Siemens SITRANS — MAG 3100, 5100W Flowmeters & P200

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Specifying and replacing Siemens SITRANS FM electromagnetic flowmeters and compact pressure transmitters: MAG 3100 process sensors against MAG 5100 W water sensors and where each belongs, the MAG 5000/6000 transmitter pairing and remote against compact mounting, liner and electrode selection by medium, the installation rules (straight runs, grounding, full pipe) that decide accuracy more than the datasheet does, the MAGFLO heritage that lets decades-old nameplates cross directly to current 7ME codes, and the SITRANS P200-class compact pressure transmitters that answer most 4-20 mA pressure RFQs in one line.

The short version

SITRANS FM electromagnetic flowmeters are two-piece systems: a sensor in the line — MAG 5100 W (the water/wastewater workhorse, e.g. DN50 and DN100 units (7ME6520 codes)) or MAG 3100 (the process sensor for industry and marine, e.g. DN32 PN40 and DN100 PN40 EPDM (7ME6310 codes)) — and a transmitter (MAG 5000/6000, compact on the sensor or remote), which does the measuring electronics, totalising and outputs.
Magmeters measure conductive liquids only (water, seawater, slurries, chemicals — not oils, not demineralised water below the conductivity floor) with no moving parts and no pressure loss — which is why they own ballast, cooling, bunkering-adjacent water duties, and every municipal application.
The liner and electrodes are the real selection: EPDM or ebonite-class rubber liners for water duties (drinking-water approvals on the 5100 W), PTFE class for chemistry and temperature on the 3100, electrode material (stainless to Hastelloy class) by medium. DN and PN only locate the flange — the wetted materials decide survival.
Installation decides accuracy: full pipe always (flooded, or rising line), straight runs of a few diameters in and a couple out as the working rule, grounding rings or electrodes on lined/plastic pipe, and sensor cable per the maker on remote mounts. Most "drifting flowmeter" RFQs are installation findings, and we say so before selling hardware.
Heritage that saves identification time: the MAG programme came to Siemens from the Danfoss flow business — old MAGFLO MAG 3100 / MAG 5000 nameplates on ships and waterworks cross directly into current SITRANS FM codes, usually flange-for-flange. For compact pressure measurement the SITRANS P200 class (0-10 bar, 0-16 bar, 0-100 bar, plus 7MF1567 siblings) answers the standard 4-20 mA pressure line.

1. MAG 5100 W or MAG 3100 — the sensor decision

Criterion | MAG 5100 W | MAG 3100 |

Built for | Water, wastewater, irrigation, district utilities | Process industry, marine systems, chemistry, slurries |

Liners | EPDM / ebonite-class rubber; drinking-water approvals available | Rubber classes for water/abrasion, PTFE class for chemistry and temperature |

Pressure/temperature envelope | Utility class (PN10/16 typical) | Up to PN40 class and higher temperatures — e.g. the DN32 PN40 unit |

Size span | Utility DN range, economical at volume | Wide DN span small to very large |

Typical RFQ | "DN100 water meter, drinking water approval, compact" | "DN100 PN40, EPDM liner, seawater cooling, remote transmitter" — i.e. the 7ME6310 class |

Sizing is by velocity, not by pipe: magmeters read best in roughly the 1–3 m/s band, so a chronically oversized line wants a sensor one or two DN below pipe size with conical transitions — the single most common correction we make to flowmeter RFQs. Conductivity floor: ordinary waters pass easily; demineralised/ultra-pure water sits at or below the limit — check before specifying, or choose a different principle.

2. The transmitter half — MAG 5000 / 6000, compact or remote

Choice | Take it when | Notes |

MAG 5000 | Standard accuracy class covers the duty (utility totalising, balance metering) | The economical transmitter |

MAG 6000 | Tighter accuracy class, more I/O/comms options wanted | The spec-sheet default in industry; our stocked units pair it — e.g. MAG 5100 W DN50 + MAG 6000 CT |

Compact mount | Accessible, benign location | One article, no sensor cable questions |

Remote mount | Hot, flooded, vibrating or buried sensors; display wanted at eye level | Sensor cable type/length per the manual — the hidden failure point; order the cable with the meter |

Replacement economics | Transmitters die (lightning, moisture, age) far more often than sensors: a MAG 6000 cartridge swap revives a 20-year-old sensor in minutes — quote the transmitter alone before condemning the line item |

3. Installation — where accuracy is actually made

Rule | The working number | Why RFQs happen when it is ignored |

Full pipe, always | Mount in a rising line or flooded section; never the high point | Air at the electrodes reads as flow noise and drift — the #1 "faulty meter" that is not |

Straight runs | A few DN upstream, a couple downstream (the manual's figures govern per disturbance) | Elbows and half-open valves upstream skew the profile the meter integrates |

Grounding | Grounding rings or built-in grounding electrodes on lined/plastic/cathodically-protected pipe; straps on bare metal | Stray potentials ride the signal — wandering zero, jumpy totals; rings belong on the order for any lined line |

Electrode axis | Horizontal lines: electrodes horizontal (3 and 9 o'clock) | Sediment and bubbles cross vertical electrodes |

Zero and verification | Zero at commissioning on a full, standing line; periodic verification per QA | Fiscal/balance duties want the verification record — ask for it with the meter |

On ships these rules meet reality in ballast and cooling systems: the meter goes where the yard left room, not where the manual dreams — which makes grounding rings, conical reducers and remote transmitters the standard accessories on marine magmeter orders, and we quote them proactively rather than watching the meter come back "faulty" in six months.

