

WO & WB AWWA Gears & MG Power Gears

Instruction & Maintenance Manual

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Section 1: Purpose

This instruction and maintenance manual replaces document W291 and explains how to install, operate, and maintain the WO, WB & MG Gears.

⚠ WARNING:

Read this manual in its entirety before installing, operating, or performing maintenance on the WO, WB & MG Gears.

Use caution when working on, with, or around valves and actuators. High pressures, forces, voltages, and flammable media can be present.

Failure to follow instructions for proper electrical wiring, storage, setup and maintenance may cause serious injury, damage equipment, or void warranty.

Installation, Operation and Maintenance should only be performed by qualified personnel.

Section 2: Lubrication

2.1 Lubrication Grease Specification

Extreme pressure multipurpose grease, NLGI Grade EP-0, suitable for bronze gear assemblies.

Inspection Procedure:

1. Ensure the worm is immersed in lubricant. Lubrication should be checked periodically to determine its condition.
2. Examine the lubricant for containments such as dirt or water. Should contamination be present, remove the grease and flush with a commercial degreaser, solvent such as mineral spirits (or white spirits), which is non-corrosive and does not affect seal materials. Refill with fresh lubricant.
3. Examine the lubricant for consistency. The appearance should be slightly fluid.

NOTE:

Alternate lubricants may be substituted in place of the standard that is supplied by the factory only if they are equivalent. Do not add different lubricants to the operator unless approval has been obtained from the lubricant manufacturer.

Section 3: Installation Procedure

3.1 General Instructions

Refer to Figure 1.

1. Place valve in full closed position.
2. Install splined bushing (17) on valve shaft (and key). Tighten set screw (20) to secure bushing to shaft.
3. Turn input shaft, rotate actuator drive sleeve (19) to full closed position. Indicator will point to close. Mechanical stops should be preset for 90° of travel. If not, adjust at this time. See disassembly instructions for adjustment procedure.
4. Remove dial indicator (16) to facilitate mounting to valve.
Note: WB units have no dial indicator.
5. Lower actuator on to splined shaft. Actuator is now ready for attachment to valve.
6. Once in place on valve, re-install indicator cover (16).

3.2 Stop Setting Procedure

1. With actuator and valve in full closed position, remove stop screw cover bolt (12).
2. Remove jam screw (13).
3. Adjust stop screw (14) inward if valve is closed and the stop has not been engaged. If valve is not fully closed, adjust the stop screw outward so the valve can be moved to the full closed position. Once the valve is in full closed position, adjust the screw inward until the screw touches the worm segment. Once the screw is in contact (with valve fully closed), adjust outward 1 / 2 turn.
4. Once the stop screw is set, install the jam screw (13) and tighten until secure. Reinstall stop screw cover bolt (12).
5. Move the valve to the full open position and repeat the procedure for the open stop.

Section 4: Disassembly Instructions

4.1 Instructions - WO & WB AWWA Gears

Refer to Figure 1.

1. Remove hex head cap screws (12) and seal washers (15).
2. Remove jam screws (13).
3. Remove stop screws (14) from main housing.
4. Rotate handwheel shaft clockwise until pointer cap (16) stops rotating or until handwheel shaft can no longer be turned.
5. Remove dial indicator (16) and housing cover (3). Note: WB units have no dial indicator (16).
6. Remove closed cap (1) and open cap (24).
7. Remove thrust bearing cups (2) from main housing. By rotating worm shaft (18) in both directions.
8. Pull worm shaft (18) from main housing (4). Caution: Note the assembly position of the worm shaft for accurate reassembly. Do not remove bearings from the worm shaft.
9. Once the worm is clear, remove the two thrust bearing cones (5).
10. Remove drive sleeve (19) lifting upward from main housing. Caution: Note position of drive sleeve in main housing to ensure accurate reassembly. Remesh gearing during reassembly.
11. Check the condition of all gaskets and o-rings. If torn or damaged, replace.
12. Reassemble the actuator by reverse order of the steps listed above. The end cap gasket thickness is generally 1/32" to 1/64". This is determined by the amount of axial float in the worm shaft once the bolts on both the end caps (1 & 24) have been tightened. When properly adjusted, axial float should be almost eliminated, while still allowing the worm shaft to be easily rotated by hand (larger WO/WB units require a handwheel or T-bar to rotate input shaft even under no load conditions).
13. Preset mechanical stops for 90° of rotation by moving the drive sleeve (worm gear) to its approximate center point (mid travel). From this midpoint, estimate 45° travel in the open direction. Insert stop screw (14) and adjust accordingly. Repeat this step for the closed direction (90° from open or 45° from center). Before reinstallation of the housing cover (3), fill the housing with recommended lubrication (Texaco EP-0 or equal) to approximately 3/4 full (check that worm shaft and bearings are covered). Refer to lubrication instructions for additional details.

