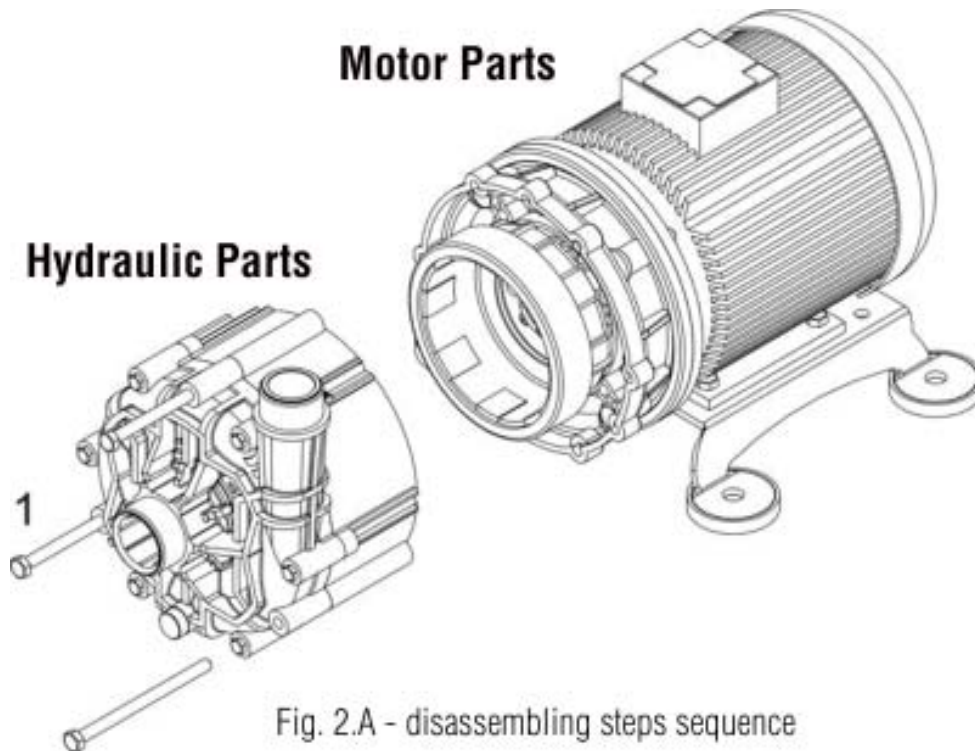


Fig. 2.A - disassembling steps sequence

| Ref.  | Pos. | Part Name                         | Qty No | Disassembling Steps Sequence |   |   |   |   |   |   |   |   |    | Spare stock per working years |   |  |  |
|-------|------|-----------------------------------|--------|------------------------------|---|---|---|---|---|---|---|---|----|-------------------------------|---|--|--|
|       |      |                                   |        | 1                            | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 2                             | 5 |  |  |
| 910.1 | 1    | Connection volute casing/strainer | 3      | ■                            |   |   |   |   |   |   |   |   |    |                               |   |  |  |

**Tools**

- Adjustable Wrench - 10 mm
- Screw driver
- Seeger pliers
- Hexagonal male wrench No 5

**Execution Notes**

- Disassemble keeping the pump in vertical position (suction on top)
- unscrew the connections (Pos.2)

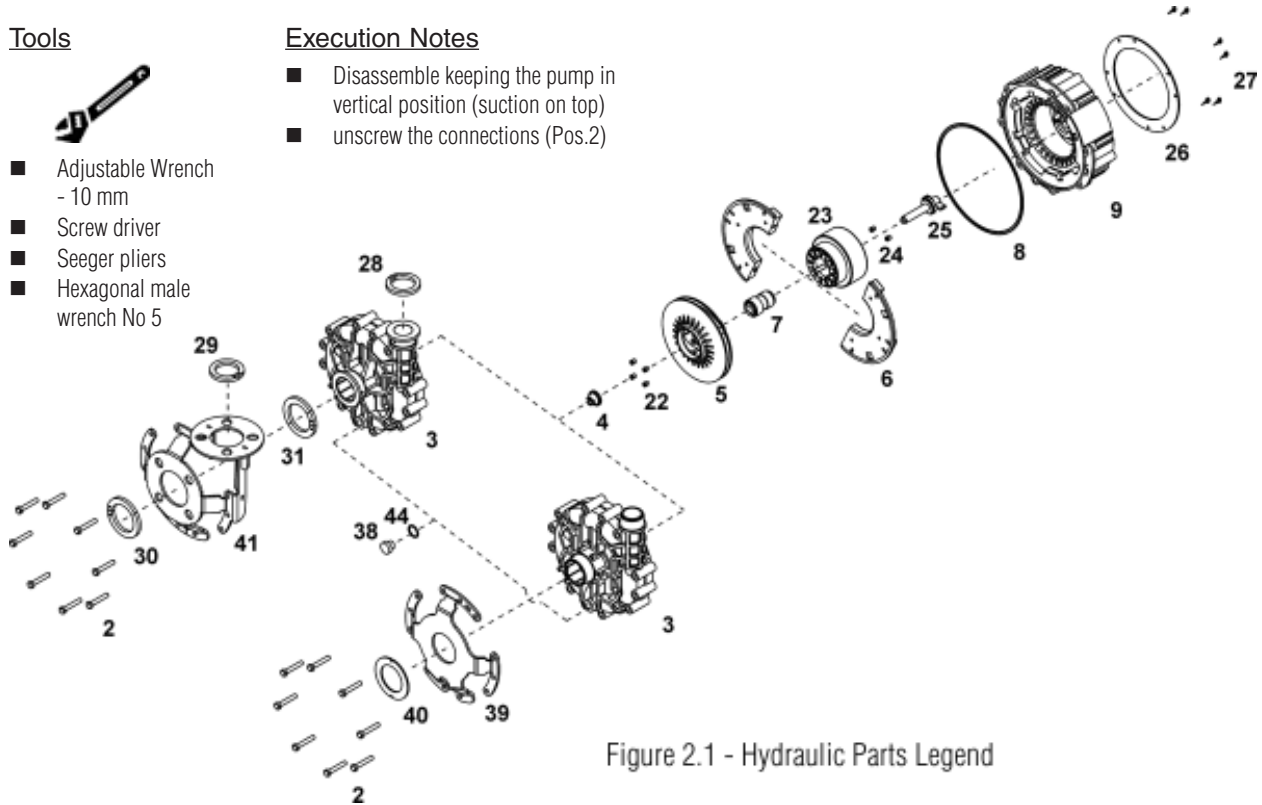





Figure 2.1 - Hydraulic Parts Legend

| Ref.  | Pos. | Part Name                            | Qty No | Disassembling Steps Sequence |   |   |   |   |   |   |   |   |    | Spare stock per working years |   |  |   |
|-------|------|--------------------------------------|--------|------------------------------|---|---|---|---|---|---|---|---|----|-------------------------------|---|--|---|
|       |      |                                      |        | 1                            | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 2                             | 5 |  |   |
| 910.1 | 2    | Connection volute casing/rear casing | 8      |                              | ■ |   |   |   |   |   |   |   |    |                               |   |  |   |
| 102   | 3    | Volute casing                        | 1      |                              |   | ■ |   |   |   |   |   |   |    |                               |   |  | 1 |
| 331   | 4    | Front thrust bearing                 | 1      |                              |   |   | ■ |   |   |   |   |   |    |                               |   |  | 1 |
| 233   | 5    | Impeller                             | 1      |                              |   |   |   | ■ |   |   |   |   |    |                               |   |  | 1 |
| 134   | 6    | Center semi-disc                     | 2      |                              |   |   |   | ■ |   |   |   |   |    |                               |   |  |   |
| 545   | 7    | Guide bushing                        | 2      |                              |   |   |   |   | ■ |   |   |   |    |                               |   |  | 2 |
| 412   | 8    | OR volute casing                     | 1      |                              |   |   |   |   |   | ■ |   |   |    |                               |   |  | 1 |
| 162   | 9    | Rear casing                          | 1      |                              |   |   |   |   |   |   | ■ |   |    |                               |   |  | 1 |
| 910.3 | 22   | Connection impeller/magnetic core    | 4      |                              |   |   | ■ |   |   |   |   |   |    |                               |   |  |   |
| 857   | 23   | Magnetic core                        | 1      |                              |   |   |   | ■ |   |   |   |   |    |                               |   |  | 1 |
| 910.4 | 24   | Connection shaft/rear casing         | 2      |                              |   |   |   |   |   | ■ |   |   |    |                               |   |  | 2 |
| 210   | 25   | Shaft                                | 1      |                              |   |   |   |   |   |   | ■ |   |    |                               |   |  | 1 |
| 197   | 26   | Plate rear casing                    | 1      |                              |   |   |   |   |   |   |   | ■ |    |                               |   |  |   |
| 910.5 | 27   | Connection rear casing/plate         | 8      |                              |   |   |   |   |   |   | ■ |   |    |                               |   |  |   |
| 932.1 | 28   | Back seeger (outlet)                 | 1      |                              | ■ |   |   |   |   |   |   |   |    |                               |   |  | 1 |
| 932.2 | 29   | Front seeger (outlet)                | 1      | ■                            |   |   |   |   |   |   |   |   |    |                               |   |  | 1 |
| 932.3 | 30   | Back seeger (inlet)                  | 1      |                              | ■ |   |   |   |   |   |   |   |    |                               |   |  | 1 |
| 932.4 | 31   | Front seeger (inlet)                 | 1      | ■                            |   |   |   |   |   |   |   |   |    |                               |   |  | 1 |
| 912   | 38   | Drain plug (optional)                | 1      | ■                            |   |   |   |   |   |   |   |   |    |                               |   |  |   |
| 195.1 | 39   | Threaded armour                      | 1      |                              |   | ■ |   |   |   |   |   |   |    |                               |   |  |   |
| 922   | 40   | Lock nut                             | 1      |                              | ■ |   |   |   |   |   |   |   |    |                               |   |  |   |
| 195.2 | 41   | flanged armour                       | 1      |                              |   | ■ |   |   |   |   |   |   |    |                               |   |  |   |
| 412.1 | 44   | OR drain plug (optional)             | 1      |                              | ■ |   |   |   |   |   |   |   |    |                               |   |  | 1 |

Tools

-  Phillips Screw Driver
-  Punch  $\varnothing < 4\text{mm}$
-  Adjustable Wrench - 10 mm

Execution Notes

- unscrew the connections (Pos.10)
- remove the collar from the drive magnet assembly using the punch (see paragraph 9.1)

