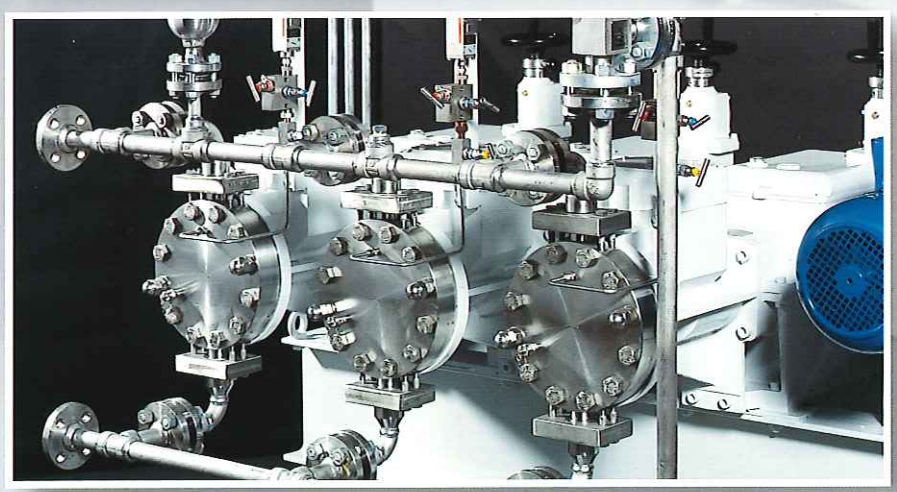
OFFICINE
MECCANICHE
GALLARATESI S.p.A.

# DOXE metering pumps

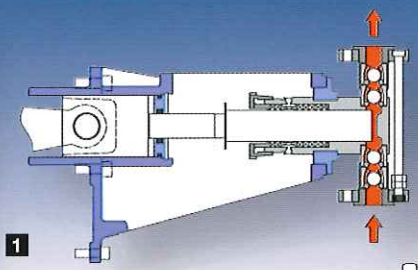
reciprocating plunger and diaphragm process pumps,
designed to solve with the highest reliability
and precision any problem
associated with metering applications
- single acting for all models,
double acting for piston
type pumping heads only.



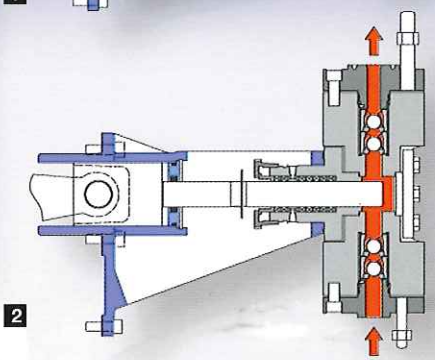
**B5Ai**

09.03.10

multi-heads plunger pumps



1



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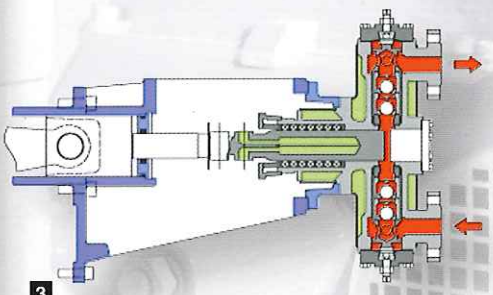
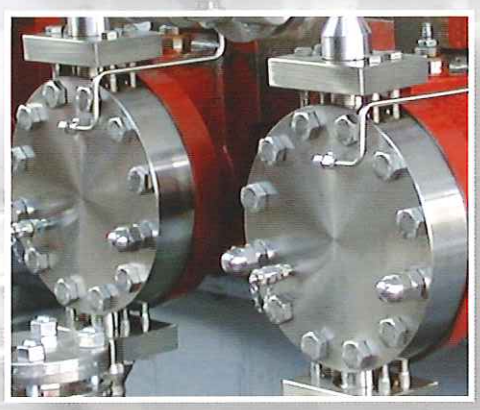
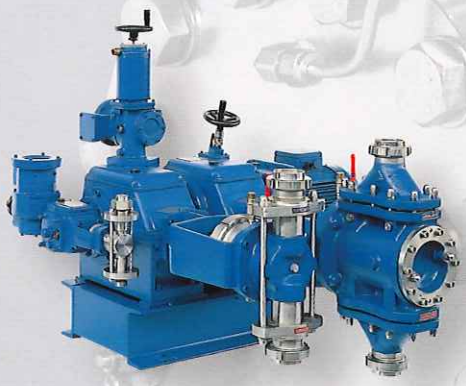


