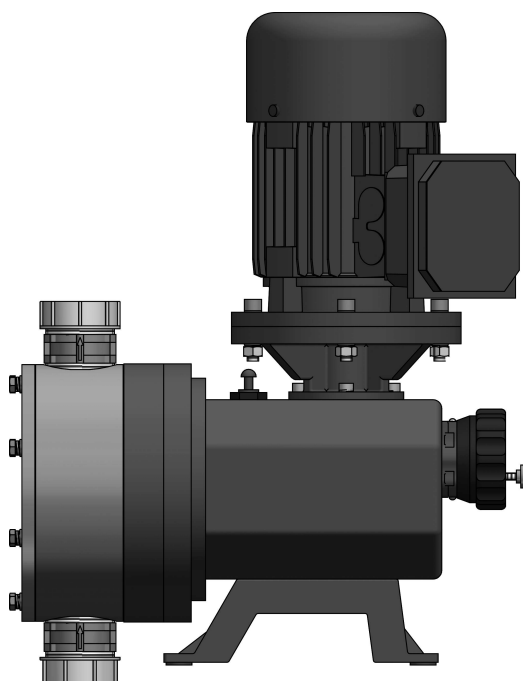


# Operating Instructions

## ProMinent<sup>®</sup> Meta

### MTMd (Diaphragm Dosing Pumps)

**ProMinent<sup>®</sup>**



**Please read the Operating Instructions through completely before  
commissioning this equipment. Do not discard!**

**Any part which has been subject to misuse is excluded from the warranty!**



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# MTMd Product Identification/Identity Code(Rev.C)

## MTMd Meta Diaphragm Dosing Pump

H Main pump

Pump type

12108\* 03662 08530

12130\* 05440 05790

10216 05530

10260 03790

10330 09395

Dosing head material

PC PVC

PP Polypropylene

TT PTFE + 25% carbon

SS Stainless steel 316L

Seal material

B FPM (only for PP &amp; PC dosing head)

E EPDM (only for PP &amp; PC dosing head)

T PTFE (only for TT &amp; SS dosing head)

Diaphragm

T Standard diaphragm, PTFE

Liquid end version

0 No valve springs

1 With 2 valve springs, Hastelloy C, 0.1 bar

Hydraulic connection

0 Standard according to technical data

1 Union nut and PVC insert

2 Union nut and PP insert

3 Union nut and PVDF insert

4 Union nut and stainless steel insert

5 Union nut and PVC hose sleeve

6 Union nut and PP hose sleeve

7 Union nut and PTFE hose sleeve

8 Union nut and stainless steel hose sleeve

Version

0 With ProMinent® logo (standard)

M Modified

\*\* Electrical power supply:

S 3ph, 230V/400V, 50 Hz

T 3ph, 230V/400V, 50 Hz, IE3, speed control range 1:5

R Variable speed motor 3ph, 230V/400V, speed control range 1:5 with PTC &amp; external fan 1ph, 230V, 50Hz

1 No motor, with B14 flange, size 90/63

2 No motor, with B5 flange, size 160/71

Enclosure rating

0 IP55

1 ExdIIBT4

2 ExdIICT4

Stroke sensor:

0 No stroke sensor (standard)

Stroke length adjustment

0 Manual (standard)

B With stroke control motor, 4-20 mA, 220V/50 Hz

Approval

00 Without approval

Language

EN English

ZH Chinese

MTMd H 10260 PC B T 0 0 0 S 0 0 0 00 EN

Remark: 1.\* PC, PP and TT max. 10 bar;

2. \*\*Only SS and TT dosing head can use EX-Motor

3. If the dosing chemical is NaOH, please use PTFE valve ball (remarks in the order)

## 1. Safety Information for ProMinent® Dosing Pumps

Safety information and important operating instructions are divided into different categories and are indicated by pictograms. Please make yourself familiar with the following descriptions and pictograms:

**DANGER:**

Ignoring safety information can endanger life or result in serious injury!

**CAUTION:**

Ignoring safety information can result in injury to persons or damage to machinery or other materials!

**WARNING:**

These situations require special monitoring.

