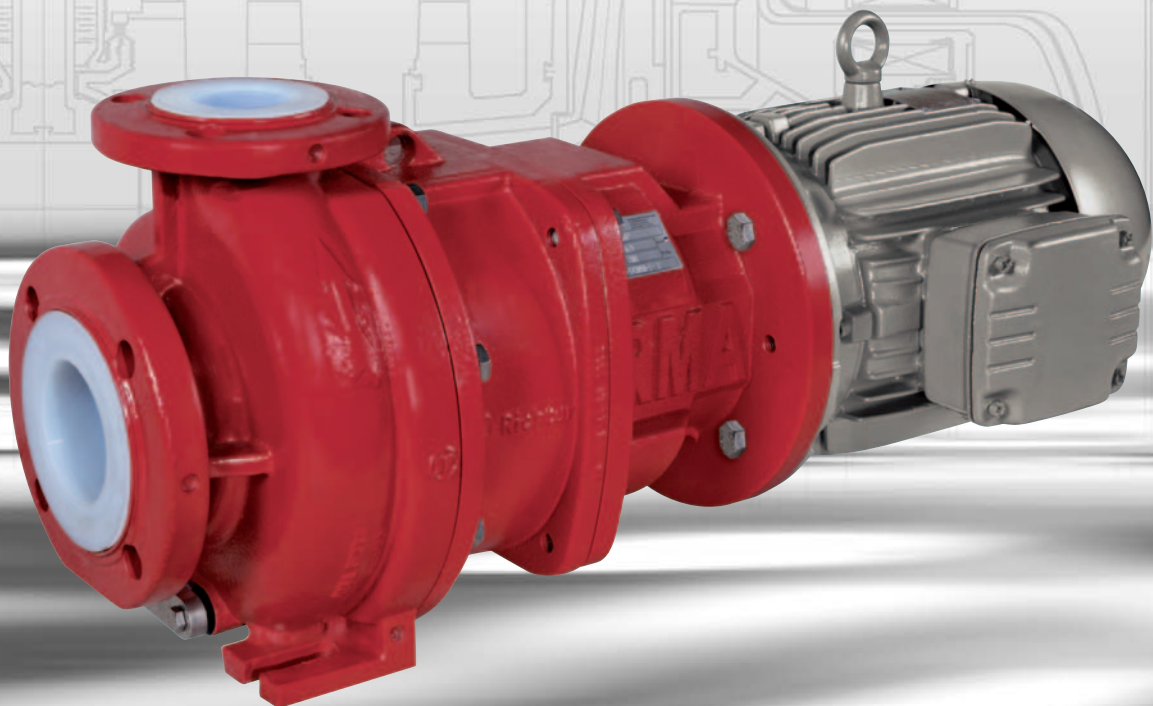


Richter Lined Mag-Drive ASME/ANSI Pumps

Corrosive, solid-laden and high-purity fluids

RMA, RMA-B



Temperatures to 150 °C (300 °F)
Virgin FDA-approved PFA/PTFE
without fillers and pure silicon
carbide bearing system
Dry-run SAFEGlide® PLUS
Thrust-optimised for all
operating conditions



RICHTER
Process Pumps & Valves

IDEX
FLUID & METERING

Richter lined mag-drive ASME/ANSI process pump

Fields of Applications

Corrosive, environmentally critical and high-purity fluids in the chemical, pharmaceutical, petrochemical, semiconductor, pulp, metal, food processing and waste disposal/recycling industries. The Richter RMA series was developed

- for use with media where stainless steel and conventional plastics do not have sufficient corrosion resistance
- as an alternative to
 - pumps made of expensive long-lead time metals (Alloy C, tantalum etc.)
 - plastic-lined mechanical seal pumps
 - full plastic pumps
 - metal pumps with double mechanical seals and liquid sealing or quench systems
 - and to stainless steel mag-drive pumps.

Design

Sealless, fluoroplastic-lined mag-drive centrifugal pump.

Dimensions and delivery data to ASME/ANSI B73.3. Close-coupled and frame-mounted designs. No dynamic seal. Eddy-current-free.

Type and material codes

- Frame-mounted RMA/...
- Close-coupled RMA-B/...
- Lining perfluoroalkoxy (PFA) .../F

Operating range

50 Hz operation	60 Hz operation
(0.1-150 m ³ /h)*	(0.1-180 m ³ /h)*
0.5-660 US gpm*	0.5-750 US gpm*
up to 110 m (360 ft) LC*	up to 155 m (500 ft) LC*

- Housing ductile iron ASTM A395/PFA lined -29 °C (-20 °F) to +150 °C (300 °F); max. 19 bar (275 psi)
- Capability of handling solids depending on shape, hardness and size of solids, consult factory

* For higher temperatures and more application specific options please see Richter ASME/ANSI heavy duty mag-drive pump MNKA.