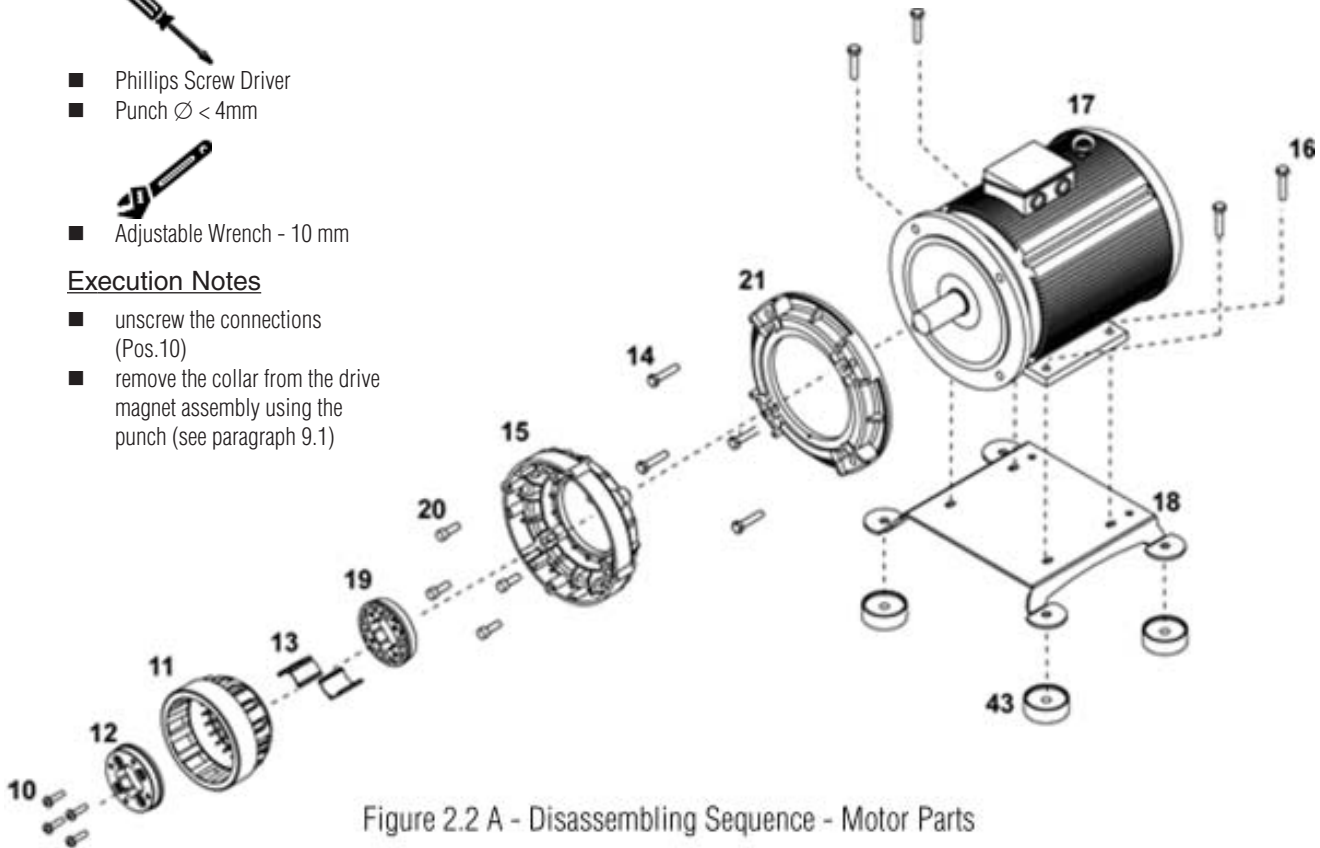


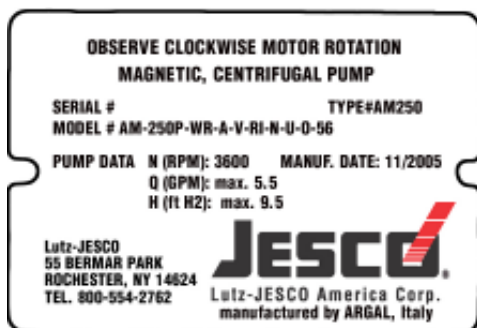
Figure 2.2 A - Disassembling Sequence - Motor Parts

| Ref.  | Pos. | Part Name                                       | Qty No | Disassembling Steps Sequence |   |   |   |   |   |   |   |   |    | Spare stock per working years |   |  |
|-------|------|---|--------|------------------------------|---|---|---|---|---|---|---|---|----|-------------------------------|---|--|
|       |      |   |        | 1                            | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 2                             | 5 |  |
| 910.6 | 10   | Connection drive magnet assembly/electric motor | 4      |                              |   | ■ |   |   |   |   |   |   |    |                               |   |  |
| 855   | 11   | Drive magnet assembly                           | 1      |                              |   |   | ■ |   |   |   |   |   |    |                               |   |  |
| 518.1 | 12   | Front collar (drive magnet assembly)            | 1      |                              |   |   |   | ■ |   |   |   |   |    |                               |   |  |
| 523   | 13   | Socket  | 1      |                              |   |   |   | ■ |   |   |   |   |    |                               |   |  |
| 910.7 | 14   | Connection bracket/electric motor               | 4      |                              |   |   |   |   | ■ |   |   |   |    |                               |   |  |
| 807   | 15   | Bracket   | 1      |                              |   |   |   |   |   | ■ |   |   |    |                               |   |  |
| 910.8 | 16   | Connection electric motor/base                  | 4      |                              |   |   |   |   |   |   | ■ |   |    |                               |   |  |
| 800   | 17   | Electric motor                                  | 1      |                              |   |   |   |   |   |   |   | ■ |    |                               |   |  |
| 890   | 18   | Base (optional)                                 | 1      |                              |   |   |   |   |   |   |   |   | ■  |                               |   |  |
| 518.2 | 19   | Back collar (drive magnet assembly)             | 1      |                              |   |   |   | ■ |   |   |   |   |    |                               |   |  |
| 910.9 | 20   | Connection bracket/motor flange                 | 4      |                              |   |   |   |   |   | ■ |   |   |    |                               |   |  |
| 334   | 21   | Motor flange                                    | 1      |                              |   |   |   |   |   |   | ■ |   |    |                               |   |  |
| 185   | 43   | Packing ring (optional)                         | 4      |                              |   |   |   |   |   |   |   |   |    | ■                             |   |  |

## Identification Codes

Each pump is supplied with the serial and model abbreviation and the serial number on the rating plate, which is riveted onto the support side. Check data upon receiving the goods. Any discrepancy between the order and the delivery must be reported communicated immediately.

**In order to be able to trace data and information, the abbreviation, model and serial number of the pump must be quoted in all correspondence.**



## General Notes

CENTRAN G3 pumps are designed and built for the transfer of liquid chemical products having a specific weight, viscosity, temperature. These criteria must be appropriate for use with centrifugal pumps in a fixed installation, from a tank at a lower level to a tank or a pipe to a higher level. The characteristics of the liquid (pressure, temperature, chemical reactivity, specific weight, viscosity, vapor tension) and the ambient atmosphere must be compatible with the characteristics of the pump and defined upon ordering.

The pump's maximum performances (capacity, head, rpm) are defined on the identification plate.

CENTRAN G3 pumps are centrifugal, horizontal, single stage, coupled to a non-synchronous electric motor via a magnetic coupling, with axial inlet and radial outlet for connection to the hydraulic system. They are foot-mounted for floor mounting.

CENTRAN G3 pumps are not self priming.

R<sub>1</sub>-R<sub>2</sub> execution CENTRAN G3 pumps can run dry.

The liquid to be pumped must be clean for the R<sub>1-2</sub> and N<sub>1-2</sub> execution. The X<sub>1-2</sub> execution may contain solid (%), dimension and solid part hardness must be agreed during the offer).

Pump rotation must be clockwise as observed from the motor end of the unit.

Make sure that the chemical and physical characteristics of the liquid have been carefully evaluated for pump suitability.

Verify the compatibility with the physical-chemical characteristics of the liquid.

The specific weight that can be pumped at a temperature of 25°C (both of the ambient and of the liquid) depends upon the impeller diameter (shown on the identification plate) and the type of construction.

|  |                         |
|--|-------------------------|
| standard construction <b>N</b> (stamped on the rating plate)       | 1.05 kg/dm <sup>3</sup> |
| powered construction <b>P</b> (stamped on the rating plate)        | 1.35 kg/dm <sup>3</sup> |
| strong-powered construction <b>S</b> (stamped on the rating plate) | 1.80 kg/dm <sup>3</sup> |

The specific weight that can be pumped at 70°C is 10% less than that at 25°C.

The level of kinematic viscosity must not exceed 40 cSt so as not to significantly modify the pump's performance. Higher values up to a maximum of 100 cSt are possible provided that the pump is equipped with suitable impeller to be defined upon ordering.

The maximum continuous working temperature referred to water depends on the choice of materials (specified on the identification plate):

|               |              |
|---------------|--------------|
| 80°C (176°F)  | execution WR |
| 110°C (230°F) | execution GF |

The ambient temperature interval is related to the choice of materials (specified on the identification plate):

|                        |              |
|------------------------|--------------|
| 0 - +40°C (14/104°F)   | execution WR |
| -20 - +40°C (-4/104°F) | execution GF |

The maximum pressure the pump may be subjected to is 1.5 times the head valve developed with the outlet closed.

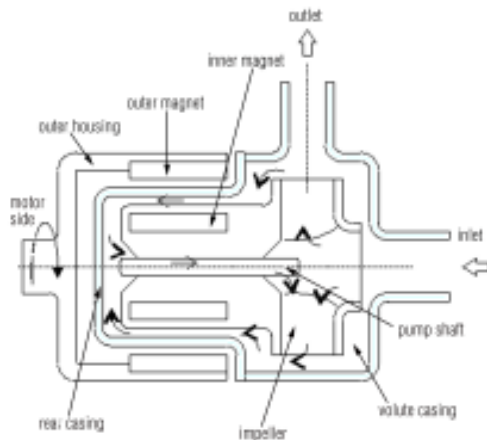
The vapour pressure value of the liquid to be pumped must exceed (by at least 1m w.c.) to the difference between the absolute total head (suction side pressure added to the positive suction head, or subtracted by the suction lift) and the pressure drops in the suction side piping (including the inlet NPSHr drops shown on the specific tables).

The pump does not include any check valve, any liquid flow control, or motor stop device.

## Operating Principle

HYDRAULICALLY similar to all centrifugal pumps, this pump is equipped with a blade-type impeller rotating within a fixed housing. It has a tangential outlet (or radial with an internal deflector) and, by creating a depression in the center, it allows the liquid to flow from the central suction side. Then, flowing through the impeller's blades, the fluid acquires energy and is conveyed towards the outlet.

