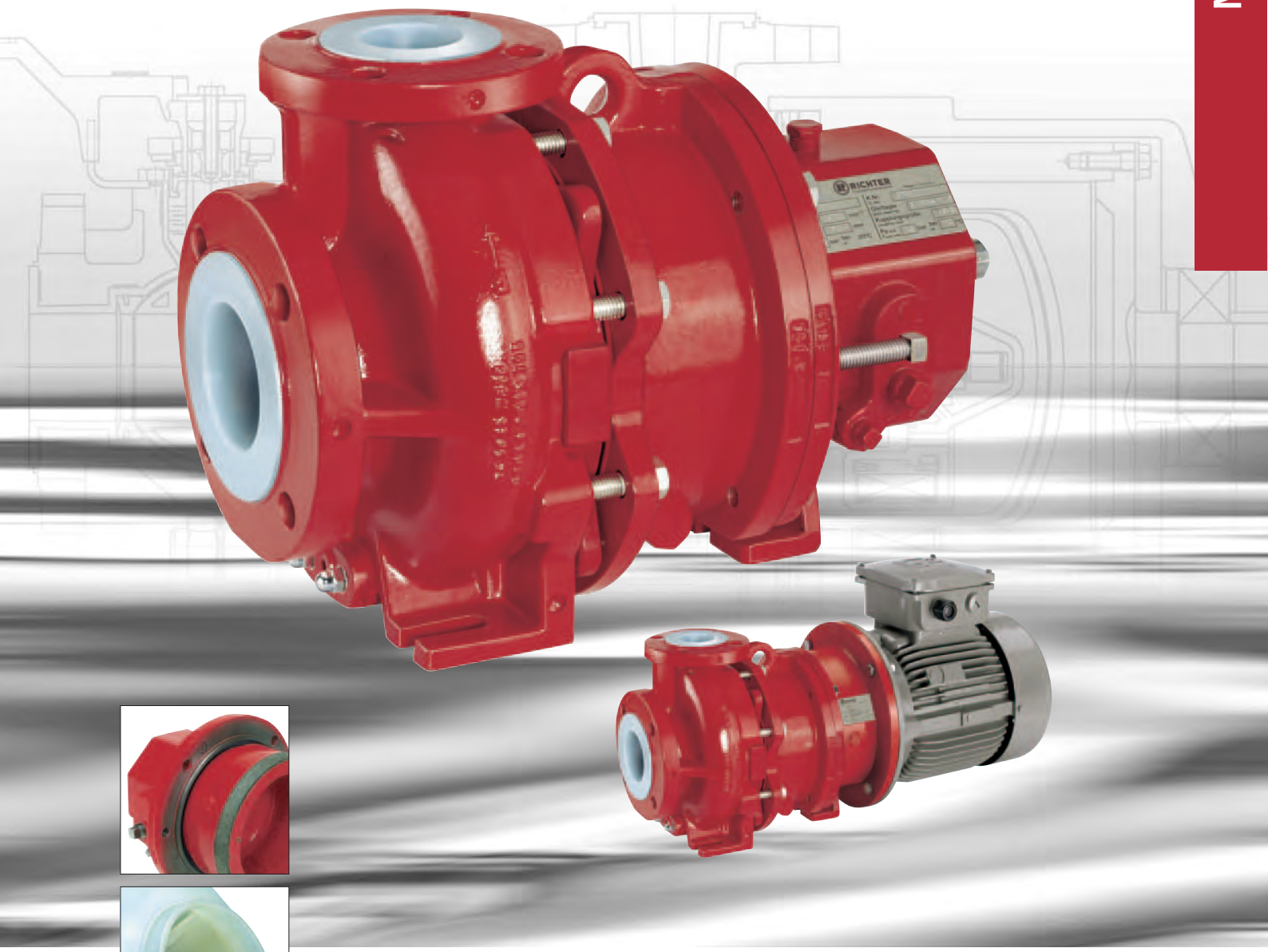
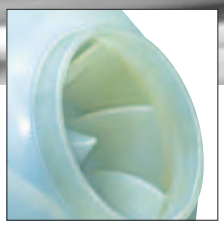
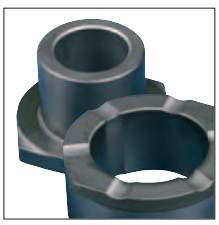
Richter Heavy Duty Lined Mag-Drive ASME/ANSI Pumps

MNKA







Dry-run optimized
SAFEGLIDE® PLUS sleeve bearings

Corrosion-resistant PFA/PTFE

-20 to 360 °F (-30 to 180 °C)

RICHTER
Process Pumps & Valves

IDEX
FLUID & METERING

Richter heavy duty lined mag-drive ASME/ANSI chemical pump MNKA

Applications

Demanding applications with corrosive, hazardous, polluted and pure media in chemical, pharmaceutical, petrochemical, water treatment, pulp and metal processing, and waste disposal/recycling industries. Economical alternative to pumps made of special metals like Alloy C, titanium, nickel etc.