**NOTICE:**

Special guidelines

### 1.1 General Guidelines

**CAUTION:**

- *The equipment described here may only be used in accordance with the instructions for use given in this manual.*
- *Combining ProMinent® metering pumps with parts not approved and tested by ProMinent® is not permissible. It can cause injury or damage to persons or materials for which we cannot accept liability!*
- *Pumps should be accessible at all times for operation and maintenance purposes. Access must not be locked or blocked!*
- *Always empty liquid end and rinse out prior to carrying out maintenance and repair work if dangerous or unknown substances have been used! Observe the safety data sheets for chemicals!*
- *When using with dangerous or unknown chemicals always wear protective clothing when working on the liquid end (safety glasses, gloves)!*

### 1.2 Instructions for Installation, Commissioning and Operation

**CAUTION:**

- *The dosing pump liquid end may still contain liquid from the factory inspections!*
- *All water should be removed from liquid end prior to use with chemicals which may not come into contact with water! For this purpose, rotate the pump 180° and empty the liquid end, then flush via the suction connector with appropriate materials.*
- *Do not connect signal cable to mains power!*
- *If the pump is operated against a closed stop tap the back pressure may increase to the maximum permissible back pressure. This can cause rupturing of the injection tubing!*
- *A bypass valve is recommended in order to prevent back pressure reaching maximum limit.*

**WARNING:**

- *Ensure that injection tubing is installed so that peak pressures produced by a dosing stroke do not exceed the maximum operating pressure (if necessary install bypass valve)!*

- Stroke length adjustment should only be carried out when the pump is running!
- When commissioning the Meta dosing pump, with draw the red gear bleed knob.

**NOTICE:**

- The pump must be firmly fixed in a position which will preclude danger of vibration! The liquid end valves must always be vertical to ensure smooth operation! The connection of suction and injection tubing to the liquid end must ensure that neither is subject to mechanical stress! Tubing must not be subject to vibration.
- Always use correct clamping rings and nozzles for tubing diameter, and original tubing with correct diameter and wall strength, otherwise guarantee is no longer valid. Do not reduce tubing sizes!
- When metering extremely aggressive or dangerous chemicals, it is advantageous to incorporate bleed valve feeding back into chemical storage container! Otherwise install a stop valve into suction or injection sides.

### 1.3 Guidelines for Maintenance, Repair and Disposal

**CAUTION:**

- *Dosing pumps and peripherals must be serviced by qualified or authorised personnel!*
- *Always empty liquid end and flush out prior to carrying out servicing and repair work if dangerous or unknown substances have been used! Read the chemical safety data sheets!*
- *When metering dangerous or unknown chemicals always wear protective clothing when working on the liquid end (safety glasses, gloves)!*
- *Always release pressure from injection tubing before working on pump! Always empty and flush out liquid end! Always read chemical safety data sheets!*

**DANGER:**

- *Always disconnect pump from mains power or remove tubing before opening up! If relay option present, remove in all cases! Check there is no power connected! Ensure that pump cannot be switched on by unauthorised personnel while repair work is being carried out!*
- *Spring under strain. When disposing note: When dismantling the pump, note that the return spring ((5), section 2.2.1) is under strong mechanical strain.*
- *Do not discard pumps which have been used with radioactive materials!*

**NOTICE:**

Flush out liquid end and clean pumps thoroughly prior to returning to factory for repair work!

## 2. Meta Product Description

**CAUTION:****Correct use**

This pump is designed for use with liquid chemicals within the prescribed capacities! Observe general precautions regarding viscosity limits, chemical resistance and seals. All other uses or modifications are forbidden.

**Incorrect use**

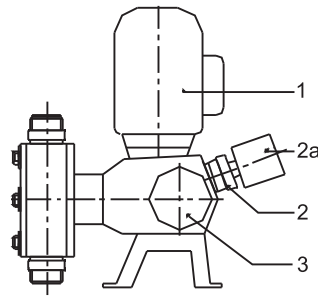
The pump is not designed for use with gaseous chemicals or solids. For chemical dosing, note material resistance. See chemical resistance list No. 2264-4! The pump is not designed for use with flammable liquids!