MECHANICALLY different from the traditional centrifugal pumps, impeller motion is created using the magnetic field between the



primary outer magnet and the inner magnet (not visible because housed inside the impeller hub). The magnetic field crosses the plastic parts and the liquid, and firmly couples the two magnet assemblies. When the motor causes the outer magnet to rotate together with its housing, the inner magnet assembly is dragged at the same speed. As a result the impeller, which is integral to it, is maintained in rotation.

The SHAFT, totally within the housing, is not involved in the transmission of rotary motion; its only function is to act as a centering guide and support for the impeller. To this end the components are designed so that a spontaneous cooling circuit (due to a simple effect of pressure) is established to cool the surfaces subject to friction. Periodic inspections and cleaning prevent the build-up of sediments between the shafts and the guide bushes significantly lengthening their working life.

## Motor

### Electrical Connections

The electrical connection to the motor terminal determines the direction of rotation of the motor and can be verified by looking at the cooling fan at the rear of the motor (this has to rotate clockwise looking at the motor fan end.)

With single phase motors the direction of rotation may be reversed by changing the wiring according to the motor data plate.

## Dry Running Survey

Though the pump can run dry (execution R<sub>1</sub>-R<sub>2</sub>), it is strongly recommended to safeguard the pump and the plant by use of:

- in-line fluid pressure switch;
- fluxmeter;
- control devices for the motor power absorption.

## Instructions on Installation and Use

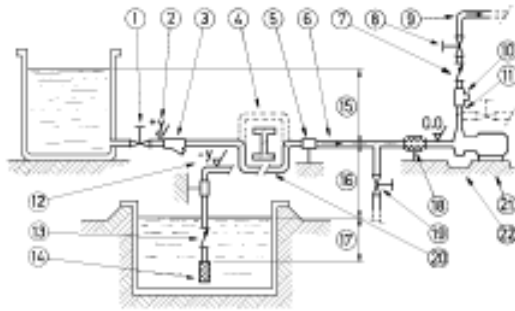
### Transport

- cover the hydraulic connections
- when lifting the unit do not exert force on the plastic fittings
- lay the pump on its base or mounting plate during transport
- protect the pump by means of adequate shock absorbing supports as bumps and shocks may damage important working parts vital for safety and functionality

### Installation

- check that bolts and nuts are correctly screwed (cfr. 9.3 page 12 "Assembly" for the right bolts torque setting), thermoplastics are dimensionally sensitive to sizeable temperature changes.
- clean the plant before connecting the pump.
- make sure that no foreign bodies are left in the pump. Remove safety caps from the hydraulic connections.
- follow the instructions indicated in the following diagram:
  1. YES: gate valve (may also be near pump in the case of long piping)
  2. With positive head: invert piping towards pump
  3. YES: line strainer (3-5 mm mesh)
  4. NO: air pockets: the circuit must be short and straight
  5. YES: pipe supports
  6. Fluid speed suction: 2.5 m/s
  7. YES: check valve (especially for long vertical or horizontal pipes; compulsory with parallel pumps).
  8. YES: adjusting gate valve on outlet
  9. speed of delivered fluid: 3.5 m/s max.
  10. YES: in-line gauge or safety pressure switch
  11. NO: elbows (and other parts) on the pump (discharge and suction lines)
  12. With negative suction lift: invert piping towards suction tank
  13. YES: check valve (with negative suction lift)
  14. YES: strainer (3-5 mm mesh)
  15. Suction head varies according to flow in order to prevent windage (min. 0.5 m, max. 15% of pump head)
  16. Suction head, 3 m max.
  17. Immersion depth: 0.3 m min.
  18. YES: pulsation dampener (indispensable with long pipes or hot liquids) and/or anti-vibration discharge and suction; located near to pump
  19. YES: drain pipe (completely sealed), drain valve. Shut during normal operations
  20. YES: overcoming obstacles at lower depths.
  21. Secure the pump by the mounting holes provided: the supports must be level
  22. YES: drainage channel around base
- secure the pump to an adequate base plate having a mass at least 5 times that of the pump
- do not use anti-vibration mounts to secure the pump
- anti-vibration joints are recommended on the pipe connections
- manually verify that all rotating parts are free to turn without abnormal friction by turning the motor cooling fan

- make sure that the power supply is compatible with the data shown on the pump motor identification plate
- connect the motor to the power supply via a thermal control switch
- ensure that star-delta starting is implemented for motors whose power is more than 15kW
- install emergency stop devices to turn off the pump in case of low liquid level (floating, magnetic, electronic, pressure- sensitive)



- ambient temperature as a function of the physical-chemical characteristics of the liquid to be pumped and in any case not greater or lower than the interval indicated in GENERAL NOTES
- other environmental conditions in accordance with the protection of the motor
- install a drainage pit to collect any liquid overflow from the base drainage channel due to normal operation and maintenance work
- leave enough free space around the pump for a person to move
- leave free space above the pump for lifting operations
- highlight the presence of aggressive liquids with colored tags following the local safety regulations
- do not install the pump (made in thermoplastic material) in close proximity to heating system
- do not install the pump in areas subject to solid or liquid matter falling
- do not install the pump in an explosive atmosphere unless the motor and its coupling have been adequately pre-arranged
- do not install the pump in close proximity to workplaces or crowded areas
- install extra protection guards for the pump or persons as the need arises
- install a spare equivalent pump in parallel

#### Start-Up

- verify that the instructions outlined in the INSTALLATION have been followed
- verify that mounting elements (screws and bolts) are closed (see bolt torque on page 13)
- verify the correct direction of rotation (clockwise from the motor fan side) supplying the motor with short impulses
- ensure that the NPSH available is greater than that required by the pump (in particular for hot liquids, liquids with high vapor pressure, very long suction pipes or negative suction lift)
- close the drain valve (pos. 19); totally flood the suction pipe and the pump
- start the pump with the suction valve completely open and the

- discharge valve partially closed
- slowly regulate the flow by opening or closing the discharge valve (never the suction valve). Make sure that the power absorbed by the motor does not exceed the rating indicated on the motor identification plate
- do not operate the pump at the limit values of its performance curve: maximum head (discharge valve excessively closed) or maximum capacity (total absence of drops and geodetic head on the discharge side)
- set the operating point to that for which the pump was requested
- ensure that there are no abnormal vibrations or noise due to inadequate mounting or cavitation
- avoid short and/or frequent starts by properly setting the control devices
- ensure that the temperature, pressure and liquid characteristics are as those specified at the time of order
- **WARNING!** At the start-up be sure that all the internal hydraulic parts are not in CCW rotation (the cooling fan of the motor must stand or CW rotate), to prevent decoupling among magnetic driven parts of the pump; if the CCW rotation is due to the feed-back of the liquid in the discharge side, add a no-return valve in the plant.

#### Use

- switch automatic control on
- do not activate valves during pump operation
- risks of dangerous water hammer effects in case of sudden or improper valve actuation (only trained personnel should operate valves)
- completely empty and wash the pump before using a different liquid
- isolate or empty the pump if the crystallization temperature of the liquid is the same or lower than the ambient temperature
- stop the pump if the liquid temperature exceeds the maximum allowed temperature indicated in the general notes; if the increase is of approximately 20%, check internal parts
- close the valves in case of leaks
- wash with water only if compatible with the chemical being used. Alternatively, use an appropriate solvent that will not generate dangerous exothermic reactions
- contact the liquid supplier for information on the appropriate fire precautions
- empty the pump during long periods of shutdown (in particular with liquids which easily crystallize)

#### Shutdown

- disconnect the motor
- before starting maintenance, turn off the suction and discharge valves

### **Maintenance**

All these maintenance operations must be performed under the



supervision of qualified personnel

- make periodic inspections (2 to 6 months depending on the type of liquid and the operating conditions) on the rotating parts of the pump; clean or replace as necessary
- make periodic inspections (3 to 5 months depending on the type of liquid and the operating conditions) on the functionality of the motor control system; efficiency must be guaranteed
- make periodic inspections (2 to 30 days depending on the type of liquid and the operating conditions) of the in-line and foot filters as well as of the bottom valve
- the presence of liquid below the pump may indicate pump problems
- excessive current consumption could be an indication of impeller problems
- unusual vibrations could be due to unbalanced impeller (due to damage or presence of foreign material obstructing its blades)
- reduced pump performance could be due to an obstruction of the impeller or damages to the motor
- motor damage could be due to abnormal friction within the pump
- damaged parts must be replaced with new original parts
- the replacement of damaged parts must be carried out in a clean dry area

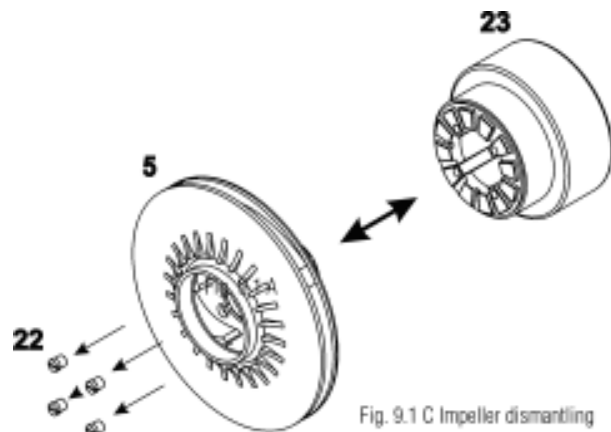


Fig. 9.1 C Impeller dismantling

## Disassembly

- Tools required: size 13 mm -17 mm -19 mm adjustable wrench, Phillips screw driver, punch  $\varnothing < 4\text{mm}$ . Bolts have right-hand thread
- all these maintenance operations must be performed under supervision of qualified personnel
- remove the power supply from the motor and disconnect the electrical wiring; pull the wires from the terminal box and isolate them accordingly
- close the suction and discharge valves and open the drain valve
- use gloves, safety glasses and acid-proof overalls when disconnecting and washing the pump
- disconnect the piping and leave enough time for the residual liquid to exit the pump body and atmospheric air to fill the empty volume
- wash the pump before carrying out any maintenance work
- do not splash the liquid in the environment
- before attempting to dismantle the pump ensure that its motor is disconnected and that it cannot be started accidentally
- before the inspection, check that you have spare O-rings ready to hand for re-installing at the end of operations
- **Warning:** tools are attracted by operations near the magnet. Proceed with caution to avoid damage.
- as described in paragraph No. 2 "Disassembling sequence", unscrew the connections (Pos.1) and remove the Hydraulic Parts from the Motor Parts
- proceed separately to disassemble the Hydraulic Parts or the Motor Parts following the sequence described in paragraph No. 2 "Disassembling sequence".
- **Warning:** the disassembly operations of parts magnetically connected involve great opposing forces; keep Motor Parts fixed on the floor while removing Hydraulic Parts
- to facilitate the disassembly operations keep the pump in vertical