Operating range

- Flows to 400 US gpm (95 m³/h)
- Heads to 480 feet (146 m)
- Temperatures to 360 °F (180 °C)
- Pressures to 275 psig (19 bar)

For higher flows to 2650 US gpm (600 m³/h) and temperatures to 400 °F (200 °C) see Richter's mag-drive lined pump series MNK.

Examples of services

- Hot acids
- Nitric acid
- Acetic acid
- Hydrofluoric acid
- Amines
- Chlorinated solvents
- Carbon tetrachloride
- Chloroform
- Dichloroethylene
- Chlorine dioxide
- Sodium hypochlorite
- Freon 113
- Ethers
- Acetone
- Bromine
- CIP solutions

Design

Single-stage, plastic-lined, magnetic drive chemical duty centrifugal pump. Dimensions and performance to ASME B73.3 and ANSI Cl.150. Close-coupled and frame-mounted.

Performance features for chemical services

Extended pump life

- Virgin PFA lining without fillers
- Sealless robust design
- PFA lined solid 316 stainless steel shaft
- Optional SAFEGLIDE® PLUS dry-run optimized sleeve bearings

Optimum performance

- Low NPSHr
- Non-slip synchronous drive with neodymium iron boron outer magnets and samarium cobalt inner magnets
- Optional samarium cobalt outer magnets for high temperatures

Ease of maintenance

- Minimum number of parts, "back pull-out" design
- Minimum maintenance, no mechanical seal

Safety

- Containment shell protection through drive magnet assembly bump ring
- Casing drain connection
- Zero emissions

The heavy-duty design, Richter SAFEGLIDE® PLUS silicon carbide sleeve bearings and the eddy current-free PTFE/CFRP containment shell provide an unmatched level of operational safety. The MNKA complies with ASME B73.3 for 60 Hz and 50 Hz applications.

⑩ **Ductile cast iron pump casing (ASTM A395)** absorbs all pipe loads.
Thick-walled PFA lining of min. 0.2" (5 mm) universally protects against corrosion. No carbon or other fillers, thus optimum quality control and no impact on high-purity fluids. See page 6.
Optional PFA-L antistatic lining and PFA-P lining for extremely permeating fluids.

⑨ **Hydraulically optimized flow path**
- enclosed impeller with large metal core and integral shaft.
- No suction-side spider obstructing inlet flow. **Low NPSHr.**
- Volute design.

⑧ **Radial rubbing safety ring (bump ring)** protects containment shell from a possibly wobbling drive magnet unit in the event of defective ball bearing. Non-sparking optional, see page 6.