## 2.1 Product Identification / Identification of Pump Type

As well as the standard technical data, the device label includes the identity code and the serial number. These two numbers should be quoted with all correspondence, as they enable clear identification of the pump type.

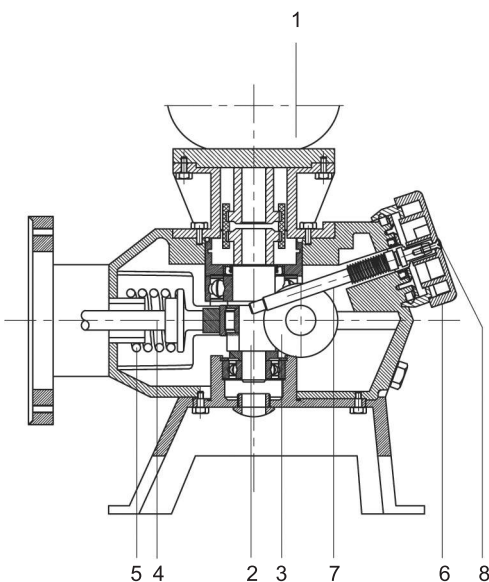
## 2.2 Design / Function Description

Side and End Views of MTMd Diaphragm Dosing Pump



- 1 Motor
- 2 Stroke length adjustment knob
- 2a Stroke positioning motor
- 3 Gear box
- 4 Liquid end

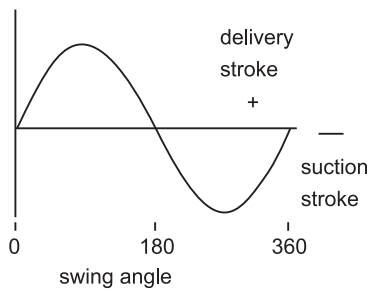
### 2.2.1 Drive Function Description



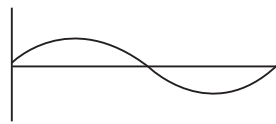
The ProMinent® Meta pump is an oscillating diaphragm dosing pump with continuously adjustable stroke length. It is driven by an electric motor (1). The drive rotation is produced by a worm gear pair (2) and transferred via the cam (3) to the push rod (4) thus producing an oscillating action. A powerful return spring (5) forces the push rod against the cam to produce the reciprocal stroke. The stroke length adjustment is carried out by the adjustment knob (6) and axis shaft (7) by limiting the reciprocal stroke. For Meta dosing pumps with 6 mm stroke length an additional locking screw on the stroke length adjustment knob grip is required in order to set the selected stroke length (8). The stroke action is transferred via union nuts and bolts to the diaphragm. These operate with the valves to increase/decrease the pressure in the liquid end, which causes the pump action. The pump flow is pulsed. The drive motor (1) in the standard version is a 220/380 V. 50 Hz three-phase motor. It can also be supplied as a variable speed motor for adjustment of the feed rate by adjusting the stroke rate (manual or automatic). Manual stroke length adjustment can be changed to automatic adjustment of the feed rate by stroke length adjustment by the addition of a stroke positioning motor.

## 2.2.2 Diagram of Stroke Action

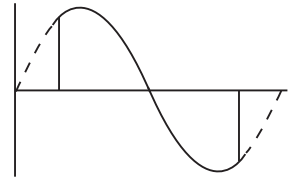
a) Stroke progress at max. stroke rate and stroke length



b) At reduced stroke rate (speed control)

