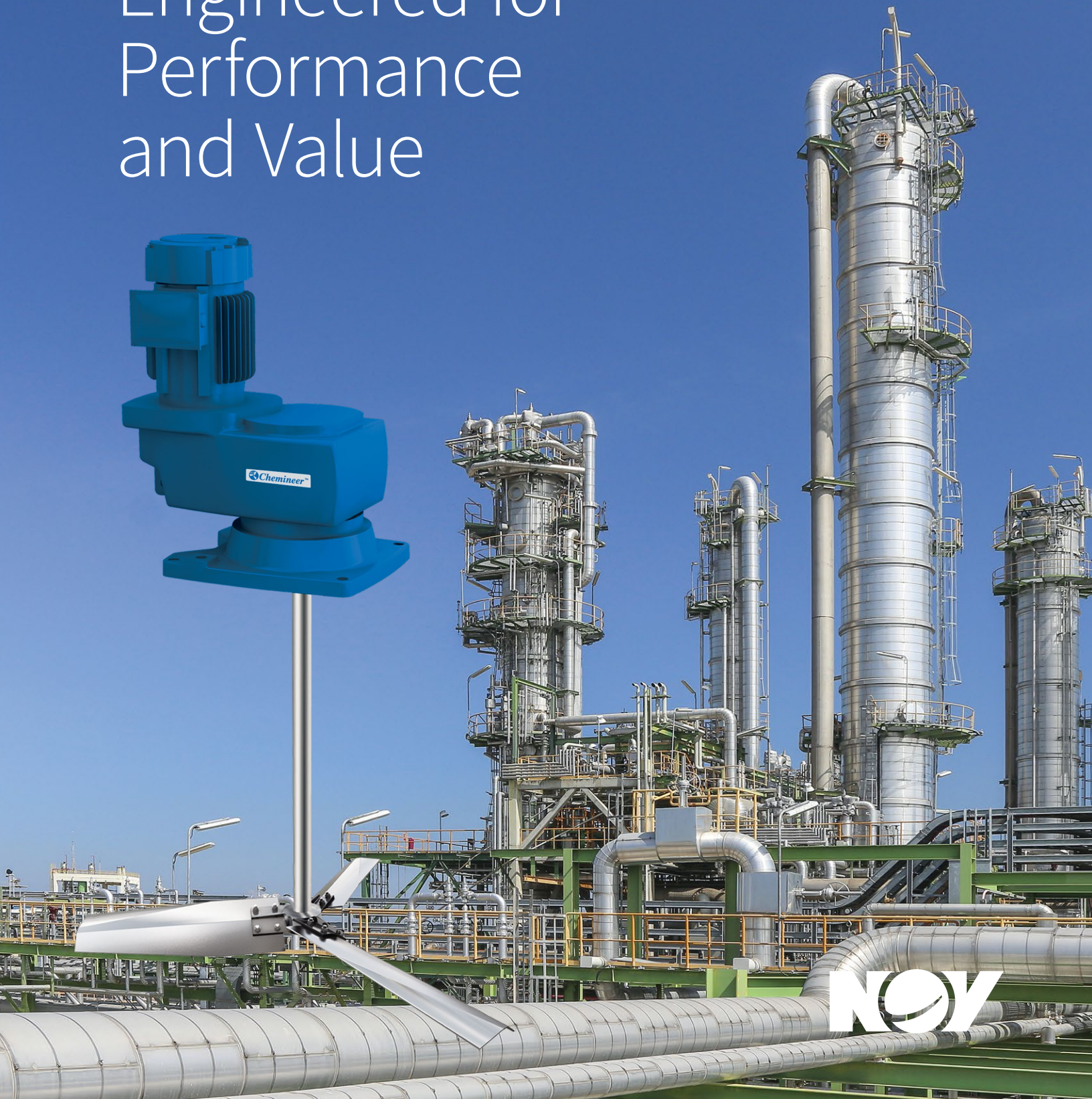


Chemineer™ MR Agitators

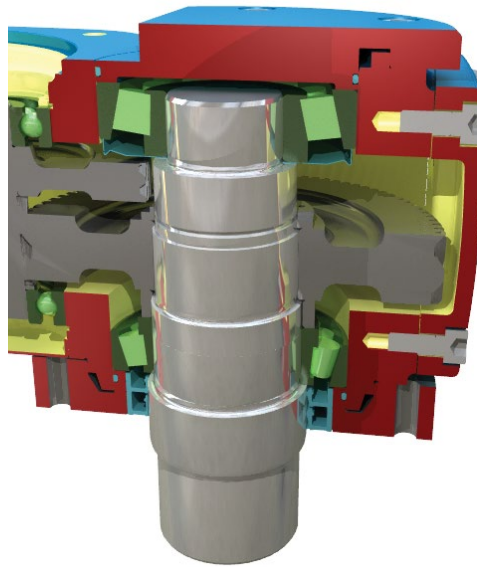
Engineered for
Performance
and Value



NOV

Reliability, Performance and Value

The MR agitator's gearbox is a proprietary, parallel shaft, helical gear design that features minimum 30,000 hour L-10 bearing life and an oversized output shaft for optimal performance and extended service life. Shaft speed selections are available from 7 to 380 rpm without the use of auxiliary reducers or electronic drives. When the MR gearbox is expertly matched with a wide variety of Chemineer impellers and other system components, MR agitators are capable of economically meeting your blending, dispersion, and other mixing needs.