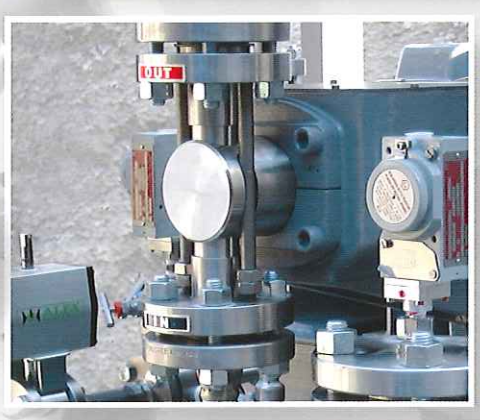
3

piston pump
with heating jacket





triplex group



1. single acting, standard plunger pumping head
2. single acting plunger, pumping head for high pressure applications
3. single acting plunger, pumping head with jacket for high accuracy heating
4. double diaphragm pumping head
5. pumping head of double acting pump
6. crank mechanism of DOXE-M metering pumps

## construction characteristics

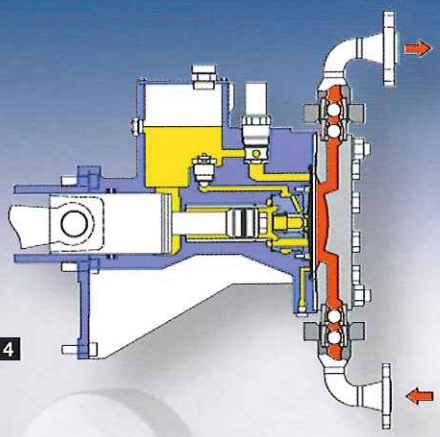
- continuous capacity control 0 to 100% adjustable with pump at rest or in operation
- plunger stroke adjustable from 0 up to 70 mm
- plunger speed from 25 up to 140 strokes/minute
- metering accuracy better than 1% throughout the normal operating range of 10 to 100% capacity
- maximum liquid temperature for continuous operation:
  300°C with metal pump head
  80 to 100°C with ceramic plunger
  150°C with diaphragms made of PTFE 50°C with PVC pump heads
- required NPSH, less than 0,3 bar abs., under normal operating conditions, for plunger pumps
- groupable in multiplex units, also with pumps of different series.
- manufactured in compliance with API 675 std., not "lost motion" type and complying with European Directive "392/89/CEE machinery directive" and therefore marked CE

## crank mechanism

- differential type, with satellite and planetary gear system, with mechanical return stroke
- cranckcase made of cast iron and completely enclosed, with oil splash lubrification, split in two sections to permit easy access
- available in two series:
  DOXE-2 with max. allowable plunger thrust 10.000 N
  DOXE-3 with max. allowable plunger thrust 30.000 N
- each mechanism can be supplied with stroke length adjustable either when the pump is at rest only (F type) or also while it is running (M type) or without capacity adjustment (FF type)

## single acting, plunger type, pumping heads

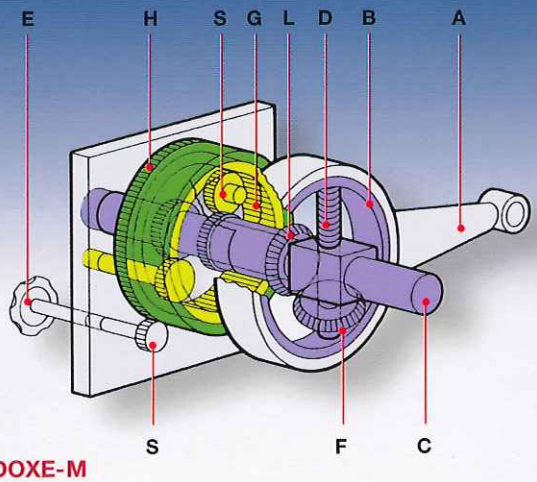
- single or double ball check valves, upon request; only single, due to the dimensions, for the models 100x70 and 125x70
- high pressure type, with forged construction, easily replaceable valves
- high accuracy liquid heating type, with incorporated heating jacket, container enclosed valves and possibility of plunger and valves replacement without disconnecting the pipe system
- pump body made of metal or plastic materials, piston made of metal or ceramics
- flanged suction and discharge connections are standard
- packing for high pressure or high temperature are available