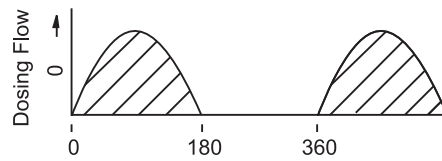


c) At reduced stroke length



Theoretical pump activity at 100 % stroke length

Simplex pump

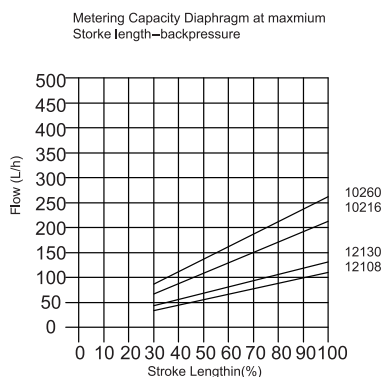
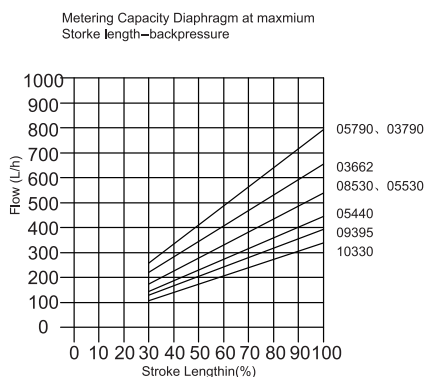
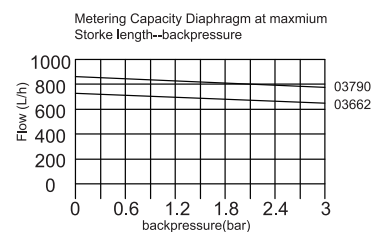
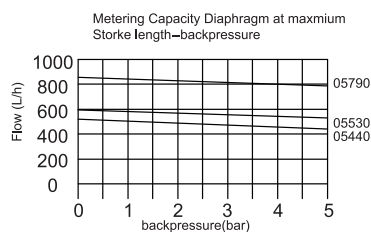
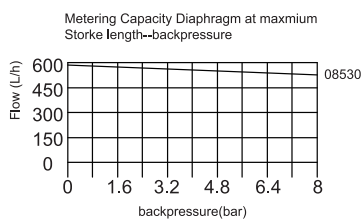
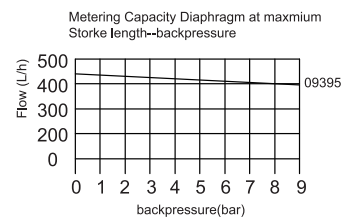
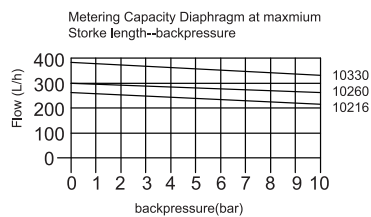
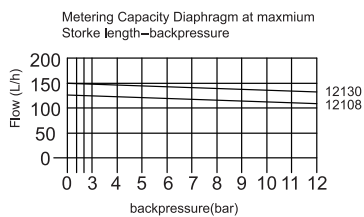


The actual dosing flow is affected by various factors, i.e. diaphragm elasticity, valve slippage, length and elasticity of tubing and back pressure at the end of the injection tubing.



## 2.2.3 Feed Rate Diagrams

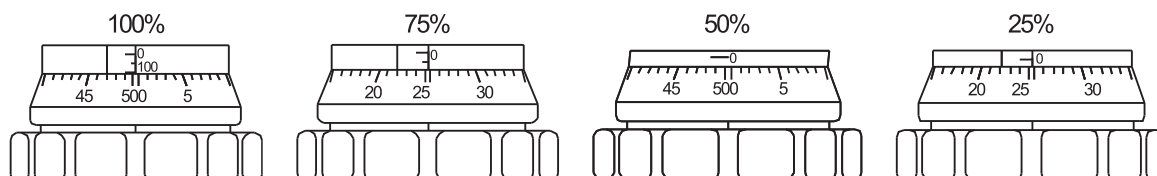
### Meta diaphragm dosing pumps



### NOTICE:

Similar linear characteristics of other pumps are available on request.

### Stroke length adjustment-diaphragm dosing pumps

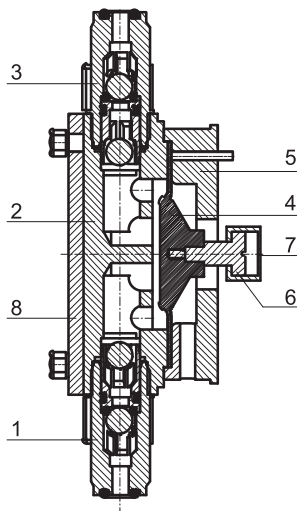


1 Turn (360°)  $\triangle$  approx. 50 % stroke length

### NOTICE:

For Meta dosing pumps with 6 mm stroke length an additional locking screw on the stroke length adjustment knob grip is required in order to set the selected stroke length.

