

## 1.2 Motor-Driven Metering Pumps

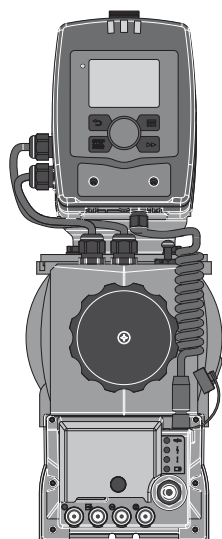
### 1.2.8

### Motor-Driven Metering Pump Sigma X Control Type – Sigma/ 2 - S2Cb

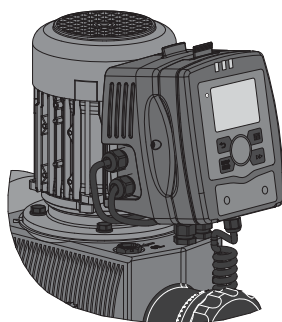
The new Sigma X range – reliable, smart and connectible

Capacity range S2Cb: 61 – 353 l/h, 16 – 4 bar

The Sigma control type is a smart motor-driven metering pump that is setting new standards in terms of productivity, reliability and safety.



P\_SI\_0202\_SW  
Sigma/ 2 control type



P\_SI\_0200\_SW1

The Sigma X diaphragm metering pump covers a capacity range of 21 to 1,040 l/h in versions S1Cb, S2Cb and S3Cb. Its patented multi-layer safety diaphragm guarantees maximum process reliability. Efficient protection of the power end from overloading by means of an integral frequency converter with microprocessor control(ler).

One highlight is the standardised operating concept with click wheel and 4 additional operating keys on a removable operating unit. A large illuminated LCD and a 3-LED display for operating, warning and error messages, visible from all sides, offers additional operating convenience.

The Sigma, like all smart ProMinent metering pumps, can be flexibly connected to various bus systems.

It has a large adjustment range thanks to a combination of frequency and stroke length adjustment. The pump works with high precision across the entire frequency range. Accurate and complication-free metering of viscous and gaseous media by adjustment of the movement profile.

Operating statuses are simply remotely transmitted via an additional output or relay module. A built-in timer, included as standard, controls time-dependent metering cycles.

Relevant spare parts can be shown in the display. The integral log book significantly improves process management, optimisation and troubleshooting.

#### Your benefits

- Safe: In the event of an accident, the feed chemical does not escape to the outside nor into the pump's power end, thanks to the patented multi-layer safety diaphragm with optical (optionally electric) signalling.
- Integrated overload shut-down in the pump control to protect the pump from overloading and thus significantly reduce pressure surges caused by blockages.
- External control is scalable via potential-free contacts with pulse step-up and step-down, batch mode or via a 0/4-20 mA standard signal.
- Flexibly connectible: Connection to process management systems via integral PROFIBUS®, CANopen interface.
- Integral log book saves up to 300 events and simplifies troubleshooting and analysis of the cause.

#### Technical Details

- Stroke length: 5 mm
- Stroke length adjustment range: 0 – 100%
- Stroke length adjustment: manually using self-locking rotary dial in 1% increments
- Metering reproducibility is better than  $\pm 2\%$  in the 30 – 100% stroke length adjustment range under defined conditions and with correct installation
- Power supply: 1 pH, 100 – 230 V  $\pm 10\%$ , 240 V  $\pm 6\%$ , 50/60 Hz (110 W)
- Degree of protection IP 65
- Fibreglass-reinforced plastic housing
- Settable manual or external contact mode, factor with external contact control 99:1 – 1:99; batch mode with max. 99,999 strokes/start pulse.
- Display of wear parts in the Service menu.
- Connector for 2-stage level switch.
- Connection to PROFINET using the ProMinent DULCONvert PROFIBUS®-PROFINET converter.
- Time-dependent control of the metering volume via integral timer.
- Relay module with 1 x switchover contact, 230 V – 8 A
- Relay module with 2 x On, 24 V – 100 mA
- Output / relay module: 0/4- 20 mA analogue output for remote transmission of the stroke rate plus relay module with 1 x On, 24 V – 100 mA
- The Sigma product range is available in a "Physiologically safe in respect of wetted materials" design.
- Wetted materials: PVDF, stainless steel 1.4571/1.4404, special materials on request
- Dosing heads with electro-polished stainless steel are available for aqueous media with hygienically demanding applications.
- Customised designs are available on request.