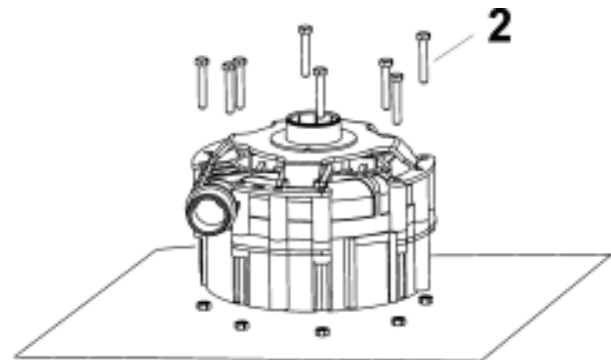


Fig. 9.1 A

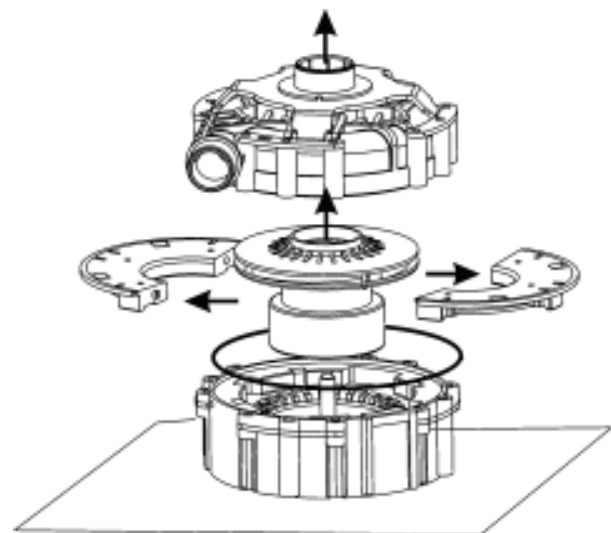


Fig. 9.1 B

position (suction on top) Fig. 9.1 A.

- **Warning:** During the disassembly of the hydraulic parts do not bump the guide components.
- **Warning:** After the dismantling of the pump casing extract together the impeller and the central disc; extract avoiding radial movements. Fig. 9.1 B.

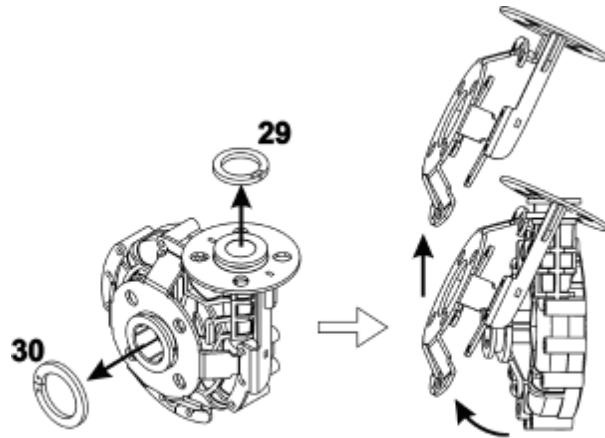


Fig. 9.1 D Flanged armour dismantling

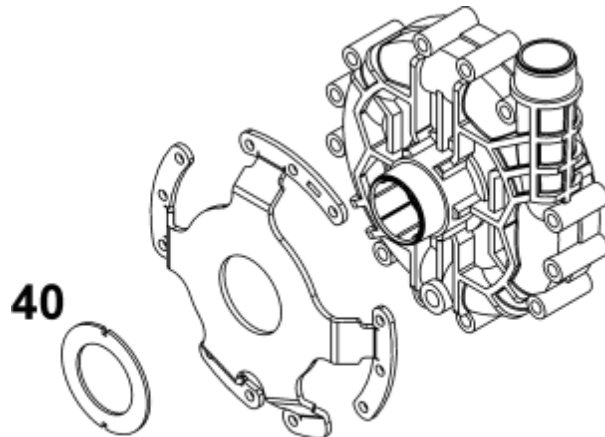


Fig. 9.1 E Threaded armour dismantling

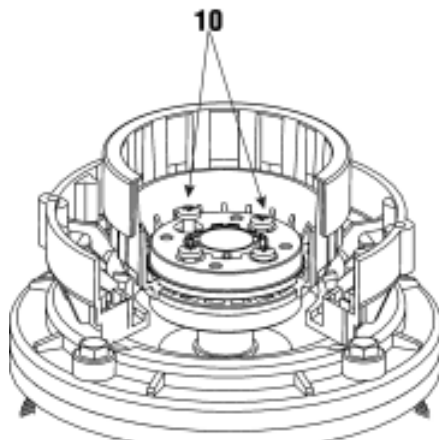


Fig. 9.1 F Drive magnet assembly dismantling

- **Warning:** Before separating the impeller assembly (Fig. 9.1 C - Pos.5) from magnetic core (Fig. 9.1 C - Pos.23), unscrew the 4 plastic lock screws (Fig. 9.1 C - Pos.22)

Armour Dismantling:

- **Warning:** the volute casing must be already separated from other Hydraulic Parts
- for the flanged execution, first disassemble the inlet and outlet seeger (Fig. 9.1 D - Pos.29, 30), second rotate the flanged armour with the purpose to disengage the inlet end outlet as described in the (Fig. 9.1 D)
- for the threaded execution unscrew the lock nut and disengage the armour (Fig. 9.1 E - Pos.40)
- disassemble the Motor Parts: unscrew the 4 screws inside the drive magnet assembly, Pos.10 in Fig. 9.1 F
- **Warning:** During the use of screw drive inside the drive magnet assembly you must oppose the magnetic attraction.
- **Warning:** After unscrewing the 4 screw (Pos.10 in Fig. 9.1 F)

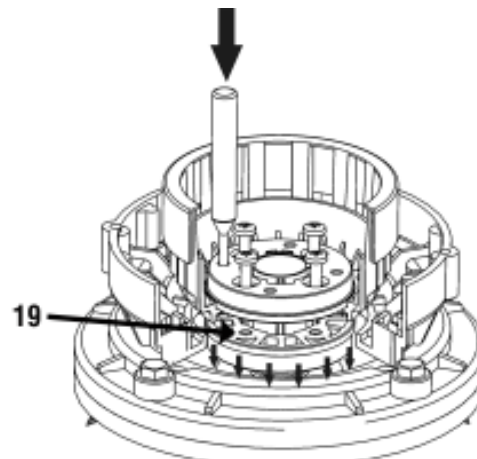


Fig. 9.1 G Drive magnet assembly unlocking

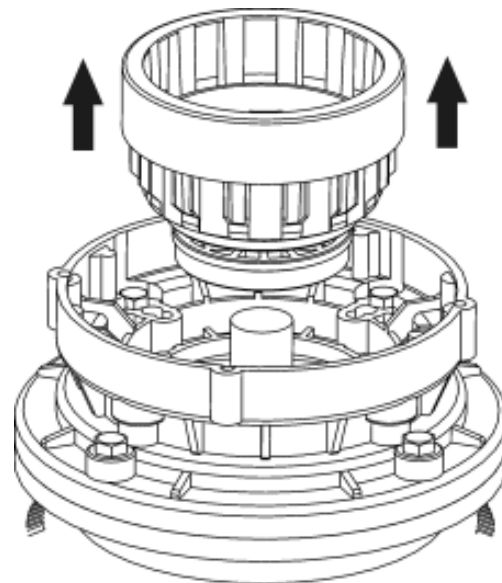


Fig. 9.1 H Drive magnet assembly dismantling

insert the punch  $\varnothing < 6\text{mm}$  in one of two extraction holes to remove the collar (Pos. 19 in Fig. 9.1 G) from the back and to allow the removing of the drive magnet assembly, sockets and collar (Fig. 9.1 H) from the motor shaft.

## Inspection

Check:

- the pump shaft for cracks and excessive wear
- guide bushing for excessive wear ( $\cong 5\%$ )
- counterthrust bushing for cracks or excessive wear
- pump shaft clutch
- that the guide bushing cooling circuit is not blocked
- the impeller, volute and rear chamber for abrasion and corrosion
- that the pressure balancing holes on the impeller blades are not blocked
- for lumps and clusters created by the pumped liquid (especially at the bottom the rear chamber)
- for infiltration of liquid into the chamber containing the inner magnets
- for abrasion on the external surface of the rear casing due to rubbing of the outer magnets
- replace broken, cracked or deformed parts.
- reopen all the blocked pipes and eliminate any chemical agglomeration.
- clean all the surfaces before re-assembly, especially O-ring seats to prevent the risk of drip leaks

## Assembly

- Tools required: size 10 mm -13 mm adjustable wrench, Phillips screw driver
- Bolts have right-hand thread

|                                  |    |    |    |     |     |    |
|----------------------------------|----|----|----|-----|-----|----|
| Bolt torque setting:             | M4 | M6 | M8 | M10 | M12 |    |
| (reduce by 25% on plastic parts) | Nm | 4  | 14 | 24  | 25  | 40 |

- all these maintenance operations must be performed under supervision of qualified personnel
- before the inspection, check that you have spare o-rings ready to hand for re-installing at the end of operations
- proceed separately to disassemble the Hydraulic Parts or the Motor Parts following the reverse sequence described in paragraph No. 2 "Disassembly sequence."