Once the actuator is installed on the valve, it will be necessary to final adjust the stop screws to suit the actual valve movement required. (Refer to installation procedure, stop setting).

Figure 1 Assembly WO20 67:1 6.50" (DWG 84216 Rev. F)

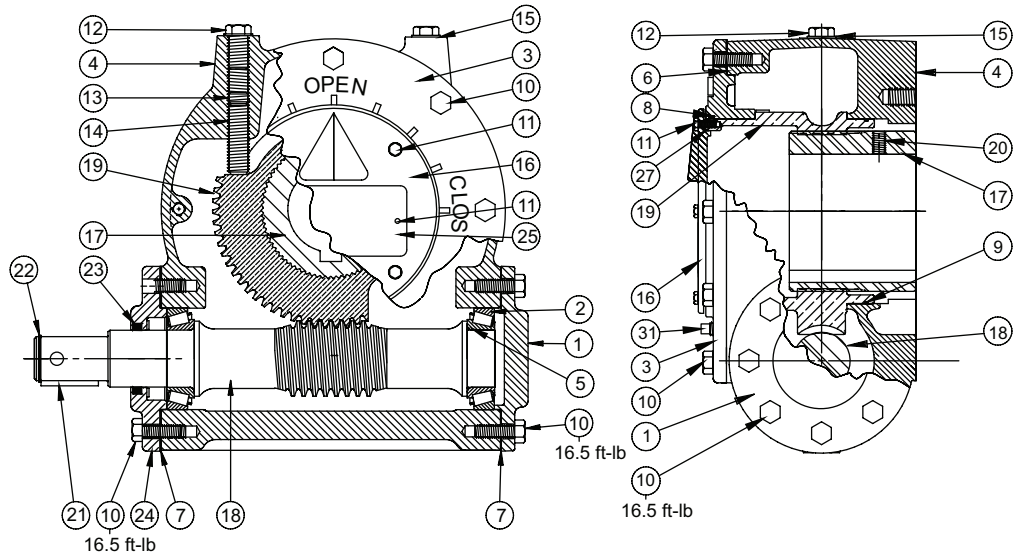


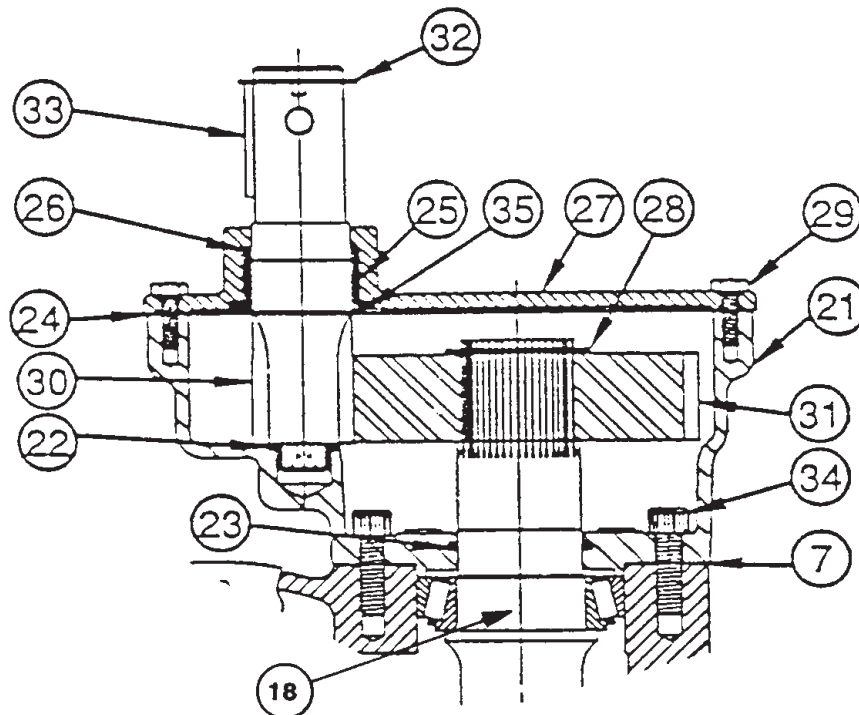
Table 1. (DWG 84216 Rev. F)

