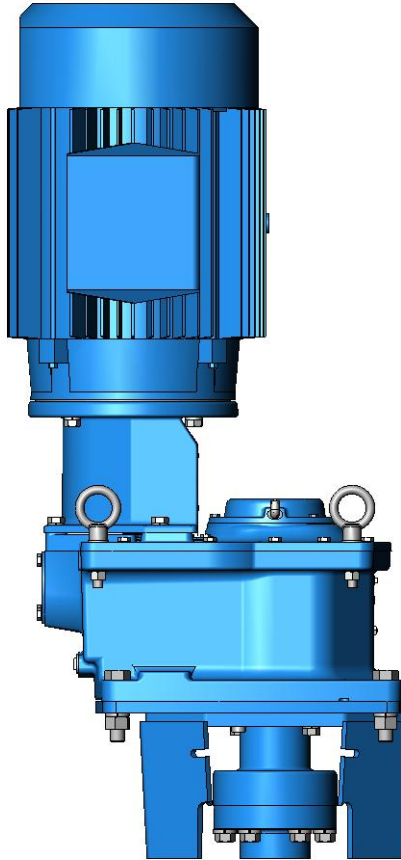


Installation Manual

HT/Model 20 Conversion

Equipment Reference:



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TABLE OF CONTENTS

A. CHEMINEER ASSISTANCE.....	I
B. SAFETY	II
B.1 VESSELS	II
B.2 FASTENERS	II
B.3 CE MARKING (WHERE APPLICABLE).....	II
B.4 SAFETY CHECKLIST	III
C. HT DRIVE REMOVAL.....	1
D. INSTALLATION.....	7
E. ITEM LIST	12
F. APPENDIX.....	13

LIST OF FIGURES

FIGURE 1. MODEL HTA/HTAL/HTL/HTP	1
FIGURE 2. MODEL HTN.....	2
FIGURE 3. MODEL HTNS.....	3
FIGURE 4. HT DRIVE LIFTING.....	4
FIGURE 5. MODEL 20 DRIVE LIFTING	7
FIGURE 6. MODEL HTA/HTAL/HTL/HTP CONVERSION	8
FIGURE 7. MODEL HTN CONVERSION	9
FIGURE 8. MODEL HTNS CONVERSION.....	10

LIST OF TABLES

TABLE 1. BOLT TIGHTENING TORQUE.....	13
TABLE 2. BOLT GRADES AND MECHANICAL PROPERTIES	14

A. CHEMINEER ASSISTANCE

Chemineer maintains a fully staffed Parts and Field Service Department ready to help you with any service requirement. When in doubt contact your local Chemineer office, or Parts/Field Service department at the Chemineer Factory:

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For your convenience, Chemineer offers the following services:

- Installation and maintenance training seminars
- Installation and start-up supervision
- Preventative maintenance planning
- Parts order service

B. SAFETY



B.1 VESSELS

All types of vessels either open or closed pose special safety challenges. It is essential that Installers, Operators and Maintainers of the equipment understand these special hazards.

Particular safety hazards arise because the vessel is typically defined as a “Confined Space”. This creates a number of special hazards, including the risk of having oxygen shortages. Never enter a confined space unless you are fully trained on the procedures and have the correct safety equipment and procedures in place.

One must not enter a confined space unless fully assured that it is safe. Typically, before entering a vessel you should require proof of power and process fluid lock out. Always carry with you an oxygen sensor (in order to verify a safe atmosphere), a suitable safety harnesses and lifting equipment. Typically, a shoulder lift harness and a man-lifting crane are required (a man on the end of a rope or a center back lift offers no safety protection). A suitable safety cover must be provided at all time.

In cases where a vessel has been in service, tests must be made to ensure that no hazardous products or product residues are present.

The work site is often within a designated hazardous area. Where potentially explosive conditions exist, all efforts must be made to make the area safe before proceeding with work. Where this is not possible, a detailed, individual hazard assessment is vital. Special working procedures and tooling are required.

B.2 FASTENERS

Important: Critical fasteners should not be reused. Critical fasteners are all those that are used with torque control, for example blade bolts, shaft coupling bolts, pedestal fixing bolts, etc. When a fastener is disturbed, always replace it with a new one. Dispose of used fasteners.

B.3 CE MARKING (WHERE APPLICABLE)

Any CE marking and associated documentation applies to the mixer only on the basis that it is an individual product. After installation of the mixer into the mixing system, it becomes an integral part of a larger installation. **Chemineer is not responsible for the CE marking once the mixer has been installed into the mixing system.**

B.4 SAFETY CHECKLIST

- ☑ This Installation, Operation and Maintenance Manual, assembly drawings, and any supplements must be reviewed and understood before commencing installation and operation.
- ☑ All site rules must be observed for the installation and operation of this mixer.
- ☑ Ensure all external connections are made in accordance with applicable codes of practice.
- ☑ The mixer must be earthed (connected to ground).
- ☑ Correct rotation must be checked prior to operation.
- ☑ **Do not** exceed the operating pressures, temperatures, and other conditions for which the machine has been designed.
- ☑ **Do not** operate the agitator unless all guards are securely fixed. Do not modify any guarding. Open tanks fitted with agitators must be provided with suitable guarding to prevent personnel contacting agitator-moving parts. The user is responsible for providing these guards.
- ☑ Ensure mechanical seal setting clips are disengaged before operation. These clips should be retained for future use.
- ☑ Ensure gas supply system, (if applicable) is correctly installed, pressurized and ready for operation.
- ☑ **Do not** touch rotating components.
- ☑ During servicing of the mixer, the motor must be isolated from the power supply and the supply locked out.
- ☑ **Do not** operate the mixer for applications other than for its intended use.
- ☑ **Do not** modify the mixer without reviewing the change with Chemineer. It is unsafe to use non-standard parts without Chemineer's approval. When in doubt, ask your local Chemineer office.