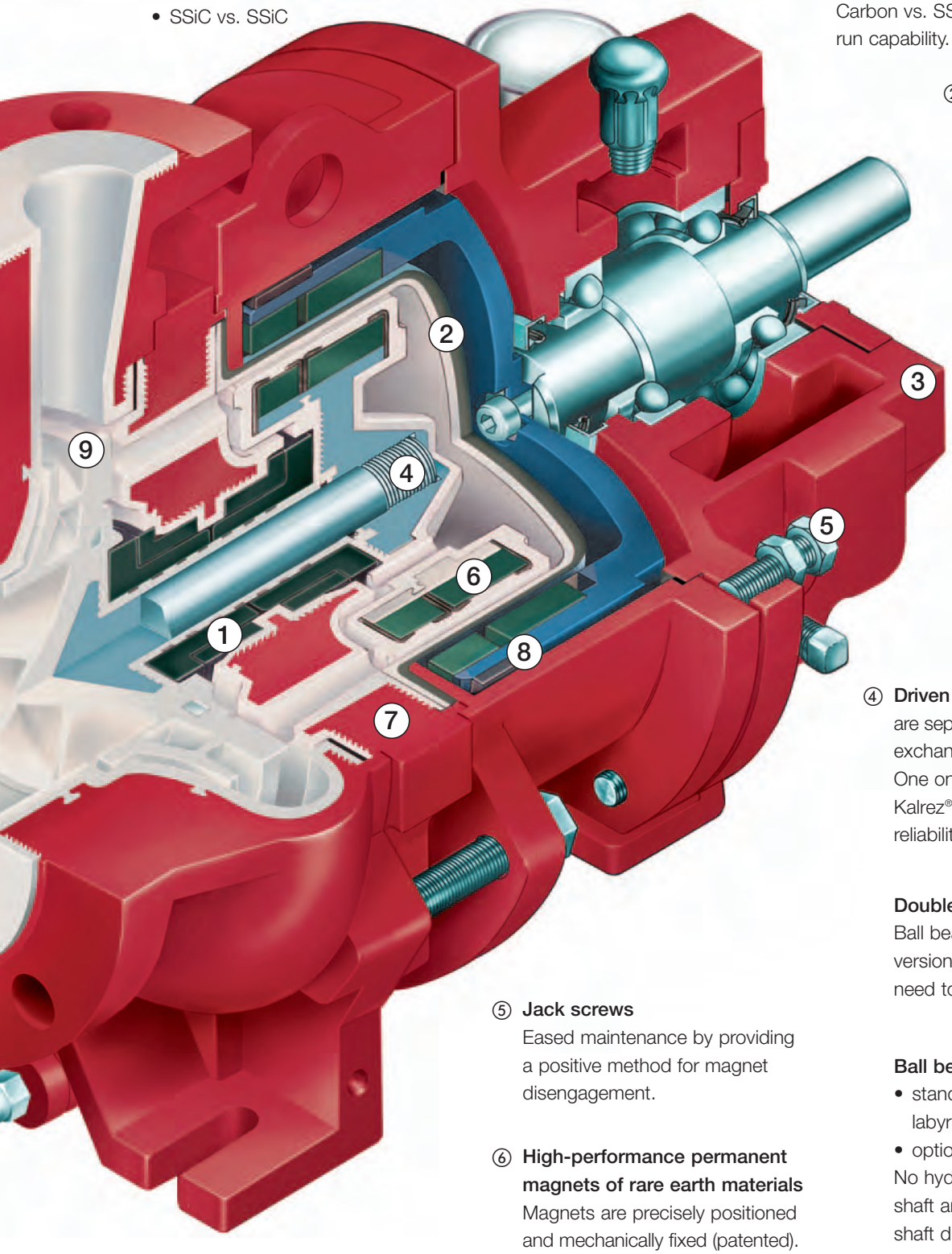
Solids handling

- The standard MNKA can handle solids contents up to 2 % and particle sizes up to 0.078" (2 mm).
- Much higher solids contents permitted with optional bearing flush using clean external liquid. Contact factory when solids occur.

① **Large sleeve bearings exceed design requirements**
Choice of
- carbon vs. SSiC
- SSiC vs. SSiC

SSiC vs. SSiC silicon carbide sleeve bearings are available with **SAFEGLIDE® PLUS dry-run protection**

This feature reduces the friction by appr. 85 % and reliably protects the pump from dry-run damages.
For more info see special brochure.
Carbon vs. SSiC offers a limited dry-run capability.



② **Eddy current-free non-metallic containment shell:**
- inside virgin PTFE
- outside carbon-fiber reinforced plastic (CFRP) with high secondary corrosion-resistance.

No generation of heat: reduces minimum flow requirement and saves energy. High vacuum proof version optional.

③ **Tertiary sealing**
to atmosphere by means of lantern/bearing pedestal unit. No vent holes.

④ **Driven magnet rotor and impeller**
are separate parts to allow economical exchange in case of damage.
One only statically sealing O-ring of Kalrez® (or equivalent) provides proven reliability.

Double "back pull-out" design
Ball bearings of frame-mounted version can be maintained without need to drain or remove the pump.

Ball bearings
- standard: oil lubrication with labyrinth seals
- option: greased for life.

No hydraulic forces act on the drive shaft and the ball bearings, as the shaft drives only the drive magnet assembly. Thus these components are ensured of a long service life.

⑤ **Jack screws**
Eased maintenance by providing a positive method for magnet disengagement.

⑥ **High-performance permanent magnets of rare earth materials**
Magnets are precisely positioned and mechanically fixed (patented). Transferable torques of 9.6 to max. 103 lbs.ft (13 to 140 Nm) result in magnetic coupling power ratings of up to 69 hp (51 kW) at 3500 rpm or 57 hp (42 kW) at 2900 rpm. For smaller and for larger pumps see series MNK.

⑦ **Heavy duty bearing frame with metallic core**
supports the whole wetted rotating unit. Containment shell does not have to support loads as with standard pump designs.