For reasons of safety, provide suitable overload protection mechanisms when installing all mechanically deflected diaphragm metering pumps.



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### Field of application

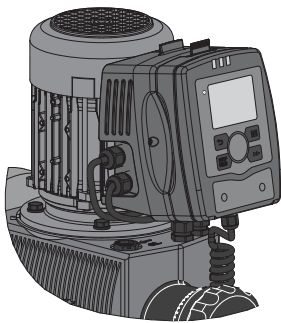
- All industrial applications, either as a stand-alone unit or integrated in a complete system
- Volume-proportional addition of chemicals in water treatment, e.g. sodium-calcium hypochlorite for the disinfection of potable water
- Neutralisation in waste water treatment
- Pulse-controlled metering in the bottling of different volumes e.g. glycerin filling of manometers
- With an integrated timer as a control unit for simple processes, e.g. biocide metering in cooling water

### Operating unit

One highlight is the standardised operating concept with gamma and Sigma metering pumps with click wheel and 4 additional operating keys on a removable operating unit. A large illuminated LCD and a 3-LED display for operating, warning and error messages, visible from all sides, offers additional operating convenience.

The Sigma metering pump (control type), like all smart ProMinent metering pumps, can be flexibly connected to various bus systems. Operating statuses are simply remotely transmitted via an additional output or relay module. A built-in timer, included as standard, controls time-dependent metering cycles.

Relevant spare parts can be shown in the display. The integral log book significantly improves process management, optimisation and troubleshooting.



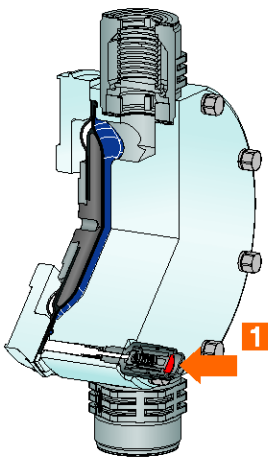
P\_SI\_0200\_SW1

### Multi-layer safety diaphragm

The Sigma X represents a durable motor-driven metering pump with integral control and patented multi-layer safety diaphragm, standing out on account of its excellent process reliability. In the event of an accident, the feed chemical does not escape to the outside nor into the pump's power end, thanks to the multi-layer safety diaphragm with optical (optionally electric) signalling.

An additional rear PTFE layer prevents medium from leaking in the event of a diaphragm rupture. In the event of a diaphragm rupture, a simple contact is mechanically triggered by the multi-layer diaphragm. Simpler technology than the double diaphragm system and independent of the feed chemical, hence a benefit with maintenance / service.

The optical diaphragm rupture warning system is available in the standard scope of delivery.



P\_SI\_0065\_C1

1: Diaphragm rupture sensor



## 1.2 Motor-Driven Metering Pumps

### Metering profiles

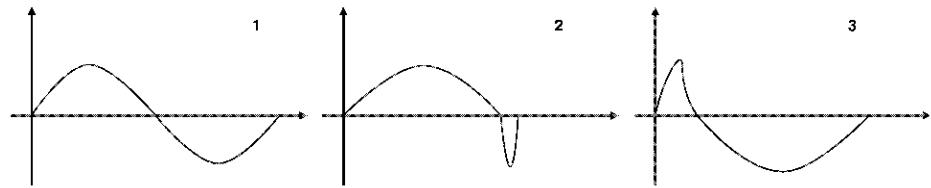
Metering profiles guarantee optimum metering results by adapting the metering behaviour of the metering pump to the application or chemical used.

The combination of frequency and stroke length adjustment permits a wide adjustment range, with the pump working with excellent precision over the entire frequency range. Adjustment of the movement profile also guarantees precise and trouble-free metering even with viscous and gaseous media.

The stroke motion of the displacement body is continually recorded and regulated so that the stroke is made in line with the desired metering profile. The pump can be operated in normal mode (Diagram 1), with optimised discharge stroke (Diagram 2) or with optimised suction stroke (Diagram 3).

Three typical metering profiles are shown schematically with the behaviour over time.