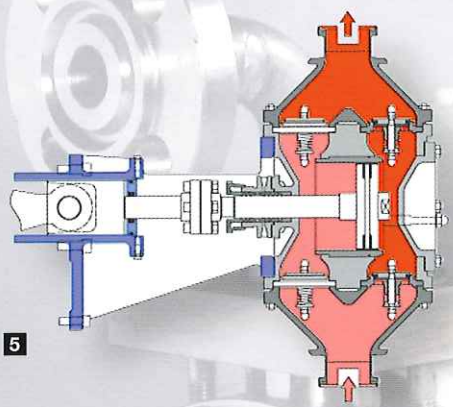
4

## structural arrangement of the crank mechanism

The piston stroke is adjusted by varying the excentricity of connecting rod (**A**) actuated by shaft (**C**) through bush (**B**) by means of screw (**D**). For crank mechanism DOXE-F, the pump can be adjusted only when at rest, by turning screw (**D**) with handwheel (**E**). For crank mechanism DOXE-M the pump can be adjusted also while running by turning screw (**D**) by means of gear (**F**) connected to the handwheel (**E**) through a gear system.
In summary: if handwheel (**E**) is not turned, the violet coloured parts rotate as a unit with shaft (**C**); satellites (**S**) and crown wheel (**G**), indicated in yellow, rotate in neutral on its own axes and wheel (**H**), indicated in green, remains stationary and maintains constant the reciprocal angular position between satellites (**S**).
By actuating handwheel (**E**) the wheel (**H**) turns and the relative angular position between satellites (**S**) is adjusted and a reciprocal rotation is imparted to gears (**L**) and (**F**), which moves screw (**D**).




DOXE-M



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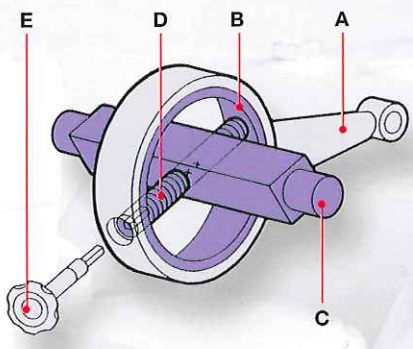
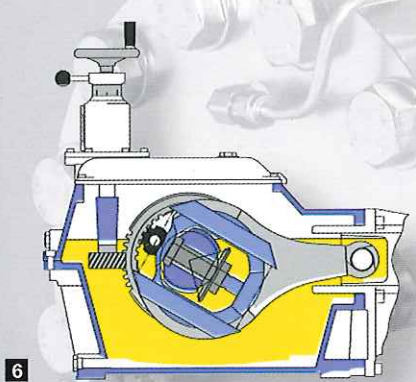
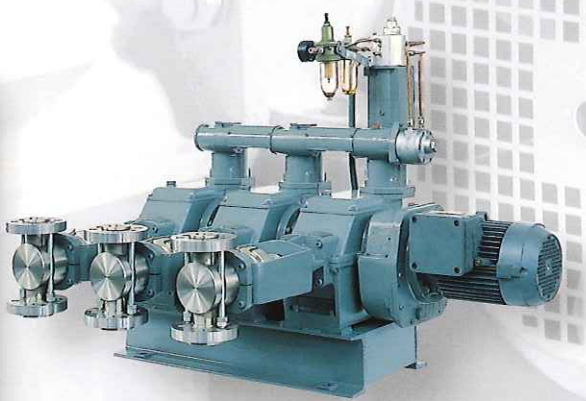



DOXE-F



6

adjustement handwheel detail



three-heads group

### double acting, plunger type, pumping heads

- cylinder liner inserted and easily replaceable
- piston and cylinder liner removable from pump body without disassembling
- valves with replaceable seats and removable without disassembling the pumping head
- standard construction material AISI 316 and AISI 304 stainless steels, for all parts in contact with the liquid; other materials available upon request

### diaphragm type pumping heads

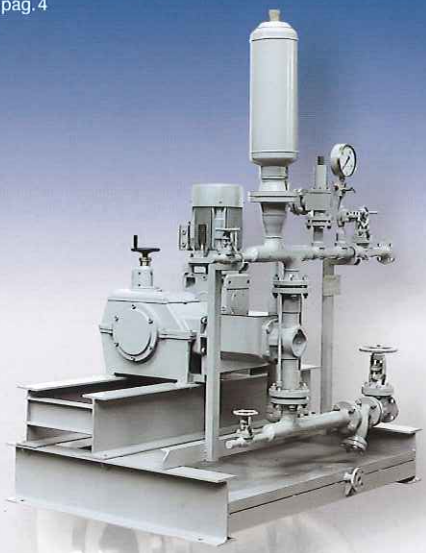
- diaphragms actuated by an hydraulic circuit with feeding and relief valves
- pump body made of metal or plastic materials; heating or cooling jackets can be supplied on request
- diaphragms made of elastomers, PTFE or metallic, always double to avoid liquids losses in case of failure of a single diaphragm

