



**ENTORNO  
INDUSTRIAL**

 ***Chemineer***

**MR Agitators**

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**Engineered for**

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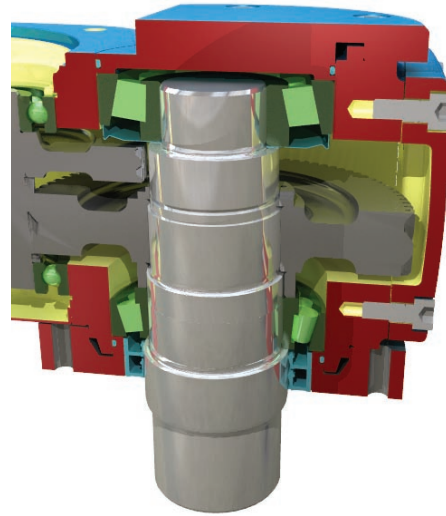
**Performance & Value**

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# Reliability, Performance & Value

The MR model is the latest addition to Chemineer's line of high performance and reliable agitators. The MR agitator's gearbox is a proprietary, parallel-shaft, helical gear design that features minimum 30,000 hour L10 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 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 Chemineer 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 with the same Chemineer assurance of reliability, performance and value. 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's impeller technology is effectively applied across your spectrum of applications ensuring successful, repeatable results from lab scale to full scale operations.

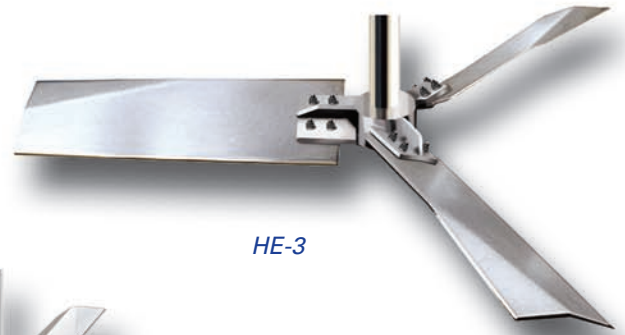
Chemineer's mixing expertise includes high flow, low shear liquid-liquid agitation, solids suspension, gas

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

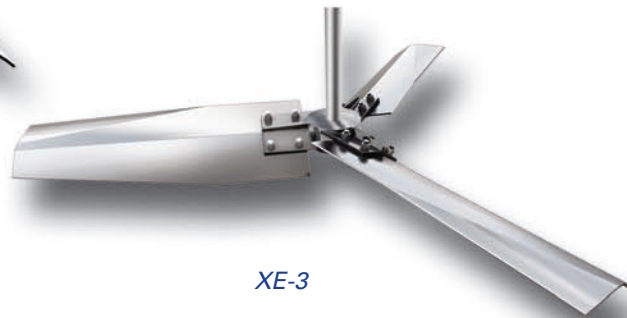
Impeller bulletin 710 is available with additional information.



SC-3



HE-3



XE-3



BT-6 Gas Dispersion



RL-3



Maxflo W

# Features and Benefits

## Internal Shafting

### Features

- Oversized low speed shaft diameter and short bearing span reduce deflection and gear misalignment

### Benefits

- Extends seal and bearing life
- Lowers initial costs
- Lowers maintenance costs

## Gearing

### Features

- Double and triple reduction gearing for low gear loading and quiet operation
- Helical gearing

### Benefits

- Smooth operation
- Long service life
- Lowers energy costs

## Gearbox Lubrication

### Features

- Bath lubrication ensures adequate lubrication to gears and bearings at all operating speeds
- Standard R&O oils and greases
- Double lip seal

### Benefits

- Lowers initial costs
- Eliminates need for internal/external lubrication pumps
- Lowers installation and maintenance costs
- Lowers capital cost
- Maintains process fluid integrity

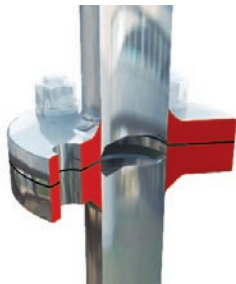
## Bearing Design

### Features

- Output shaft features tapered roller bearings and a short bearing span that provides greater capacity to handle bending and thrust loads
- Ball bearings, oil lubricated