Gearbox proprietary internals for optimum service life

Gearbox Designed for Agitator Duty

Commercially available gearboxes for agitators in this size range normally have low speed output shafts and bearing designs that are poorly suited to agitator duty. Commercial gearboxes typically use smaller diameter output shafts, resulting in the need to select larger and more expensive units to handle the torsional loads and bending moments produced by the hydraulic loads on agitator systems. These smaller output shafts and less robust bearing designs of commercial gearboxes also contribute to higher gear deflections, excessive vibration, higher maintenance costs, and a reduced life of many

critical agitator system components. The MR gearbox addresses these concerns by incorporating a larger output shaft straightened to exact tolerances and high capacity tapered roller bearings into its design. The rugged cast iron housing of the MR gearbox features a double lip seal to effectively contain the gearbox lubricant as well as a swing out seal change design that saves maintenance labor and reduces downtime. These design features reduce the overall initial cost of the gearbox and other agitation system components and reduce the maintenance costs of the agitator.

Versatile Modular Design

The modular design of MR agitators makes them well suited for a variety of mixing applications. MR agitators are designed to meet AGMA, OSHA, ANSI, IEC, DIN, EU and ATEX standards and requirements. They may be supplied with integral gearmotors, standard NEMA and IEC motors or explosion proof motors. A variety of stuffing boxes or mechanical seals and many custom pedestals, couplings, impellers, shafts, and steady bearings can be incorporated into the MR design as well. This product can be mounted to support

beams or similar structures for open tank operation or to pedestals, plates or flanges for closed tank operation. The MR agitator and all of its system components are included in the Chemineer Expert Design System (CEDS), the industry leading agitator design and analysis software program. CEDS helps insure that MR components are selected and configured for optimal system performance and value.

Global Availability

To support the global manufacturing footprint of our customers, MR agitators are available in all major global markets. MR agitator gearboxes, mountings and system components are also interchangeable with the Chemineer Model 20 HT and GT agitators enabling customers to readily adapt or upgrade their agitator drives

and system components to changes in application requirements or operating environments.

With all of its versatility, MR agitators can become your global process system standard helping drive efficiencies in procurement and reduce maintenance costs and replacement part investment.

Impeller Technology

Chemineer impeller technology is effectively applied across your spectrum of applications ensuring successful, repeatable results from lab scale to full scale operations.

Our mixing expertise includes high flow, low shear liquid-liquid agitation, solids suspension, gas dispersion, high shear blending and

viscous mixing. Whether it is R&D or production phase, we have the expertise to solve your mixing challenges.

An impeller bulletin is available with additional information.



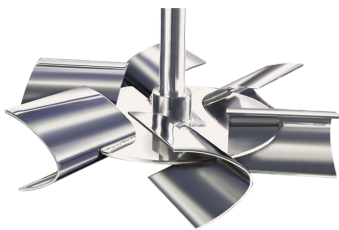
P-4



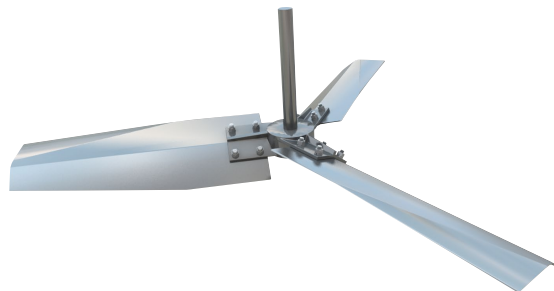
RL-3



HE-3



BT-6



XE-3

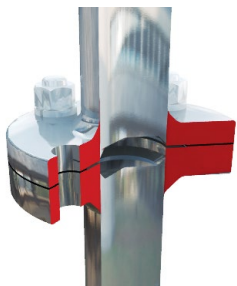


Maxflo W

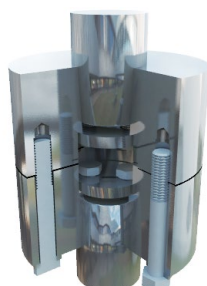
Features and Benefits

	Features	Benefits
Internal Shafting	<ul style="list-style-type: none"> • Oversized low speed shaft diameter and short bearing span reduce deflection and gear misalignment 	<ul style="list-style-type: none"> • Extends seal and bearing life • Lowers initial costs • Lowers maintenance costs
Gearing	<ul style="list-style-type: none"> • Double and triple reduction gearing for low gear loading and quiet operation 	<ul style="list-style-type: none"> • Smooth operation • Long service life
	<ul style="list-style-type: none"> • Helical gearing 	<ul style="list-style-type: none"> • Lowers energy costs
Gearbox Lubrication	<ul style="list-style-type: none"> • Bath lubrication ensures adequate lubrication to gears and bearings at all operating speeds 	<ul style="list-style-type: none"> • Lowers initial costs • Eliminates need for internal/external lubrication pumps
	<ul style="list-style-type: none"> • Standard R&O oils and greases 	<ul style="list-style-type: none"> • Lowers installation and maintenance costs
	<ul style="list-style-type: none"> • Double lip seal 	<ul style="list-style-type: none"> • Lowers capital cost • Maintains process fluid integrity
Bearing Design	<ul style="list-style-type: none"> • Output shaft features tapered roller bearings and a short bearing span that provides greater capacity to handle bending and thrust loads 	<ul style="list-style-type: none"> • Extends service life • Lowers maintenance costs
	<ul style="list-style-type: none"> • Ball bearings, oil lubricated 	<ul style="list-style-type: none"> • Ensures cool operation and low maintenance