## 2.2.4 Diaphragm Liquid End (FM) Function Description



The heart of the liquid end is the Developan® dosing diaphragm (4). It hermetically seals the pump area inside the liquid end (2) which results in the pressure building up in the liquid end (2). The head disc (5) made from chemically resistant plastic, separates the drive housing from the feed section and protects the housing from corrosion in case of diaphragm rupture. The suction valve (1) and the identical injection valve (3) work together with the diaphragm action to produce the pump action. For dosing of viscous substances valve balls can be spring loaded. The connector dimensions of valves and liquid ends are the same, but they are made in different materials. These parts can be exchanged if necessary.

### Diaphragm assembly

1. Screw coupling bolt (6) with nut (7) into the diaphragm (4) (left-hand thread!)
2. Screw together head disc (5) diaphragm (4) liquid end (2) and protective disc (8). Screw into housing by hand, do not tighten.
3. Tighten coupling nut(7)
4. While motor is running at 100 % stroke length, tighten alternate screws on liquid end (crosswise).

### Choosing the Right Pump

The chemical resistance list can be used to help you to select the correct material combination for your application. The drive selection depends upon the application. For viscous chemicals we recommend that you install lower speed types.

## 2.3 Ambient conditions

### 2.3.1 Ambient temperatures

|                                   |                |
|-----------------------------------|----------------|
| Storage and transport temperature | -10.....+50 °C |
| Ambient temperature in operation  | -10.....+45 °C |

### 2.3.2 Media temperatures

| Date                                                  | PP  | PVC | PVT | TTT | SST | Unit |
|-------------------------------------------------------|-----|-----|-----|-----|-----|------|
| Max. temperature long-term at max. operating pressure | 50  | 45  | 65  | 50  | 90  | °C   |
| Minimum temperature                                   | -10 | -10 | -10 | -10 | -10 | °C   |

### 3. Technical Data

#### 3.1 MTMd Capacity Data

| Meta d- HM 0.18/0.37Kw,1500rpm,400V,50Hz |                                    |         |                   |              |               |              |                                  |                 |                 |
|------------------------------------------|------------------------------------|---------|-------------------|--------------|---------------|--------------|----------------------------------|-----------------|-----------------|
| Pump Type                                | Pump Capacity at Max.back pressure |         | Max strokes Freq. |              | Stroke length | suction lift | Admissible pressure suction side | Connection Side | Shipping weight |
| Identity code MTMd                       | Bar                                | l/h     | ml/ Stroke        | strokes/ min | mm            | mWs          | bar                              | G-DN            | KG              |
| 12108                                    | 10/12**                            | 108/104 | 15                | 120          | 4             | 5            | 2.8                              | 1 1/4 20        | 18/23**         |
| 12130                                    | 10/12**                            | 130/125 | 15                | 144          | 4             | 5            | 2.8                              | 1 1/4 20        | 18/23**         |
| 10216                                    | 10                                 | 216     | 30                | 120          | 4             | 3            | 1.3                              | 1 1/4 20        | 21/26**         |
| 10260                                    | 10                                 | 260     | 30                | 144          | 4             | 3            | 1.3                              | 1 1/4 20        | 21/26*          |
| 05440                                    | 5                                  | 440     | 61                | 120          | 4             | 2            | 0.5                              | 1 1/2 25        | 24.5/32**       |
| 05530                                    | 5                                  | 530     | 61                | 144          | 4             | 2            | 0.5                              | 1 1/2 25        | 24.5/32**       |
| 10330                                    | 10                                 | 330     | 46                | 120          | 6             | 3            | 1.3                              | 1 1/4 20        | 21/26*          |
| 09395                                    | 9                                  | 395     | 46                | 144          | 6             | 3            | 1.3                              | 1 1/4 20        | 21/26*          |
| 03662                                    | 3                                  | 662     | 92                | 120          | 6             | 2            | 0.5                              | 1 1/2 25        | 24.5/32**       |
| 03790                                    | 3                                  | 790     | 92                | 144          | 6             | 2            | 0.5                              | 1 1/2 25        | 24.5/32**       |
| 05790                                    | 5                                  | 790     | 92                | 144          | 6             | 2            | 0.5                              | 1 1/2 25        | 26/34**         |
| 08530                                    | 8                                  | 530     | 92                | 144          | 4             | 2            | 0.5                              | 1 1/2 25        | 26/34**         |