Items	Description	QTY.	Items	Description	QTY.
1	Closed Cap	1	14	Stop Screw	2
2	Thrust Bearing Cup	2	15	Sealing Washer	2
3	Housing Cover	1	16	Dial Indicator	1
4	1/4 T Main HSG	1	17	Spline Bushing	1
5	Thrust Bearing Cone	2	18	Worm Shaft	1
6	HSG CVR Gasket	1	19	Drive Sleeve	1
7	End Cap Gasket	1	20	Set Screw	1
8	O-Ring	1	21	Key	1
9	O-Ring	1	22	Retaining Ring	1
10	End Cap Bolts	16	23	O-Ring	1
11	Dial Indicator Bolts	4	24	Open Cap	1
12	Stop Screw Cover Bolts	2	25	Nameplate	1
13	Jam Screw	2	26	HSG CVR Bolts	8

4.2 Instructions - GB1 Spur Gear Attachment

1. Remove retaining ring (32), allowing the removal of handwheel and key (33) from input shaft (30).
 2. Remove eight GB1 cover bolts (29), housing cover (27) and gasket (24).
 3. Remove input shaft (30). If damaged or bent, replace. Check bronze bearings (25) & (22) for wear. Replace if needed.
 4. Remove retaining ring (28). If damaged or bent, replace.
 5. Remove gear (31) from worm shaft (18).
 6. Remove eight socket head cap screws (34).
 7. Remove GB1 housing (21) and end cap gasket (7).
 8. Inspect bearing (22). If worn or damaged, replace.
 9. Inspect all gaskets and a-rings. If worn or damaged, replace.
- To reassemble, proceed in reverse order listed above.

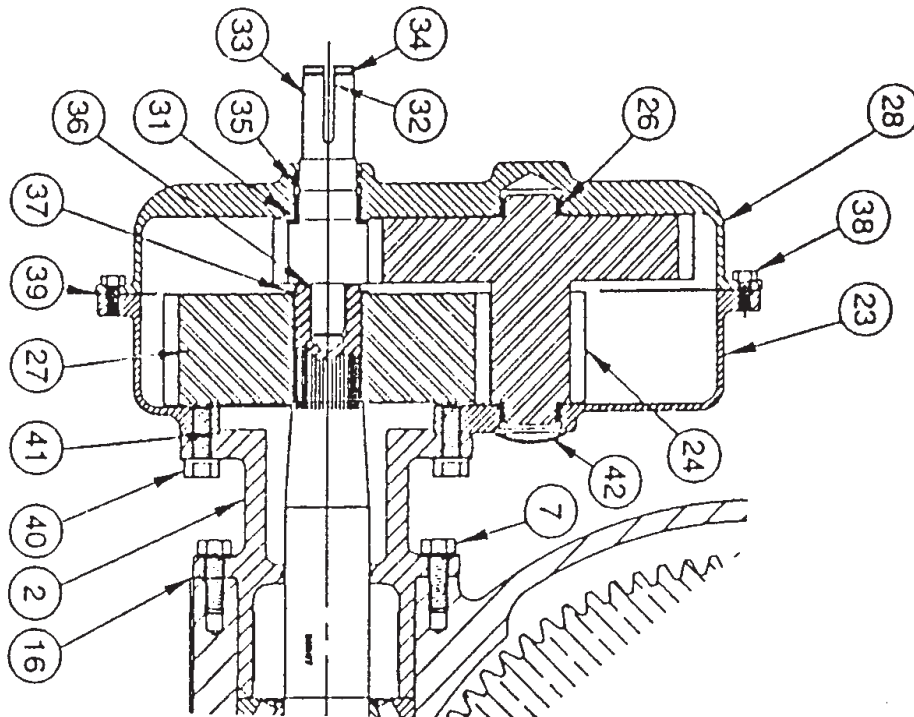
Figure 2 WG54 320:1 11.75" (DWG 83839 Rev. D)



4.3 Instructions - GB3 Spur Gear Attachment

1. Remove retaining ring (34), allowing the removal of handwheel and key (32) from input shaft (33). Note: Key (33) not used for tandem mount GB 1 /G83. Input shaft (33) is splined.
 2. Remove twelve GB3 cover bolts (38), housing cover (28) and gasket (39).
 3. Remove input shaft (33).
 4. Remove gear (24).
 5. Remove retaining ring (37).
 6. Remove gear (27) from worm shaft.
 7. Inspect bearings (31, 36, 26). If worn or damaged, replace.
 8. Remove four cap screws (40) and GB3 housing (23)
 9. Remove eight cap screws (7), G83 adaptor (2) and end cap gasket (16).
 10. Inspect all gaskets and o-rings. If damaged or worn, replace.
- To reassemble, proceed in reverse order listed above.