For an even wider application range please see Richter's ISO pump range MNK with flows to 600 m³/h (2,650 US gpm) and temperatures to 400 °F (200 °C).

Features and benefits

The handling of highly corrosive, high-purity or environmentally critical fluids calls for truly reliable and safe equipment without compromises on quality, material and efficiency.

Richter fluoroplastic PFA lined process pumps have proven to be world-class in demanding chemical processing applications for decades.

Richter's RMA mag-drive pump series excel through

- ① **Virgin PFA lining without carbon or carbon fibre fillers – Perfect lining quality and guaranteed even lining thickness**
 - **Highest chemical resistance**, well above ETFE (e.g. Tefzel®)
 - Temperatures to 150 °C (300 °F)
 - **Full FDA conformity**
 - Neutral to pure fluids in pharmaceutical, fine chemical and semiconductor applications
 - Superb permeation resistance
 - Wall thickness from at least **3 to 5 mm (0.12 to 0.2")**.
 - Unmatched quality control opportunities
 - **Vacuum-proof anchored lining:**
 - Housing and impeller magnet assembly are lined with virgin PFA, and virgin PTFE is used for the wetted part of the double CFRP/PTFE can.
 - Richter exclusively applies the **"TM transfer molding process"** (not the so-called roto-molding). Indexing drillings on casting outside guarantee uniform lining thickness according to best practice, very important for high permeation resistance and wear allowance.
- ② **SAFEGLIDE® PLUS: Resilient against dry-run for 30 minutes and more**
 - **SAFEGLIDE® PLUS silicon carbide (SSiC) sleeve bearings** provide true dry-run capability, they withstood dry-run trials for 30-60 minutes. The proprietary surface impregnation is **extremely tear and chemical resistant**. Supplied with more than 20.000 Richter pumps into the toughest applications.
- ③ **Capability of handling liquids containing solids**
 - **Housing and rotor solids restriction rings** prevent critical solid particles from entering the rear can chamber. The SSiC suction-sided spider will resist all possible wear and tear.
- ④ **Axially thrust-optimised rotating unit: Smooth running even under critical load conditions**
 - **Well-balanced rotating unit** supported both in the can and in the suction-sided SSiC spider. **Non-cantilevered design**, thus no shaft deflection, working components are under less stress.
 - Wide space between SSiC bearing sleeves provides reliable distribution of radial forces.
 - Engineered closed impeller design. Thrust-balancing circulation holes and defined internal circulation flow path ensure minimum thrust loads.

⑤ **Minimum life cycle cost and**

Ease of maintenance

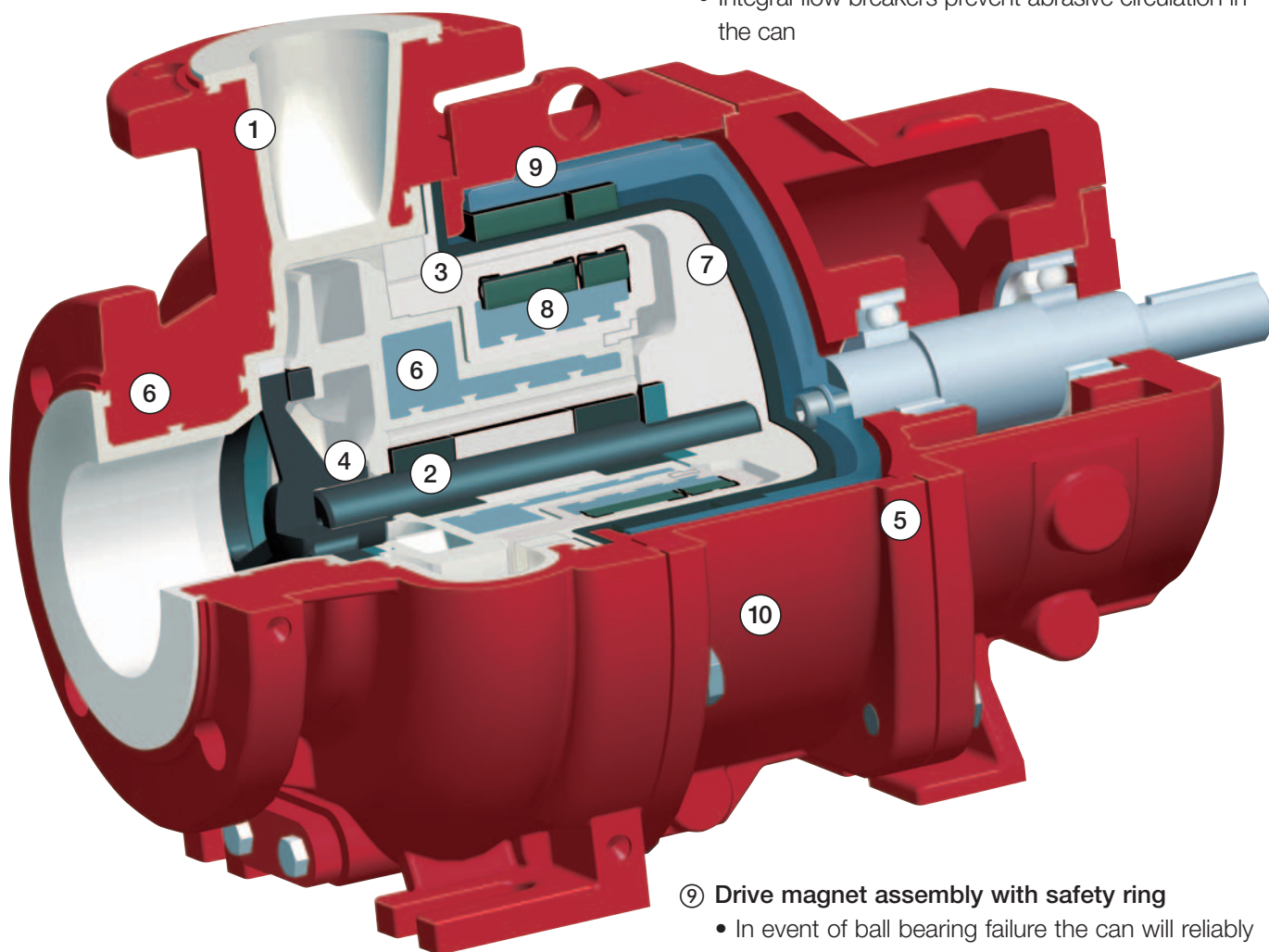
- High efficiency design, no energy-wasting eddy currents
- Universal corrosion resistance provides high flexibility
- Virtually maintenance-free
- Double “back pull-out” design for easy maintenance of motor and roller bearings without releasing system pressure
- Few components only: a service-orientated pump.