WHEN IN DOUBT, ASK!

C. HT DRIVE REMOVAL

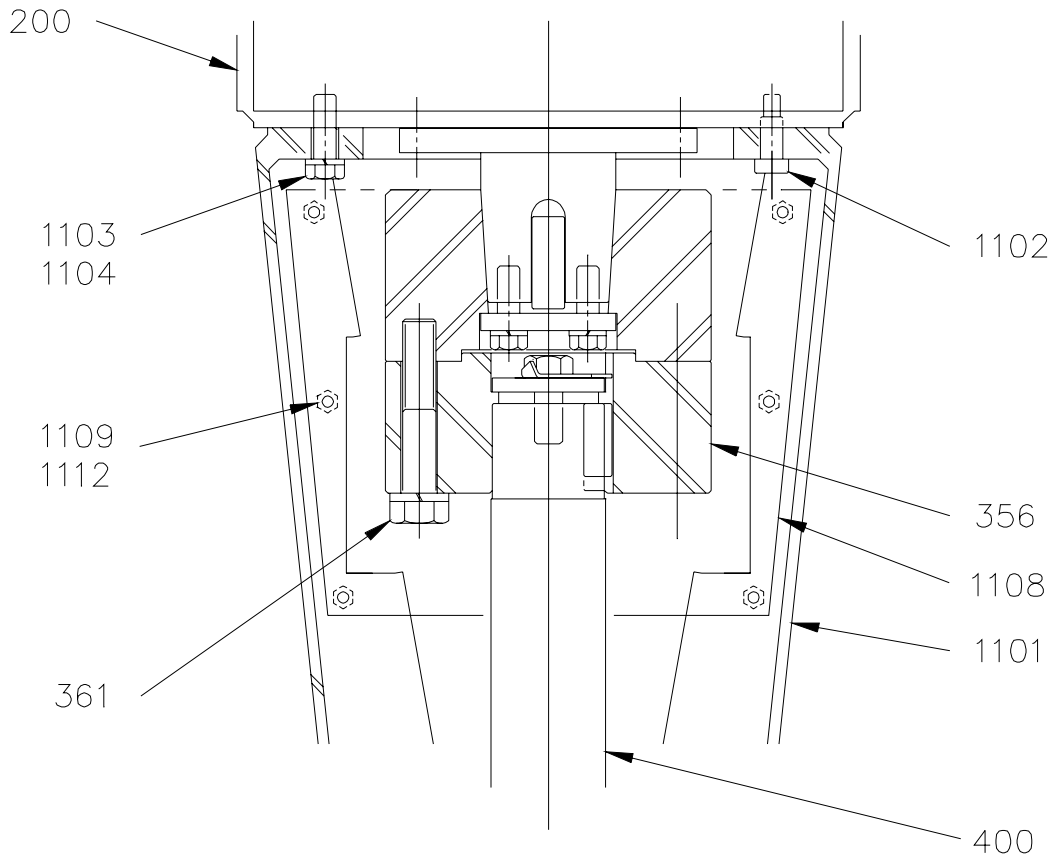


Figure 1. Model HTA/HTAL/HTL/HTP

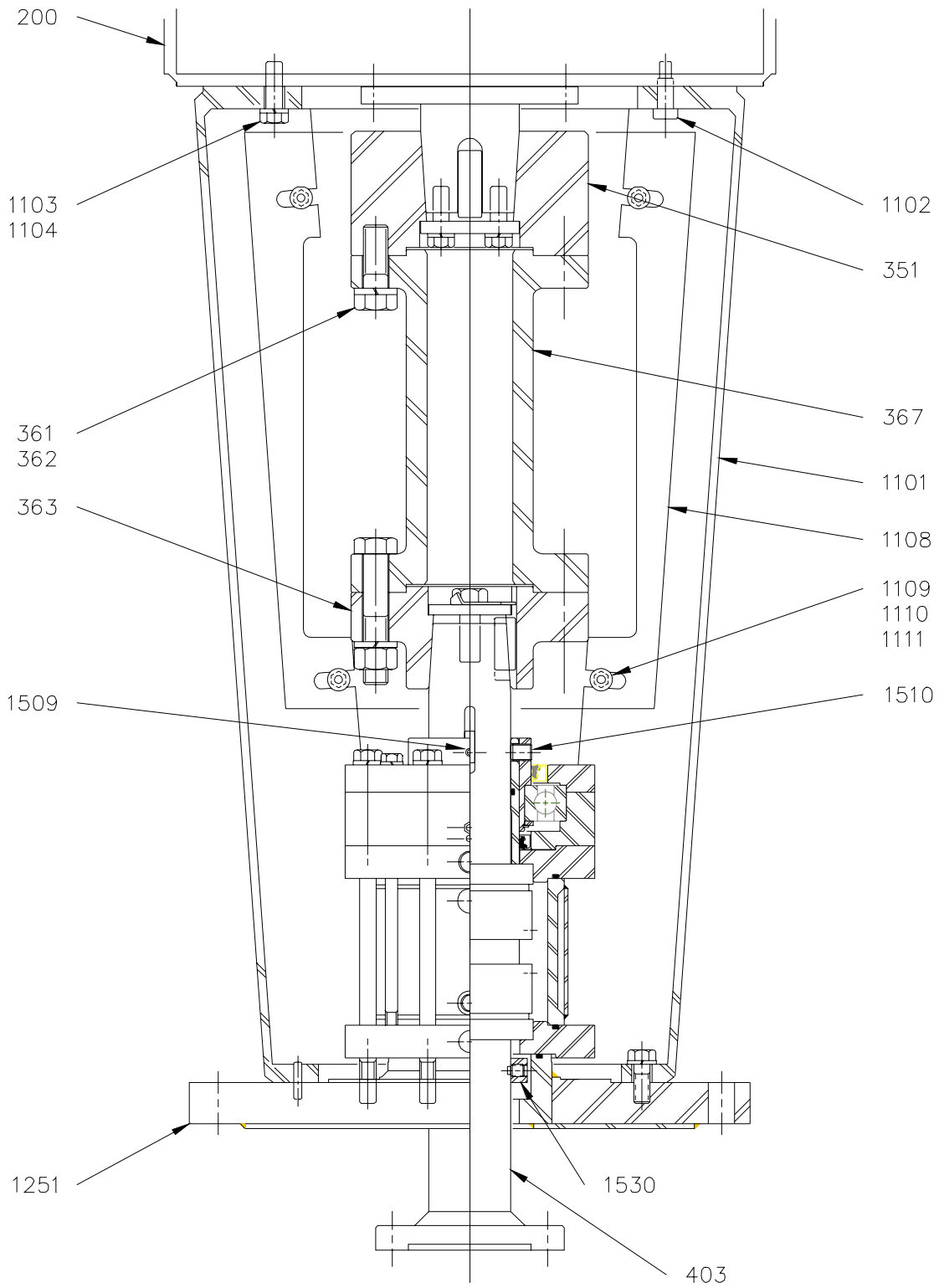


Figure 2. Model HTN

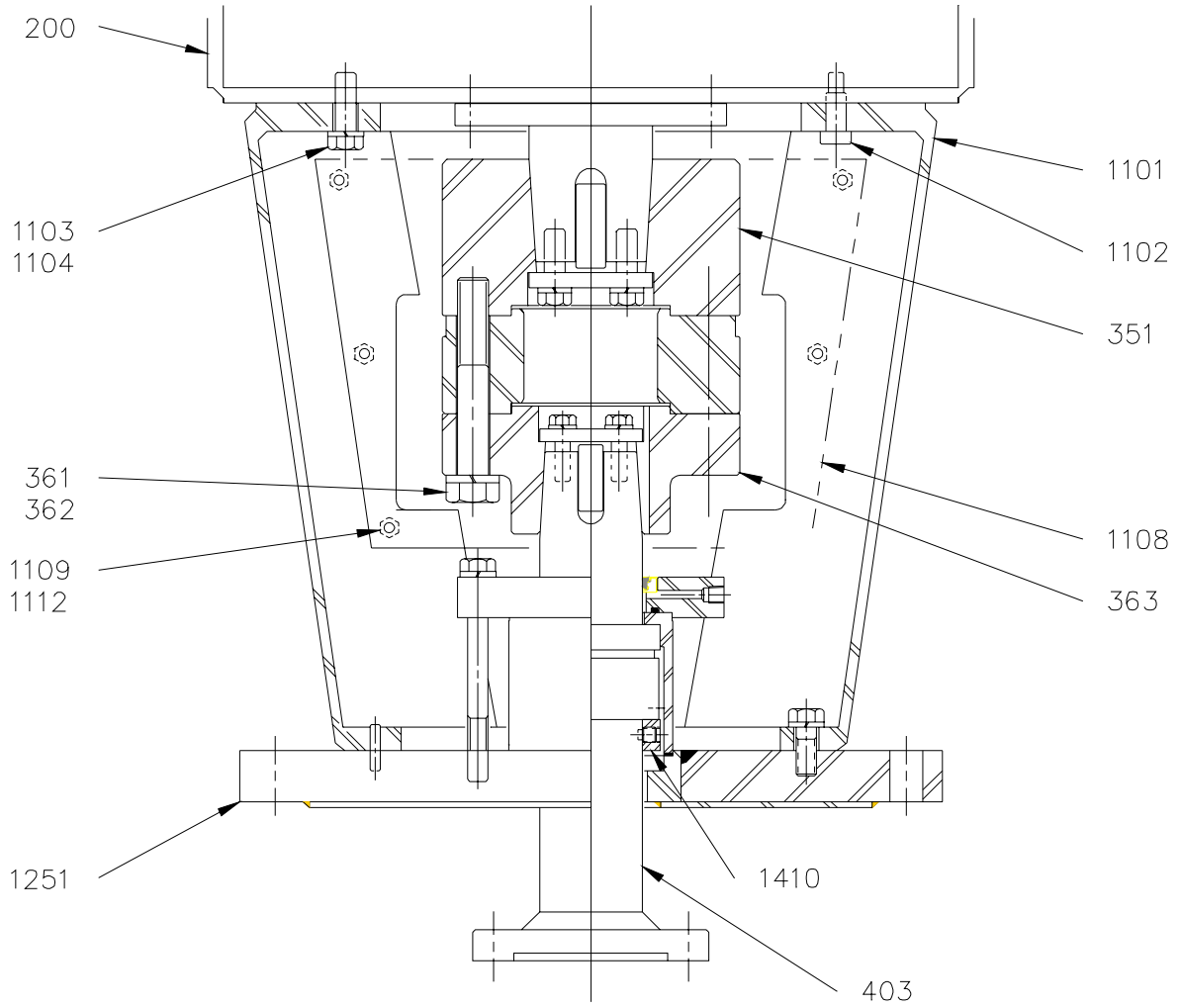


Figure 3. Model HTNS

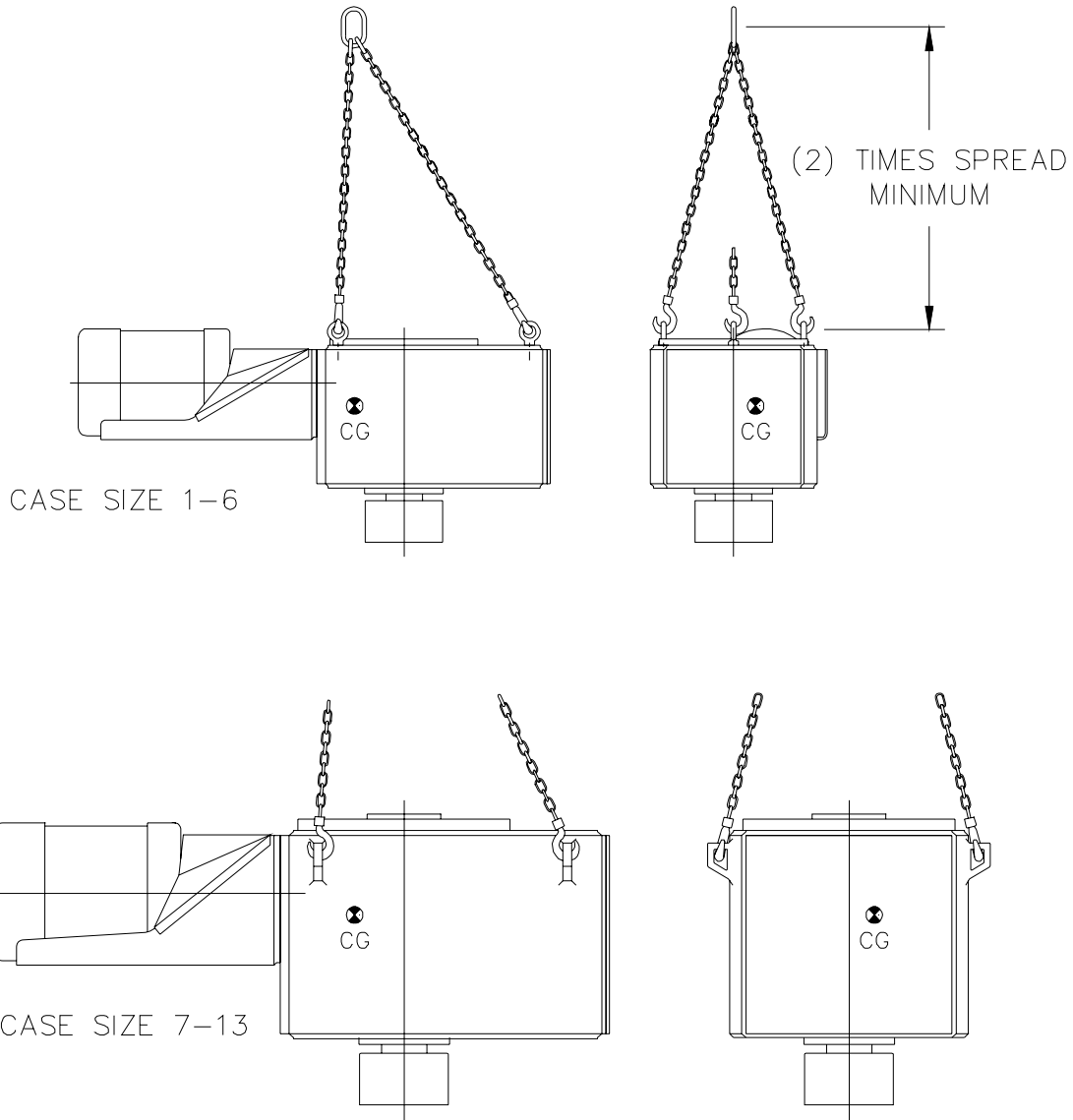


Figure 4. HT Drive Lifting

Agitator Drive Removal model HTA/ HTAL/ HTL/ HTP. See Figure 1, page 1.

CAUTION! Prior to removing the agitator drive, review the agitator installation to assure that all safety issues are resolved.

NOTE: Lower coupling half [356] may appear different depending on unit type.

1. Lock out and disconnect all power to the gear drive motor and optional devices.
2. Disconnect any water lines to oil coolers.
3. If an optional auxiliary shaft seal is installed, depressurize vessel and loosen the gland nuts (on stuffing box seals).