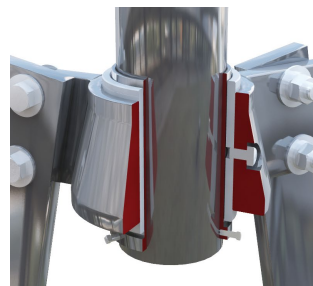
In-Tank Coupling and Steady Bearing Options



Welded Coupling



Removable Coupling



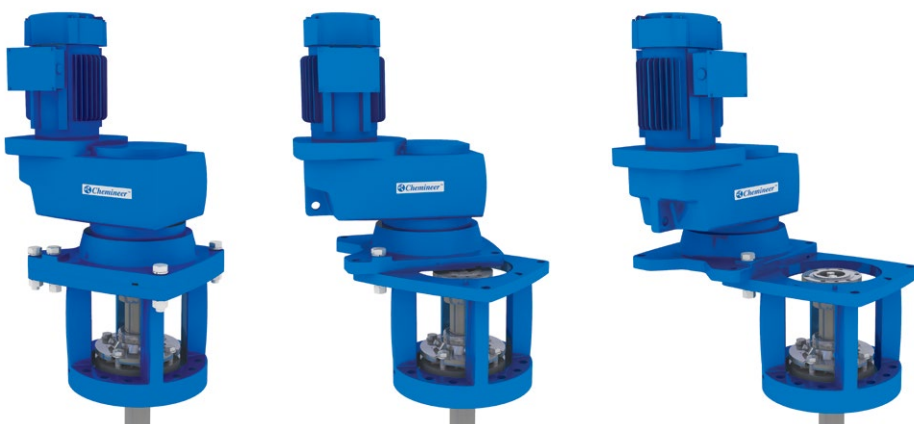
Tripod Steady Bearing



Bracket Steady Bearing

Features and Benefits

	Features	Benefits
Seals	<ul style="list-style-type: none"> • Drop collar shaft support during seal change 	<ul style="list-style-type: none"> • Shaft drops easily by loosening coupling bolts, and engages by tightening the coupling bolts • Shaft only drops 0.5" eliminating steady bearing disengagement
	<ul style="list-style-type: none"> • Optional throttle bushing and debris well design 	<ul style="list-style-type: none"> • Clean fluid flush eliminates process build up in seal area improving seal life • Eliminates particle shedding from entering tank
	<ul style="list-style-type: none"> • Swing out seal change design 	<ul style="list-style-type: none"> • No need to pull shaft up through gearbox or in-tank shaft supports • No labor or parts required for special shaft support system • No lifting and removing of gearbox, saving labor and downtime
	<ul style="list-style-type: none"> • Variety of seal options from major mechanical seal vendors such as John Crane, Flowserve, Chesterton and AES 	<ul style="list-style-type: none"> • Cartridge double and single seals, low pressure single seals, and cartridge ChemSeals provide performance and flexibility to meet agitator sealing needs
	<ul style="list-style-type: none"> • Low height pedestal design reduces shaft deflection at the seal 	<ul style="list-style-type: none"> • Extends service life • Minimizes downtime
	<ul style="list-style-type: none"> • Optional seal shut off device 	<ul style="list-style-type: none"> • Eliminates operator exposure to hazardous vapors without draining the vessel
	<ul style="list-style-type: none"> • Optional lip seals and stuffing boxes 	<ul style="list-style-type: none"> • Value lip seals for low pressure applications • Self lubricating packing offers low maintenance sealing options for pressures up to 100 psi



Swing out seal change



ChemSeal

Dimensions for 11-16 MR

Agitator Dimensions

Bolt Pattern

Case Size	A	B	C	D	E	F [Ⓢ]	G	H	J	Seal/Mount Type
11MR	1.12"	16.00"	8.00"	2.81"	5.71"	8" — 150# ANSI (holes straddle center line)	10.00"	0.75"	9.50"	All
12MR										
13MR	1.50"	20.00"	8.00"	4.00"	7.48"	10" — 150# ANSI (holes on center line)	12.50"	0.88"	10.00"	All
14MR										
15MR	1.59"	18.63"	8.63"	4.63"	9.45"	12" — 150# ANSI (holes straddle center line)	14.06"	1.18"	10.83"	All
16MR										

