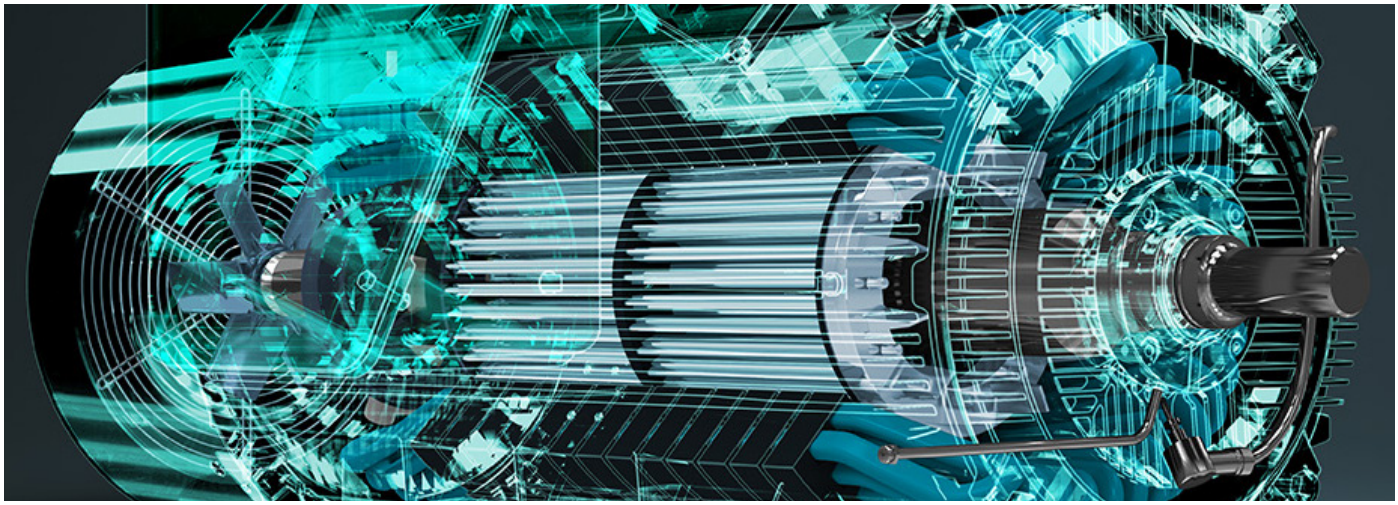
Retrofit Guide

AboveNEMA Motors
Retrofit capability description with a convenient digital proposal request guide

SIEMENS



Challenging times call for new solutions to improve reliability and productivity.

When unpredictable demands are made on plant systems, reliability of components becomes an absolute priority. Increased risk of un-scheduled downtime necessitates robust equipment designed for harsh environments and challenging applications.

The global pandemic disrupted the global supply chain in ways that slowed many plants while running others to maximum capacity due to unforseen demand shifts. All of this had given plant owners and operators an opportunity to rethink how to maintain critical systems.

Ordinarily, operating cost pressures on industrial sites lead management to continually find ways to save costs. The present market upheavals also make this practice a major priority. Producing consistently or increasing output while reducing energy and maintenance costs helps managers hedge increased profits against future risk.

Motor retrofits are a relatively modest investment to help minimize these risks, and contribute significantly to reliable plant operation over the long term.