- 1 Diagram 1: Discharge stroke, suction stroke equal
- 2 Diagram 2: long discharge stroke, short suction stroke
- 3 Diagram 3: short discharge stroke, long suction stroke



P\_SI\_010x\_SW

### "Physiologically safe (FDA) in respect of wetted materials" design "F"

All wetted materials in the "Physiologically safe (FDA) in respect of wetted materials" design comply with the FDA guidelines (Version F).

FDA guidelines:

- Material PTFE: FDA-No. 21 CFR § 177.1550
- Material PVDF: FDA-No. 21 CFR § 177.2510

Available for material version PV and SS and DN 25 ball valve.

Identity code example: S2CbH16050PV F S010UA1000DE



## 1.2 Motor-Driven Metering Pumps

### Technical Data

| Type S2Cb | Delivery rate at max. back pressure |     |           | Max. stroke rate<br>Strokes/min | Delivery rate at max. back pressure |          | Suction lift<br>m WC | Perm. pre-pressure suction side<br>bar | Connection, suction/discharge side<br>G-DN | Shipping weight<br>kg |
|-----------|-------------------------------------|-----|-----------|---------------------------------|-------------------------------------|----------|----------------------|--|--|-----------------------|
|           | bar                                 | l/h | ml/stroke |                                 | psi                                 | gph (US) |                      |  |  |                       |
| 16050 PVT | 10                                  | 61  | 11.4      | 90                              | 145                                 | 16.1     | 7                    | 2                                      | 1-15                                       | 15                    |
| 16050 SST | 16                                  | 56  | 10.4      | 90                              | 232                                 | 14.8     | 7                    | 2                                      | 1-15                                       | 20                    |
| 16090 PVT | 10                                  | 109 | 11.4      | 160                             | 145                                 | 28.8     | 7                    | 2                                      | 1-15                                       | 15                    |
| 16090 SST | 16                                  | 99  | 10.3      | 160                             | 232                                 | 26.2     | 7                    | 2                                      | 1-15                                       | 20                    |
| 16130 PVT | 10                                  | 131 | 10.9      | 200                             | 145                                 | 34.6     | 7                    | 2                                      | 1-15                                       | 15                    |
| 16130 SST | 16                                  | 129 | 10.9      | 200                             | 232                                 | 34.1     | 7                    | 2                                      | 1-15                                       | 20                    |
| 07120 PVT | 7                                   | 150 | 27.4      | 90                              | 102                                 | 39.6     | 5                    | 1                                      | 1 1/2-25                                   | 16                    |
| 07120 SST | 7                                   | 150 | 27.4      | 90                              | 102                                 | 39.6     | 5                    | 1                                      | 1 1/2-25                                   | 24                    |
| 07220 PVT | 7                                   | 271 | 27.7      | 160                             | 102                                 | 71.6     | 5                    | 1                                      | 1 1/2-25                                   | 16                    |
| 07220 SST | 7                                   | 271 | 27.7      | 160                             | 102                                 | 71.6     | 5                    | 1                                      | 1 1/2-25                                   | 24                    |
| 04350 PVT | 4                                   | 353 | 29.4      | 200                             | 58                                  | 93.3     | 5                    | 1                                      | 1 1/2-25                                   | 16                    |
| 04350 SST | 4                                   | 353 | 29.4      | 200                             | 58                                  | 93.3     | 5                    | 1                                      | 1 1/2-25                                   | 24                    |

\* With Sigma types 07120, 07220 and 04350, the dosing head is fitted with DN 25 (G 1 1/2) valves. As DN 20 is generally sufficient for these types of pipes (see technical data, suction/discharge side connector), the connector parts that can be ordered under the identity code (e.g. inserts) are already reduced to DN 20, i.e. piping and accessories can be installed in DN 20.

### Materials in Contact With the Medium

| Material | Dosing head            | Suction/pressure connector | Seals/ball seat | Balls                  | Integral relief valve       |
|----------|------------------------|----------------------------|-----------------|------------------------|-----------------------------|
| PVT      | PVDF                   | PVDF                       | PTFE/PTFE       | Ceramic/glass*         | PVDF/FKM or EPDM            |
| SST      | Stainless steel 1.4404 | Stainless steel 1.4581     | PTFE/PTFE       | Stainless steel 1.4404 | Stainless steel/FKM or EPDM |

\* With 07120, 07220, 04350

With "F" sealing material design – "physiologically safe - FDA", the ball seat is made of PVDF

### Motor Data

| Identity code specification | Power supply   |                                |          | Remarks |
|-----------------------------|----------------|--------------------------------|----------|---------|
| U                           | 1-phase, IP 65 | 100 – 230 V ±10 % / 240 V ±6 % | 50/60 Hz | 220 W   |

Motors less than 0.75 kW and motors designed for speed-controllable operation are not subject to the IE3 standard in compliance with the Ecodesign Directive 2009/125/EC.