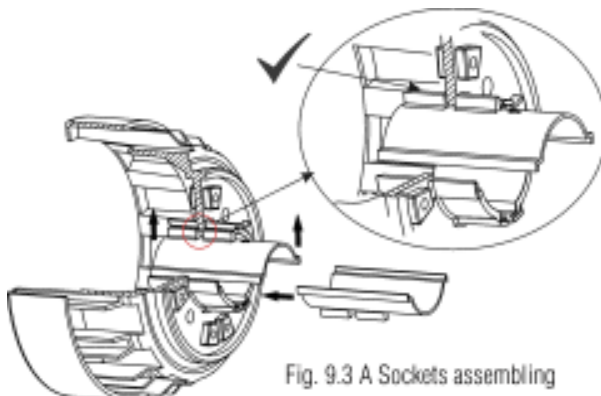


Fig. 9.3 A Sockets assembling

- **Warning:** assemble the hydraulic parts to the motor parts only after the complete assembly of these two sub-assembly groups.
- assemble the hydraulics and the motor parts, oppose the magnetic force keeping the hydraulic parts by the inlet and outlet connectors

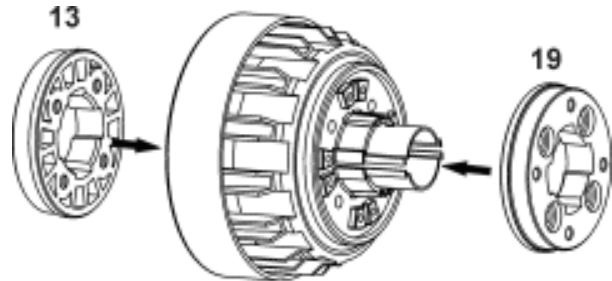


Fig. 9.3 B Collars assembly

- insert the correct sockets couple (see APPENDIX-A), take care that the groove placed between the socket keys is fitted in the drive magnet assembly, this placement guarantees the correct assembly

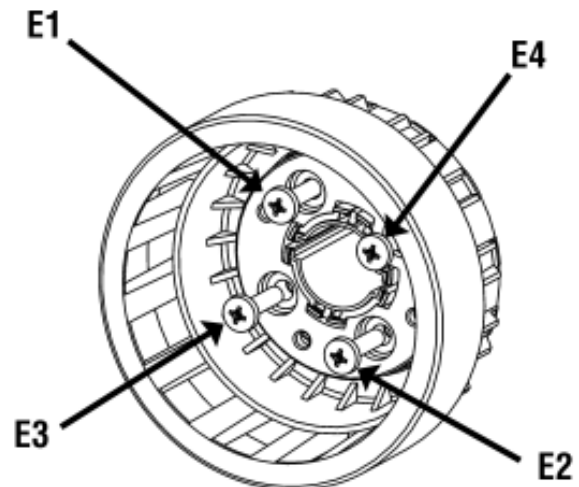
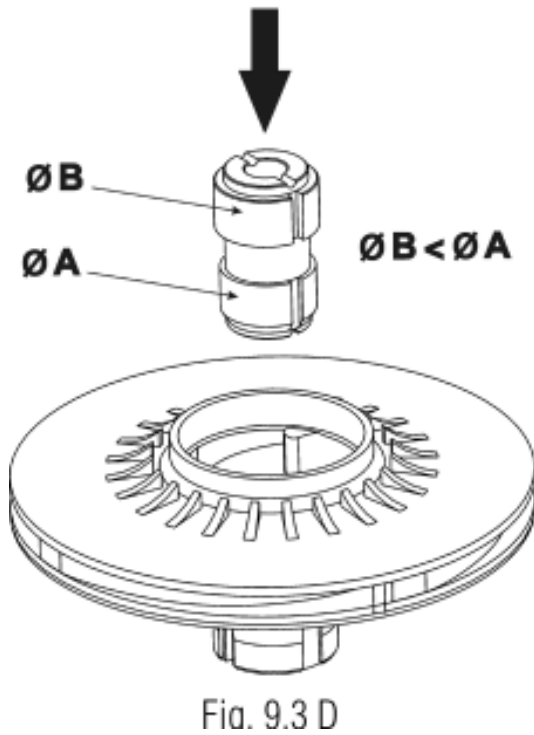


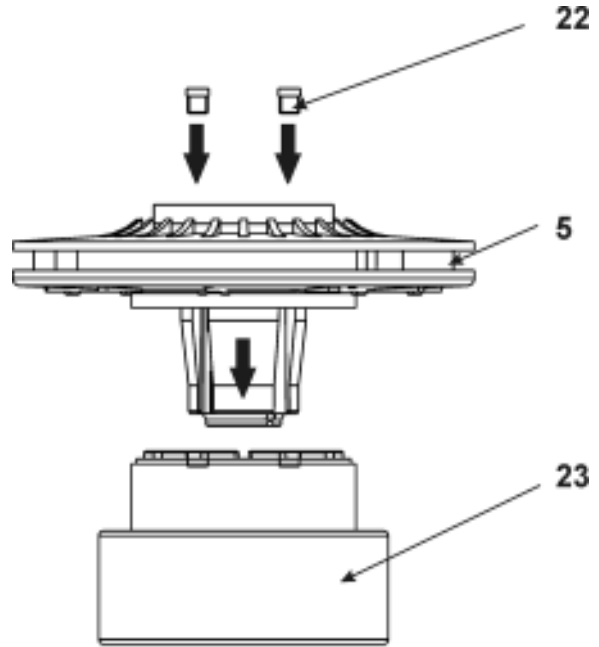
Fig. 9.3 C Lock screw assembly

- and the removal of the sockets.(Fig. 9.3 A)
- the correct placement of the drive magnet assembly is explained in APPENDIX – A
- insert the collars in the drive magnet assembly tang, see the explanation in Fig. 9.3 B for the correct placement
- **Warning:** Don't reverse the collars; in the collar POS.19 are visible the brass nuts
- insert the assembly group (drive magnet assembly, sockets, collars) on motor shaft
- check that during fitting of the assembly group the position between the sockets and the drive magnet assembly is unchanged (see APPENDIX –A), tighten the 4 screws repeating an "X" pattern (Fig. 9.3 C) applying a torque  $\cong 6\text{ Nm}$
- insert the 4 screws in the sites
- insert the correct sockets couple (see APPENDIX-A), take care that the groove placed between the socket keys is fitted in the drive

- magnet assembly, this placement guarantees the correct assembly and the removal of the sockets (Fig. 9.3 A)
- the correct placement of the drive magnet assembly is explained in APPENDIX-A
- insert the assembly group (drive magnet assembly, sockets, collars) on motor shaft
- insert the collars in the drive magnet assembly tang, see the



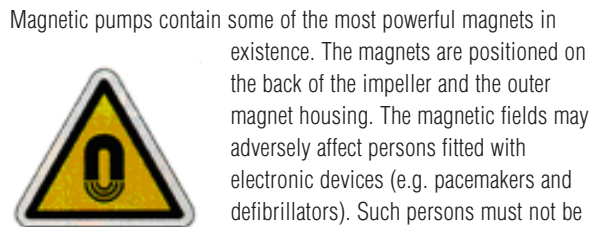
- explanation in Fig. 9.3 B for the correct placement
- **Warning:** Don't reverse the collars; in collar POS. 19 are visible brass nuts
- insert the 4 screws in the sites
- **Warning:** Don't tighten the 4 screws before fitting the drive magnet assembly on motor
- fit the bushing POS.7 (cfr. 2.1 pag. 3) in the impeller as explained in Fig. 9.3 D
- before insertion, take care to align the bushing radial grooves with the key placed in the impeller
- **Warning:** During the bushing insertion the ambient temperature must be at least 20°C, otherwise heat the impeller to about 40 °C during the assembly don't hit the bushing
- fit the impeller assembly in the magnetic core
- align the 4 radial grooves placed on the impeller POS. 5 with the 4 keys placed in the internal diameter of the magnetic core
- after checking that the assembly is correct, insert the 4 plastic screws POS. 22
- assemble the impeller with the semi-disks pos.6 as explained in Fig. 9.3 F
- insert the group (impeller + semi-disks) in the rear casing, during this operation take care of the guide system components, these



- components are made of materials which shatter easily.
- Place the o-ring in its location and tighten the 8 screws POS. 2 (cfr. 2.1 page 3)
- Assemble the motor parts with the hydraulic parts, oppose the magnetic force by keeping the hydraulic parts by the inlet and the outlet connectors

## Safety Risks

### WARNING! MAGNETIC FIELDS.



Magnetic pumps contain some of the most powerful magnets in existence. The magnets are positioned on the back of the impeller and the outer magnet housing. The magnetic fields may adversely affect persons fitted with electronic devices (e.g. pacemakers and defibrillators). Such persons must not be allowed to handle magnetic pumps and magnetic pump components. Individuals with internal surgical clips, metallic wiring, or other metallic prosthetic devices must not be allowed to handle magnetic pumps and magnetic components.

### WARNING! MAGNETIC FORCE.

Exercise extreme caution and follow instructions carefully during pump assembly/disassembly. The strong magnetic field can cause



tools and parts to slam together, injuring hands and fingers.

### **WARNING! CHEMICAL HAZARD.**

The pumps are designed to pump different types of liquid and chemical. Follow the specific instructions to decontaminate during inspection or maintenance.



### **WARNING!**

Safety risks for personnel mainly arise from improper use or accidental damages.

These risks may be of an electrical nature as far as the non-synchronous motor is concerned and may cause injury to hands if working on an open pump. Risks may also arise due to the nature of the liquids pumped. It is therefore of utmost importance to closely follow all the instructions contained in this manual so as to eliminate the causes that may lead to pump failure and the consequent leakage of dangerous liquid for both personnel and the environment.



Risks may also arise from improper maintenance or dismantling practices.

In any case five general rules are important:

1. all services must be carried out by specialized personnel or supervised by qualified personnel depending on the type of maintenance required
2. install protection guards to prevent liquid sprays (when the pump is not installed in remote areas) due to an accidental pipe rupture. Arrange for safety basins to collect possible leakage
3. when working on the pump always wear adequate personal protective clothing
4. arrange for proper conditions for suction and discharge valve closing during disassembly
5. make sure that the motor is completely disconnected during disassembly.

Proper design and construction of plants, with well positioned and well marked piping and shut-off valves, adequate passages and work areas for maintenance and inspection are extremely important. Pressure developed by the pump could damage the plant as a result of faulty installation or normal operational wear and tear.

It must be stressed that the major cause of pump failures leading to a consequent need for repair is the pump running dry in manually operated plants. This is generally due to:

- the suction valve being closed at start-up or
- the suction tank being emptied without stopping pump operation

### **Installation and Commissioning Personnel**

Installation must be performed by qualified personnel who are properly trained in their fields. They may eventually delegate to others some operations depending on specific evaluations (technical capability required: specialization in industrial plumbing or electric systems as needed).

### **Operators and Maintenance Personnel**

Operations allowed to be performed by general operators (after training on the correct use of the plant) include:

- pump starting and stopping
- opening and closing of valves with the pump at rest
- emptying and washing of the pump body via special valves and piping
- cleaning of filtering elements

Operations allowed to be performed by qualified personnel (technical capabilities required: general knowledge of the mechanical, electrical and chemical features of the plant being fed by the pump and of the pump itself) include:

- verification of environmental conditions
- verification of the condition of the liquid being pumped
- inspection of the control/stop devices of the pump
- inspection of the rotating parts of the pump
- trouble shooting

### **Repair Personnel**

Procedures allowed to be performed by general operators under the supervision of qualified personnel include:

- stopping of the pump
- closing of the valve
- emptying of pump body
- disconnection of piping from fittings
- removal of anchoring bolts
- washing with water or suitable solvent as needed
- transport (after removal of electrical connections by qualified personnel)

Operations allowed to be performed by qualified personnel (technical capabilities required: general knowledge of machining operations, awareness of possible damage to parts due to abrasion or shocks during handling, know-how of required bolt and screw tightening required on different materials such as plastics and metals, use of

precision measuring instruments) include:

- opening and closing of the pump body
- removal and replacement of rotating parts

## Waste Disposal

Materials: separate plastic from metal parts. Dispose of by authorized companies.