Siemens retrofit solutions offer clear benefits

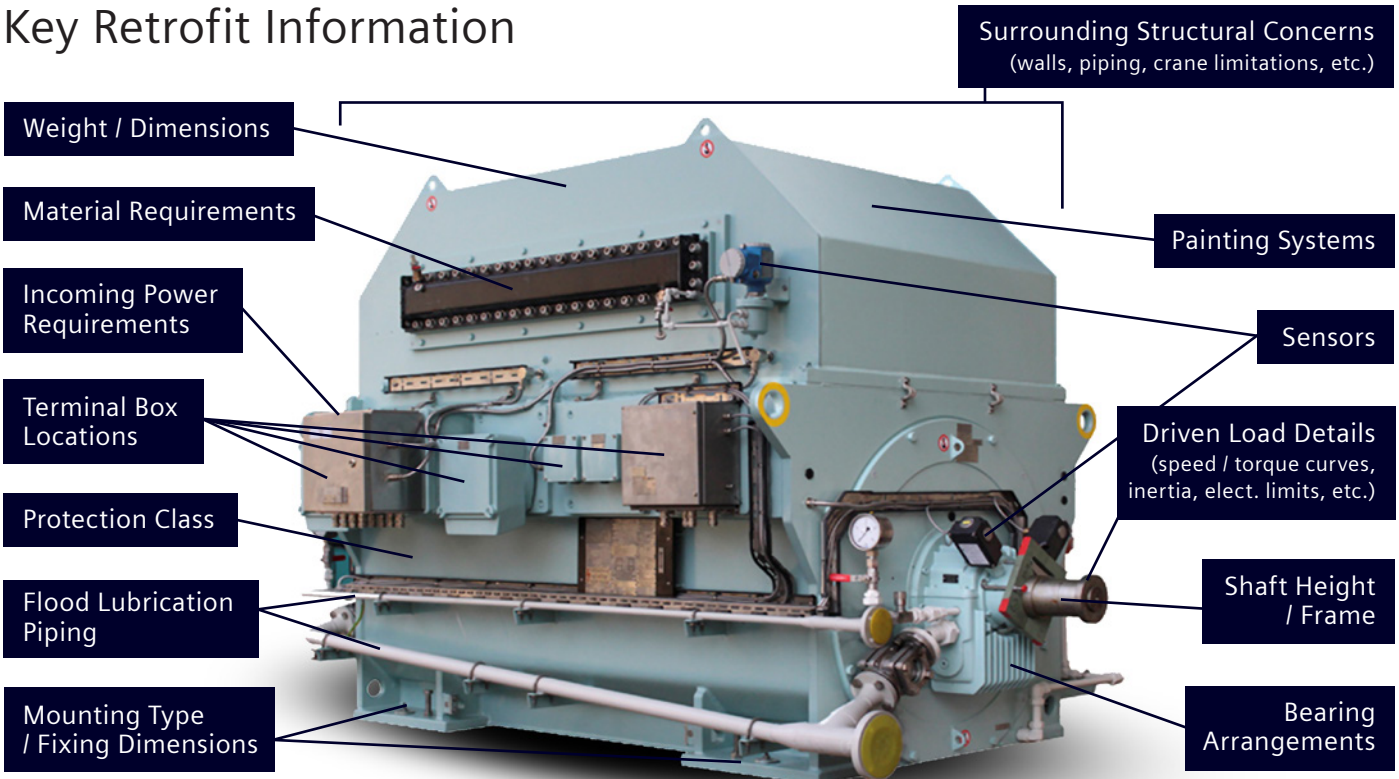
- Increased uptime with new motors offering full interchangeability with a mechanical drop-in and an electrical-equivalent to replace an older legacy motor.
- Comprehensive upgrades to the latest industry standards, and additional reliability features including monitoring equipment, VFD compatibility, and more.
- The ability to utilize existing coupling, conduit hub and foundation mounting.
- With 60-70% of all energy at industrial sites used by motors to drive processes, higher efficiency motor replacements can result in big energy savings.

The Economical Solution

In many cases, it is possible to replace older motors starting with a modern machine from our extensive product range carefully engineered and customized with little to no site modifications to the existing installation.

In terms of investment costs, replacement with a Siemens customized solution is usually the most affordable option. And users experience an ease of maintenance while minimizing or eliminating the need for any site modifications.