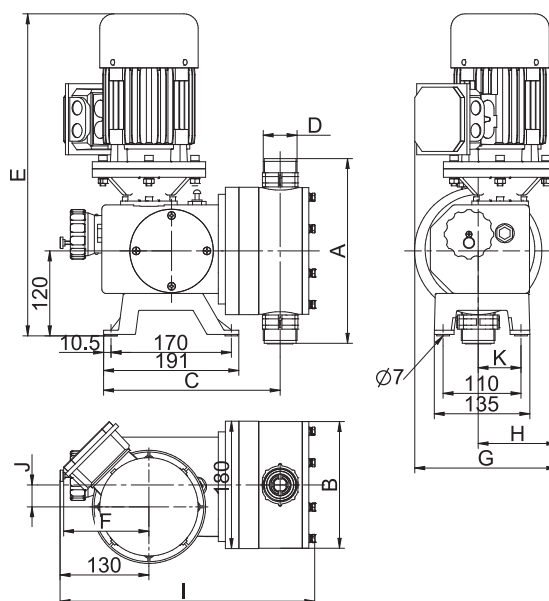
\* Data for material version SST

\*\* Data for SST liquid end.

#### Materials In Contact With Chemicals

| Type | DosingHead CC    | Suction/Discharge Connector | Seals | Valve Balls                    | Valve Seat |      |
|------|------------------|-----------------------------|-------|--------------------------------|------------|------|
|      |                  |                             |       |                                | DN20       | DN25 |
| PCE  | PVC              | PVC                         | EPDM  | Borosilicate glass             | PVC        | PVDF |
| PCB  | PVC              | PVC                         | FPM   | Borosilicate glass             | PVC        | PVDF |
| PPE  | Polypropylene    | Polypropylene               | EPDM  | Borosilicate glass             | PP         | PVDF |
| PPB  | Polypropylene    | Polypropylene               | FPM   | Borosilicate glass             | PP         | PVDF |
| SST  | Stainless Steel  | Stainless Steel             | PTFE  | Stainless Steel                | PTFE       |      |
| TTT  | PTFE with carbon | PTFE with carbon            | PTFE  | Al <sub>2</sub> O <sub>3</sub> | PTFE       |      |

### 3.2 Specification Sheet for ProMinent® Meta Diaphragm Dosing Pump (MTMd)



| Type                                         | Power (kW) |     | Dimension (mm) | 3ph-motor | Variable Frequency motor | EX-motro |
|----------------------------------------------|------------|-----|----------------|-----------|--------------------------|----------|
| 12108/12130                                  | 0.18       |     | E              | 421       | -                        | 441      |
|                                              |            |     | F              | 114       | -                        | 114      |
|                                              |            |     | G              | 175       | -                        | 175      |
|                                              |            |     | H              | 92        | -                        | 92       |
|                                              |            |     | J              | 31        | 31                       | 31       |
|                                              |            |     | K              | 60.5      | 60.5                     | 60.5     |
|                                              | 0.37       |     | E              | -         | 548                      | -        |
|                                              |            |     | F              | -         | 120                      | -        |
|                                              |            |     | G              | -         | 200                      | -        |
|                                              |            |     | H              | -         | 111                      | -        |
|                                              |            |     | J              | 31        | 31                       | 31       |
|                                              |            | K   | 60.5           | 60.5      | 60.5                     |          |
| 10216/10260/05440/05530<br>10330/09395/03662 | 0.37       |     | E              | 455       | 548                      | 528      |
|                                              |            |     | F              | 120       | 120                      | 120      |
|                                              |            |     | G              | 200       | 200                      | 200      |
|                                              |            |     | H              | 111       | 111                      | 111      |
|                                              |            |     | J              | 31        | 31                       | 31       |
|                                              |            |     | K              | 60.5      | 60.5                     | 60.5     |
| 05790/08530                                  | 0.75       |     | E              | 500       | 600                      | 565      |
|                                              |            |     | F              | 137       | 125                      | 220      |
|                                              |            |     | G              | 237       | 225                      | 320      |
|                                              |            |     | H              | 127       | 127                      | 127      |
|                                              |            |     | J              | 27        | 27                       | 27       |
|                                              |            |     | K              | 56.5      | 56.5                     | 56.5     |
| Type                                         | Liquid end | A   | B              | C         | D                        | I        |
| 12108/12130                                  | FM-130     | 220 | 145            | 245       | G1 1/4-DN20              | 354      |
| 10216/10260/10330/09395                      | FM-260     | 220 | 145            | 245       | G1 1/4-DN20              | 354      |
| 05440/05530/03662                            | FM-530     | 260 | 180            | 250       | G1 1/2-DN25              | 365      |
| 05790/08530                                  | FM-530     | 260 | 180            | 265       | G1 1/2-DN25              | 410      |