### Benefits

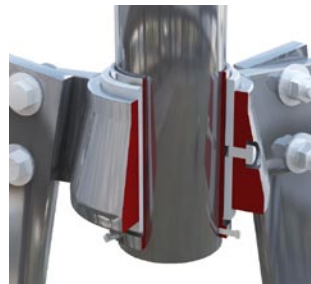
- Extends service life
- Lowers maintenance costs
- Ensures cool operation and low maintenance



*Welded Coupling*



*Removable Coupling*



*Tripod Steady Bearing*



*Bracket Steady Bearing*

*In-Tank Coupling and Steady Bearing Options*

# Features and Benefits

## Seals

### Features

- Drop collar shaft support during seal change
- Optional throttle bushing and debris well design
- Swing out seal change design
- Variety of seal options from major mechanical seal vendors such as John Crane, Flowserve, Chesterton and AES
- Low height pedestal design reduces shaft deflection at the seal
- Optional seal shut-off device
- Optional lip seals and stuffing boxes

### Benefits

- Shaft drops easily by loosening coupling bolts, and engages by tightening the coupling bolts
- Shaft only drops 1/2" eliminating steady bearing disengagement
- Clean fluid flush eliminates process build-up in seal area improving seal life
- Eliminates particle shedding from entering tank
- 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
- Cartridge double and single seals, low pressure single seals, and cartridge ChemSeals provide performance and flexibility to meet agitator sealing needs
- Extends service life
- Minimizes downtime
- Eliminates operator exposure to hazardous vapors without draining the vessel
- 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*