4. Loosen fasteners [1109, 1112] and remove handhole covers [1108].
5. If a bracket steady bearing is installed, remove the wear sleeve.
6. Block the extension shaft [400] in place.
7. Loosen coupling bolts and lockwashers [361, 362] to disengage coupling [356].
8. Using a crane or hoist, attach lifting chains to the gearcase, see (*Figure 4, page 4*). Be sure the lifting chains are taught.
9. Remove gearcase to pedestal fasteners [1102, 1103, 1104].
10. Lift the agitator drive assembly [200] off the pedestal [1101].

Agitator Drive Removal model HTN, HTNS. See figure 2, 3, page 2, 3.

CAUTION! Prior to removing the agitator drive, review the agitator installation to assure that all safety issues are resolved.

1. Lock out and disconnect all power to the gear drive motor and optional devices.
2. Disconnect any water lines to oil coolers, mechanical seal housing, etc.
3. Depressurize vessel and then the mechanical seal housing.
4. Loosen fasteners [1109, 1112] and remove handhole covers [1108].
5. If a bracket steady bearing is installed, remove the wear sleeve.
6. Loosen setscrews [1509 and 1510] one turn. (Model HTN only.)
7. Lower drive shaft [403] by evenly loosening bolts [361]. The drive shaft should drop approximately 1/2" (12 mm) allowing shaft collar [1530 or 1410] to seat on mounting flange [1251]. If the shaft does not drop, tapped holes are provided in spacer spool [367] upper flange (HTN) or in taper bore coupling half [363] flange (HTNS) for inserting bolts to jack the shaft down. Note: Ensure bolts [361] are slightly loose, but still engaged in reducer coupling [351] to prevent the shaft from suddenly dropping.