## Improper Use

The pump must not be used for purposes other than the transfer of liquids.

The pump cannot be used to generate isostatic or counter pressures.

The pump cannot be used to mix liquids generating an exothermal reaction.

The pump must be installed horizontally on a firm base.

The pump must be installed on a suitable hydraulic plant with inlet and outlet connections to proper suction and discharge pipes.

The plant must be able to shut off the liquid flow independently from the pump.

Handling of aggressive liquids requires specific technical knowledge.

## Troubleshooting

### Condition: Pump does not deliver

1. motor rotates in wrong direction
2. suction pipe is excessively long
3. insufficient geodetic pump head or excessive suction geodetic lift
4. air infiltration into the suction pipe or branches
5. pump or suction pipe not completely covered by liquid
6. impeller channels blocked by impurities
7. check valve on discharge pipe jammed
8. geodetic system height is greater than maximum potential pump head
9. impeller jammed by crystals or by melting of materials during dry operation.
10. suction line blocked by mud or other debris
11. foot valve insufficiently immersed
12. suction valve faulty, thereby causing suction valve to empty when pump stops
13. magnets release a much greater specific weight and flow rate of liquid than planned
14. magnets release during start-up while impeller is CCW moving (feed-back of the liquid in the discharge side)

### Condition: Pump discharge rate or pressure insufficient

see 01, 02, 03, 04, 05, 06, 10, 11, 12, 13

15. system's discharge head is greater than expected
16. suction pipe, closing valve and other items have an insufficient nominal diameter
17. small geometric pump suction head
18. damaged or worn impeller
19. liquid viscosity greater than expected
20. excessive air or gas in liquid
21. elbow joints, check valves or other items restrict the outlet port flow
22. liquid (especially if hot) with tendency to change into gaseous state

### Condition: Pump absorbs too much power

see 19

23. pump operates at greater capacity than expected
24. specific weight of liquid is greater than expected
25. impurities inside pump create abnormal wear
26. electric motor supply voltage is not rated voltage

### Condition: Pump vibrates and is noisy

see 25

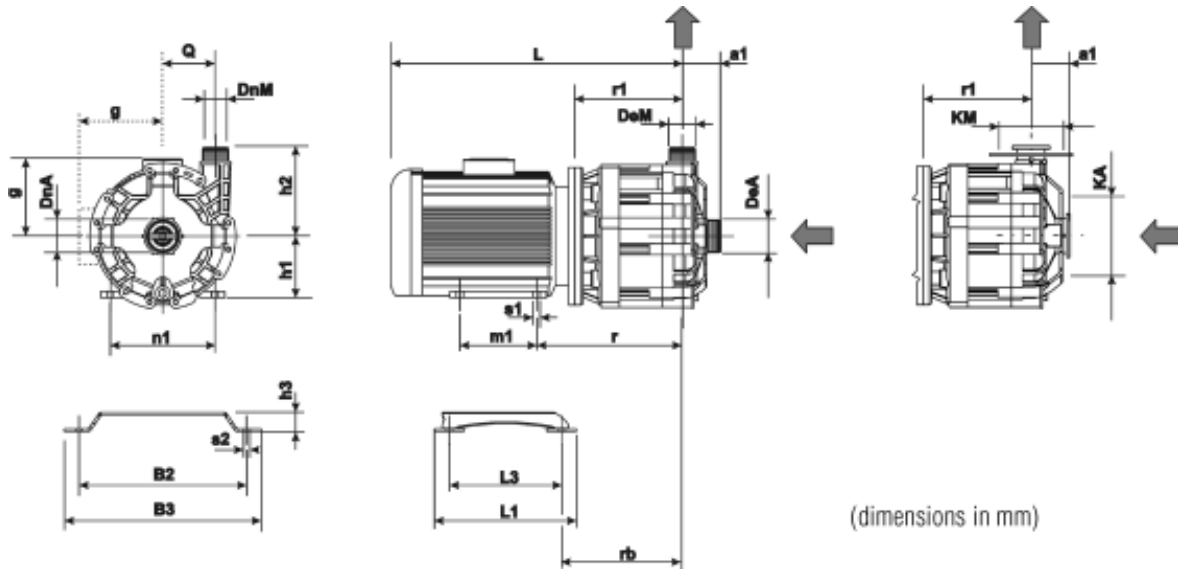
27. operates at full capacity (no head)
28. pump or pipes inadequately supported
29. eccentric impeller operation because of worn bushings

### Condition: Pump's internal parts wear out too quickly

see 25

30. liquid excessively abrasive
31. recurring cavitation problems (see 02, 15, 19, 17)
32. high tendency of liquid to crystallize or polymerize when pump is not operating
33. pump made of materials that are unsuitable for pumped liquid
34. operation with capacity reduced too much

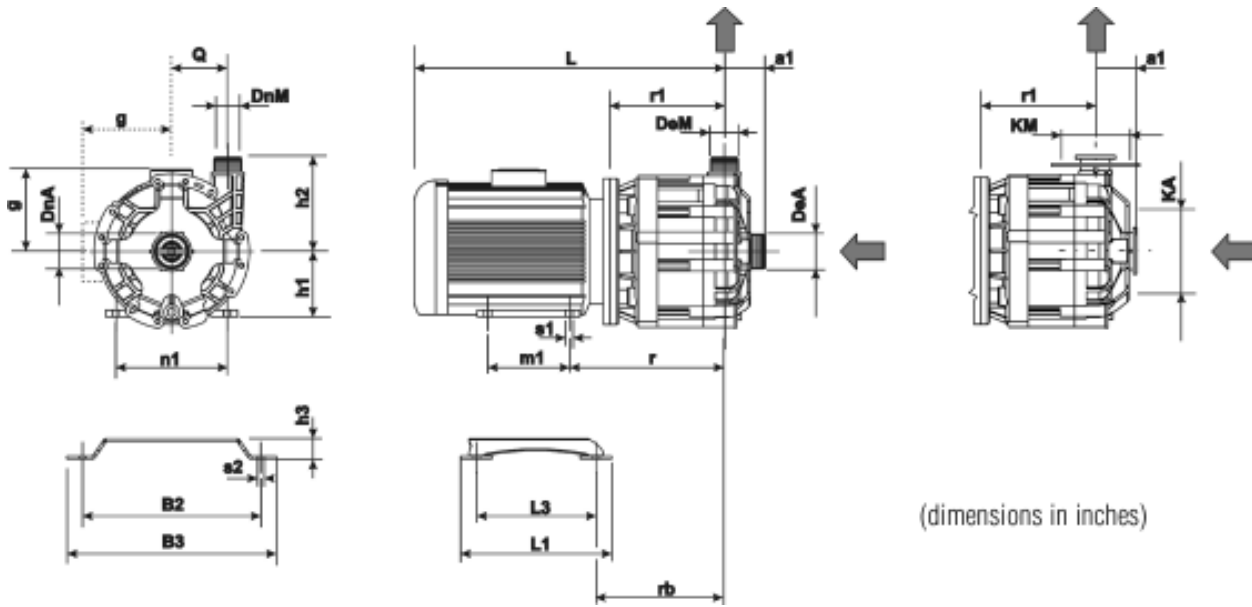
## Technical Data



**CENTRAN G3 Technical Data - Motor IEC - 60 Hz**

| CENTRAN G3   | 21.18     |      |       | 21.25     |       |       | 21.28     |           | 21.43     | 31.22     |           | 31.30     | 05.55     |
|--------------|-----------|------|-------|-----------|-------|-------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|              | 100L      | 112M | 132SA | 112M      | 132SA | 132SB | 132SA     | 132SB     | 132SB     | 132SA     | 132SB     | 132SB     | 132SB     |
| a1           | 70        |      |       | 70        |       |       | 70        | 70        | 70        | 70        | 70        | 70        | 70        |
| L            | 512       | 521  | 578   | 521       | 578   |       | 548       | 578       | 578       | 578       | 578       | 578       | 578       |
| Q            | 96        |      |       | 96        |       |       | 96        | 96        | 96        | 96        | 96        | 96        | 96        |
| h1           | 100       | 112  | 132   | 112       | 132   |       | 132       | 132       | 132       | 132       | 132       | 132       | 132       |
| h2           | 160       |      |       | 160       |       |       | 160       | 160       | 160       | 160       | 160       | 160       | 160       |
| r            | 261       | 268  | 307   | 268       | 307   |       | 307       | 307       | 307       | 307       | 307       | 307       | 307       |
| r1           | 198       |      | 218   | 198       | 218   |       | 218       | 218       | 218       | 218       | 218       | 218       | 218       |
| rb           | 210       | 217  | 235   | 217       | 235   |       | 235       | 235       | 235       | 235       | 235       | 235       | 235       |
| m1           | 140       |      |       | 140       |       |       | 140       | 140       | 140       | 140       | 140       | 140       | 140       |
| n1           | 160       | 190  | 216   | 190       | 216   |       | 216       | 216       | 216       | 216       | 216       | 216       | 216       |
| s1           | 10        |      |       | 10        |       |       | 10        | 10        | 10        | 10        | 10        | 10        | 10        |
| g            | 155       | 168  | 181   | 168       | 181   |       | 181       | 181       | 181       | 181       | 181       | 181       | 181       |
| L3           | 205       |      | 263   | 205       | 263   |       | 263       | 263       | 263       | 263       | 263       | 263       | 263       |
| B2           | 305       |      | 359   | 305       |       | 359   | 359       | 359       | 359       | 359       | 359       | 359       | 359       |
| S2           | 14        |      |       | 14        |       |       | 14        | 14        | 14        | 14        | 14        | 14        | 14        |
| L1           | 265       |      | 333   | 265       | 333   |       | 333       | 333       | 333       | 333       | 333       | 333       | 333       |
| B3           | 365       |      | 429   | 365       | 429   |       | 429       | 429       | 429       | 429       | 429       | 429       | 429       |
| h3           | 55        |      |       | 55        |       |       | 55        | 55        | 55        | 55        | 55        | 55        | 55        |
| KM (ISO)     | 110       |      |       | 110       |       |       | 110       | 110       | 110       | 110       | 110       | 110       | 110       |
| KA (ISO)     | 125       |      |       | 125       |       |       | 125       | 125       | 125       | 125       | 125       | 125       | 125       |
| KM (ANSI)    | 98        |      |       | 98        |       |       | 98        | 98        | 98        | 98        | 98        | 98        | 98        |
| KA (ANSI)    | 121       |      |       | 121       |       |       | 121       | 121       | 121       | 121       | 121       | 121       | 121       |
| KM (JIS)     | 105       |      |       | 105       |       |       | 105       | 105       | 105       | 105       | 105       | 105       | 105       |
| KA (JIS)     | 120       |      |       | 120       |       |       | 120       | 120       | 120       | 120       | 120       | 120       | 120       |
| d x z (ISO)  | 18 x 4    |      |       | 18 x 4    |       |       | 18 x 4    | 18 x 4    | 18 x 4    | 18 x 4    | 18 x 4    | 18 x 4    | 18 x 4    |
| d x z (ANSI) | 16-19 x 4 |      |       | 16-19 x 4 |       |       | 16-19 x 4 | 16-19 x 4 | 16-19 x 4 | 16-19 x 4 | 16-19 x 4 | 16-19 x 4 | 16-19 x 4 |
| d x z (JIS)  | 19 x 4    |      |       | 19 x 4    |       |       | 19 x 4    | 19 x 4    | 19 x 4    | 19 x 4    | 19 x 4    | 19 x 4    | 19 x 4    |