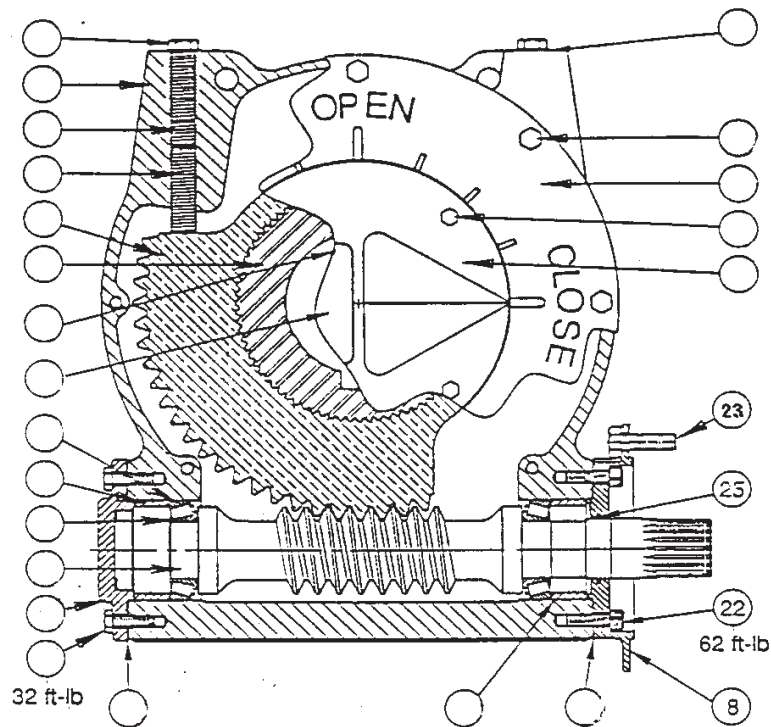
Figure 3 Assembly WG65 972:1 16" (DWG 83841 Rev. C)



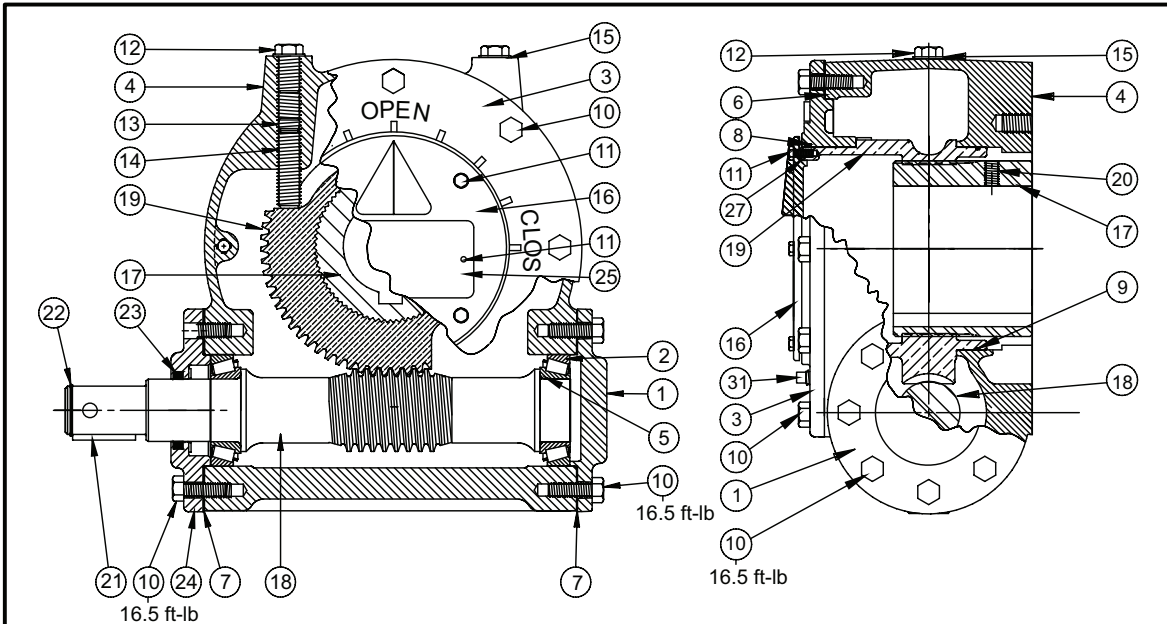
4.4 Instructions - MG Quarter Turn Power Assemblies