# 1.2 Motor-Driven Metering Pumps

## Identity Code Ordering System for the Sigma/ 2 Control Type (S2Cb)

|                 |  |  |            |       |            |            |       |            |            |  |  |
|-----------------|--|--|------------|-------|------------|------------|-------|------------|------------|--|--|
| <b>S2Cb</b>     | <b>Drive type</b>  | H Main power end, diaphragm  |            |       |            |            |       |            |            |  |  |
|                 | <b>Pump type</b>   |  |            |       |            |            |       |            |            |  |  |
|                 |  | <b>bar</b>   | <b>l/h</b> |       | <b>bar</b> | <b>l/h</b> |       | <b>bar</b> | <b>l/h</b> |  |  |
|                 | 16050  | 16   | 56         | 16130 | 16         | 129        | 07220 | 7          | 271        |  |  |
|                 | 16090  | 16   | 99         | 07120 | 7          | 150        | 04350 | 4          | 353        |  |  |
|                 | <b>Dosing head material</b>  | PV PVDF (max. 10 bar)   SS   Stainless steel   |            |       |            |            |       |            |            |  |  |
|                 | <b>Seal material</b>   | T PTFE seal   F   FDA-compliant  |            |       |            |            |       |            |            |  |  |
|                 | <b>Displacement body</b>   | S Multi-layer safety diaphragm with optical rupture indicator<br>A Multi-layer safety diaphragm with electrical signal   |            |       |            |            |       |            |            |  |  |
|                 | <b>Dosing head version</b>   | 0 no valve spring (standard)<br>1 with 2 valve springs, Hastelloy C; 0.1 bar<br>2 with bleed valve, FKM seal, no valve spring<br>3 with bleed valve, FKM seal, with valve spring<br>4** with relief valve, FPM seal, no valve springs<br>5** with relief valve, FPM seal, with valve springs<br>6** with relief valve, EPDM seal, no valve springs<br>7** with relief valve, EPDM seal, with valve springs<br>8 with bleed valve, EPDM seal, no valve spring<br>9 with bleed valve, EPDM seal, with valve spring |            |       |            |            |       |            |            |  |  |
|                 | <b>Hydraulic connector</b>   | 0 Standard connection<br>1 Union nut and PVC insert<br>2 Union nut and PP insert<br>3 Union nut and PVDF insert<br>4 Union nut and stainless steel*** insert<br>7 Union nut and PVDF tube nozzle<br>8 Union nut and stainless steel tube nozzle<br>9 Union nut and stainless steel welding sleeve  |            |       |            |            |       |            |            |  |  |
|                 | <b>Version</b>   | 0 With ProMinent® Logo<br>1 Without ProMinent® Logo  |            |       |            |            |       |            |            |  |  |
|                 | <b>Electric power supply</b>   | U 1 ph, 100 – 230 V ±10%, 240 V ±6%, 50/60 Hz, 220 W   |            |       |            |            |       |            |            |  |  |
|                 | <b>Cable and plug</b>  | A 2 m Europe   C 2 m Australia<br>B 2 m Swiss   D 2 m USA  |            |       |            |            |       |            |            |  |  |
|                 | <b>Relay</b>   | 0 No relay<br>1 Fault indicating relay (230 V, 8 A)<br>3 Fault indicating relay (24 V, 100 mA) + pacing relay (24 V, 100 mA)<br>8 0/4-20 mA analogue output + fault indicating / pacing relay (24 V - 100 mA)  |            |       |            |            |       |            |            |  |  |
|                 | <b>Control versions</b>  | 0 Manual + external contact with pulse control<br>1 as per 0 + analogue<br>6 As 1 + PROFIBUS® DP interface, M 12<br>7 as 1 + CANopen (CiA 402, M12 plug), pump without operating unit (HMI) ****   |            |       |            |            |       |            |            |  |  |
|                 | <b>Overload switch-off</b>   | 0 without overload switch-off  |            |       |            |            |       |            |            |  |  |
|                 | <b>Operating unit (HMI)</b>  | 0 Operating unit with Click Wheel (0.5 m cable)<br>4 Operating unit with Click Wheel + 2 m cable<br>5 Operating unit with Click Wheel + 5 m cable<br>6 Operating unit with Click Wheel + 10 m cable<br>X without operating unit (HMI)  |            |       |            |            |       |            |            |  |  |
|                 | <b>Access code</b>   | 0 without access control<br>1 with access control  |            |       |            |            |       |            |            |  |  |
| <b>Language</b> | DE German<br>EN English<br>ES Spanish<br>FR French<br>IT Italian<br>NL Dutch<br>PL Polish<br>PT Portuguese<br>CS Czech<br>RU Russian |  |            |       |            |            |       |            |            |  |  |