(Dimensions in inches)



**CENTRAN G3 Technical Data - MotorNEMA - 60 Hz**

| CENTRAN G3   | 21.18         |          | 21.25         |          |      | 21.28         |      | 21.43     | 31.22         |      | 31.30     | 05.55     |
|--------------|---------------|----------|---------------|----------|------|---------------|------|-----------|---------------|------|-----------|-----------|
|              | 184T          | 213T     | 184T          | 213T     | 215T | 213T          | 215T | 215T      | 213T          | 215T | 215T      | 215T      |
| a1           | 2-3/4         |          | 2-3/4         |          |      | 2-3/4         |      | 2-3/4     | 2-3/4         |      | 2-3/4     | 2-3/4     |
| L            | 20-13/16      | 23-1/8   | 20-13/16      | 23-1/8   |      | 23-1/8        |      | 23-1/8    | 23-1/8        |      | 23-1/8    | 23-1/8    |
| Q            | 3-3/4         |          | 3-3/4         |          |      | 3-3/4         |      | 3-3/4     | 3-3/4         |      | 3-3/4     | 3-3/4     |
| h1           | 4-1/2         | 5-1/4    | 4-1/2         | 5-1/4    |      | 5-1/4         |      | 5-1/4     | 5-1/4         |      | 5-1/4     | 5-1/4     |
| h2           | 6-1/4         |          | 6-1/4         |          |      |               |      |           |               |      |           |           |
| r            | 10-15/16      | 11-11/16 | 10-15/16      | 11-11/16 |      | 11-11/16      |      | 11-11/16  | 11-11/16      |      | 11-11/16  | 11-11/16  |
| r1           | 8-11/16       | 8-11/16  | 8-11/16       | 8-11/16  |      | 8-11/16       |      | 8-11/16   | 8-11/16       |      | 8-11/16   | 8-11/16   |
| rb           | 8-5/8         | 8-3/4    | 8-5/8         | 8-3/4    |      | 8-3/4         |      | 8-3/4     | 8-3/4         |      | 8-3/4     | 8-3/4     |
| m1           | 5-1/2         |          | 5-1/2         |          | 7    | 5-1/2         |      | 7         | 5-1/2         | 7    | 7         | 7         |
| n1           | 7-1/2         | 8-1/2    | 7-1/2         | 8-1/2    |      | 8-1/2         |      | 8-1/2     | 8-1/2         |      | 8-1/2     | 8-1/2     |
| s1           | 13/32         |          | 13/32         |          |      | 13/32         |      | 13/32     | 13/32         |      | 13/32     | 13/32     |
| g            | 7             | 8        | 7             | 8        |      | 8             |      | 8         | 8             |      | 8         | 8         |
| L3           | 8-1/16        | 10-3/8   | 8-1/16        | 10-3/8   |      | 10-3/8        |      | 10-3/8    | 10-3/8        |      | 10-3/8    | 10-3/8    |
| B2           | 12            | 14-1/8   | 12            | 14-1/8   |      | 14-1/8        |      | 14-1/8    | 14-1/8        |      | 14-1/8    | 14-1/8    |
| S2           | 9/16          |          | 9/16          |          |      | 9/16          |      | 9/16      | 9/16          |      | 9/16      | 9/16      |
| L1           | 10-3/16       | 13-1/8   | 10-3/16       | 13-1/8   |      | 13-1/8        |      | 13-1/8    | 13-1/8        |      | 13-1/8    | 13-1/8    |
| B3           | 14-1/8        | 16-7/8   | 14-1/8        | 16-7/8   |      | 16-7/8        |      | 16-7/8    | 16-7/8        |      | 16-7/8    | 16-7/8    |
| h3           | 2-5/32        |          | 2-5/32        |          |      | 2-5/32        |      | 2-5/32    | 2-5/32        |      | 2-5/32    | 2-5/32    |
| KM (ISO)     | 4-11/32       |          | 4-11/32       |          |      | 4-11/32       |      | 4-11/32   | 4-11/32       |      | 4-11/32   | 4-11/32   |
| KA (ISO)     | 4-15/16       |          | 4-15/16       |          |      | 4-15/16       |      | 4-15/16   | 4-15/16       |      | 4-15/16   | 4-15/16   |
| KM (ANSI)    | 3-7/8         |          | 3-7/8         |          |      | 3-7/8         |      | 3-7/8     | 3-7/8         |      | 3-7/8     | 3-7/8     |
| KA (ANSI)    | 4-3/4         |          | 4-3/4         |          |      | 4-3/4         |      | 4-3/4     | 4-3/4         |      | 4-3/4     | 4-3/4     |
| KM (JIS)     | 4-1/8         |          | 4-1/8         |          |      | 4-1/8         |      | 4-1/8     | 4-1/8         |      | 4-1/8     | 4-1/8     |
| KA (JIS)     | 4-23/32       |          | 4-23/32       |          |      | 4-23/32       |      | 4-23/32   | 4-23/32       |      | 4-23/32   | 4-23/32   |
| d x z (ISO)  | 3/4 x 4       |          | 3/4 x 4       |          |      | 3/4 x 4       |      | 3/4 x 4   | 3/4 x 4       |      | 3/4 x 4   | 3/4 x 4   |
| d x z (ANSI) | 5/8 - 3/4 x 4 |          | 5/8 - 3/4 x 4 |          |      | 5/8 - 3/4 x 4 |      | 5/8-3/4x4 | 5/8 - 3/4 x 4 |      | 5/8-3/4x4 | 5/8-3/4x4 |
| d x z (JIS)  | 3/4 x 4       |          | 3/4 x 4       |          |      | 3/4 x 4       |      | 3/4 x 4   | 3/4 x 4       |      | 3/4 x 4   | 3/4 x 4   |

(Dimensions in inches)



| CENTRAN G3            |          | 60Hz                                      | 21.18  | 21.25  | 21.28  | 21.43  | 31.22  | 31.30  | 05.55  |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------|----------|---|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| inlet                 | BSP-NPT  | 2"  | 2"     | 2"     | 2"     | 2"     | 2"     | 2"     | 2"     |       |       |       |       |       |       |       |       |       |       |       |       |       |
| outlet                | BSP-NPT  | 1-1/2"                                    | 1-1/2" | 1-1/2" | 1-1/2" | 1-1/2" | 1-1/2" | 1-1/2" | 1-1/2" |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Flange ISO-ANSI-JIS   | DNA(mm)  | 50  | 50     | 50     | 50     | 50     | 50     | 50     | 50     |       |       |       |       |       |       |       |       |       |       |       |       |       |
|                       | DNM(mm)  | 40  | 40     | 40     | 40     | 40     | 40     | 40     | 40     |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Flange ISO-ANSI-JIS   | DNA (in) | 2"  | 2"     | 2"     | 2"     | 2"     | 2"     | 2"     | 2"     |       |       |       |       |       |       |       |       |       |       |       |       |       |
|                       | DNM (in) | 1-1/2"                                    | 1-1/2" | 1-1/2" | 1-1/2" | 1-1/2" | 1-1/2" | 1-1/2" | 1-1/2" |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Pump                  | Model    | 21.18                                     |        |        | 21.25  |        |        | 21.28  |        |       | 21.43 |       |       | 31.22 |       |       | 31.30 |       |       | 05.55 |       |       |
|                       | Version  | N   | P      | S      | N      | P      | S      | N      | P      | S     | N     | P     | S     | N     | P     | S     | N     | P     | S     | N     | P     | S     |
| Power (IEC) 60 Hz     | KW       | 3   | 4      | 5.5    | 4      | 5.5    | 7.5    | 5.5    | 7.5    | 7.5   | 5.5   | 7.5   | 7.5   | 5.5   | 7.5   | 7.5   | 5.5   | 7.5   | 7.5   | 5.5   | 7.5   | 7.5   |
| Motor size            | IEC      | 100L                                      | 112M   | 132SA  | 112M   | 132SA  | 132SB  | 213SA  | 132SB  | 132SB | 213SA | 132SB | 132SB | 213SA | 132SB | 132SB | 213SA | 132SB | 132SB | 213SA | 132SB | 132SB |
| Power (NEMA) 60 Hz    | HP       | 5   | 5      | 7.5    | 5      | 7.5    | 10     | 7.5    | 10     | 10    | 7.5   | 10    | 10    | 7.5   | 10    | 10    | 7.5   | 10    | 10    | 7.5   | 10    | 10    |
| Motor size            | NEMA     | 184T                                      | 184T   | 213T   | 184T   | 213T   | 215T   | 213T   | 215T   | 215T  | 213T  | 215T  | 215T  | 213T  | 215T  | 215T  | 213T  | 215T  | 215T  | 213T  | 215T  | 215T  |
| noise                 | dB       | 70  | 75     | 80     | 75     | 80     | 80     | 80     | 80     | 80    | 80    | 80    | 80    | 80    | 80    | 80    | 80    | 80    | 80    | 80    | 80    | 80    |
| phase                 | N.       | 3-phase                                   |        |        |        |        |        |        |        |       |       |       |       |       |       |       |       |       |       |       |       |       |
| voltage Std. IEC      | V        | 400 +/- 5% 50 Hz                          |        |        |        |        |        |        |        |       |       |       |       |       |       |       |       |       |       |       |       |       |
| voltage Std. NEMA     | V        | 460 +/- 5% 60 Hz                          |        |        |        |        |        |        |        |       |       |       |       |       |       |       |       |       |       |       |       |       |
| protection            | IP       | 55  |        |        |        |        |        |        |        |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Loads (ports-section) | Kg       | Max. single strength value F(x,y,z) = 2.5 |        |        |        |        |        |        |        |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Dynamic loads (base)  | Kg       | Max. single strength value F(x,y,z) = 3.5 |        |        |        |        |        |        |        |       |       |       |       |       |       |       |       |       |       |       |       |       |