Parts and material list

Additional features and options

Casing drain
available as an option:
- allows for safe and easy pump drainage
- for standstill conditions especially with crystallizing media

Casing drain provides a flushing circuit via the lowest point of the pump.

External corrosion protection
- epoxy coating
- casing fasteners of stainless steel

Quality
Quality system to ISO 9001.

Temperature monitoring
Available as an option, measuring the liquid's temperature.

Type code:

magnetic drive pump, frame-mounted	MNKA/...
magnetic drive pump, close-coupled	MNKA-B/...
lining PFA	.../F
antistatic PFA-L	.../F-L
highly permeation resistant PFA-P	.../F-P

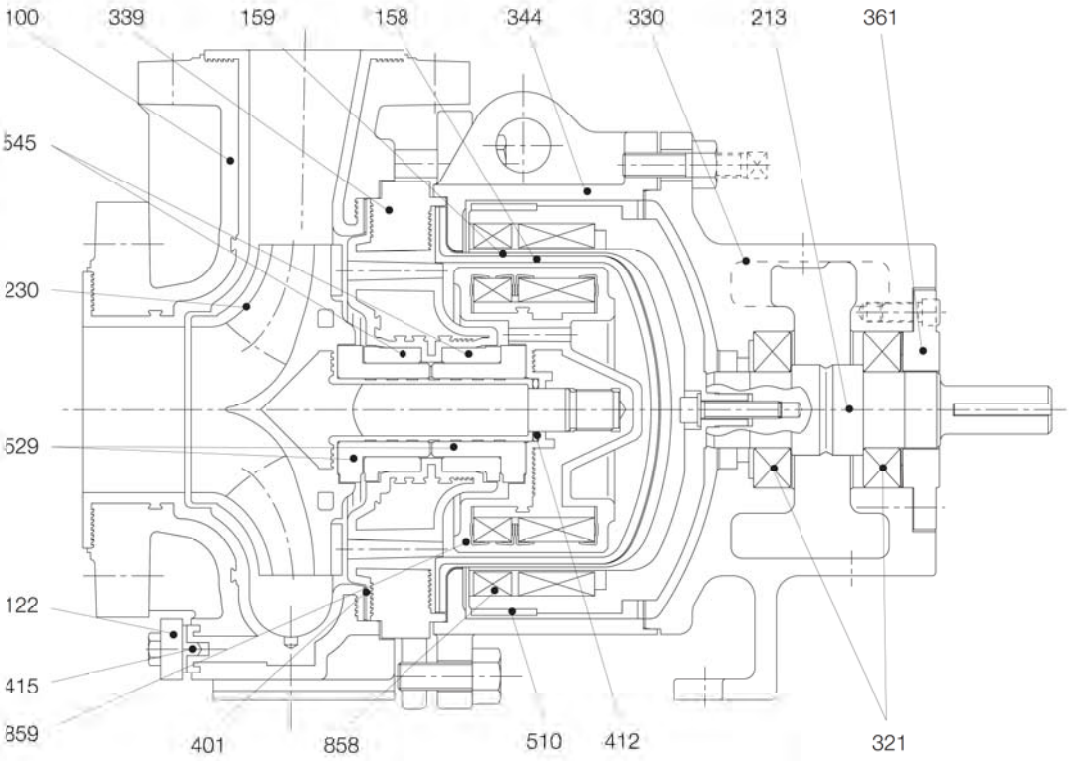


Illustration: Frame-mounted pump with oil bath lubrication.
Not shown: grease lubrication and close-coupled pump.