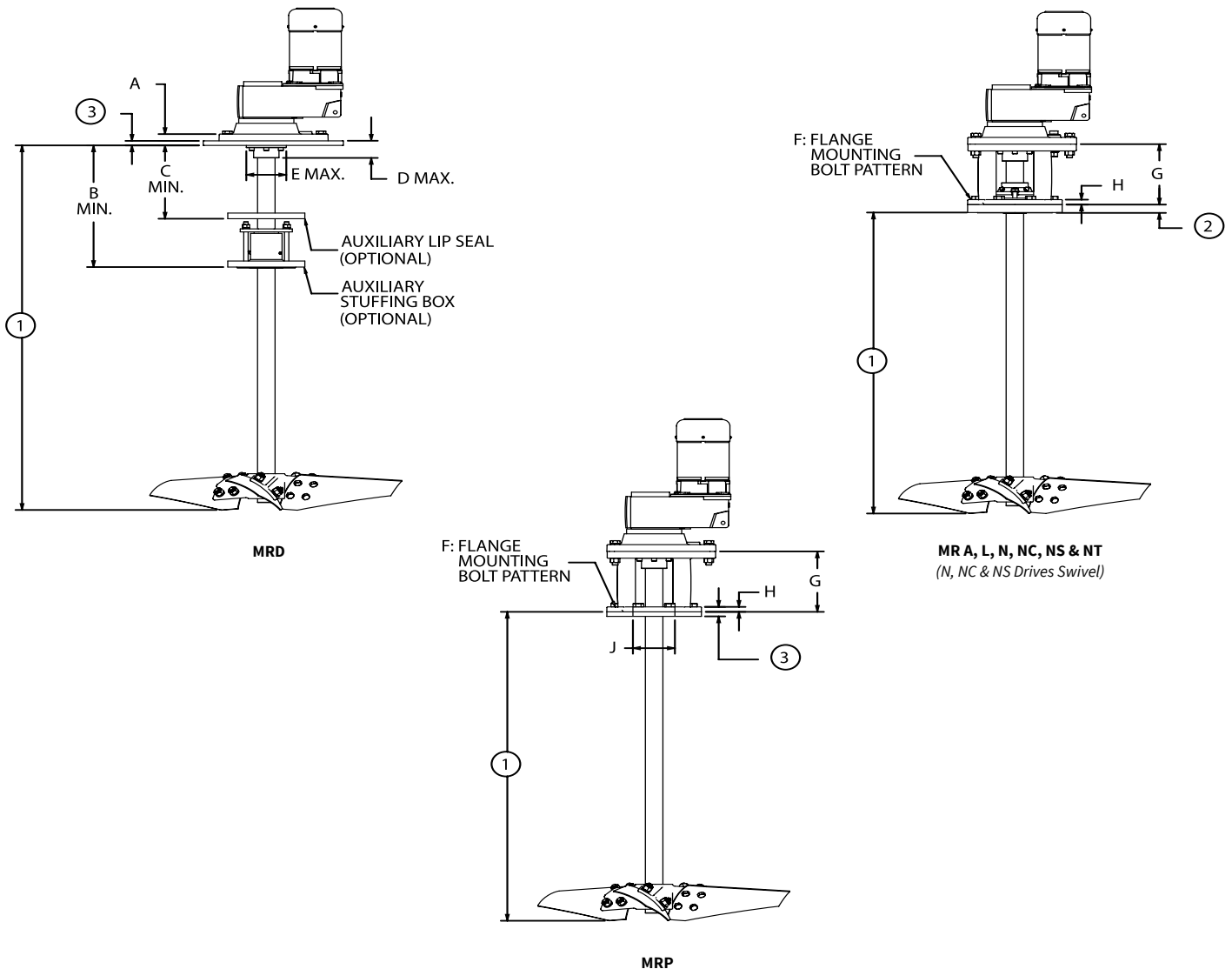
Dimensions are for reference only. See assembly drawing.

1 Agitator output speed, shaft diameter and extension, impeller design and other features not shown built to suit application.

2 Alternate flange sizes are available.

3 Both the D and P style agitators come with a steel base plate as an option. See IOM for base plate dimensions.

4 These dimensions are only approximations, and may vary slightly depending on the motor options and the motor supplier chosen.