⑥ **Robust design for dimensional stability even at high temperatures**

- Full-surface ductile cast iron ASTM A395 absorbs pipework forces and eliminates need for expansion joints
- Impeller magnet assembly with large metal core
- Robust highest grade SSiC silicon carbide components

⑦ **Non-metallic double can system**

- Wetted: thick-walled virgin PTFE
- Pressure-bearing: carbon-fibre, with high safety reserves
- No eddy currents: no heating of fluid, no energy waste
- Integral flow breakers prevent abrasive circulation in the can



⑧ **High-performance NdFeB (neodymium iron boron) and SmCo (samarium cobalt) permanent magnets**

- Consistent energy density even at high temperatures
- Patented magnet attachment by stainless steel caging underneath PFA lining

⑩ **High-quality external corrosion protection**

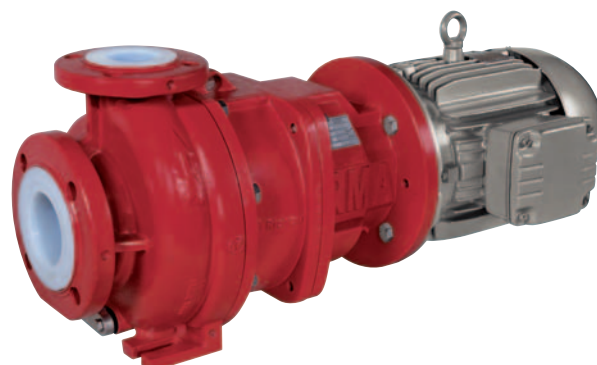
- Thick 2-component outside epoxy coating of the pump
- SS screws, other grades available.

⑨ **Drive magnet assembly with safety ring**

- In event of ball bearing failure the can will reliably be protected from contact by a possibly tumbling drive magnet assembly

Close-coupled pump RMA-B

All sizes are available both in compact close-coupled design for a flange motor and in frame-mounted design.



Quality and reliability count when difficult fluids are to be handled

SAFEGLIDE® PLUS dry-run optimised SSiC silicon carbide bearing system

SSiC silicon carbide and SAFEGLIDE® PLUS are extremely corrosion and abrasion resistant.

The SSiC radial sleeve bearings are positively locked in the impeller magnet assembly and rotate on the SSiC shaft. The SSiC impeller thrust ring absorbs possible axial thrust. SAFEGLIDE® PLUS is a most valuable option and offers unique dry-run properties. It protects the pump against dry-run damages for a reasonable period should lubricating fluid be missing – even when bone-dry!

Carbon graphite sleeve bearings are not being offered due to risk of premature wear in case of solids in the fluid.