### 3.3 Motor Data

The technical data sheets are available on request.

**WARNING:**

Check direction of rotation when connecting motors, indicated by the arrow on the motor housing

### 3.4 Sound intensity level

The sound intensity level is < 70 dB (A) at maximum stroke, maximum stroke rate, maximum back pressure (water) in accordance with: DIN EN ISO 3744 (Reproducibility 2 Determining Sound intensity level) PR DIN EN 12639 (Metering Pump Noise Measurement) DIN 45635-24 (Maschine Noise Measurement)

## 4. Commissioning / Maintenance

**WARNING:**

Observe safety guidelines outlined in section 1.

### 4.1 Commissioning

See general instructions given in the accompanying Operating Instructions manual "ProMinent® Motor-Driven Dosing Pumps".

### 4.2 Maintenance

**Ongoing maintenance and inspections:**

- Check liquid end screws are firmly in place
- Check tubing is firmly in place (injection and suction sides)
- Check injection and suction valves are firmly in place
- Check drainage hole in head disc for blockage (may indicate diaphragm rupture).
- Operate pump in continuous mode for a while to check feed is operating correctly.

**Maintenance intervals**

General maintenance interval requirement, once a quarter. When in constant or heavy use, we recommend more frequent maintenance. The gear oil should be changed after approx. 5000 operating hours. Gear oil ISO, viscosity class VG 460, e.g. Mobil Gear 634, ProMinent part no. 555325 (oil quantity approx. 0.5 l). The dosing diaphragm is a consumable item. Its operating life depends upon the following conditions:

- Back pressure in the system
- Operating temperature
- Properties of dosing chemical

Abrasive chemicals will shorten the life of the diaphragm. We recommend more frequent checks on the diaphragm or the installation of a diaphragm rupture alarm when using the pump with abrasive chemicals.

### 4.3 Replacing Consumable Items

| Liquid End | Material/Seals | Part No. |
|------------|----------------|----------|
| FM130-DN20 | PCB            | 910454   |
| FM130-DN20 | PCE            | 1084300  |
| FM130-DN20 | PPB            | 1084303  |
| FM130-DN20 | PPE            | 910451   |
| FM130-DN20 | TTT            | 1102526  |
| FM260-DN20 | PCB            | 910455   |
| FM260-DN20 | PCE            | 1084301  |
| FM260-DN20 | PPB            | 1084304  |
| FM260-DN20 | PPE            | 910452   |
| FM260-DN20 | TTT            | 1102525  |
| FM530-DN25 | PCB            | 1084308  |
| FM530-DN25 | PCE            | 1084302  |
| FM530-DN25 | PPB            | 1084305  |
| FM530-DN25 | PPE            | 1084307  |
| FM530-DN25 | TTT            | 1102524  |

Spare parts kit:

1-diaphragm  
2-valve ball

1-suction valve  
2-set of seal

1-discharge valve

| Liquid End   | Material/Seals | Part No. |
|--------------|----------------|----------|
| FM130 - DN20 | SS             | 1092843  |
| FM260 - DN20 | SS             | 1092894  |
| FM530 - DN25 | SS             | 1092895  |

Spare parts kit:

1-diaphragm

2-valve ball

2-set of seal



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