Dimensions for 17 and 18 MR

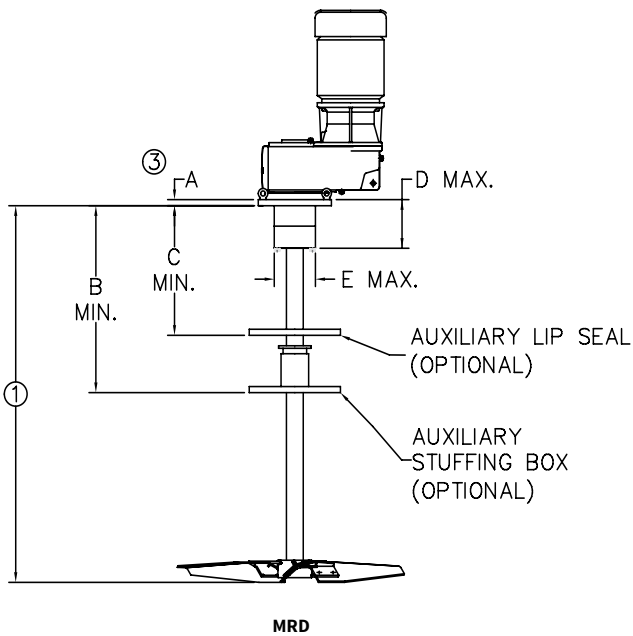
Agitator Dimensions

Bolt Pattern

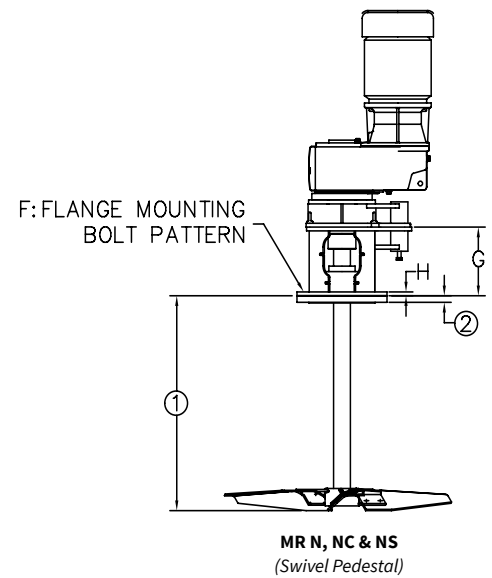
Case Size	A	B	C	D	E	F ^②	G	H	J	Seal/Mount Type
17MR	1.50"	27.00"	16.00"	11.95"	5.71"	16" — 150# ANSI (holes straddle center line)	16.88"	0.94"	14.57"	D, N, NC, NS
							20.25"			AL, L, P
							24.56"			A
18MR	1.75"	28.00"	17.00"	13.97"	7.48"	16" — 150# ANSI (holes straddle center line)	16.88"	0.94"	14.57"	D, N, NC, NS
							22.00"			AL, L, P
							26.06"			A

Dimensions are for reference only. See assembly drawing.

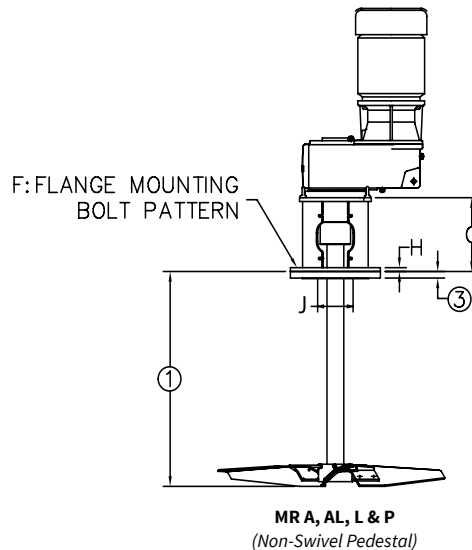
- 1 Agitator output speed, shaft diameter and extension, impeller design and other features not shown built to suit application.
- 2 Alternate flange sizes are available.
- 3 Both the D and P style agitators come with a steel base plate as an option. See IOM for base plate dimensions.
- 4 These dimensions are only approximations, and may vary slightly depending on the motor options and the motor supplier chosen.



MRD



MR N, NC & NS
(Swivel Pedestal)



MR A, AL, L & P
(Non-Swivel Pedestal)

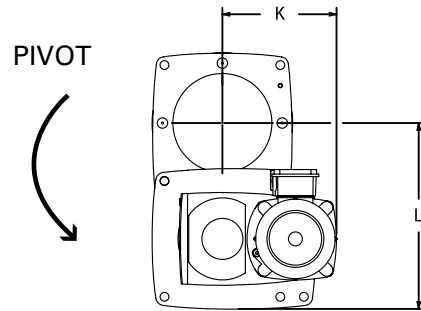
Dimensions for 11 and 12 MR

Swivel Dimensions

Case Size	K [Ⓞ]	L
11MR	9.72"	17.57"
12MR	11.04"	

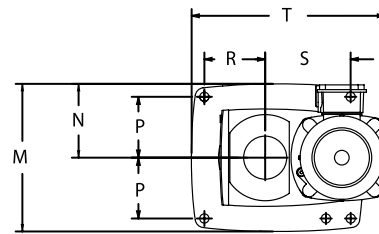
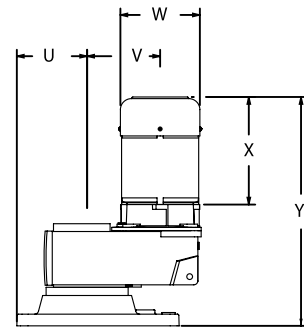
Typical Drive Assembly Swivel Dimensions

Drive assembly pivots at top of pedestal to allow change out of mechanical seals. See IOM for special motor conduit instructions.