Key Retrofit Information

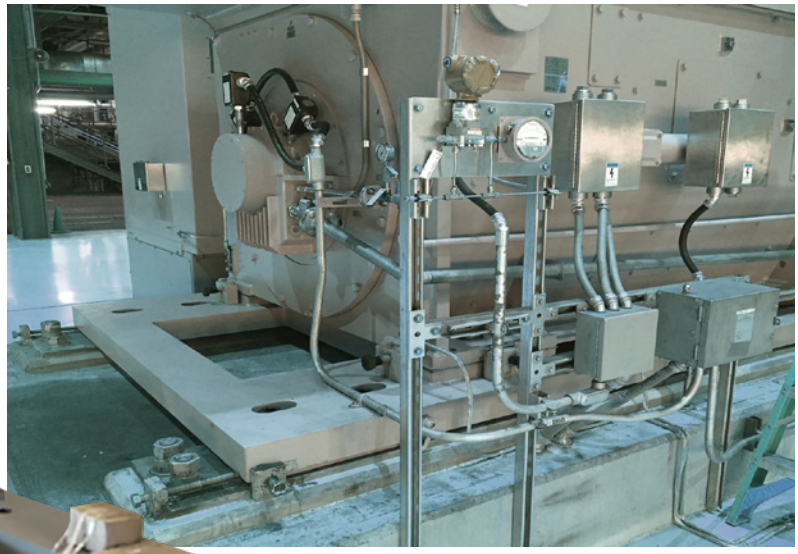


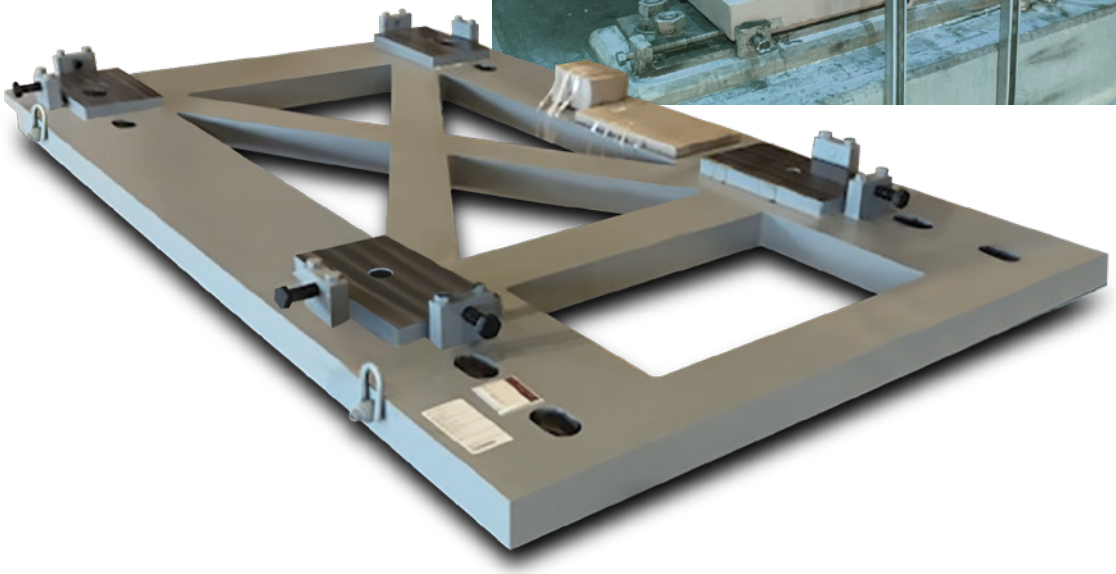
Adaptor Bases

In many cases, newer technology allows for smaller motors to replace larger ones. Siemens has extensive experience customizing adaptor bases for our retrofit projects.

A custom adaptor base gives users the option to replace old machines with newer standard frames that fit perfectly into place. This avoids the extra cost associated with customizing motor frame designs.

The bases are designed and constructed to ensure solid rigid support with slotted holes to meet operator base requirements.





Common Applications and Motor Design Characteristics

Applications	Characteristics
Compressors	High Speed, High Torque Precision Balance
ID / FD / PA Fans	Horizontal, High Inertia, High Power (HP, kW)
Crushers / Pulverizers	High Torque and Inertia
Pipeline Pumps	High Speed, API 541 Precision Balance
Circulating Pumps	Slow Speed, Horizontal / Vertical
Condensate Pumps	Vertical P-Base
Conveyors	High Torque and Inertia

Sample Replacement

Energy User: 8000 hp, 3600 rpm, 6.6 kV, boiler-feed water pump motor

20+ year installation challenge

- An older, inefficient motor technology with the motor getting tired and increasing vibration levels.
- The application features complex coupling, a lube system, and an unconventional conduit hub and entry.
- Driven equipment maintenance required safe passage for emergency evacuation.

Siemens retrofit solution

- Modern Siemens motor technology increased energy efficiency and lowered vibration to extend the life of the drive system.
- A more compact Siemens frame with a special oversized main motor terminal box preserved the safe passage for the maintenance of the driven equipment.
- A Siemens designed and supplied motor adapter base saved the owner from having to alter the existing base for the new shaft height.
- The Siemens-engineered special shaft, lube system connection points, and special main motor terminal box size and location were matched saving the owner from having to make major mechanical adjustments.
- The motor accessories were kept and upgraded per the owners requirements.
- Critical mechanical dimensions were met while being electrically equivalent giving the customer the flexibility for common spares.