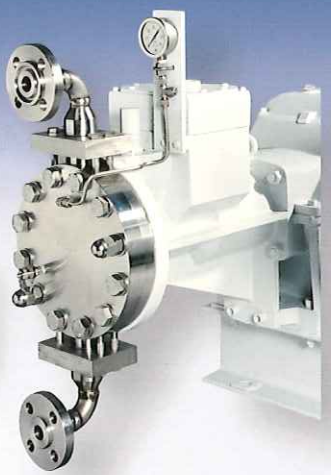
### driving motors - speed reducers

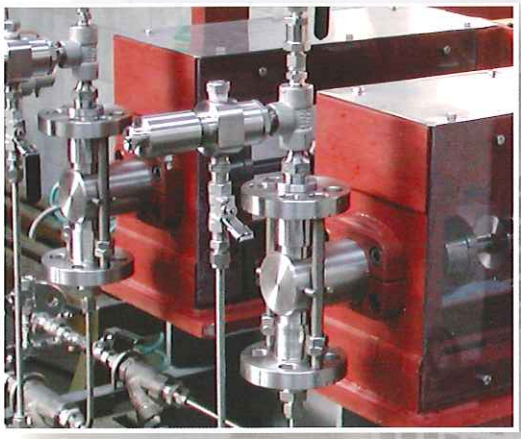
- three phase, four poles, B5 or V1 flanged type electric motors are normally supplied with dimensions according to IEC standards; also B3 base assembled motors are normally provided
- speed reducers with cylindrical or worm-wheel gears and oil splash lubricated
- normal crankshaft speed 50, 70, 87,110 and 125 strokes/minute

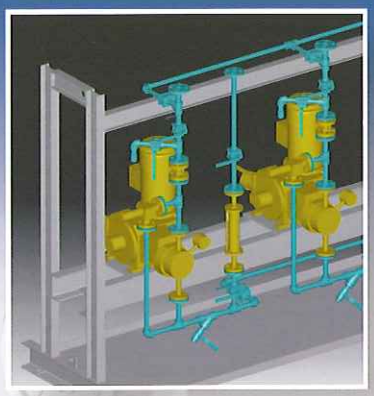
### capacity control systems

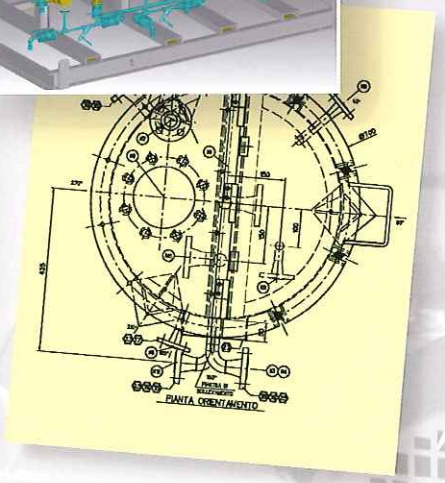
- manual control, with pump at rest or in operation, by handwheel with lock knob; linear adjustment scale with precision vernier
- automatic control with pneumatically actuated positioner; either from linear or non linear signal, normal range 3 to 15 psi, with emergency manual overdrive
- automatic control with positioner controlled by an electrically actuated monophase servomotor and reponse potentiometer with emergency handwheel
- running speed adjustable by electric motor frequency variator (inverter) or by variable speed motor or variable speed gear reducer; speed adjustement by hand or automatic by electric or pneumatic signal
- batch impulses generator and pulsemeter to meter a predeterminated liquid dose