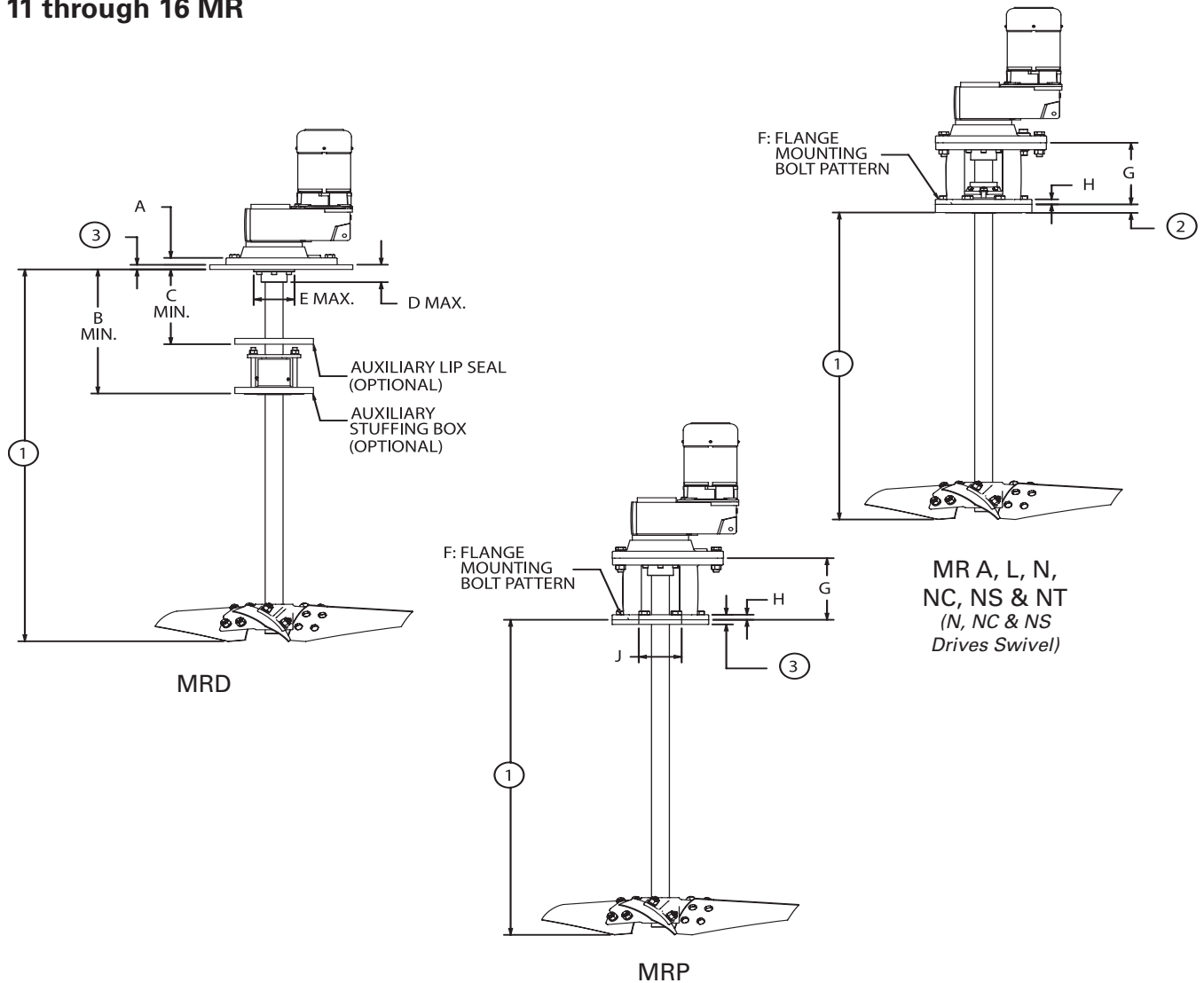


*ChemSeal*



# Dimensions

## 11 through 16 MR



CASE SIZE	A	B	C	D	E	F <sup>Ⓞ</sup>	G	H	J	Seal/Mount Type
						Bolt Pattern				
11MR	1.12	16.00	8.00	2.81	5.71	8" – 150# ANSI (HOLES STRADDLE C.L.)	10.00	0.75	9.50	All
12MR										
13MR	1.50	20.00	8.00	4.00	7.48	10" – 150# ANSI (HOLES ON CENTERLINE)	12.50	0.88	10.00	All
14MR										
15MR	1.59	18.63	8.63	4.63	9.45	12" – 150# ANSI (HOLES STRADDLE C.L.)	14.06	1.18	10.83	All
16MR										

Dimensions are shown in inches.

- 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 Chemineer IOM manual 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

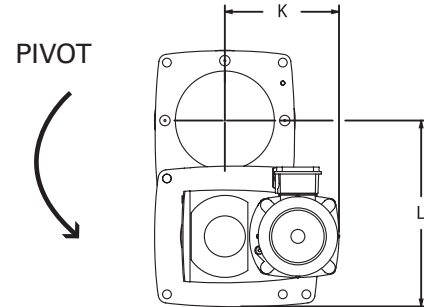
## 11 through 16 MR

### Swivel Dimensions

CASE SIZE	K <sup>⊙</sup>	L
11MR	9.72	17.57
12MR	11.04	
13MR	13.03	22.61
14MR	15.02	
15MR	22.17	28.31
16MR	23.55	

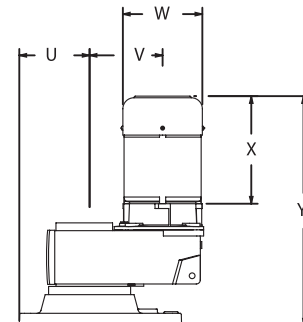
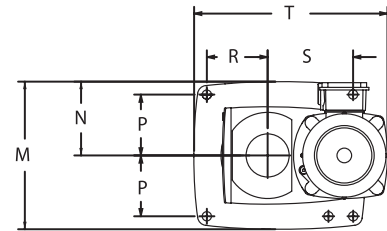
### Typical Drive Assembly Swivel Dimensions

(Drive assembly pivots at top of pedestal to allow change-out of mechanical seals. See I.O.M. for special motor conduit instructions)