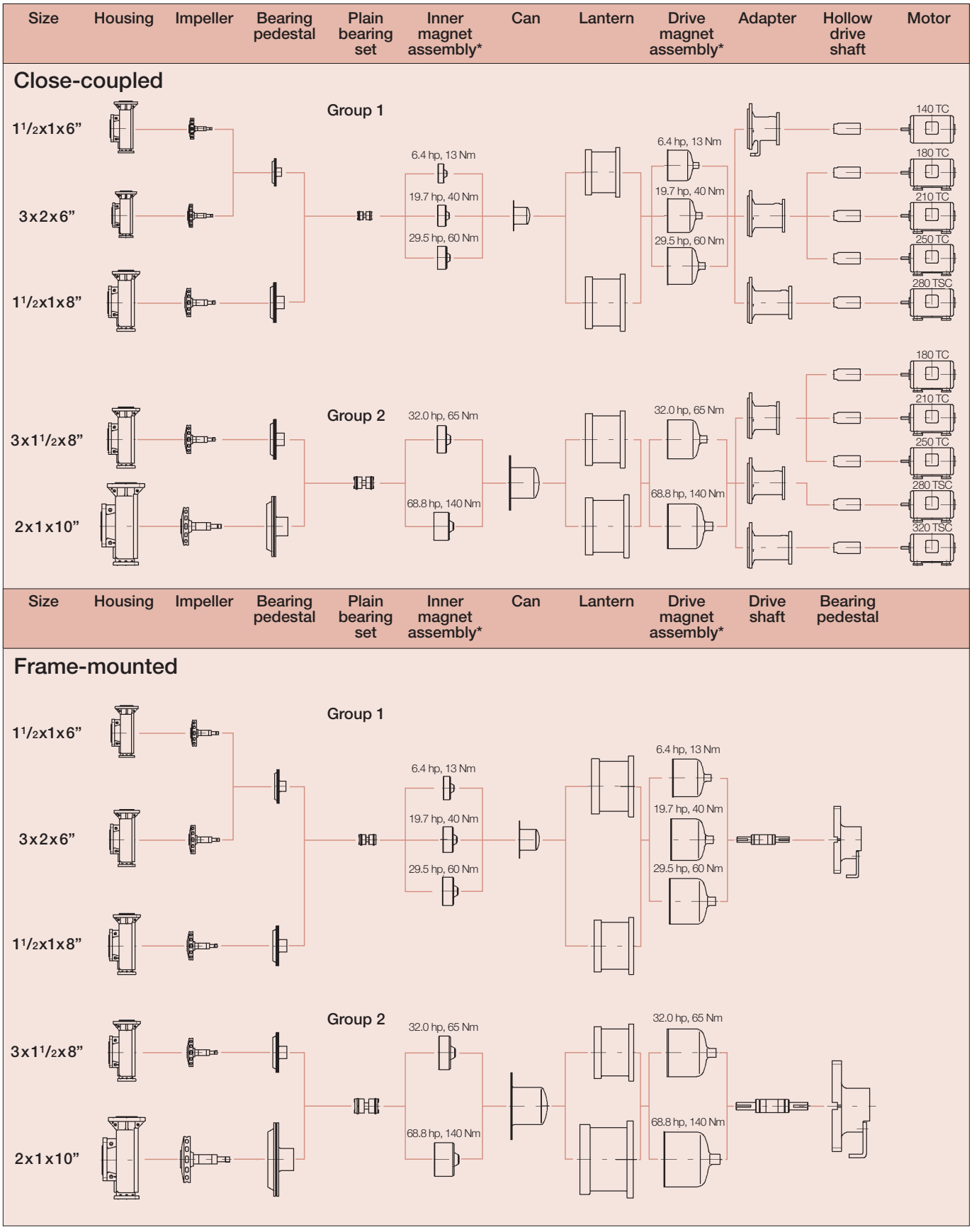
Parts and materials

Item No.	Designation	Material
100	Housing	Ductile iron ASTM A 395/PFA[1]
122	Cover flange[2]	Steel
158	Can insert	PTFE
159	Can	Carbon-fibre reinforced plastic (CFRP)
213	Drive shaft	Steel
216	Hollow drive shaft (close-coupled pump, not illustrated)	Steel
230	Impeller with integral shaft	PFA with stainless steel core
321	Radial ball bearing	oil lubrication (greased optional)
330	Bearing pedestal	Ductile iron ASTM A 395
339	Bearing pedestal	Ductile iron ASTM A 395/PFA[1]
344	Lantern	Ductile iron ASTM A 395
346	Adapter (close-coupled pump, not illustrated)	Ductile iron ASTM A 395
361	Bearing cover	Steel
401	Housing gasket	PTFE
412	O-ring	FFKM (Kalrez® or equivalent)
415	Centering gasket[2]	PTFE
510	Safety ring	Integral to part 858, optional non-sparking
529 / 545	Plain bearing set consisting of bearing sleeve + bearing bush	SSiC silicon carbide/carbon, optionally SSiC/SSiC or SSiC/SSiC with SAFEGLIDE® PLUS
858	Drive magnet assembly	D.I. ASTM A 395, NdFeB magnets, opt. SmCo
859	Inner magnet assembly	Steel/PFA[1], SmCo magnets

[1] PP/PE-UHMW, antistatic and highly permeation resistant linings on request
[2] Housing drain standard undrilled

Viton® and Kalrez®: TM of DuPont
SAFEGLIDE® and Richter: TM of Richter Chemie-Technik GmbH

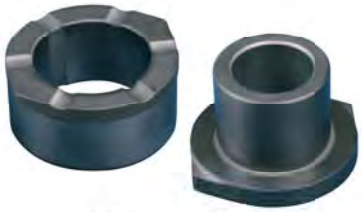
Modular interchangeability



*Magnetic drive ratings at 3,500 rpm

The MNKA in detail: built for outstanding service life

Optional SAFEGLIDE® PLUS silicon carbide (SSiC) sleeve bearings provide dry-run capability. That helps to overcome short-term upsets and gives valuable time to make corrections before pump damage occurs (see separate brochure).