Motor Dimensions

Frame Size		W [Ⓞ]	X [Ⓞ]	Y [Ⓞ]	
				11MR	12MR
NEMA	56C	7.75"	13.11"	25.75"	26.84"
	140TC	7.75"	13.11"	25.75"	26.84"
	180TC	9.25"	16.24"	30.03"	31.97"
	210TC	11.00"	17.96"	—	33.69"
	250TC	12.75"	22.25"	—	—
	280TC	14.50"	24.24"	—	—
	320TC	16.88"	27.00"	—	—
	360TC	18.50"	27.63"	—	—
IEC	71	5.69"	9.25"	20.85"	21.84"
	80	6.61"	10.66"	23.05"	24.04"
	90	7.40"	11.18"	23.57"	24.56"
	100	7.72"	13.15"	26.21"	27.20"
	112	9.45"	13.03"	26.09"	27.08"
	132	10.16"	16.73"	—	32.00"
	160	12.52"	21.26"	—	—
	180	14.37"	23.31"	—	—
	200	15.67"	27.09"	—	—
	225	17.64"	30.51"	—	—
	250	20.00"	35.04"	—	—
	280	22.17"	38.39"	—	—
315	26.05"	50.28"	—	—	
Integral	71	5.43"	9.06"	17.20"	18.18"
	80	6.14"	10.04"	18.18"	19.17"
	90	6.92"	11.65"	19.79"	20.78"
	100	7.63"	12.84"	20.98"	21.96"
	112	8.58"	13.74"	21.88"	22.87"
	132	10.16"	17.12"	—	26.25"
	160M/LMH	12.60"	18.86"	—	—
	160LH	12.60"	20.42"	—	—
	180MX/LX	12.60"	20.42"	—	—
	180MH/LH	14.09"	24.52"	—	—
	200/225S/M	15.67"	27.15"	—	—
	225SH/MH	17.52"	27.03"	—	—
	250M	19.49"	30.55"	—	—
	250MH	19.49"	33.31"	—	—
	280S/SH	22.64"	34.69"	—	—
	280M	—	—	—	—
	280MH	—	—	—	—
	315S/SH	—	—	—	—
	315Ma/Mha	—	—	—	—



Drive Assembly Dimensions

Case Size	M	N	P	R	S	T [Ⓞ]	U	V
11MR	13.50"	6.75"	5.56"	5.56"	7.81"	16.47"	6.75"	5.79"
12MR	—	—	—	—	—	17.79"	—	7.01"

Dimensions are for reference only. See assembly drawing.

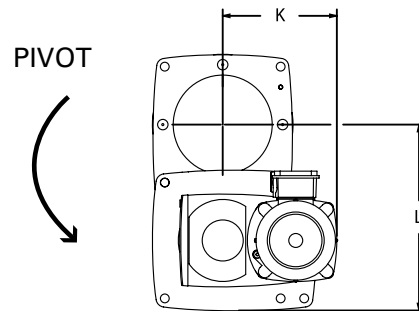
Dimensions for 13 and 14 MR

Swivel Dimensions

Case Size	K [Ⓞ]	L
13MR	13.03"	22.61"
14MR	15.02"	

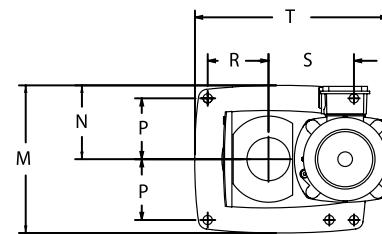
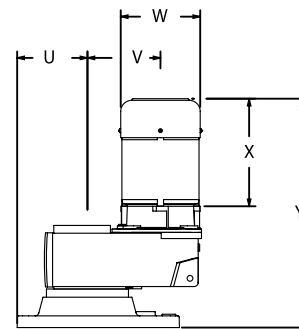
Typical Drive Assembly Swivel Dimensions

Drive assembly pivots at top of pedestal to allow change out of mechanical seals. See IOM for special motor conduit instructions.



Motor Dimensions

Frame Size		W [Ⓞ]	X [Ⓞ]	Y [Ⓞ]	
				13MR	14MR
NEMA	56C	7.75"	13.11"	28.78"	29.78"
	140TC	7.75"	13.11"	28.78"	29.79"
	180TC	9.25"	16.24"	35.51"	36.51"
	210TC	11.00"	17.96"	37.23"	38.23"
	250TC	12.75"	22.25"	41.52"	42.53"
	280TC	14.50"	24.24"	—	45.15"
	320TC	16.88"	27.00"	—	—
	360TC	18.50"	27.63"	—	—
IEC	71	5.69"	9.25"	—	—
	80	6.61"	10.66"	—	—
	90	7.40"	11.18"	26.84"	27.85"
	100	7.72"	13.15"	29.76"	30.77"
	112	9.45"	13.03"	29.64"	30.65"
	132	10.16"	16.73"	35.58"	36.59"
	160	12.52"	21.26"	40.27"	41.28"
	180	14.37"	23.31"	57.40"	58.40"
	200	15.67"	27.09"	—	—
	225	17.64"	30.51"	—	—
	250	20.00"	35.04"	—	—
Integral	71	5.43"	9.06"	—	—
	80	6.14"	10.04"	—	—
	90	6.92"	11.65"	22.28"	23.27"
	100	7.63"	12.84"	23.46"	24.45"
	112	8.58"	13.74"	24.37"	25.36"
	132	10.16"	17.12"	27.75"	28.75"
	160M/LMH	12.60"	18.86"	30.23"	31.23"
	160LH	12.60"	20.42"	31.81"	32.80"
	180MX/LX	12.60"	20.42"	—	32.80"
	180MH/LH	14.09"	24.52"	—	36.90"
	200/225S/M	15.67"	27.15"	—	—
	225SH/MH	17.52"	27.03"	—	—
	250M	19.49"	30.55"	—	—
	250MH	19.49"	33.31"	—	—
	280S/SH	22.64"	34.69"	—	—
	280M	—	—	—	—
	280MH	—	—	—	—
	315S/SH	—	—	—	—
	315Ma/Mha	—	—	—	—