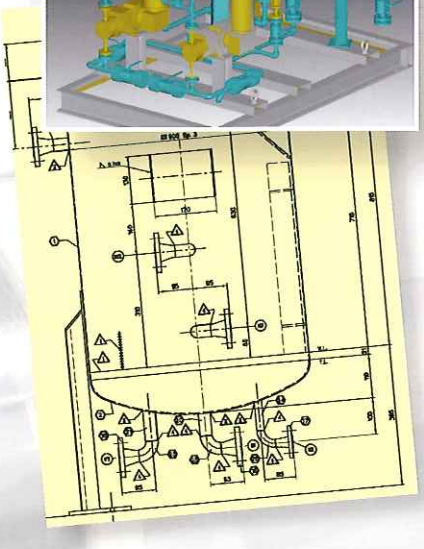


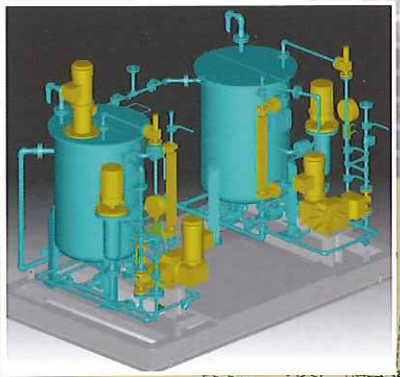


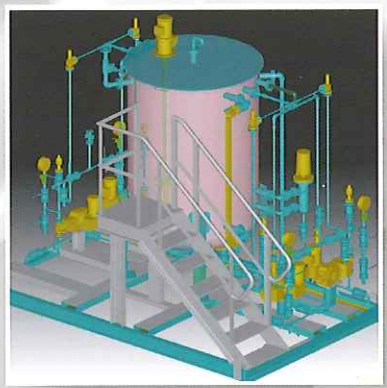


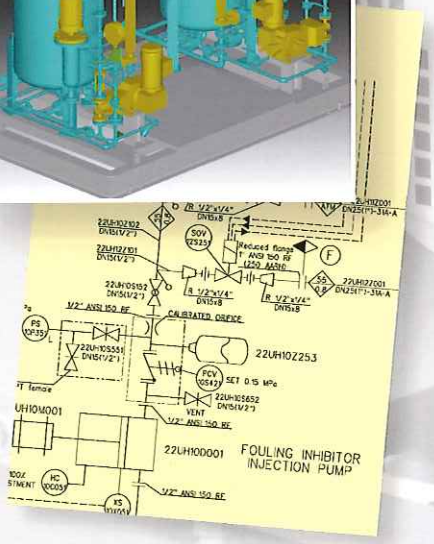




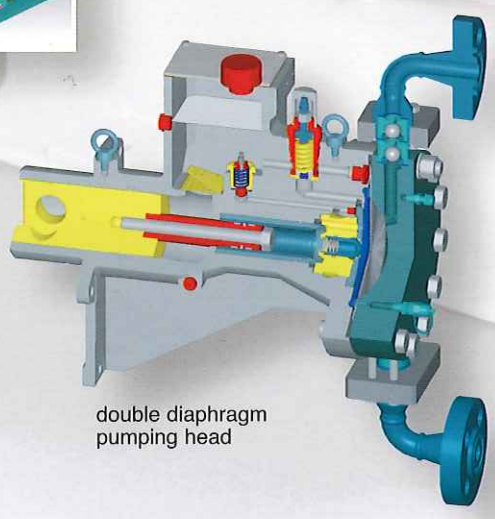










Thanks to its decades-long experience in the dosing industry as well as to the skilled engineering resources, OMG can provide the most demanding clients and contractors with customer-tailored dosing solution and with complete chemical injection packages, matching all major international industry standards.