CAUTION! Do not jack the drive shaft down more than shown on the unit seal assembly drawing.

8. Remove bolts and lockwashers [361, 362].
9. Using a crane or hoist, attach lifting chains to the gearcase, see (Figure 4, page 4). Be sure the lifting chains are taught.
10. Remove gearcase to pedestal fasteners [1102, 1103, 1104].
11. Lift the agitator drive assembly [200] off the pedestal [1101].

D. INSTALLATION

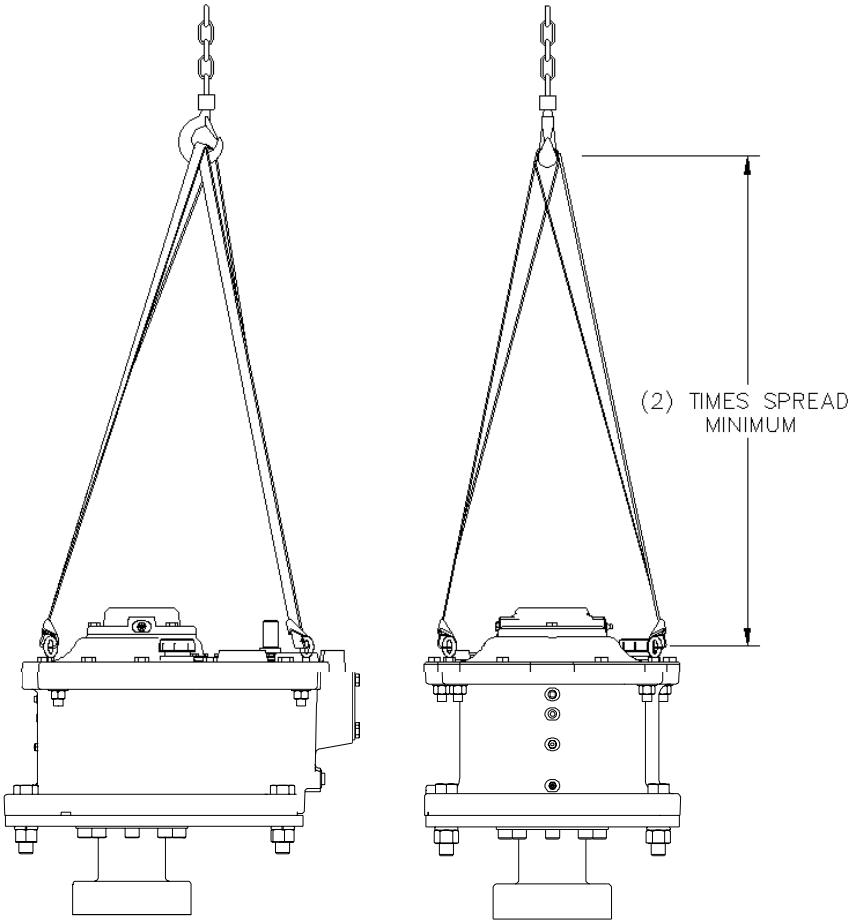


Figure 5. Model 20 Drive Lifting

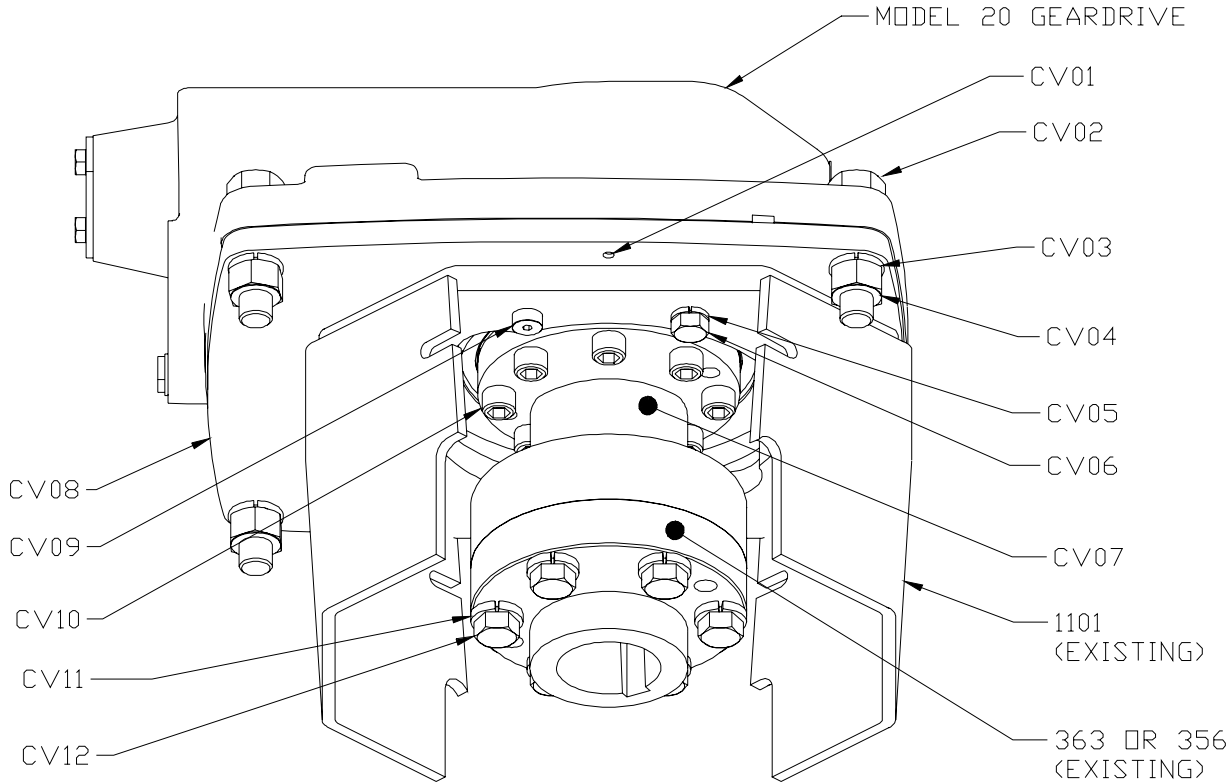


Figure 6. Model HTA/HTAL/HTL/HTP Conversion

Note: Lower portion of pedestal cropped out of figure for clarity

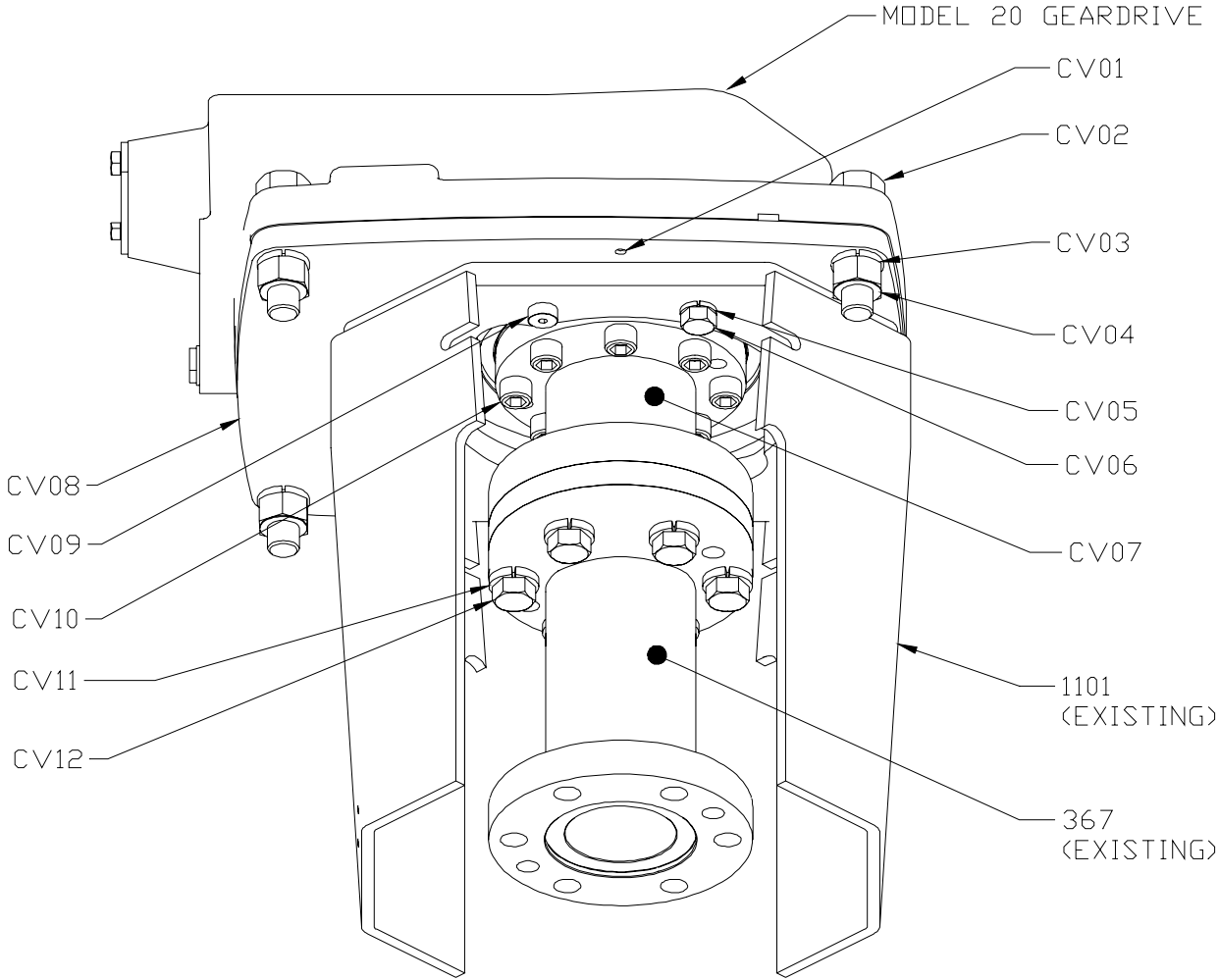


Figure 7. Model HTN Conversion

Note: Lower portion of pedestal cropped out of figure for clarity

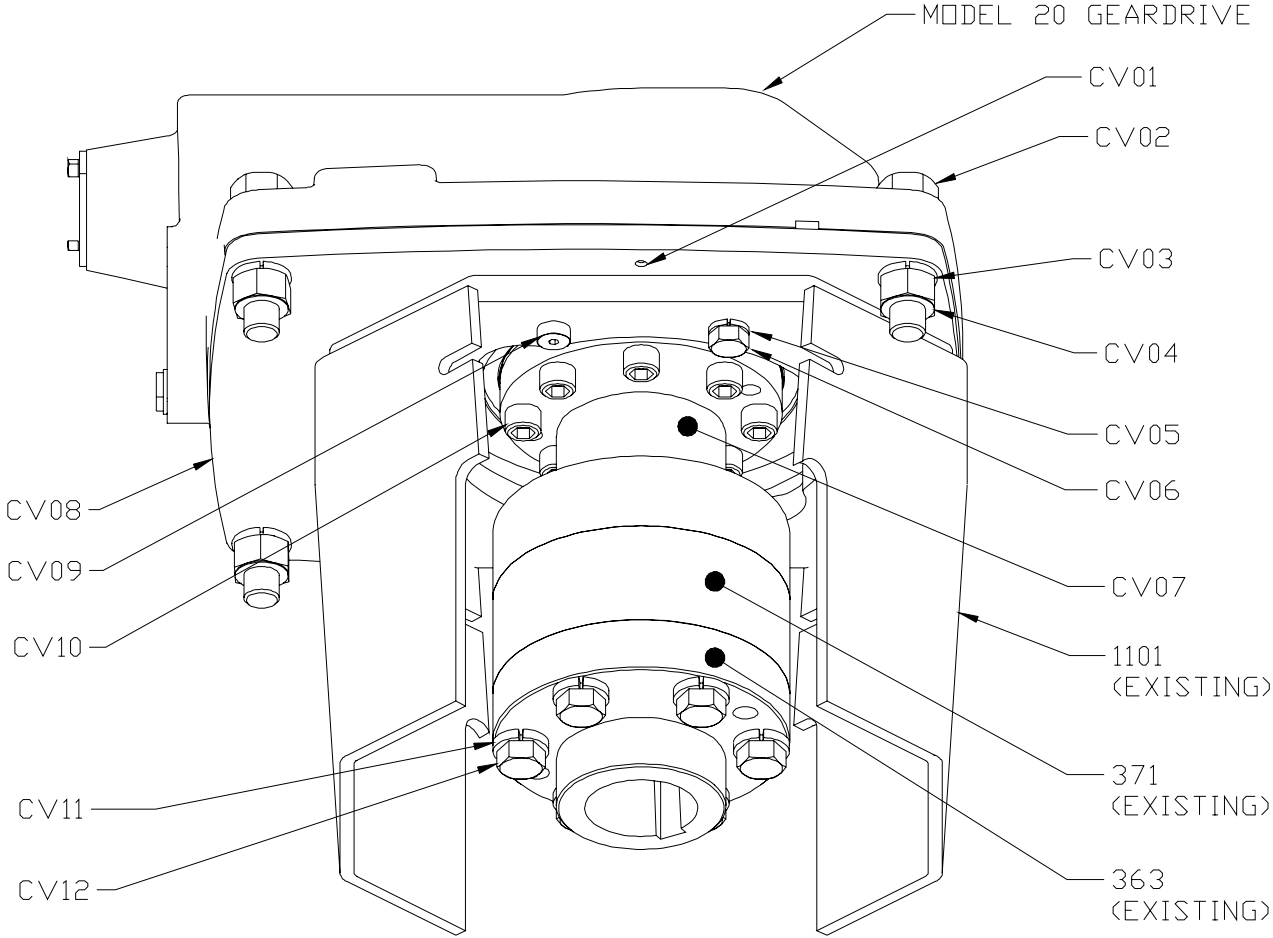


Figure 8. Model HTNS Conversion

Note: Lower portion of pedestal cropped out of figure for clarity

M20 Agitator Drive Installation. See figures 6, 7, 8, pages 8, 9, 10.

1. With HT gear drive removed, attach adapter plate [CV08] to Model 20 geardrive using dowel pins [CV01], bolt, lockwasher and nut [CV02, CV03, CV04].