\* 10 bar with PVDF version.

\*\* Standard with tube nozzle in the bypass. Threaded connection on request.

\*\*\* Internal thread of the insert SS DN15-Rp 1/2, DN25/20-G 3/4

\*\*\*\* An HMI order no. 1042549 is required for manual operation, e.g. with the failure of the CAN bus

On request, electropolished dosing heads (≤ Ra 0.8 µm) are available.



## 1.2 Motor-Driven Metering Pumps

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### Spare Parts

The spare parts kit generally includes the wear parts for the liquid ends.

#### Scope of delivery with PVT material version:

- 1 diaphragm
- 2 valves, complete
- 2 valve balls
- 2 ball seats
- 4 composite seals
- 1 elastomer sealing set (EPDM, FKM-B)

#### Scope of delivery with SST material version:

- 1 diaphragm
- 2 valve balls
- 2 ball seat discs
- 4 composite seals

### Spare Parts Kit for Sigma/ 2 for Design With Multi-layer Safety Diaphragm

(Applies to identity code types 16050, 16090, 16130, 12050, 12090 and 12130)

| Liquid end     | Materials in contact with the medium |                    | Order no. |
|----------------|--------------------------------------|--------------------|-----------|
| FM 130 - DN 15 | PVT                                  | –                  | 1035951   |
| FM 130 - DN 15 | TTT                                  | with 2 valves cpl. | 1077573   |
| FM 130 - DN 15 | SST                                  | –                  | 1035957   |
| FM 130 - DN 15 | SST                                  | with 2 valves cpl. | 1035954   |

(Applies to identity code types 07120, 07220 and 04350)

| Liquid end     | Materials in contact with the medium |                    | Order no. |
|----------------|--------------------------------------|--------------------|-----------|
| FM 350 - DN 25 | PVT                                  | –                  | 1035953   |
| FM 350 - DN 25 | TTT                                  | with 2 valves cpl. | 1077574   |
| FM 350 - DN 25 | SST                                  | –                  | 1035960   |
| FM 350 - DN 25 | SST                                  | with 2 valves cpl. | 1035959   |

### Spare Parts Kits for Sigma/ 2 for Design With Old Diaphragm

(Applies to identity code types 16050, 16090, 16130, 12050, 12090 and 12130)

| Liquid end     | Materials in contact with the medium |                    | Order no. |
|----------------|--------------------------------------|--------------------|-----------|
| FM 130 - DN 15 | PVT                                  | –                  | 740324    |
| FM 130 - DN 15 | SST                                  | –                  | 740326    |
| FM 130 - DN 15 | SST                                  | with 2 valves cpl. | 740328    |

(Applies to identity code types 07120, 07220 and 04350)

| Liquid end     | Materials in contact with the medium |                    | Order no. |
|----------------|--------------------------------------|--------------------|-----------|
| FM 350 - DN 25 | PVT                                  | –                  | 740325    |
| FM 350 - DN 25 | SST                                  | –                  | 740327    |
| FM 350 - DN 25 | SST                                  | with 2 valves cpl. | 740329    |



## 1.2 Motor-Driven Metering Pumps

### Spare Parts Kits for Sigma/ 2 With FDA Design (Physiologically Safe)

(Applies to identity code types 16050, 16090, 16130, 12050, 12090 and 12130)

| Liquid end     | Materials in contact with the medium |               | Order no. |
|----------------|--------------------------------------|---------------|-----------|
| FM 130 - DN 15 | PVT                                  | –             | 1046472   |
| FM 130 - DN 15 | SST                                  | without valve | 1046473   |
| FM 130 - DN 15 | SST                                  | with valve    | 1046474   |