double diaphragm
pumping head

## tab. A /pump ratings and technical data

| model plunger dia. x stroke | plunger area | volume | maximum capacity | | | max. admissible back pressure (2) | | max. discharge pressure: bar with motors power: | | | | | | flanges (3) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | strokes | theor. | actual | DOXE-2 | DOXE-3 | 0,55 | 1,1 | 2,2 | 5,5 | 7,5 | 11 | UNI DN | ANSI nom. |
| mm | cm² | cm³ | min. | l/h | l/h (1) | bar | bar | kW | kW | kW | kW | kW | kW | mm | size |
| **single acting pumping heads, pluger type and DS series double diaphragm type** | | | | | | | | | | | | | | | |
| | | | 70 | 23 | 21 | | | 150 | 350 | 700 | — | — | — | | |
| 10 x 70 | 0,785 | 5,495 | 87 | 28,6 | 27 | 700 | — | 100 | 280 | 550 | — | — | — | 15 | 1/2" |
| | | | 110 | 36,3 | 34 | | | 100 | 215 | 420 | — | — | — | | |
| | | | 70 | 51,9 | 49 | | | 65 | 150 | 300 | — | — | — | | |
| 15 x 70 | 1,767 | 12,36 | 87 | 64,5 | 61 | 450 | 700 | 55 | 120 | 240 | 600 | — | — | 15 | 1/2" |
| | | | 110 | 81,5 | 77 | | | 40 | 90 | 190 | 460 | 680 | — | | |
| | | | 70 | 92,3 | 87 | | | 35 | 85 | 170 | 400 | 600 | — | | |
| 20 x 70 | 3,141 | 21,98 | 87 | 114 | 108 | 270 | 700 | 30 | 70 | 135 | 350 | 480 | 700 | 15 | 1/2" |
| | | | 110 | 145 | 137 | | | 20 | 53 | 110 | 270 | 380 | 550 | | |
| | | | 70 | 144 | 137 | | | 20 | 55 | 110 | 270 | 380 | 550 | | |
| 25 x 70 | 4,908 | 34,35 | 87 | 179 | 170 | 175 | 550 | 18 | 44 | 88 | 215 | 300 | 460 | 20 | 3/4" |
| | | | 110 | 227 | 185 | | | 15 | 34 | 70 | 170 | 240 | 360 | | |
| | | | 70 | 208 | 195 | | | 15 | 37 | 77 | 185 | 265 | 380 | | |
| 30 x 70 | 7,068 | 49,47 | 87 | 258 | 245 | 120 | 380 | 13 | 30 | 62 | 150 | 200 | 320 | 20 | 3/4" |
| | | | 110 | 327 | 310 | | | 10 | 24 | 48 | 120 | 165 | 250 | | |
| | | | 70 | 283 | 270 | | | 11 | 27 | 56 | 135 | 190 | 290 | | |
| 35 x 70 | 9,616 | 67,31 | 87 | 351 | 333 | 90 | 300 | 9 | 21 | 45 | 110 | 155 | 230 | 25 | 1" |
| | | | 110 | 444 | 420 | | | 7 | 17 | 35 | 90 | 120 | 180 | | |
| | | | 70 | 369 | 350 | | | 8 | 21 | 44 | 110 | 150 | 220 | | |
| 40 x 70 | 12,56 | 87,92 | 87 | 459 | 436 | 70 | 220 | 7 | 16 | 34 | 85 | 120 | 180 | 25 | 1" |
| | | | 110 | 580 | 550 | | | 5 | 13 | 27 | 65 | 95 | 140 | | |
| | | | 70 | 577 | 550 | | | — | 13 | 27 | 70 | 95 | 140 | | |
| 50 x 70 | 19,63 | 137,4 | 87 | 717 | 680 | 40 | 140 | — | 10 | 22 | 55 | 77 | 110 | 25 | 1" (4) |
| | | | 110 | 907 | 860 | | | — | 8 | 17 | 44 | 60 | 90 | | |
| | | | 70 | 975 | 930 | | | — | 8 | 16 | 40 | 57 | 80 | | |
| 65 x 70 | 33,18 | 232,2 | 87 | 1211 | 1150 | 27 | 80 | — | 6 | 12 | 32 | 46 | 68 | 40 | 1 1/2" |
| | | | 110 | 1532 | 1450 | | | — | 4 | 9 | 26 | 35 | 53 | | |
| | | | 70 | 1477 | 1400 | | | — | 5 | 10 | 27 | 38 | 55 | | |
| 80 x 70 | 50,26 | 351,8 | 87 | 1836 | 1745 | 17 | 55 | — | 4 | 8 | 22 | 30 | 45 | 40 | 1 1/2" |
| | | | 110 | 2322 | 2200 | | | — | 3 | 6 | 17 | 24 | 35 | | |
| | | | 70 | 2309 | 2200 | | | — | 3 | 6 | 17 | 24 | 35 | | |
| 100 x 70 | 78,54 | 549,7 | 87 | 2869 | 2730 | 11 | 35 | — | 2,5 | 5 | 14 | 19 | 28 | 65 | 2 1/2" |
| | | | 110 | 3628 | 3400 | | | — | 2 | 4 | 11 | 15 | 22 | | |
| | | | 70 | 3607 | 3400 | | | — | — | 4 | 11 | 15 | 22 | | |
| 125 x 70 | 122,7 | 858,9 | 87 | 4482 | 4260 | 7 | 22 | — | — | 3 | 9 | 12 | 18 | 65 | 2 1/2" |
| | | | 110 | 5669 | 5400 | | | — | — | 2 | 7 | 9 | 14 | | |
| **double acting pumping heads, piston type** | | | | | | | | | | | | | | | |
| | | | 70 | 6845 | 6500 | | | — | — | 5 | 12 | 17 | 22 | | |
| 125DEx70 | 122,7 | 1630 | 87 | 8510 | 8100 | 6 | 22 | — | — | 4 | 10 | 13 | 20 | 65 | 2 1/2" |
| | | | 110 | 10760 | 10200 | | | — | — | 3 | 7,5 | 10 | 15 | | |
| | | | 70 | 11450 | 10800 | | | — | — | 2,8 | 7 | 10 | 13 | | |
| 160DEx70 | 201 | 2727 | 87 | 14235 | 13500 | 3,5 | 13 | — | — | 2,3 | 6 | 8 | 12 | 80 | 3" |
| | | | 110 | 17990 | 17000 | | | — | — | — | 4,5 | 6,5 | 9 | | |
| | | | 70 | 18100 | 17000 | | | — | — | — | 4,5 | 6 | 8,5 | | |
| 200DEx70 | 314 | 4310 | 87 | 22500 | 21370 | — | 8,5 | — | — | — | 3,5 | 5 | 7,5 | 100 | 4" |
| | | | 110 | 28440 | 27000 | | | — | — | — | 3 | 4 | 5,5 | | |
| | | | 70 | 28490 | 27000 | | | — | — | — | 2,5 | 4 | 5,5 | | |
| 250DEx70 | 490 | 6784 | 87 | 35414 | 33650 | — | 5,5 | — | — | — | 2 | 3 | 4,5 | 125 | 5" |
| | | | 110 | 47770 | 45000 | | | — | — | — | — | 2 | 3,5 | | |