1. Separate "M" electric unit (DWG 83775) from MG Power Assembly by removing bolts (23) and pulling the two assemblies apart.
2. Remove bolts (22) and M/MG Adaptor (8).
3. For further disassembly of MG Power Assembly, refer to the section "DISASSEMBLY INSTRUCTIONS, WO & WB AWWA GEARS". For parts listings, refer to the specific assembly drawing for that model.
4. For disassembly of "M" Power Assembly, refer to 1/M Manual E987 and Assembly Drawing 83775.

Figure 4 Assembly MG03 1/4T PWR ASSY (DWG 84360_F)



Appendix: A Reference Drawings



84216-B WO20-B 67:1 6.50" (CW for CW)

ITEM	CODE	QTY	PART NUMBER	DESCRIPTION
1	CI03	1	35333	DI END CAP
2	B002	2	4000500132	THRUST BRG CUP
3	CI01	1	36665	HOUSING COVER
4	CI03	1	34978	1/4T MAIN HOUSING
5	B002	2	4000500131	THRUST BRG CONE
*6	G003	*	13466-	HSG CVR GASKET
*7	G003	*	31366-	END CAP GASKET
8	SE01	1	4045225217	O-RNG 568-252-70D
9	SE09	1	4045225017	O-RNG 568-250-70D
10	S11/6SS	24	4042533048	HHCS 3/8-16 X 1.00 SS
11	S10/3	6	34094	THWS 10-24 X .48 SS
12	S11/10SS	2	4042533120	HHCS 5/8-11 X 1.0 SS
13	S19/10	2	4042250003	SHJS 5/8-11 X .31
14	S22/10	2	4042214410	SHSS 5/8 X 2.0
15	SE05	2	4045611615	STAT-O-SEAL .625
16	CI01	1	36736	INDICATOR
17	CI01	1	35477-	SPLINE BUSH
18	SO05	1	35689-2R	67:1R WORM (H/W)
19	BR03	1	34971-4R	67:1 RH DR/SLV
20	S22/6	1	4042209310	SHSS 3/8-16 X .50
21	SO12	1	4101802514	KEY .25 SQ X 1.50
22	R001	1	4060001125	RTN 5100-125
23	SE01	1	4045232617	O-RNG 568-326-70D
24	CI03	1	35333-1	DI OPEN CAP
25	SO1	1	36664	NAMEPLATE
27	SE01	1	4045204717	O-RNG 568-047-70D
31	PL01	1	3000600870	1/8-27 NPT SQ. HD. PLUG SS

Assembly Notes:

- 1) Customer furnished mounting screws should be Grade 5 or stronger 3/4-10 UNC with length selected to engage .75" minimum to 1.00" maximum into actuator mounting flange. Torque 250 ft-lb(+/- 5%).
- 2) Actuator mounting holes are (4) 3/4-10 UNC-2B on 6.500" Bolt Circle Straddle \varnothing
- 3) Most Screws may be reused and retightened to handwheel wrench tight. Item 10 should not be reused. Tighten to torque (+/- 5%) shown for specific screw. Screw threads should be clean & lightly oiled prior to torque wrench tightening.

* Variable: 1, 2 or 4 of the thickness' referenced may have been used. See Table for replacement parts.