Data Requirements for Quotation

Project Name and #: _____
Application Description: _____
Location for application: _____
Customer Code Number: _____

ITEM	QTY	HP/kW
RPM	Hz	SF
VOLTS	TYPE	FRAME

1. Existing Enclosure

Clear Buttons

- ☐ ODP (Open Drip Proof)
- ☐ WPI (Weather-Protect Type I)
- ☐ WPII (Weather-Protect Type II)
- ☐ TEFC (Totally Enclosed Fan Cooled)
- ☐ TEAAC (Totally Enclosed Air-Air Cooled)
- ☐ TEWAC (Totally Enclosed Water To Air Cooled)
- ☐ TEAO (Totally Enclosed Air Over Axial or Top Mounted)
- ☐ TEPV (Totally Enclosed Pipe Ventilated)

Hazardous Location
Class _____ Temperature Code
Group _____ _____
Div _____

☐ CSA Label

2. Horizontal Motor Mounting (Including W8 & W6)

Clear Buttons

- ◯ Standard Horizontal
- ◯ Vertically Mounted
  - ☐ Shaft Up ☐ Drip Cover
  - ☐ Shaft Down ☐ Drip Cover
- ◯ C Face ☐ Standard ☐ Metric
- ◯ D Flange ☐ Standard ☐ Metric
- ◯ Other Flange _____
- ☐ Angle of Inclination from Horizontal _____ Degrees
- ☐ Self Supporting Bracket

3. Vertical Motors (P-Base)

Clear Buttons

- ☐ Base Diameter _____ Inches
- ☐ Drip Cover

Thrust Conditions

- ☐ Continuous Downthrust _____ lbs.
- ☐ Momentary Up _____ lbs. (Std. 30% cont.)
- ☐ Momentary Down _____ lbs. (Std. 200% cont.)
- ☐ Bearing Life (Minimum L10 Life) _____
- ◯ Solid Shaft
- ◯ Hollow Shaft
  - ☐ Coupling Bore (BX) _____ Inches
  - ☐ Self-Release Coupling
  - ☐ Stabilizing Bushing Bore _____ lbs.
- ☐ Non-Reverse Device Rotation (looking from above)
  - ◯ Counterclockwise ◯ Clockwise

4. Screens (ODP, WPI, and WPII only)

Clear Buttons

- ◯ Stainless Steel (Standard)
- ◯ Stainless Steel (1/4 in. x 1/4 in. mesh, .063 in. thick per API Std.)
- ◯ Other _____

5. Filters and Filter Accessories (ODP, WPI, and WPII only)

Clear Buttons

- ◯ Galvanized Steel (Standard)
- ◯ Aluminum
- ◯ Stainless Steel
- ◯ Other _____
- ◯ Provisions Only
- ☐ Differential Pressure Switch Dwyer Model 1950-1

6. Ambient Temperature

Clear Buttons

◯ 40°C ◯ 50°C ◯ Other (°C) _____

7. Cooling Water (TEWAC or Brg. Cooling Coils)

Clear Buttons

- ◯ 85°F or Lower ◯ Other (°F) _____
- ☐ Fouling Factor .001 or less
- ☐ Incoming Water Pressure (PSIG) _____
- ☐ Leak Detector Barksdale Model D2H-H2

8. Insulation Class

Clear Buttons

- ◯ Standard Class F
- ◯ Other Class _____

9. Starting Method

Clear Buttons

- ◯ Standard Across the Line (90% of full voltage or greater)
- ◯ Reduced Voltage Starting _____ % Voltage
- ◯ Autotransformer _____ Voltage Tap
- ◯ Additional voltage drop of _____
- ◯ Wye Start/Delta Run (Low voltage only)
- ◯ Part Winding Start (Low voltage only)
- ◯ VFD (See Item 26)
- ◯ Other (Supply complete details)

IMPORTANT NOTE: Must provide load inertia at motor shaft and speed torque curve of driven equipment, if less than 90% voltage start, if acceleration time/curves are required, or if load inertia exceeds values in application manual.