### Motor Dimensions

FRAME SIZE	W <sup>⊙</sup>	X <sup>⊙</sup>	Y <sup>⊙</sup>							
			11MR	12MR	13MR	14MR	15MR	16MR		
NEMA	56C	7.75	13.11	25.75	26.84	28.78	29.78	34.65	—	
	140TC	7.75	13.11	25.75	26.84	28.78	29.79	34.65	—	
	180TC	9.25	16.24	30.03	31.97	35.51	36.51	41.38	41.86	
	210TC	11.00	17.96	—	33.69	37.23	38.23	43.10	43.58	
	250TC	12.75	22.25	—	—	41.52	42.53	47.39	51.76	
	280TC	14.50	24.24	—	—	—	45.15	50.02	53.74	
	320TC	16.88	27.00	—	—	—	—	54.59	55.48	
	360TC	18.50	27.63	—	—	—	—	58.14	59.03	
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	26.84	27.85	32.71	—	
	100	7.72	13.15	26.21	27.20	29.76	30.77	35.63	36.28	
	112	9.45	13.03	26.09	27.08	29.64	30.65	35.52	36.16	
	132	10.16	16.73	—	32.00	35.58	36.59	41.46	41.83	
	160	12.52	21.26	—	—	40.27	41.28	48.97	49.86	
	180	14.37	23.31	—	—	57.40	58.40	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	68.45	
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	22.28	23.27	27.15	—	
	100	7.63	12.84	20.98	21.96	23.46	24.45	29.35	28.54	
	112	8.58	13.74	21.88	22.87	24.37	25.36	30.13	29.32	
	132	10.16	17.12	—	26.25	27.75	28.75	34.43	35.30	
	160M/LMH	12.60	18.86	—	—	30.23	31.23	36.12	36.99	
	160LH	12.60	20.42	—	—	31.81	32.80	37.69	38.56	
	180MX/LX	12.60	20.42	—	—	—	32.80	37.69	38.56	
	180MH/LH	14.09	24.52	—	—	—	36.90	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	—	—	—	—	—	—	—	—		



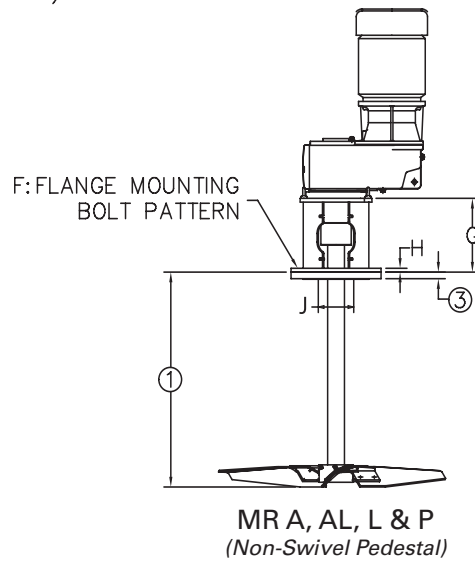
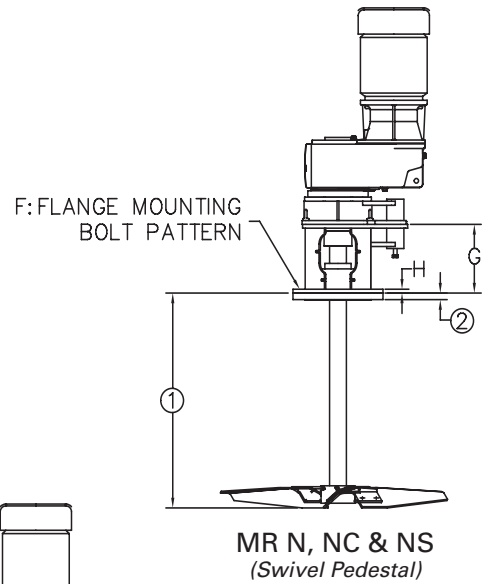
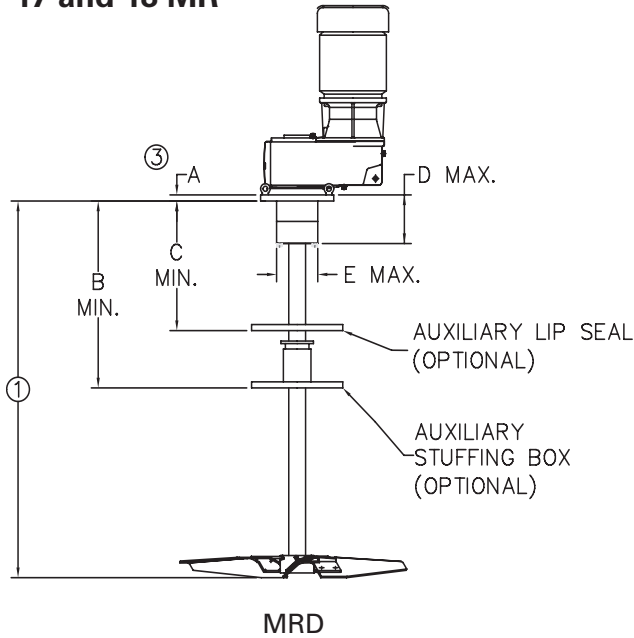
### Drive Assembly Dimensions

CASE SIZE	M	N	P	R	S	T <sup>⊙</sup>	U	V
11MR	13.50	6.75	5.56	5.56	7.81	16.47	6.75	5.79
12MR						17.79		7.01
13MR	17.00	8.50	7.06	7.06	10.06	21.53	8.50	8.11
14MR						23.52		9.88
15MR	22.05	11.03	9.65	7.68	2.17	31.42	9.25	11.08
16MR						32.80		12.46

Dimensions are in inches and for reference only.