(1) the volumetric efficiency of plunger type pumps may vary from 90% to 99%, according to pump working pressure, liquid handled, r.p.m., etc. The table is valid for plunger type pumps only. Double diaphragm type pumps have a volumetric efficiency of 90%; efficiency decreases by about 1% every 7÷8 bar increase of discharge pressure.
(2) for calculation of absorbed power of single acting pumps, the maximum discharge pressure must be considered. and not the maximum diffe rential pressure; the maximum differential pressure must be considered on the contrary for double acting pumps.
(3) flanges are normally supplied in accordance with ANSI B16.5, 150 to 600 lbs, or DIN DN10 or DN 40, unless higher pressure is provided; upon request, flanges in accordance with other standards can be supplied.
(4) the diaphragm pumps DOXE-M mod. 50 DS x70, have flanges DN 40 or 1 1/2" nom. size

## tab. B / construction materials for standard units

| part / execution | 316 | PVC | H C |
|---|---|---|---|
| body | AISI 316 | PVC | Hastelloy-C 276 |
| plunger | AISI 316 or ceramics | ceramics | ceramics or Hastelloy-C 276 |
| ball valves | AISI 316 o AISI 420 | pyrex glass or ceramics | ceramics or Hastelloy-C 276 |
| valve seats | AISI 316 | PVC | Hastelloy-C 276 |
| packing | NBR or PTFE + impregnater fiber | PTFE | PTFE |

- double acting pumping heads of AISI 304 or AISI 316 stainless with piston rings and packing made of PTFE or impregnated fiber.
- double diaphragm pumps have process diaphragm made of PTFE and hydraulic diaphragm made of NBR + PTFE

## tab. C / overall dimensions of plunger type pumps (in mm)

| mod. | A | C | C1 | C2 | C3 | E | E1 | F | G | G1 | H | I | I1 | L | M | M1 | P | R | S | T | T1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DOXE-2 | 205 | 505 | 765 | 335 | 595 | 180 | 350 | 180 | 380 | 420 | 120 | 350 | 370 | 13 | 40 | 286 | 170 | 132 | 30 | 30 | 18 |
| DOXE-3 | 277 | 590 | 850 | 420 | 680 | 225 | 395 | 265 | 520 | 540 | 195 | 480 | 490 | 15 | 65 | 440 | 170 | 180 | 45 | 35 | 18 |

| pumping head | D dimension | | | | Z dimension | |
|---|---|---|---|---|---|---|
| | single check valves | | double check valves | | DOXE-2 | DOXE-3 |
| | inox | PVC | inox | PVC | | |
| 10x70,15x70,20x70 | 132 | 114 | 172 | 154 | 605 | 697 |
| 25x70,30x70 | 150 | 138 | 204 | 188 | 625 | 717 |
| 35x70,40x70 | 176 | 160 | 246 | 230 | 625 | 717 |
| 50x70 | 191 | 213 | 261 | 283 | 660 | 752 |
| 65x70 | 236 | 244 | 328 | | 660 | 752 |
| 80x70 | 251 | 293 | 343 | | 660 | 752 |
| 100x70,125x70 | 371 | 402 | (503) | | 660 | 752 |
| | only single check valves | | N dimension | | | |
| 125DEx70 | 545 | 155 | 155 | | 725 | 800 |
| 160DEx70 | 605 | 170 | 170 | | 725 | 800 |
| 200DEx70 | 690 | 170 | 170 | | | 800 |
| 250DEx70 | 755 | 215 | 215 | | | 815 |