2. Install adapter spool [CV07] to Model 20 geardrive using bolts [CV10].
3. Using a crane or hoist, attach lifting chains to gearcase see (*Figure 5, page 7*).
4. Lift Model 20 geardrive onto existing HT pedestal [1101].
5. Install shoulder bolts [CV08], bolts and lockwashers [CV05, CV06].
6. For HTN units, raise drive shaft to attach spacer spool [367] to adapter spool [CV07] using bolts and lockwashers [CV11, CV12].
7. For HTNS units, raise drive shaft to attach coupling half, coupling spacer [363, 371] to adapter spool [CV07] using bolts and lockwashers [CV11, CV12].
8. For HTA, HTAL, HTL or HTP units, raise drive shaft to attach coupling half [363 or 356] to adapter spool [CV07] using bolts and lockwashers [CV11, CV12].
9. For HTN or HTNS units, check the installed extension shaft runout. Place a dial indicator on the side of the extension shaft at the bottom. Manually turn the flexible motor coupling to rotate the extension shaft one turn. Total shaft runout should not exceed 0.005" per foot (0.42 mm per meter) FIM (Full Indicator Movement) of shaft length. If the shaft runout is excessive, try rotating the new adapter spool to help minimize the runout. If the runout is still excessive, the shaft can be restraightened in the field. Rotate the shaft to the maximum positive indicator reading. Apply heat to the shaft at a point 180° from the indicator and just below the first in-tank shaft coupling or just below the mounting flange if there is no in-tank coupling. As heat is applied to the shaft (do not allow surface temperature of shaft to exceed 500° F [260° C]), the shaft will move toward the indicator. After the shaft has moved 0.030 - 0.060" (0.76 - 1.52 mm), remove the heat and allow the shaft to cool completely. The shaft will begin to move away from the indicator. The shaft will draw more than it moved initially, and as a result will be straightened. After each heating cycle, recheck the shaft until runout is within tolerance. Do not heat in the same location. Move up or down 2 to 3" (50 to 70 mm) to avoid reheating in the same location.
10. Install handhole covers [1108] with fasteners [1109, 1110, 1111, 1112].
11. Continue to install the motor per the supplied Model 20 IOM manual.