SSiC Shaft and sleeve bearings



Integral flow breakers

Non-metallic double can

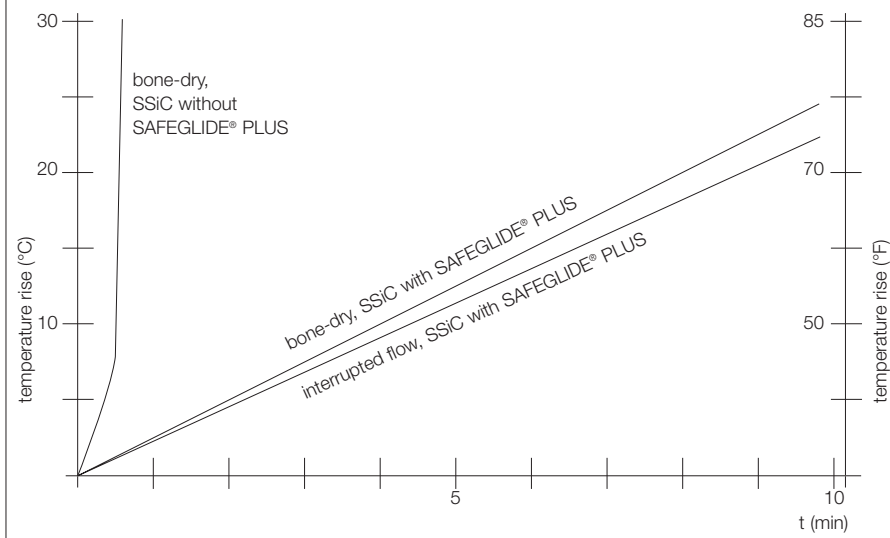
The integral flow breakers prevent the fluid from unwanted circulation. This is of advantage especially with fluids containing abrasive solids.

Virgin PFA and PTFE fluoroplastics, no fillers

Any filler – be it e.g. graphite or glass powder or carbon fibre – has a negative impact on the overall chemical resistance of fluoroplastics against corrosive chemicals like on the inertness versus high-purity and valuable fluids.

Fillers are usually compounded in for dimensional stability of the liner or component at higher temperatures or

Dry-run of SSiC silicon carbide bearings in lined magnetic drive pumps, 2900 rpm: Temperature rise



pressures. Instead a metal core is the more reliable solution and provides more flexibility, as virgin lined pumps can operate as multi-purpose pumps with higher temperature ranges. Normally fillers also degrade the permeation resistance substantially.

2-piece impeller magnet assembly

Largely dimensioned metal-backed catches safely transmit the torque from magnet rotor to impeller. Exactly die-molded geometries ensure a simple and durable assembly of magnet rotor and impeller by means of a jaw clutch type design, fixed by retaining ring, with easy dismantling.

No O-rings, no threads, no key-ways needed.

2-piece design also for economical reasons: magnet coupling torque can be adjusted to changing demands by exchange of magnet rotor and reuse of impeller. Impeller itself can individually be replaced in case of wear and tear.

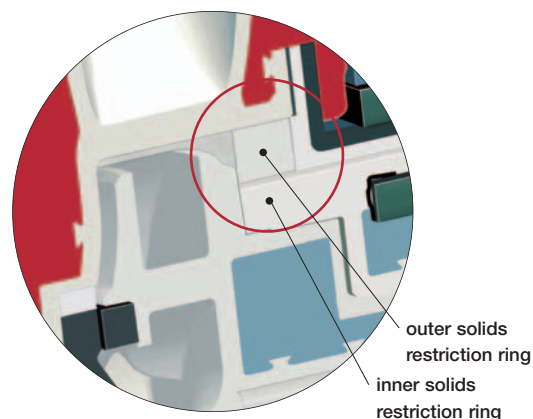


Impeller magnet assembly (shown detached)

Flow-optimised impeller channel design for high efficiency and low NPSHr. Thick-walled PFA lining, entirely seamless and without welding points.

Solid restrictor

Fluoroplastic lined pumps are capable of handling solids-laden fluids to a certain share of solids. The allowable share of solids is very much depending on particle size, shape and hardness. Richter has a long and rich experience with this, a case by case validation is strongly recommended.



The RMA solids restriction rings act as barrier to solid constituents in the fluid towards the can chamber. The inner solids restriction ring is standard integral molded into the magnet rotor. The outer solids restriction ring is standard made of PTFE and replaceable. Other solids restriction ring materials on request.