4. Identification, MAGFLO heritage, and the pressure side

Reordering a flow sensor: the nameplate's 7ME code (7ME6520 = MAG 5100 W class, 7ME6310 = MAG 3100 class) plus DN/PN and liner tells the whole story; absent a readable plate, DN + PN + liner colour/material + transmitter type identifies it. MAGFLO-era plates (Danfoss flow heritage: MAGFLO MAG 1100/3100/5100, transmitter MAG 5000/6000) cross directly into the current SITRANS FM programme — same family logic, flange-for-flange in most sizes; send the plate photo and the current code comes back. The pressure side: the SITRANS P200 class (7MF1565) and its gauge/absolute siblings (7MF1567 — 3CA00, 3DG00 variants) are compact ceramic-cell 4-20 mA transmitters covering the 0-x bar ranges that make up most pressure RFQs; selection = range, process connection (G1/4 class), output, and accuracy class — with the Danfoss MBS guide as the cross-brand twin and the switch-vs-transmitter guide for the architecture question. Signal integration (4-20 mA vs IO-Link vs HART) is covered in the signals guide; calibration practice in the calibrator guide.

How buying works at cballast. We quote sensors, transmitters, grounding rings, cables and verification accessories as one configured line, cross MAGFLO-era plates to current codes, and flag installation findings honestly before replacing healthy hardware. Accounts are vetted at onboarding; first order prepaid; established accounts on credit terms with repeat discounts; public bodies and utilities invoiced against purchase order from the first order. RFQs to sales@cballast.com.

Frequently asked questions

What is the difference between SITRANS MAG 5100 W and MAG 3100?MAG 5100 W is the water/wastewater sensor — rubber liners, drinking-water approvals, utility pressure classes, priced for volume. MAG 3100 is the process sensor — PTFE-class liners available, higher PN and temperature envelope, wider electrode options — for industry, marine and chemistry. Both pair with MAG 5000/6000 transmitters.

Can an electromagnetic flowmeter measure oil or demineralised water?No for oils (non-conductive) and usually no for demin/ultra-pure water (below the conductivity floor). Magmeters need a conductive liquid. For those media the answer is a different principle (Coriolis, ultrasonic), and we will say so rather than sell the wrong physics.

Do I need grounding rings on a MAG flowmeter?On lined, plastic or cathodically-protected pipe: yes — the meter needs a stable potential reference, and without rings (or grounding electrodes) the reading wanders. On bare conductive pipe, grounding straps per the manual suffice. Rings belong on the original order; retrofitting them means draining the line twice.

My old MAGFLO MAG 3100 needs replacing — what is the current equivalent?The same family under the Siemens SITRANS FM name: the MAG programme moved from Danfoss to Siemens, and MAGFLO-era sensors and MAG 5000/6000 transmitters cross directly into current 7ME codes, normally flange-for-flange. Often only the transmitter needs replacing — send the nameplate photo and we quote both paths.

Why does my flowmeter read when the pump is off, or drift?In observed order: partial pipe/air at the electrodes, grounding problems on lined pipe, electrode fouling, a disturbed flow profile from upstream fittings, or (remote mounts) sensor-cable damage. The sensor itself is rarely the culprit — walk the installation table above before condemning hardware; a transmitter-only swap is the commonest genuine repair.

What is a SITRANS P200?A compact ceramic-sensor pressure transmitter family (7MF1565 codes and 7MF1567 siblings) with 4-20 mA output across the standard 0-x bar ranges — the economical answer to general machinery, water and pneumatic pressure measurement, and the Siemens twin of the Danfoss MBS class we cover in its own guide.

Who supplies SITRANS flowmeters and pressure transmitters?cballast.com quotes MAG 5100 W and MAG 3100 sensors with MAG 5000/6000 transmitters, grounding and cable accessories, MAGFLO-heritage crosses, and the P200-class pressure programme. Write to sales@cballast.com with DN, medium and the nameplate if replacing.

References and related guides

Standards and sources referenced: Siemens SITRANS FM documentation (MAG 3100/5100 W sensors, MAG 5000/6000 transmitters — installation, grounding, liner/electrode selection), SITRANS P compact transmitter data; the Danfoss-heritage MAGFLO programme mapping; general magmeter practice per ISO 6817-class guidance.

Danfoss MBS pressure transmitters

Pressure switch vs transmitter selection

IO-Link vs 4-20 mA vs HART

Process calibrator selection

Siemens SIMATIC spares — 6ES7, 6AV

Temperature sensor finder

Turbidity meters & water analysis

Questions on a sizing, a liner choice or an old plate: write to sales@cballast.com. We answer whether or not you buy from us.

Part numbers and designations are those of the original manufacturers and are given for identification. cBallast is an independent supplier. © cBallast