# Dimensions

## 17 and 18 MR



Agitator Dimensions										
CASE SIZE	A	B	C	D	E	F <sup>②</sup>	G	H	J	Seal/Mount Type
						Bolt Pattern				
17MR	1.50	27.00	16.00	11.95	10.75	16" - 150# ANSI (HOLES STRADDLE C.L.)	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	11.75		16.88	0.94	14.57	D, N, NC, NS
							22.00			AL, L, P
							26.06			A

Dimensions are shown in inches.

- 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 Chemineer IOM manual 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

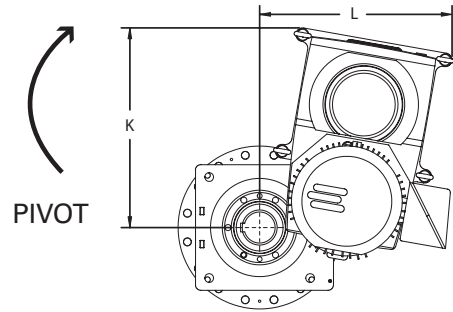
## 17 and 18 MR

### Swivel Dimensions

CASE SIZE	K <sup>⊙</sup>	L
17MR	28.78	27.77
18MR	31.60	35.60

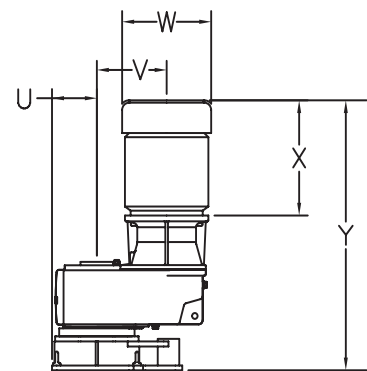
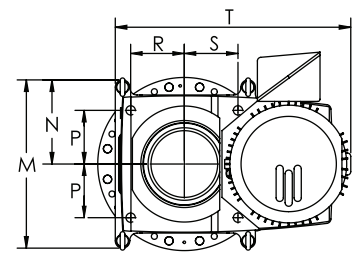
### Typical Drive Assembly Swivel Dimensions

(Drive assembly pivots at top of pedestal to allow change-out of mechanical seals. See I.O.M. for special motor conduit instructions)



### Motor Dimensions

FRAME SIZE	W <sup>⊙</sup>	X <sup>⊙</sup>	Y <sup>⊙</sup>		
			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	55.61	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	56.06	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 <sup>⊙</sup>	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 in inches and for reference only.



Chemineer Express' mission is to offer customers immediate assistance to help achieve operating performance goals for agitation and mixing processes. This is accomplished in two ways: ensuring replacement parts and services are available on a timely basis to increase the "uptime" of your systems, and ensuring customers are offered the latest technology to improve the performance of agitation and mixing systems.

### The Right Part Every Time

Chemineer Express provides drop-in replacement parts of standard and custom Chemineer agitator components, minimizing installation problems like improper fit-up or alignment. Chemineer replacement parts are made to original equipment specifications to ensure maximum reliability of your mixing equipment.

### Chemineer Express Service Center

Chemineer Express offers multiple options to get your process back up and running. Highly-Trained Field Service Engineers are ready to deploy for assisting maintenance crews in repair, diagnostic, and/or maintenance work. A Chemineer Authorized Service Center is located near your plant for quick responsiveness backed by the full support of the Chemineer manufacturing facility.

The Chemineer Express Service Center is located in the Chemineer manufacturing facility for more extensive failure analysis, fast replacement parts assemblies, and the most reliable agitator repair service in the world. New and re-furnished parts options are available to suit your business requirements and get equipment back into operation.

Chemineer Express offers Customer Service Plans tailored to fit your needs. Contact your local representative or Chemineer Express (937-454-3200 or chemineerexpress@nov.com).



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