### mod. DOXE-2

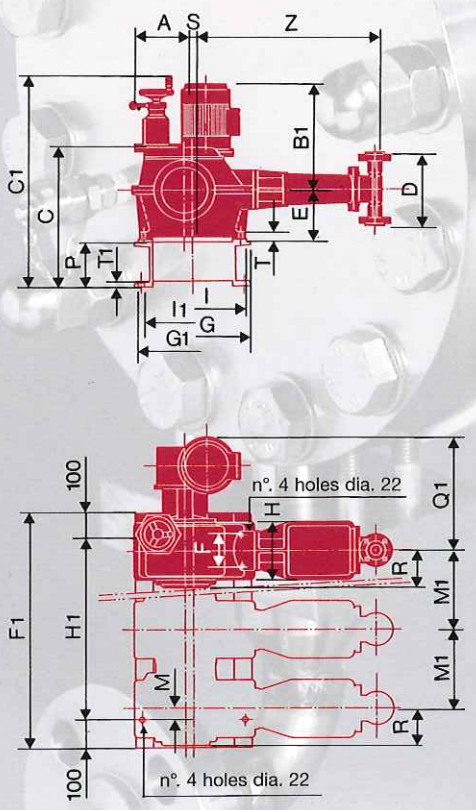
| el.motor kW | B | B1 | F1 | F2 | H1 | H2 | Q | Q1 |
|---|---|---|---|---|---|---|---|---|
| 1,1-1,5 | — | 410 | 565-1710 | 710-2140 | 365-1510 | 510-988 | — | 383-463 |
| 2,2-3 | — | 435 | 565-1710 | 710-2140 | 365-1510 | 510-988 | — | 446-523 |
| 4 | — | 435 | 565-1710 | 710-2140 | 365-1510 | 510-988 | — | 460-558 |
| 5,5 -7,5 | 536-588 | — | 565-1710 | 710-2140 | 365-1510 | 510-988 | 482-660 | — |

### mod. DOXE-3

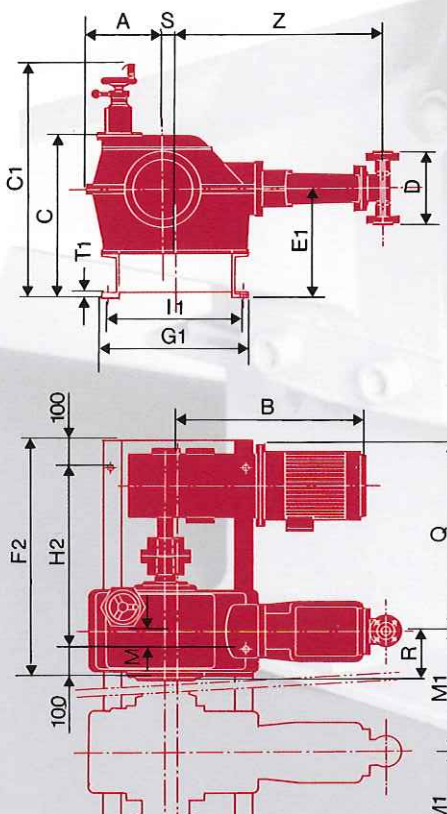
| el.motor kW | B | F2 | H2 | Q |
|---|---|---|---|---|
| 1,1-1,5 | — | 860-3060 | 660-1430 | — |
| 2,2-3 | — | 860-3060 | 660-1430 | — |
| 4 | 572 | 860-3060 | 660-1430 | 485-600 |
| 5,5-9,2 | 597-636 | 860-3060 | 660-1430 | 557-815 |
| 11-15 | 661-720 | 860-3060 | 660-1430 | 855-1022 |
| 18,5 | 661-720 | 860-3060 | 660-1430 | 914-1082 |

- all dimensions are in millimeters and are approximate • baseplates are always supplied with B3 motors and with multiplex groups; for large size groups also with B5 flanged motors
- the minimum space for pump disassembly = Z + 300 mm; for valve removal = D + 200 mm
- for diaphragm type pumps, overall dimensions must be always required to OMG

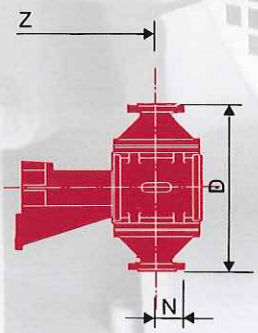
### gear reducer flanged B5




### gear reducer B3




### double acting pumping head



Officine Meccaniche Gallaratesi, established in 1907,
has been manufacturing positive displacement pumps
for more than 90 years.
The company is highly specialized in design and production
of reciprocating plunger and diaphragm metering pumps
as well as complete package units including O.M.G. pumps.
In its field of activity, O.M.G. has always given priority
to reliable solutions, in order to satisfy
the most demanding requirements of advanced industrial
users and engineering companies.
The result of this choice is that today O.M.G.
can be ranked among the best known and technologically
advanced companies in the market.

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design: Jacobuzio - Milano