Parts and materials

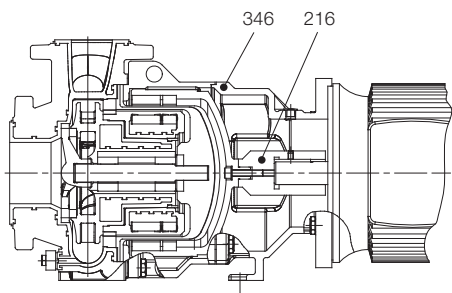


Illustration shows close-coupled pump RMA-B

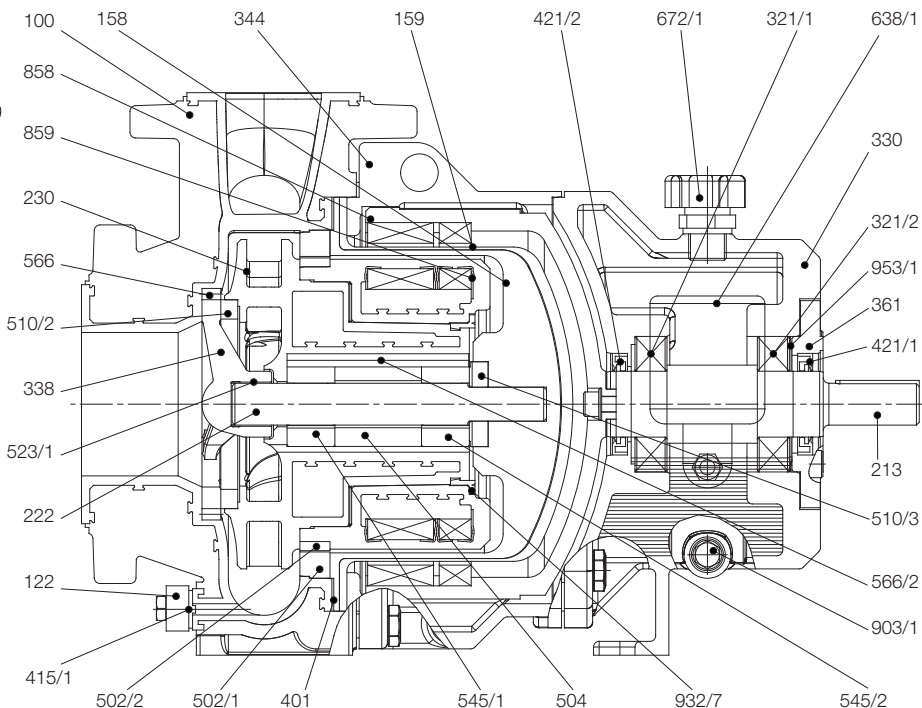
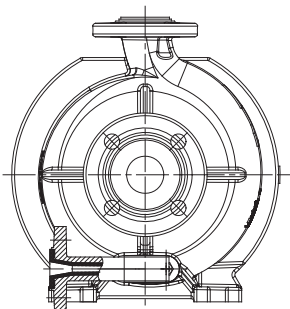
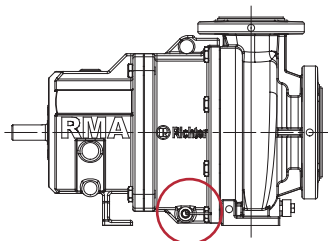


Illustration shows frame-mounted pump RMA with oil bath lubrication

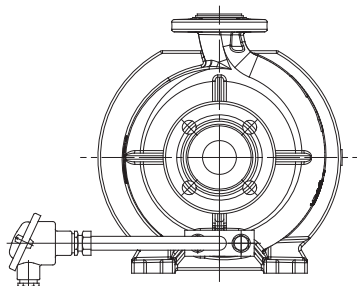
Additional options



Housing drain connection



Can leak sensor in lantern chamber



Temperature monitoring

Parts and materials

Item No.	Index of parts	Material
100	Housing	Ductile iron ASTM A395, PFA lined
122	Blind cover	Steel
158	Can insert	PTFE
159	Can	Carbon-fiber-reinforced resin (CFRP)
213	Drive shaft	Steel
216	Hollow drive shaft	Steel
222	Shaft	SSiC pure silicon carbide, option. with SAFEGSLIDE® PLUS
230	Impeller	PFA with SS core
321/x	Radial ball bearing	Oil bath, long-life grease optional
330	Bearing pedestal	Ductile iron
338	Shaft spider	SSiC pure silicon carbide
344	Lantern	Ductile iron ASTM A395
346	Adapter	Ductile iron ASTM A395
361	Rear bearing cover	Steel
401	Housing gasket	PTFE
415/1	Centering gasket	PTFE
421/x	Rotary shaft seal	
502/1	Outer solids restriction ring	PTFE, optional
502/2	Inner solids restriction ring	PFA, integral to impeller # 230 (optional replaceable PTFE)
504	Distance ring (spacer ring)	PTFE
510/2	Front thrust ring	SSiC pure silicon carbide
510/3	Rear thrust ring	SSiC pure silicon carbide
523/1	Shaft sleeve	PTFE
545/x	Bearing sleeve	SSiC pure silicon carbide, option. with SAFEGSLIDE® PLUS
566/x	Anti-torsion insert	PTFE
638/1	Constant level oiler	Only with oil bath lubrication
672/1	Venting/filling plug	Plastic
858	Drive magnet assembly	Ductile iron, NdFeB permanent magnets
859	Inner magnet assembly	Steel/PFA, SmCo permanent magnets
903/1	Screw plug	
932/7	Circlip (retaining ring)	PTFE