Drive Assembly Dimensions

Case Size	M	N	P	R	S	T [Ⓞ]	U	V
13MR	17.00"	8.50"	7.06"	7.06"	10.06"	21.53"	8.50"	8.11"
14MR	—	—	—	—	—	23.52"		9.88"

Dimensions are for reference only. See assembly drawing.

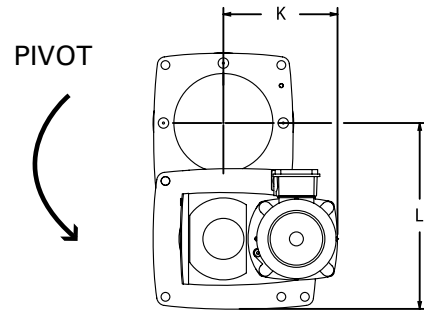
Dimensions for 15 and 16 MR

Swivel Dimensions

Case Size	K [Ⓞ]	L
15MR	22.17"	28.31"
16MR	23.55"	

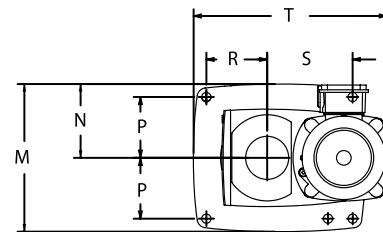
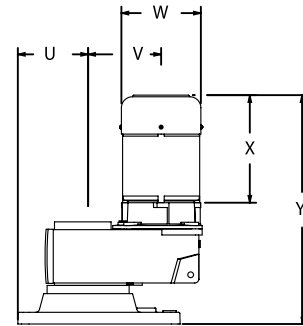
Typical Drive Assembly Swivel Dimensions

Drive assembly pivots at top of pedestal to allow change out of mechanical seals. See IOM for special motor conduit instructions.



Motor Dimensions

Frame Size	W [Ⓞ]	X [Ⓞ]	Y [Ⓞ]		
			15MR	16MR	
NEMA	56C	7.75"	13.11"	34.65"	—
	140TC	7.75"	13.11"	34.65"	—
	180TC	9.25"	16.24"	41.38"	41.86"
	210TC	11.00"	17.96"	47.39"	43.58"
	250TC	12.75"	22.25"	50.02"	51.76"
	280TC	14.50"	24.24"	54.59"	53.74"
	320TC	16.88"	27.00"	58.14"	55.48"
	360TC	18.50"	27.63"	—	59.03"
IEC	71	5.69"	9.25"	—	—
	80	6.61"	10.66"	—	—
	90	7.40"	11.18"	32.71"	—
	100	7.72"	13.15"	35.63"	36.28"
	112	9.45"	13.03"	35.52"	36.16"
	132	10.16"	16.73"	41.46"	41.83"
	160	12.52"	21.26"	48.97"	49.86"
	180	14.37"	23.31"	51.02"	51.91"
	200	15.67"	27.09"	53.35"	54.24"
	225	17.64"	30.51"	59.68"	60.57"
	250	20.00"	35.04"	64.21"	65.10"
		280	22.17"	38.39"	67.56"
	315	26.05"	50.28"	—	—
Integral	71	5.43"	9.06"	—	—
	80	6.14"	10.04"	—	—
	90	6.92"	11.65"	27.15"	—
	100	7.63"	12.84"	29.35"	28.54"
	112	8.58"	13.74"	30.13"	29.32"
	132	10.16"	17.12"	34.43"	35.30"
	160M/LMH	12.60"	18.86"	36.12"	36.99"
	160LH	12.60"	20.42"	37.69"	38.56"
	180MX/LX	12.60"	20.42"	37.69"	38.56"
	180MH/LH	14.09"	24.52"	41.00"	41.87"
	200/225S/M	15.67"	27.15"	44.39"	45.26"
	225SH/MH	17.52"	27.03"	44.27"	45.14"
	250M	19.49"	30.55"	—	—
	250MH	19.49"	33.31"	—	—
	280S/SH	22.64"	34.69"	—	—
	280M	—	—	—	—
	280MH	—	—	—	—
	315S/SH	—	—	—	—
	315Ma/Mha	—	—	—	—



Drive Assembly Dimensions

Case Size	M	N	P	R	S	T [Ⓞ]	U	V
15MR	22.05"	11.03"	9.65"	7.68"	2.17"	31.42"	9.25"	11.08"
16MR						32.80"		12.46"

Dimensions are for reference only. See assembly drawing.