SSiC sleeve bearings

Radial rubbing safety ring ("bump ring"): no danger for the containment shell even in the unlikely event of a failure of the ball bearings. Shown: optional non-sparking ring.

Bump Ring

Tough **all-metal external pump casing** absorbs hydraulic loads and those from suction and discharge piping. Unlike non-armoured plastic pumps, no expansion joints are necessary. **Min. 0.2" (5 mm) thick PFA lining.**

PFA lined pump casing

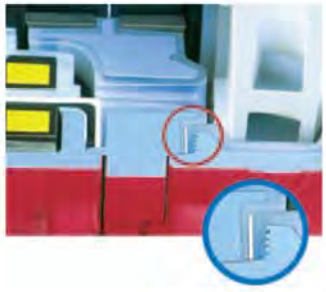
One-piece enclosed trimmable impeller with integral shaft. Minimized axial thrust. Stable metal core and thick walled lining contribute to long service life.

Trimmable impeller

Dual non-metallic containment shells as standard, avoid eddy current losses and increase efficiency and operational safety. Also available in vacuum-proof version.

Containment shell

Fully contained flat PTFE gasket provides superior corrosion resistance compared to an O-ring of FKM (e.g. Viton®) and is more reliable than a PFA/PTFE/FEP encapsulated FKM O-ring. All sealing surfaces are backed by metal to "limit" flow of plastic.



Contained flat PTFE gasket

MNKA also in close-coupled design: MNKA-B

Installation flexibility
The MNKA is available in frame-mounted or close-coupled designs for maximum installation or pump replacement flexibility.

ASME/ANSI pump replacement
Since the MNKA meets ASME/ANSI dimensional standards, retrofitting mechanically sealed ASME/ANSI pumps is easy: Simply replace the old pump with the equivalent MNKA or MNKA-B.

MNKA-B

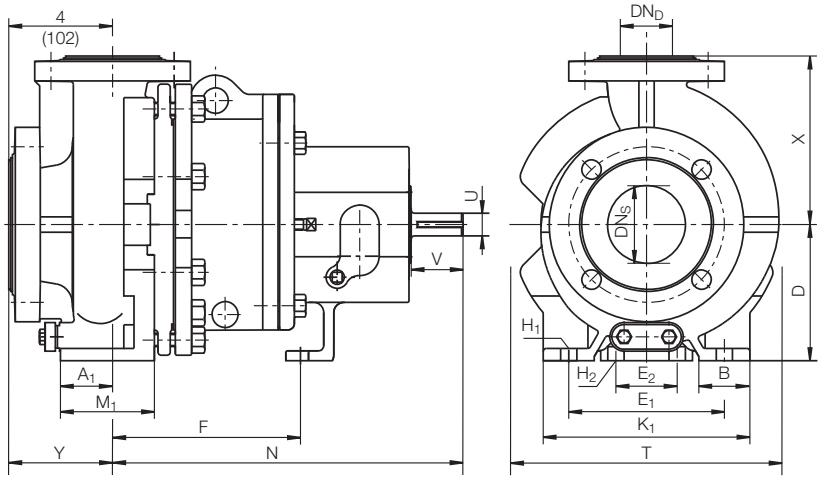
MNKA

Pump dimensions for frame-mounted and close-coupled designs

Dimensions inch (mm)/Weight appr. lbs (kg)