Performance curves

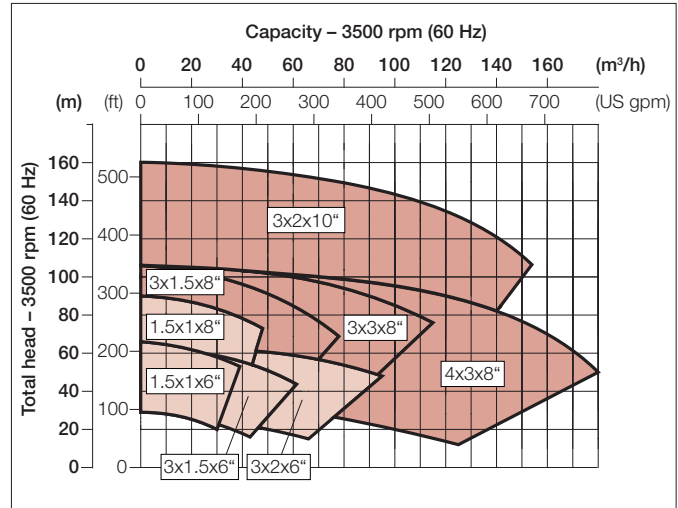
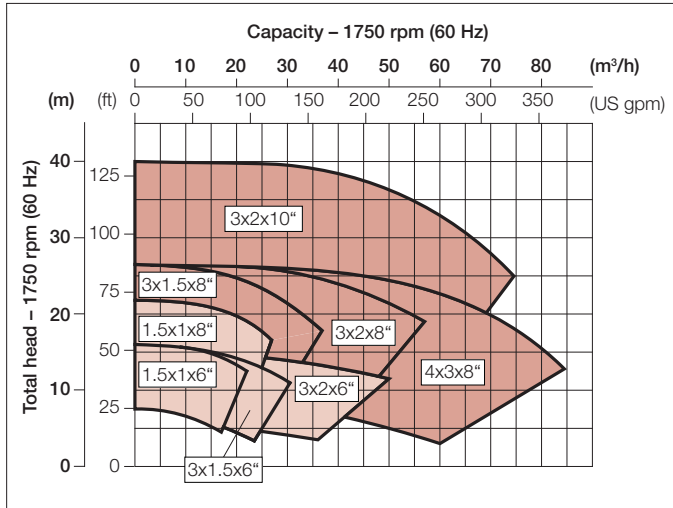
Richter magnetic drive pumps RMA and RMA-B are available for a performance range of up to

- 180 m³/h (750 US gpm) and up to 155 m (500 ft) LC at 3500 rpm
- 150 m³/h 660 US gpm) and up to 110 m (360 ft) LC at 2900 rpm

Flow rates and delivery heads outside this performance range can be covered by the **Richter magnetic drive pump series MNK/MNKA up to 600 m³/h (2650 US gpm).**

In view of its design, the good hydraulics, the can free of eddy currents and the overall good value for money, the RMA/RMA-B series is one of the most economic pumps of its kind.

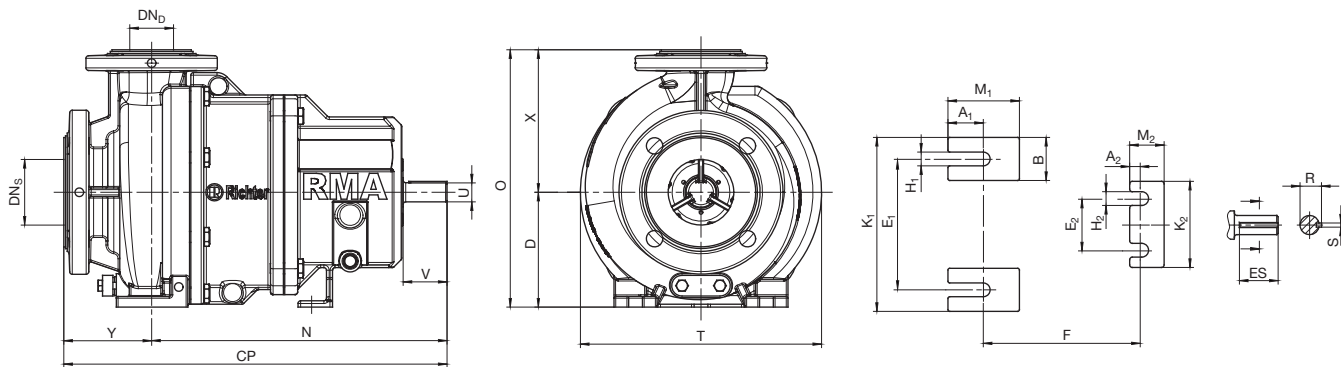
8 well graduated pump sizes from 1.5x1x6" to 3x2x10" allow for a tailor-made pump selection.



