

# Specifications: Makro

## General:

<i>Housing construction:</i>	Acrylic resin coated cast aluminum
<i>Drive:</i>	Slide-ring adjustable crank (non-lost motion)
<i>Motor mounting flange:</i>	Available for NEMA 56C, 143/145 TC or 182/184 TC frame motors (motor not included with pump)
<i>Gear ratios and stroke frequencies (with 1725 RPM motor):</i>	10:1 = 172 SPM, 12:1 = 144 SPM, 15:1 = 115 SPM, 20:1 = 86 SPM
<i>Motor coupling:</i>	Flexible coupling included with pump
<i>Maximum motor RPM:</i>	1725
<i>Stroke frequency control:</i>	Remote or automatic frequency control optional with DC SCR drive or AC inverter
<i>Stroke length adjustment:</i>	Manual, in increments of $\pm 0.5\%$ . Motorized stroke length control optional.
<i>Stroke counting:</i>	Available with optional stroke counter
<i>Lubrication:</i>	Oil lubricated
<i>Recommended oil:</i>	Mobil Gear Oil 629, ISO VG 150 or 220
<i>Oil quantity:</i>	Approximately 3.3 quarts (3.5 liters)
<i>Recommended oil change interval:</i>	5,000 hours
<i>Separation of drive from liquid end:</i>	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.
<i>Maximum solids size in fluid:</i>	200 $\mu$

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

<i>Pump type:</i>	Mechanically-actuated diaphragm (diaphragm threaded directly to reciprocating shaft)		
<i>Diaphragm:</i>	PTFE-faced EPDM with steel core		
<i>Max. stroke length:</i>	0.236" (6 mm) up to 1500 liquid end; for 2100 liquid end 0.354" (9 mm)		
<i>Diaphragm failure indication:</i>	Optional - see accessories		
<i>Wetted material</i>		<u>Continuous</u>	<u>Short Term</u>
<i>of construction options</i>	PP = polypropylene	176°F (80°C)	212°F (100°C)
<i>and maximum fluid temperatures:</i>	P = PVC	113°F (45°C)	140°F (60°C)
	T = carbon-filled PTFE	194°F (90°C)	248°F (120°C)
	SS = 316 stainless steel	194°F (90°C)	248°F (120°C)
<i>Check valves:</i>	Single ball (except disc-type valves on 1500 & 2100 P, PP and S liquid ends)		
<i>Repeatability:</i>	When installed and operated according to instructions, better than $\pm 2\%$ of rated capacity.		

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

<i>Pump type:</i>	Packed plunger (plunger threaded directly to reciprocating shaft)
<i>Max. stroke length:</i>	0.787" (20 mm)
<i>Plunger material:</i>	Aluminum oxide ceramic
<i>Packing seal method:</i>	Nut-tightened packing gland
<i>Seal flush port:</i>	Packing lubrication/flushing is possible for abrasive or hazardous fluids via the flush port. Hosebarbs fit 1/2" x 3/8" flexible tubing.
<i>Check valves:</i>	Double ball, models 12S, 17S, 23S and 30S; single ball models 40S, 50S, 60S, 79S and 85S
<i>Repeatability:</i>	When installed and operated according to instructions, better than $\pm 0.5\%$ of rated capacity.
<i>Maximum fluid temperature:</i>	Continuous: 392°F (200°C); Short term: 482°F (250°C)

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

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