Size*	DN_D	DN_S	Y	N	D	X	B	M_1	A_1	K_1	E_1	E_2	T	H_1	H_2	F	U	V	lbs (kg)***
1½ x 1 x 6”	1 (25)	1.5 (38)	4 (101.6)	13.50 (342.9)	5.25 (133.4)	6.50 (165.1)	1.97 (50)	2.60 (66)	1.42 (36)	7.97 (202.4)	6.00 (152.4)	0** (0**)	10.47 (266)	0.63 (15.9)	0.63 (15.9)	7.25 (184.2)	0.88 (22.23)	2 (50.8)	157 (71)
3 x 2 x 6”	2 (51)	3 (76)	4 (101.6)	13.50 (342.9)	5.25 (133.4)	6.50 (165.1)	1.97 (50)	3.27 (83)	1.65 (42)	7.97 (202.4)	6.00 (152.4)	0** (0**)	10.47 (266)	0.63 (15.9)	0.63 (15.9)	7.25 (184.2)	0.88 (22.23)	2 (50.8)	168 (76)
1½ x 1 x 8”	1 (25)	1.5 (38)	4 (101.6)	13.50 (342.9)	5.25 (133.4)	6.50 (165.1)	1.97 (50)	2.40 (61)	1.06 (27)	7.97 (202.4)	6.00 (152.4)	0** (0**)	11.46 (291)	0.63 (15.9)	0.63 (15.9)	7.25 (184.2)	0.88 (22.23)	2 (50.8)	172 (78)
3 x 1½ x 8”	1.5 (38)	3 (76)	4 (101.6)	19.49 (495.3)	8.25 (210)	8.50 (216)	2.24 (57)	2.72 (69)	1.38 (35)	11.88 (301.8)	9.75 (247.7)	7.25 (184.2)	12.60 (320)	0.63 (15.9)	0.63 (15.9)	12.5 (317.5)	1.13 (28.58)	2.63 (66.7)	243 (110)
2 x 1 x 10”	1 (25)	2 (51)	4 (101.6)	19.49 (495.3)	8.25 (210)	8.50 (216)	2.24 (57)	2.76 (70)	1.38 (35)	11.88 (301.8)	9.75 (247.7)	7.25 (184.2)	14.33 (364)	0.63 (15.9)	0.63 (15.9)	12.5 (317.5)	1.13 (28.58)	2.63 (66.7)	269 (122)

* e.g. 3x2x6” = Suction x Discharge x Impeller (in inches). Flanges ANSI B 16.5/Cl.150
** Frame foot has only one mounting hole to ground on pump center line
*** Weights are for bare-shaft pump MNKA

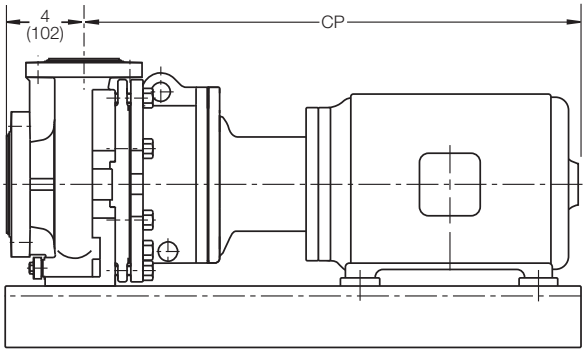


Dimensions mm (inch)

Motor frame	Group	CP (approx.)	Motor frame	Group	CP (approx.)
143TC	1	634 (24.96)	254TC	1	891 (35.06)
	2	730 (28.73)		2	945 (37.20)
145TC	1	659 (25.96)	256TC	1	934 (36.76)
	2	755 (29.73)		2	988 (38.90)
182TC	1	713 (28.09)	284TSC	1	1040 (40.95)
	2	768 (30.23)		2	1094 (43.09)
184TC	1	739 (29.09)	286TSC	1	N/A
	2	793 (31.23)		2	1094 (43.09)
213TC	1	785 (30.89)	324TSC	1	N/A
	2	839 (33.03)		2	1141 (44.91)
215TC	1	823 (32.39)	326TSC	1	N/A
	2	877 (34.53)		2	1141 (44.91)

Dimensions vary depending on motor manufacturer.