Dimensions and weights

(frame-mounted and close-coupled pumps with NEMA motors)

Frame-mounted design



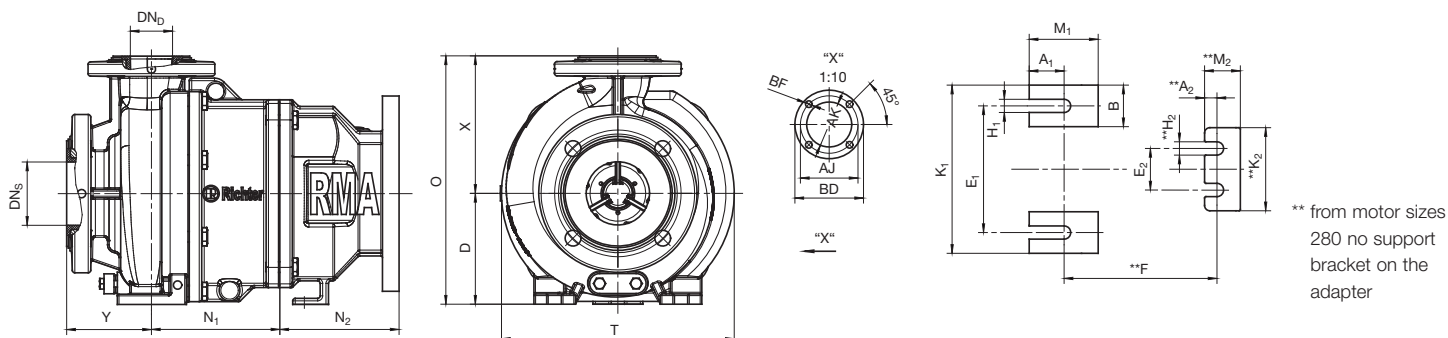
Pump dimensions mm (inch)

Group	Pump Size	DN _s	DN _o	Y	T	U	N	O	D	X	CP	V	R	S	ES
1	1.5x1x6"	38.1 (1.5)	25.4 (1)	102 (4.02)	280 (11.02)	22.3 (0.87)	343 (13.5)	298 (11.75)	133 (5.25)	165 (6.5)	445 (17.52)	51 (2)	24.3 (0.96)	4.8 (0.19)	44.5 (1.75)
	3x1.5x6"	76.2 (3)	38.1 (1.5)												
	3x2x6"	76.2 (3)	50.8 (2)												
	1.5x1x8"	38.1 (1.5)	25.4 (1)												
2	3x1.5x8"	76.2 (3)	38.1 (1.5)	102 (4.02)	330 (13)	28.6 (1.13)	495 (19.5)	425 (16.7)	210 (8.25)	216 (8.5)	597 (23.5)	82 (3.23)	31.4 (1.24)	6.35 (0.25)	57.2 (2.25)
	3x2x8"	76.2 (3)	50.8 (2)					450 (17.75)		242 (9.5)					
	4x3x8"	101.6 (4)	76.2 (3)					490 (19.3)		280 (11.02)					
	3x2x10"	76.2 (3)	50.8 (2)					450 (17.75)		242 (9.5)					

Pump feet dimensions mm (inch)

Group	Pump Size	B	M ₁	A ₁	M ₂	A ₂	K ₁	E ₁	E ₂	K ₂	H ₁	H ₂	F
1	1.5x1x6"	50 (1.97)	78 (3.07)	36 (1.42)	43 (1.69)	14 (0.55)	202.4 (7.97)	152.4 (6)	0	100 (3.94)	16 (0.63)	16 (0.63)	184 (7.25)
	3x1.5x6"		83 (3.27)	41 (1.61)									
	3x2x6"		83 (3.27)	41 (1.61)									
	1.5x1x8"		78 (3.07)	36 (1.42)									
2	3x1.5x8"	50 (1.97)	83 (3.27)	41 (1.61)	54 (2.13)	25 (0.98)	298 (11.7)	248 (9.76)	184 (7.25)	220 (8.66)	16 (0.63)	16 (0.63)	318 (12.5)
	3x2x8"		90 (3.54)	45 (1.77)									
	4x3x8"		83 (3.27)	41 (1.61)									
	3x2x10"		83 (3.27)	41 (1.61)									

Close-coupled design



Pump dimensions mm (inch)

Group	Pump Size	DN _S	DN _D	D	N ₁	O	T	X	Y
1	1.5x1x6"	38.1 (1.5)	25.4 (1)	133 (5.25)	152.9 (6.02)	298 (11.75)	280 (11.02)	165 (6.5)	102 (4.02)
	3x1.5x6"	76.2 (3)	38.1 (1.5)						
	3x2x6"	76.2 (3)	50.8 (2)						
	1.5x1x8"	38.1 (1.5)	25.4 (1)						
2	3x1.5x8"	76.2 (3)	38.1 (1.5)	210 (8.25)	169.9 (6.69)	425 (16.7)	330 (13)	216 (8.5)	102 (4.02)
	3x2x8"	76.2 (3)	50.8 (2)						
	4x3x8"	101.6 (4)	76.2 (3)						
	3x2x10"	76.2 (3)	50.8 (2)						
	3x2x10"	76.2 (3)	50.8 (2)						