(Applies to identity code types 07120, 07220 and 04350)

| Liquid end     | Materials in contact with the medium |               | Order no. |
|----------------|--------------------------------------|---------------|-----------|
| FM 350 - DN 25 | PVT                                  | –             | 1046475   |
| FM 350 - DN 25 | SST                                  | without valve | 1046476   |
| FM 350 - DN 25 | SST                                  | with valve    | 1046477   |

### Multi-layer Safety Diaphragm (Standard)

|                                    | Order no. |
|------------------------------------|-----------|
| FM 130 (type: 16050, 16090, 16130) | 1029771   |
| FM 350 (type: 07120, 07220, 04350) | 1033422   |

### Metering Diaphragm (Old Version)

|   | Order no. |
|---|-----------|
| Sigma with FM 130 identity code: Type 16050, 16090, 16130 | 792495    |
| Sigma with FM 350 identity code: Type 07120, 07220, 04350 | 792496    |

### Spare Parts Kit for Integrated Relief Valve (S2Ca, S2Cb)

Consisting of two compression springs made from Hastelloy C and four FKM-A and EPDM O-rings each

|   | For material | Seals      | Order no. |
|---|--------------|------------|-----------|
| Spare parts kits for integrated relief valve 4 bar  | PVT/SST      | FKM-A/EPDM | 1031199   |
| Spare parts kits for integrated relief valve 7 bar  | PVT/SST      | FKM-A/EPDM | 1031200   |
| Spare parts kits for integrated relief valve 10 bar | PVT          | FKM-A/EPDM | 1031201   |
| Spare parts kit for relief valve 16 bar             | SST          | FKM-A/EPDM | 1031203   |

### Gear Oil

|                               | Volume | Order no. |
|-------------------------------|--------|-----------|
| Mobilgear 634 VG 460 gear oil | 1      | 1004542   |

### Spare Parts Kits for Integrated Bleed Valve (S2Cb)

Consisting of a compression spring made from Hastelloy C and four FKM-A and EPDM O-rings each  
For identity code specification "Dosing head version" with characteristic "2", "3", "8", "9"

|     | For material | Seals      | Order no. |
|-----|--------------|------------|-----------|
| ETS | PVT/SST      | FKM-A/EPDM | 1043785   |



## 1.2 Motor-Driven Metering Pumps

### Protective Cowling for Operating Unit (HMI)

Protection of the operating unit (HMI) of Sigma metering pumps against contamination; made from transparent silicone rubber. For Sigma X control types S1Cb, S2Cb and S3Cb.

|  | Order no. |
|--|-----------|
| Protective cowling for operating unit (S1Cb, S2Cb, S3Cb) | 1083680   |

### Wall Bracket for Operating Unit (HMI)

Wall bracket with operating lever for wall mounting of the operating unit (HMI) without any fittings. For Sigma control types S1Cb / S2Cb / S3Cb.

|  | Order no. |
|--|-----------|
| Wall bracket for operating unit (S1Cb, S2Cb, S3Cb) | 1036683   |

### Extension cable for operating unit (HMI)

|  | Order no. |
|--|-----------|
| Connecting cable - CAN M12 5-pole 1 m  | 1022139   |
| Connecting cable - CAN M12 5-pole 2 m  | 1022140   |
| Connecting cable - CAN M12 5-pole 5 m  | 1022141   |
| Connecting cable - CAN M12 5-pin. 10 m | 1046383   |

### Accessories of CANopen operation

An operating unit is needed for the manual operation of a CANopen pump.

|                                     | Order no. |
|-------------------------------------|-----------|
| Operating unit (HMI) Sigma X - S1Cb | 1092957   |

### Accessories

- Foot Valves see page
- Injection Valves see page
- Connector Parts, Seals, Hoses see page → 1-189
- Suction Lances/Suction Assemblies see page → 1-183
- Speed Controllers see page → 1-203
- Metering monitor Flow Control set up for motor-driven metering pumps see page → 1-198

### Spare Parts

- Custom Accessories See page