Close-coupled

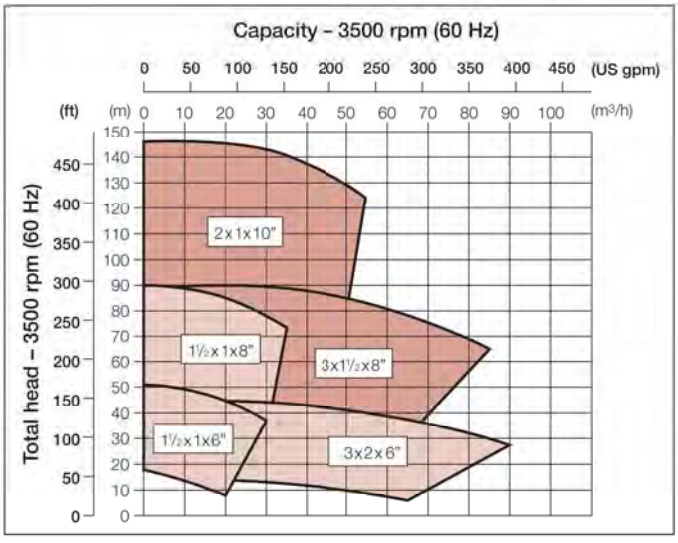


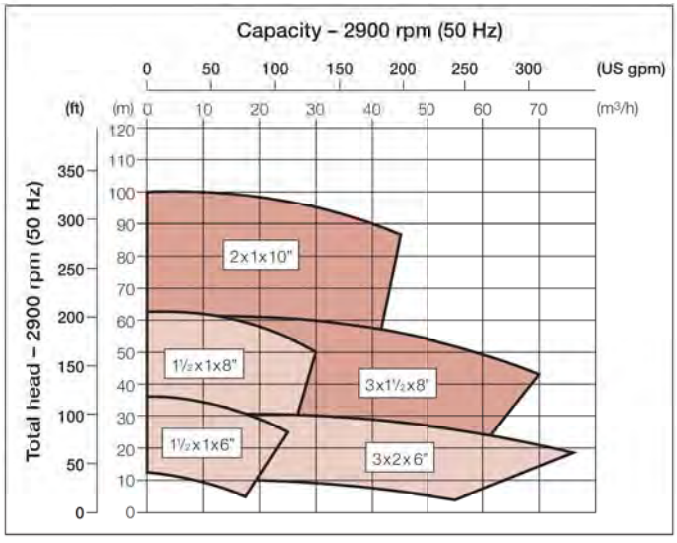
Operating range, hydraulic coverage

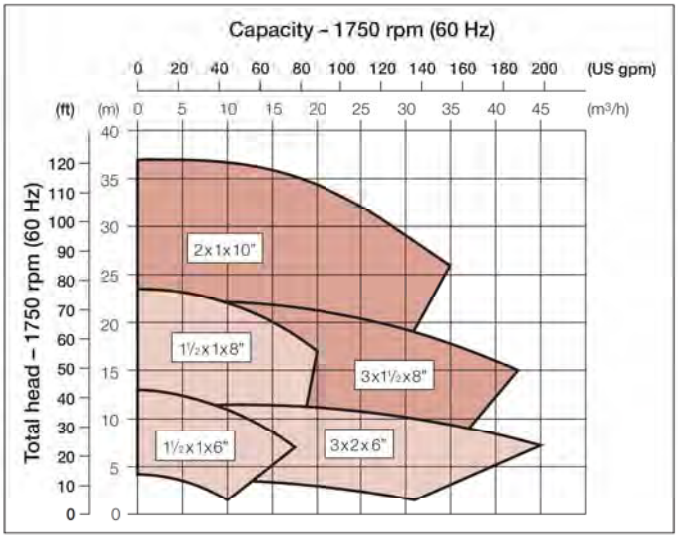
Operating temperature:
From -20 to 360 °F (-30 °C to 180 °C), depending on configuration and pressure.

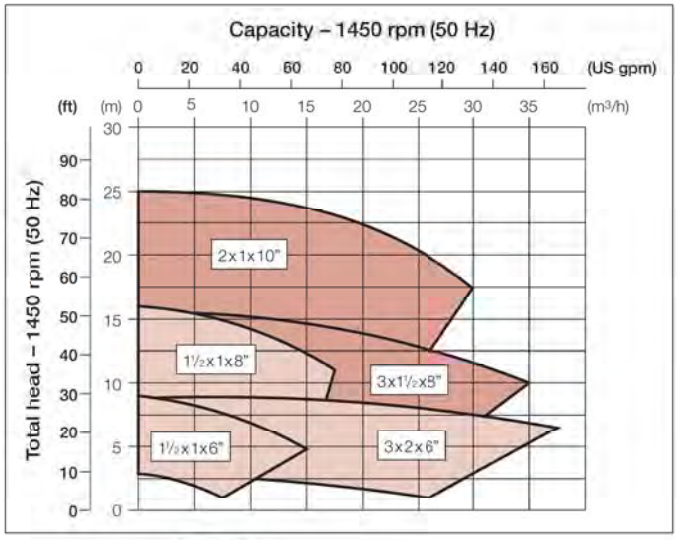
Operating pressure:
Up to 275 psi (19 bar), depending on temperature. Pump standstill vacuum permissible depending on temperature and pump specification.

Solids containing liquids:
When solids containing media are pumped, flushing of bearings can be carried out using an external sealing liquid. This also refers to fluids which tend to crystallize. Low solids content of small particle size can often be handled even without such ancillary equipment. Please ask for details on a case to case basis.









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