Adapter dimensions mm (inch)

Group	NEMA motor	N ₂	BD	AK	AJ	BF
1	140 TC	114.9 (4.52)	170 (6.7)	114.3 (4.5)	149.23 (5.88)	11.1 (7/16)
	180 TC	145 (5.71)	235 (9.25)	215.9 (8.5)	184.2 (7.25)	14.3 (9/16)
	210 TC					
	250 TC					
	280 TSC	145 (5.71)	285 (11.22)	266.7 (10.5)	228.6 (9)	17.5 (11/16)
	320 TSC	155 (6.1)	355 (14)	317.5 (12.5)	279.4 (11)	
2	180 TC	184.5 (7.26)	235 (9.25)	215.9 (8.5)	184.2 (7.25)	14.3 (9/16)
	210 TC					
	250 TC					
	280 TSC					
	320 TSC	190.5 (7.5)	355 (14)	317.5 (12.5)	279.4 (11)	17.5 (11/16)
	360 TSC					
400 TSC						

Pump feet dimensions mm (inch)

Group	Pump Size	B	M ₁	A ₁	M ₂	A ₂	K ₁	E ₁	E ₂	K ₂	H ₁	H ₂	F
1	1.5x1x6"	50 (1.97)	78 (3.07)	36 (1.42)	43 (1.69)	14 (0.55)	202.4 (7.97)	152.4 (6)	0	100 (3.94)	16 (0.63)	16 (0.63)	184 (7.24)
	3x1.5x6"		83 (3.27)	41 (1.61)									
	3x2x6"		83 (3.27)	41 (1.61)									
	1.5x1x8"		78 (3.07)	36 (1.42)									
2	3x1.5x8"	50 (1.97)	83 (3.27)	41 (1.61)	56 (2.2)	25 (0.98)	298 (11.7)	248 (9.76)	184 (7.24)	220 (8.66)	16 (0.63)	16 (0.63)	318 (12.5)
	3x2x8"		90 (3.54)	45 (1.77)									
	4x3x8"		83 (3.27)	41 (1.61)									
	3x2x10"		83 (3.27)	41 (1.61)									

Other Richter process pumps

Richter magnetic drive and mechanical seal pumps are – just like Richter chemical shut-off and control valves – at home in a host of different chemical and related processes.

This pump range also includes more specialised designs. The plant operator can thus choose from Richter pumps even for very difficult applications.

Mechanically sealed pumps

- to EN 22858/ISO 2858 up to 300 m³/h (1300 US gpm) and 90 m (300 ft) LC at 1450/2900 rpm.
- to ASME B73.1 up to 115 m³/h (500 US gpm) and 105 m (350 ft) LC at 3500 rpm

Self-priming pumps

for emptying containers and basins from the top. Suction height up to 6 m (20 ft) WC, suction back pressure up to 18 m (59 ft) WC. Up to 33 m³/h (145 US gpm) and 40 m (130 ft) LC at 2900 and 55 m (180 ft) at 3500 rpm.

Mag-drive pumps

- to EN 22858/ISO 2858 up to 600 m³/h (2650 US gpm) and 90 m (300 ft) LC at 1450/2900 rpm
- to ASME B73.3 up to 170 m³/h (750 US gpm) and 155 m (500 ft) LC at 3500 rpm.

Vortex pumps

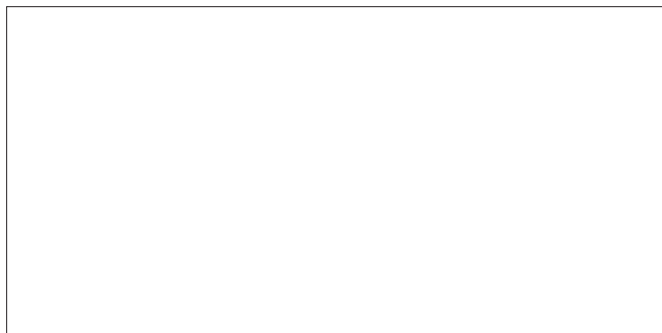
for solids contents, lumpy particles and gas contents. Up to 200 m³/h (880 US gpm) and 85 m (280 ft) LC at 2900 rpm and 120 m (395 ft) at 3500 rpm.

Peripheral pumps

for lower flow rates at high heads. 0.1-5 m³/h (0.4-22 US gpm) and up to 100 m (330 ft) LC at 2900 and 3500 rpm.



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