Dimensions in mm; weight and loads in kg  
BSP or NPT parallel thread on the hydraulic connections

Contractual Data  
Technical Data

Medium \_\_\_\_\_  
conc. % \_\_\_\_\_ temp °C \_\_\_\_\_  
capacity m<sup>3</sup>/h \_\_\_\_\_ head m c.l. \_\_\_\_\_

w.o.  
\_\_\_\_\_

### Code Number Configuration

| TMR          | 21.18 P  |   | WR                           | V                         | R1  | B  | E                    | N   | 3                         |
|--------------|--|---|------------------------------|---------------------------|---|--|----------------------|---|---------------------------|
| Route Series | Chosen model                                       | EXEC.<br>N=normal<br>P=powered<br>S=strong-pow. | See materials & construction | V=FKM<br>E=EPDM<br>K=FFKM | See materials & construction                              | B=thr. BSP<br>N=thr. NPT<br>Z=flange<br>Y=flange<br>40/40 ANSI | U=NEMA               | N=Std.<br>S=Spec. V<br>E=Ex-proof<br>O=No motor | 3=3 phase<br>1=1 phase    |
| Series       | Model  | Execution                                       | Version                      | O-ring Material           | Internal Structure  | Connection   | Standard Motor       | Data Motor                                      | Motor Phases              |
| TMR          | 21.18<br>21.25<br>21.28<br>21.43<br>31.22<br>31.30 | N<br> <br>P<br> <br>S                           | WR<br> <br>GF<br> <br>GX     | V<br> <br>E<br> <br>K     | N1<br> <br>R1<br> <br>X1<br> <br>N2<br> <br>R2<br> <br>X2 | B<br> <br>N<br> <br>Z  | U<br> <br> <br> <br> | N<br> <br>S<br> <br>E                           | 3<br> <br>1<br> <br> <br> |

### Parts List

| Item No. | Description                               | Code  | Qty. | Part Number |             |             |             |             |             | Spare Stock |       |
|----------|---|-------|------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------|
|          |   |       |      | Model 21.18 | Model 21.25 | Model 21.28 | Model 21.43 | Model 31.22 | Model 31.30 | 2 yrs       | 5 yrs |
| 1        | Connection for Volute                     | ---   | 3    | 41118       | 41121       | 41128       | 41143       | 41122       | 41130       | ---         | ---   |
| 2        | Casing Screw                              | ---   | 8    | 41218       | 41221       | 41228       | 41243       | 41222       | 41230       | ---         | ---   |
| 3        | Volute Casing<br>(See Version)            | WR    | 1    | 41318WR     | 41321WR     | 41328WR     | 41343WR     | 41322WR     | 41330WR     | ---         | 1     |
|          |   | GF    | 1    | 41318GF     | 41321GF     | 41328GF     | 41343GF     | 41322GF     | 41330GF     | ---         | 1     |
| 4        | Front Thrust Bearing<br>(See Version)     | WR    | 1    | 41018WR     | 41021WR     | 41028WR     | 41043WR     | 41022WR     | 41030WR     | 1           | 2     |
|          |   | GF    | 1    | 41018GF     | 41021GF     | 41028GF     | 41043GF     | 41022GF     | 41030GF     | 1           | 2     |
| 5        | Impeller (See Version)                    | WR    | 1    | 41418WR     | 41421WR     | 41428WR     | 41443WR     | 41422WR     | 41430WR     | 1           | 1     |
|          |   | GF    | 1    | 41418GF     | 41421GF     | 41428GF     | 41443GF     | 41422GF     | 41430GF     | 1           | 1     |
| 6        | Center Semi-Disc                          | ---   | 2    | 41518       | 41521       | 41528       | 41543       | 41522       | 41530       | ---         | ---   |
| 7        | Guide Bushing<br>(See Internal Structure) | R1/R2 | 2    | 42918R      | 42921R      | 42928R      | 42943R      | 42922R      | 42930R      | 2           | 4     |
|          |   | X1/X2 | 2    | 42918X      | 42921X      | 42928X      | 42943X      | 42922X      | 42930X      | 2           | 4     |
|          |   | N1/N2 | 2    | 42918N      | 42921N      | 42928N      | 42943N      | 42922N      | 42930N      | 2           | 4     |
| 8        | O-Ring<br>(See O-Ring Material)           | V     | 1    | 41718V      | 41721V      | 41728V      | 41743V      | 41722V      | 41730V      | 1           | 2     |
|          |   | E     | 1    | 41718E      | 41721E      | 41728E      | 41743E      | 41722E      | 41730E      | 1           | 2     |
|          |   | K     | 1    | 41718K      | 41721K      | 41728K      | 41743K      | 41722K      | 41730K      | 1           | 2     |
| 9        | Rear Casing<br>(See Version)              | WR    | 1    | 42718WR     | 42721WR     | 42728WR     | 42743WR     | 42722WR     | 42730WR     | ---         | 1     |
|          |   | GF    | 1    | 42718GF     | 42721GF     | 42728GF     | 42743GF     | 42722GF     | 42730GF     | ---         | 1     |
| 10       | Screw (Magnet-Assembly)                   | ---   | 4    | 42018       | 42021       | 42028       | 42043       | 42022       | 42030       | ---         | ---   |

**Parts List (con't)**

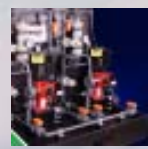
| Item No. | Description                         | Code | Qty. | Part Number                            |             |             |             |             |             | Spare Stock |       |
|----------|-------------------------------------|------|------|--|-------------|-------------|-------------|-------------|-------------|-------------|-------|
|          |                                     |      |      | Model 21.18                            | Model 21.25 | Model 21.28 | Model 21.43 | Model 31.22 | Model 31.30 | 2 yrs       | 5 yrs |
| 11       | Drive Magnet Assembly               | ---  | 1    | 41918                                  | 41921       | 41928       | 41943       | 41922       | 41930       | ---         | ---   |
| 12       | Front Collar (Magnet-Assembly)      | ---  | 1    | 42018                                  | 42021       | 42028       | 42043       | 42022       | 42030       | ---         | 1     |
| 13       | Socket                              | ---  | 1    | 43018                                  | 43021       | 43028       | 43043       | 43022       | 43030       | ---         | 2     |
| 14       | Screw (Strainer/Motor)              | ---  | 4    | 42118                                  | 42121       | 42128       | 42143       | 42122       | 42130       | ---         | ---   |
| 15       | Bracket                             | ---  | 1    | 42218                                  | 42221       | 42228       | 42243       | 42222       | 42230       | ---         | ---   |
| 16       | Screw (Motor/Baseplate)             | ---  | 4    | 42318                                  | 42321       | 42328       | 42343       | 42322       | 42330       | ---         | ---   |
| 17       | Electric Motor                      | ---  | 1    | Consult Factory wth Pump Serial Number |             |             |             |             |             |             |       |
| 18       | Baseplate (Optional)                | ---  | 1    | 42418                                  | 42421       | 42428       | 42443       | 42422       | 42430       | ---         | ---   |
| 19       | Back Collar (Drive Magnet Assembly) | ---  | 1    | 43018                                  | 43021       | 43028       | 43043       | 43022       | 43030       | ---         | 1     |
| 20       | Screw (Bracket/Motor Flange)        | ---  | 4    | 43118                                  | 43121       | 43128       | 43143       | 43122       | 43130       | ---         | ---   |
| 21       | Motor Flange                        | ---  | 1    | 43218                                  | 43221       | 43228       | 43243       | 43222       | 43230       | ---         | ---   |
| 22       | Screw (Impeller/Magnetic Core)      | ---  | 4    | 43318                                  | 43321       | 43328       | 43343       | 43322       | 43330       | 2           | 4     |
| 23       | Magnetic Core                       | ---  | 1    | 43418                                  | 43421       | 43428       | 43443       | 43422       | 43430       | ---         | ---   |
| 24       | Screw (Shaft/Rear Casing)           | ---  | 2    | 43518                                  | 43521       | 43528       | 43543       | 43522       | 43530       | 2           | 2     |
| 25       | Shaft                               | ---  | 1    | 43618                                  | 43621       | 43628       | 43643       | 43622       | 43630       | ---         | 1     |
| 26       | Plate (Rear Casing)                 | ---  | 1    | 43718                                  | 43721       | 43728       | 43743       | 43722       | 43730       | ---         | ---   |
| 27       | Screw (Rear Casing/ Plate)          | ---  | 8    | 43818                                  | 43821       | 43828       | 43843       | 43822       | 43830       | ---         | ---   |
| 28       | Back Seeger (Outlet)                | ---  | 1    | 43918                                  | 43921       | 43928       | 43943       | 43922       | 43930       | ---         | 1     |
| 29       | Front Seeger (Outlet)               | ---  | 1    | 44018                                  | 44021       | 44028       | 44043       | 44022       | 44030       | ---         | 1     |
| 30       | Back Seeger (Inlet)                 | ---  | 1    | 44118                                  | 44121       | 44128       | 44143       | 44122       | 44130       | ---         | 1     |
| 31       | Front Seeger (Inlet)                | ---  | 1    | 44218                                  | 44221       | 44228       | 44243       | 44222       | 44230       | ---         | 1     |
| 38       | Drain Plug (Optional)               | ---  | 1    | 44318                                  | 44321       | 44328       | 44343       | 44322       | 44330       | ---         | ---   |
| 39       | Threaded Armor                      | ---  | 1    | 44418                                  | 44421       | 44428       | 44443       | 44422       | 44430       | ---         | ---   |
| 40       | Lock Nut                            | ---  | 1    | 44518                                  | 44521       | 44528       | 44543       | 44522       | 44530       | ---         | ---   |
| 41       | Flanged Armor                       | ---  | 1    | 44618                                  | 44621       | 44628       | 44643       | 44622       | 44630       | ---         | ---   |
| 43       | Packing Ring                        | ---  | 4    | 42518                                  | 42521       | 42528       | 42543       | 42522       | 42530       | ---         | ---   |
| 44       | Drain Plug O-Ring (Optional)        | ---  | 1    | 44718                                  | 44721       | 44728       | 44743       | 44722       | 44730       | 1           | 1     |



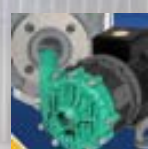
Accessories



Chemical Feed Systems



Measuring and Control Technology



Transfer Pumps

Metering Pumps