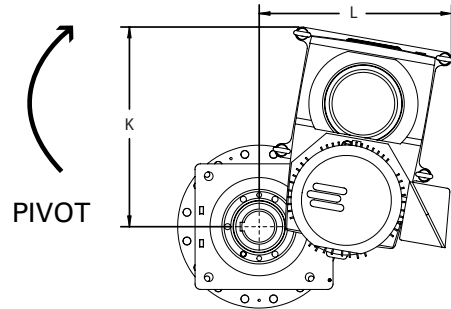
Dimensions for 17 and 18 MR

Swivel Dimensions

Case Size	K [⊕]	L
17MR	28.78"	27.77"
18MR	31.60"	35.60"

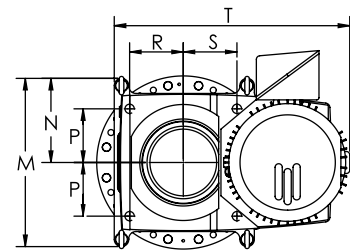
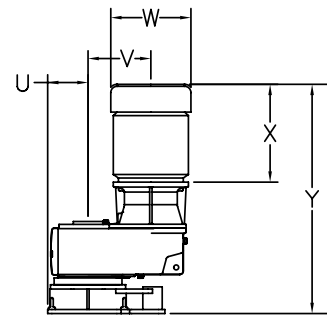
Typical Drive Assembly Swivel Dimensions

Drive assembly pivots at top of pedestal to allow change out of mechanical seals. See IOM for special motor conduit instructions.



Motor Dimensions

	Frame Size	W [⊕]	X [⊕]	Y [⊕]	
				17MR	18MR
NEMA	56C	7.75"	13.11"	—	—
	140TC	7.75"	13.11"	—	—
	180TC	9.25"	16.24"	43.73"	45.92"
	210TC	11.00"	17.96"	45.45"	47.64"
	250TC	12.75"	22.25"	53.62"	55.81"
	280TC	14.50"	24.24"	53.61"	57.80"
	320TC	16.88"	27.00"	57.34"	59.53"
	360TC	18.50"	27.63"	60.89"	63.08"
IEC	71	5.69"	9.25"	—	—
	80	6.61"	10.66"	—	—
	90	7.40"	11.18"	—	—
	100	7.72"	13.15"	38.10"	40.33"
	112	9.45"	13.03"	37.98"	40.21"
	132	10.16"	16.73"	43.65"	45.88"
	160	12.52"	21.26"	51.68"	53.91"
	180	14.37"	23.31"	53.73"	55.96"
	200	15.67"	27.09"	53.06"	58.29"
	225	17.64"	30.51"	62.39"	64.62"
	250	20.00"	35.04"	66.92"	69.15"
	280	22.17"	38.39"	70.27"	72.50"
	315	26.05"	50.28"	85.27"	87.50"
Integral	71	5.43"	9.06"	—	—
	80	6.14"	10.04"	—	—
	90	6.92"	11.65"	—	—
	100	7.63"	12.84"	32.04"	—
	112	8.58"	13.74"	32.82"	—
	132	10.16"	17.12"	37.12"	39.31"
	160M/LMH	12.60"	18.86"	38.81"	41.00"
	160LH	12.60"	20.42"	40.38"	42.57"
	180MX/LX	12.60"	20.42"	40.38"	42.57"
	180MH/LH	14.09"	24.52"	43.69"	45.88"
	200/225S/M	15.67"	27.15"	47.08"	49.27"
	225SH/MH	17.52"	27.03"	46.96"	49.15"
	250M	19.49"	30.55"	50.50"	52.69"
	250MH	19.49"	33.31"	53.26"	55.45"
	280S/SH	22.64"	34.69"	54.64"	56.83"
	280M	—	—	—	55.05"
	280MH	—	—	—	59.38"
	315S/SH	—	—	—	60.96"
	315Ma/Mha	—	—	—	66.47"



Drive Assembly Dimensions

Case Size	M	N	P	R	S	T [⊕]	U	V
17MR	22.83"	11.42"	7.28"	7.28"	7.28"	31.41"	9.37"	14.17"
18MR	24.80"	12.40"	8.27"	8.27"	8.27"	36.56"	10.35"	18.27"

Dimensions are for reference only. See assembly drawing.

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Sales Facilities

US Ohio
+1 937 454 3200
chemineer@nov.com

US North Andover
+1 978 687 0101
navinfo@nov.com

United Kingdom
+44 1332 363 175
chemineeruk@nov.com

China
+86 21 6124 0001
chemineercn@nov.com

Singapore
+65 6271 1121
chemineeruk@nov.com

Mexico
+52 55 3300 5370
chemineerventasmx@nov.com

Austria
+43 1 8923481
chemineeruk@nov.com

Manufacturing Facilities

US
+1 937 454 3200
chemineer@nov.com

United Kingdom
+44 1332 363 175
chemineeruk@nov.com

China
+86 21 6124 0001
chemineercn@nov.com

Corporate Headquarters

7909 Parkwood Circle Drive
Houston, Texas 77036
USA

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