10. Inrush Limits

Clear Buttons

- ◯ Standard (650% per NEMA MG1)
- ◯ Percentage of Full Load Current _____ %
- ☐ KVA Code Letter _____

11. Rotor Construction

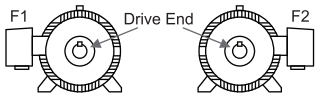
Clear Buttons

- ◯ Standard Rotor Design (Aluminum Die Cast for some frames)
- ◯ Copper Bar Rotor Required

12. Terminal Box Location

Clear Buttons

- ◯ F1 Position
- ◯ F2 Position



- ◯ Auxiliary Standard Location (Opposite Main Box)
- ◯ Other _____

13. Coupling Method

Clear Buttons

- ◯ Direct Connected
- ◯ V-Belt Drive (Supply complete belt info on last page)
- ☐ Tapered (If tapered shaft, provide ring gage)
- ☐ Special Key Requirements _____
- ☐ Other Details _____

_____

_____

14. Rotation (Required for 2-pole and/or TEAAC motors)

Clear Buttons

- ◯ Clockwise (Facing drive end)
- ◯ Counterclockwise (Facing drive end)
- ◯ Bi-Directional

15. Bearings

Clear Buttons

- ◯ **Anti-Friction**
  - ☐ Special Grease (include type) _____
  - ☐ Provision for Oil Mist Lubrication
  - ☐ Bearing Life (Minimum L10 Life) _____
  - ☐ Rotating Labyrinth Seal Both Ends ☐ Drive End Only
- ◯ **Oil Lube Split Sleeve**
  - ☐ Constant Level Oiler (Oil Rite Standard)
  - ☐ Provisions for Flood Lube (SUS) if special
    Provide Pressure _____ psi
  - ☐ Provisions for Purge Oil Mist
  - ☐ Rotating Labyrinth Seal Both Ends ☐ Drive End Only
- ☐ **Insulated Bearing**
  - ☐ Drive End
  - ☐ Non Drive End

16. Space Heaters (Standard on WPII)

Clear Buttons

- ◯ No ◯ Yes
- ☐ Incoming Voltage _____ Volts
- ☐ Low Sheath Temperature 200°C
  (Low watt density - consult factory for lower temperature)
- ☐ Separate auxiliary box from all other accessories

17. Bearing Thermal Protection

Clear Buttons

■ **RTD's**

- ◯ 100Ω Platinum ◯ 10Ω Copper ◯ Other _____
- ◯ Single Element ◯ Dual Element
- ☐ Spring loaded bayonet type
- ☐ Embedded per API670 (two per bearing standard)
- ☐ DIN (Std.)

■ **Thermocouples**

- ◯ Single Element Type _____
- ◯ Dual Element Type _____

■ **Other** (specify below)

_____

_____

_____

NOTE: If more than one device per bearing, consult factory.

18. Vibration Detection Devices (When Applicable)

Clear Buttons

- ◯ Proximity Probe Vibration System _____
  (Consisting of two non-contacting radial probes at 45° angle proximeters and cable mounted on motor)
- ◯ Two Radial Probes per Bearing (2 additional to above)
- ◯ Provision Only for Proximity Probe
- ☐ Key Phasor
- ☐ Accelerometer ☐ Provisions Only _____
- ☐ Velometer ☐ Provisions Only _____
- ☐ Vibration Switch _____

19. Stator Thermal Protection (When Applicable)

Clear Buttons

■ **RTD's**

- ◯ 2 / Phase (6) ◯ 3 / Phase (9) ◯ 4 / Phase (12)
- ◯ 100Ω Platinum ◯ 10Ω Copper ◯ Other _____
- ☐ DIN (Std.)
- ◯ 3 Wire ◯ 4 Wire

■ **Thermocouples**

- ◯ Single Element Type _____
- ◯ Dual Element Type _____

■ **Thermistors**

- ◯ One per Phase ◯ Two per Phase
- ☐ Control Module _____ Volts

■ **Thermostats**

- ◯ Normally Closed (Std.) ◯ Normally Open

20. Bases

Clear Buttons

- ☐ Slide Rails (Two rails per motor)
- ☐ Soleplates
  - ◯ Two Piece (Std.) ◯ One Piece
- ☐ Shim Pack
- ☐ Adapter Base _____

21. Jacking Screws

Clear Buttons

- ☐ Provisions for Vertical Jacking Screws Only (Std.)
- ☐ Supply Vertical Jacking Screws

22. Dowel Pin Pilot Holes - 1 on all 4 feet

Clear Buttons

◯ Required ◯ Not Required

23. Drains (When applicable excluding open motors)

◯ Standard ◯ Breather Drain

Clear Buttons

24. Tests / Standards / Specifications

Clear Buttons

- ☐ Standard Test Routine per IEEE 112
- ☐ Witness Test
- ☐ Other Tests

_____

_____

- ☐ IEEE 841
- ☐ Severe Duty
- ☐ API

25. Variable Frequency Drive

Clear Buttons

- ☐ Variable Torque Application _____ to _____ RPM
- ☐ Constant Torque Application _____ to _____ RPM
- ☐ Constant HP Application _____ to _____ RPM
- ☐ Overloads _____
- ☐ Type and Mfg. of VFD _____

