Specifications: Makro

General:

- **Housing construction:** Acrylic resin coated cast aluminum
- **Drive:** Slide-ring adjustable crank (non-lost motion)
- **Motor mounting flange:** Available for NEMA 56C, 143/145 TC or 182/184 TC frame motors (motor not included with pump)

**Gear ratios and stroke frequencies (with 1725 RPM motor):**
- 10:1 = 172 SPM, 12:1 = 144 SPM, 15:1 = 115 SPM, 20:1 = 86 SPM

**Motor coupling:** Flexible coupling included with pump

**Maximum motor RPM:** 1725

**Motor coupling:** Flexible coupling included with pump

**Stroke frequency control:** Remote or automatic frequency control optional with DC SCR drive or AC inverter

**Stroke length adjustment:** Manual, in increments of ±0.5%. Motorized stroke length control optional.

**Stroke counting:** Available with optional stroke counter

**Lubrication:** Oil lubricated

**Recommended oil:** Mobil Gear Oil 629, ISO VG 150 or 220

**Oil quantity:** Approximately 3.3 quarts (3.5 liters)

**Recommended oil change interval:** 5,000 hours

**Separation of drive from liquid end:** An air gap separates the drive from the liquid end to prevent cross contamination of oil and process fluid in the event of diaphragm (HM/AM) or packing (HK/AK, HMH/AMH) failure.

**Maximum solids size in fluid:** 200 µ

**Makro TZ 6 & 9 HM/AM; HMD/AMD:**

- **Pump type:** Mechanically-actuated diaphragm (diaphragm threaded directly to reciprocating shaft)
- **Diaphragm:** PTFE-faced EPDM with steel core
- **Max. stroke length:** 0.236” (6 mm) up to 1500 liquid end; for 2100 liquid end 0.354” (9 mm)
- **Diaphragm failure indication:** Optional - see accessories
- **Wetted material of construction options**
  - **Continuous**
    - PP = polypropylene: 176ºF (80ºC) 212ºF (100ºC)
    - P = PVC: 113ºF (45ºC) 140ºF (60ºC)
    - T = carbon-filled PTFE: 194ºF (90ºC) 248ºF (120ºC)
    - SS = 316 stainless steel: 194ºF (90ºC) 248ºF (120ºC)
  - **Short Term**
    - Continuous: 392ºF (200ºC); Short term: 482ºF (250ºC)
- **Check valves:** Single ball (except disc-type valves on 1500 & 2100 P, PP and S liquid ends)
- **Repeatability:** When installed and operated according to instructions, better than ±2% of rated capacity.

**Makro TZ 20 HK/AK; HKD/AKD:**

- **Pump type:** Packed plunger (plunger threaded directly to reciprocating shaft)
- **Max. stroke length:** 0.787” (20 mm)
- **Plunger material:** Aluminum oxide ceramic
- **Packing seal method:** Nut-tightened packing gland
- **Seal flush port:** Packing lubrication/flushing is possible for abrasive or hazardous fluids via the flush port. Hosebarbs fit 1/2” x 3/8” flexible tubing.
- **Check valves:** Double ball, models 12S, 17S, 23S and 30S; single ball models 40S, 50S, 60S, 79S and 85S
- **Repeatability:** When installed and operated according to instructions, better than ±0.5% of rated capacity.

**Makro TZ 20 HMH/AMH; HMHD/AMHD:**

- **Pump type:** Hydraulically-actuated diaphragm (packed plunger drives hydraulic fluid behind diaphragm)
- **Max. stroke length:** 0.787” (20 mm)
- **Diaphragm:** PTFE faced EPDM with secondary PTFE faced EPDM backer
- **Diaphragm failure indication:** Integral to composite diaphragm, with micro-switch indicating separation of plies
- **Pressure relief:** Built-in hydraulic pressure relief valve. No external pressure relief valve required.
- **Repeatability:** When installed and operated according to instructions, better than ±0.5% of rated capacity.