E. ITEM LIST

Item#	Description	Qty.
CV01	alignment pin	2
CV02	bolt	4
CV03	lockwasher	4
CV04	nut	4
CV05	lockwasher	6
CV06	bolt	6
CV07	adapter spool	1
CV08	adapter plate	1
CV09	shoulder bolt	2
CV10	bolt	6 to 8
CV11	lockwasher	6
CV12	bolt	6
200	gear drive assembly	1
351	gear drive coupling half	1
356	rigid, non-removable, shtink fit, straight bore coupling half	1
361	bolt	6
362	lockwasher	6
363	rigid, removable, taper bore coupling half	1
367	spacer Spool	1
371	coupling Spacer	1
400	extension shaft assembly	1
403-001	drive shaft (welded coupling)	1
403-002	drive shaft (removable coupling)	1
1101	pedestal	1
1102	shoulder bolt	2
1103	bolt	6
1104	lockwasher	6
1108	handhole voer	2
1109	bolt	8 to 12
1110	flatwasher	8 to 12
1111	wellnut	8 to 12
1112	lockwasher	8 to 12
1251-001	HTNS mounting flange	1
1251-002	HTN mounting flange	1
1410	HTNS shaft collar	1
1509	setscrew, knurled cup point	1
1510	setscrew, cup point with nylok	3
1530	HTN shaft collar	1

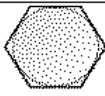
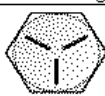
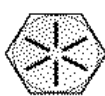
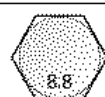
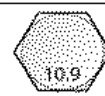
F. APPENDIX

Tighten all fasteners to values shown unless specifically instructed to do otherwise. Lubricate all fasteners at assembly with thread lubricant or an anti-seize material. Bolt threads and contact surfaces of bolt heads and nuts should be lubricated. Note that stainless steel and alloy fasteners can gall while being tightened. The risk of galling or thread seizing is reduced by using lubrication, by tightening fasteners with low rpm's and without interruptions, and applying only light pressure. Dry fasteners, components with dirt or dust, bolting faces with rough finish, or even some environmental factors such as heat or moisture can effect the torque readings, and require values different than those listed in the table below.

Table 1. BOLT TIGHTENING TORQUE

BOLT SIZE	SAE J429 CARBON STEEL						STAINLESS STEEL	
	GRADE 2 METRIC GRADE 4.6		GRADE 5 METRIC GRADE 8.8		METRIC GRADE 12.9		300 Series Stainless Steel (e.g. 304, 316)	
	ft-lb	Nm	ft-lb	Nm	ft-lb	Nm	ft-lb	Nm
1/4 - 20	-	-	6	8.1	-	-	4.1	5.6
5/16 - 18	-	-	13	18	-	-	8	11
3/8 - 16	-	-	23	31	-	-	15	20
1/2 - 13	38.0	52	55	75	-	-	38	52
9/16 - 12	50.0	68	79	107	-	-	50	68
5/8 - 11	68.0	92	110	149	-	-	68	92
3/4 - 10	120.0	163	195	264	-	-	95	129
7/8 - 9	122.0	165	314	426	-	-	153	207
1 - 8	184.0	250	470	637	-	-	230	312
1-1/8 - 7	260.0	353	587	796	-	-	326	442
1-1/4 - 7	368.0	499	828	1123	-	-	460	624
1-3/8 - 6	482.0	654	1085	1471	-	-	602	816
1-1/2 - 6	640.0	868	1440	1953	-	-	800	1085
M6 x 1.00	3.8	5.1	6.9	9.4	9.7	13	4.3	5.8
M8 x 1.25	8	10	17	23	24	32	10	14
M10 x 1.50	15	20	34	45	47	63	21	28
M12 x 1.75	26	35	58	79	81	110	36	49
M16 x 2.00	64	87	145	196	202	274	89	121
M20 x 2.50	126	170	282	383	394	534	174	236
M24 x 3.00	217	295	489	663	537	728	300	407

Table 2. Bolt grades and mechanical properties

Head Marking	Grade and Material	Nominal Size Range (inches)	Mechanical Properties		
			Proof Load (psi)	Min. Yield Strength (psi)	Min. Tensile Strength (psi)
US Bolts					
 No Markings	Grade 2 Low or medium carbon steel	1/4 thru 3/4	55,000	57,000	74,000
		Over 3/4 thru 1-1/2	33,000	36,000	60,000
 3 Radial Lines	Grade 5 Medium Carbon Steel, Quenched and Tempered	1/4 thru 1	85,000	92,000	120,000
		Over 1 thru 1-1/2	74,000	81,000	105,000
 6 Radial Lines	Grade 8 Medium Carbon Alloy Steel, Quenched and Tempered	1/4 thru 1-1/2	120,000	130,000	150,000
Stainless markings vary. Most stainless is non-magnetic	18-8 Stainless Steel alloy with 17-19% Chromium and 8-13% Nickel	1/4 thru 5/8		40,000 Min. 80,000 – 90,000 Typical	100,000 – 125,000 Typical
		3/4 thru 1		40,000 Min. 45,000 – 70,000 Typical	100,000 Typical
		Above 1			80,000 – 90,000 Typical
Head Marking	Class and Material	Nominal Size Range (mm)	Mechanical Properties		
Metric bolts					
 8.8	Class 8.8 Medium Carbon Steel, Quenched and Tempered	All Sizes below 16mm	580	640	800
		16mm - 72mm	600	660	830
 10.9	Class 10.9 Alloy Steel, Quenched and Tempered	5mm - 100mm	830	940	1040
12.9	Class 12.9 Alloy Steel, Quenched and Tempered	1.6mm - 100mm	970	1100	1220
Stainless markings vary. Most stainless is non-magnetic. Usually stamped A-2	A-2 Stainless Steel alloy with 17- 19% Chromium and 8-13% Nickel	All Sizes thru 20mm		210 Min. 450 Typical	500 Min. 700 Typical
Tensile Strength: The maximum load in tension (pulling apart) which a material can withstand before breaking or fracturing.					
Yield Strength: The maximum load at which a material exhibits a specific permanent deformation					
Proof Load: An axial tensile load which the product must withstand without evidence of any permanent set.					
1MPa = 1N/mm ² = 0.2248 pounds/mm ²					

(Source: www.boltdepot.com)



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