_____

- ☐ Filtered Output
- ☐ Grounding Brush Required
- ☐ Auxiliary Blower (3 Phase, 60 Hz., 460 V Standard)
- ☐ Drive Bypass Starting (Refer to 9)

26. Special Tagging

Clear Buttons

Item # _____

Tag # _____

Other _____

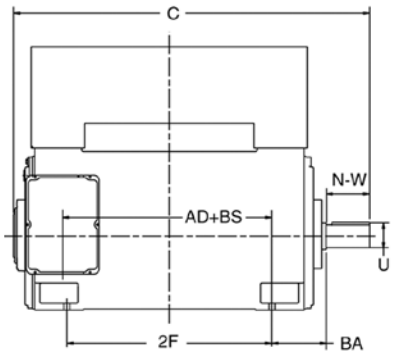
27. Paint

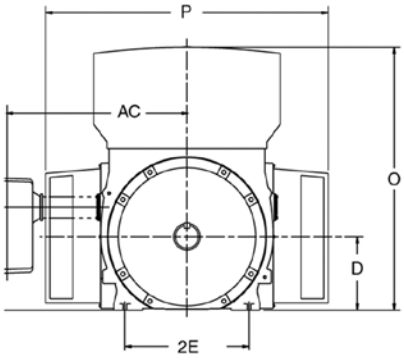
Clear Buttons

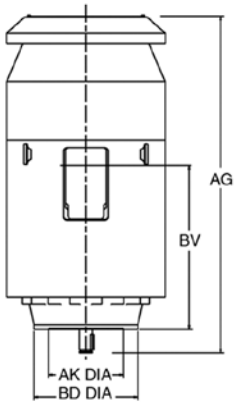
- ◯ Standard
- ◯ Special color (Munsell or RAL number _____)
- ◯ Harsh Duty Paint System
- ◯ Extreme Duty Paint System (Coastal)
- ◯ Other _____

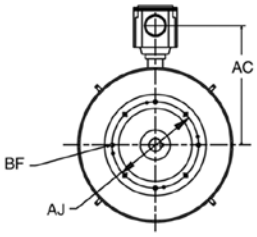
28. Outline Dimensions (If outline drawings are not available)

Clear Buttons









C _____ In.
N-W _____ In.
U _____ In.
AD+BS _____ In.
2F _____ In.
BA _____ In.

P _____ In.
AC _____ In.
O _____ In.
D _____ In.
2E _____ In.

AG _____ In.
BV _____ In.
AK Dia. _____ In.
BD Dia. _____ In.

AC _____ In.
BF _____ In.
AJ _____ In.

29. Required Data for Motors Coupled by Pulley and Belt

Clear Buttons

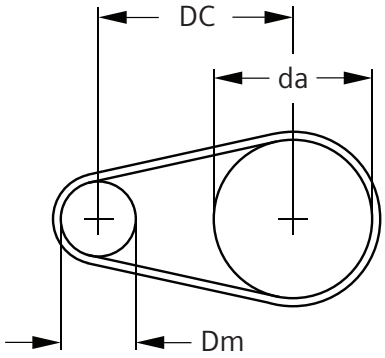
DC _____ In.

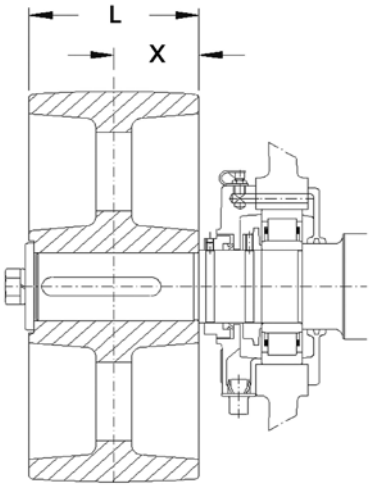
da _____ In.

Dm _____ In.

L _____ In.

X _____ In.





30. Any Other Considerations (Site/proximity obstructions, shipping/dock details, local lifting capabilities, etc.)

Clear Buttons

When you are ready to submit, save the document on your hard drive with a project name and email to a Siemens rep.

Comprehensive Service and Support

Siemens warranty, parts and service request call center is available 24/7, providing fast and efficient responses. Siemens service technicians take pride in finding the right solution, the first time, every time.

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