	Part No.	Thickness
End Cap Gskt	31366-1	1/64 (.015)
	31366-2	1/32 (.031)
Hsg Cvr Gskt	13466-1	1/64 (.015)
	13466-2	1/32 (.031)

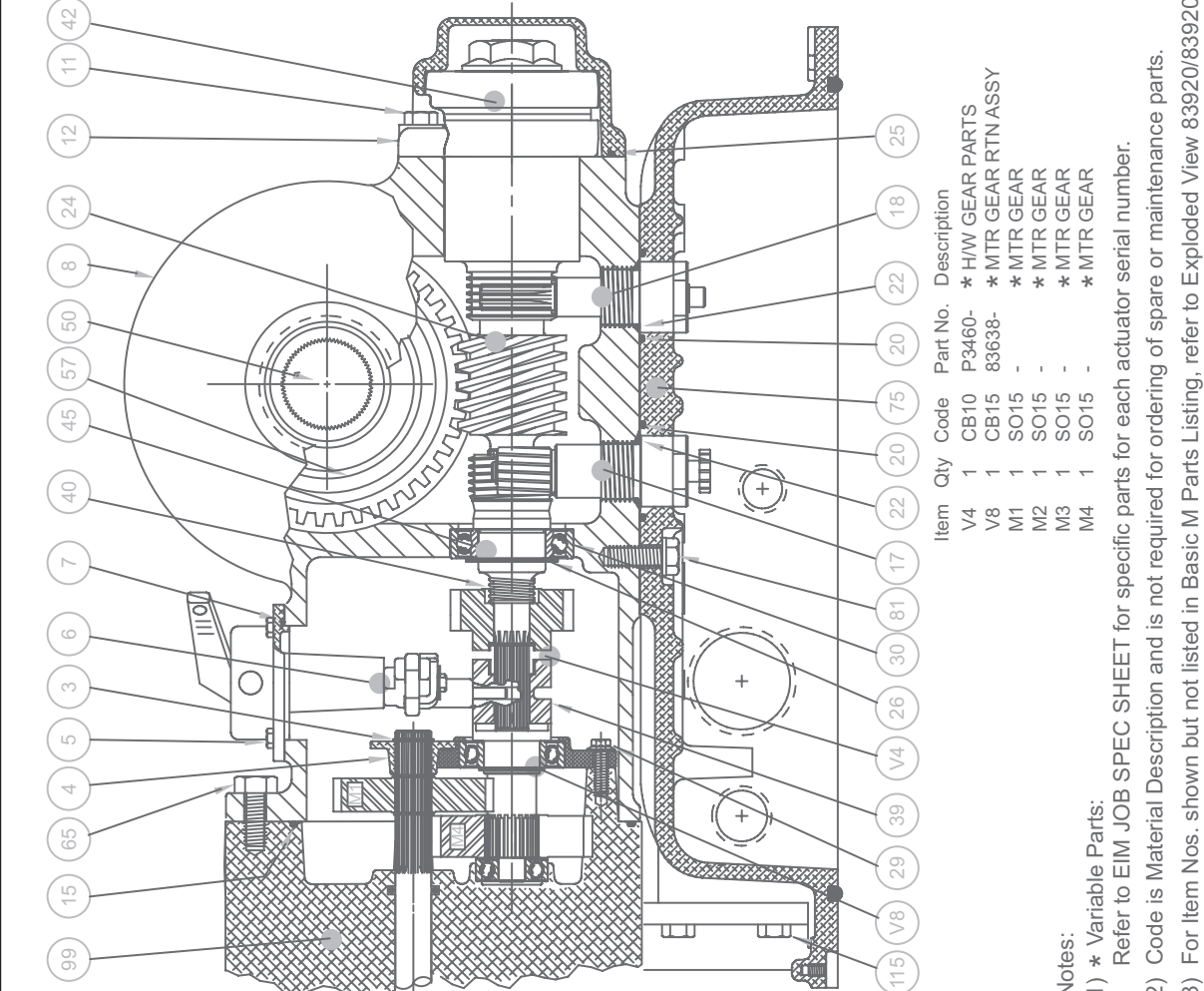
84216-A WO20-A 67:1 6.50" (CCW for CW)

Special Note: Industry standards for actuators generally require Clockwise (CW) rotation of handwheel to Close valve with Clockwise (CW) rotation of valve shaft. EIM Model WO20-B has CW rotation of actuator input for CW rotation of valve shaft. Special applications require Counter Clockwise (CCW) rotation of EIM input, therefore, model WO20-A is made available for these non-standard requirements.

ERO 14963

				<h2 style="text-align: center;">Assembly Drawing</h2>			DESCRIPTION		
							<h1 style="text-align: center;">WO20 67:1 6.50"</h1>		
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LHE/CL	1/7/98		7/29/02	1 of 1	84216-	F			

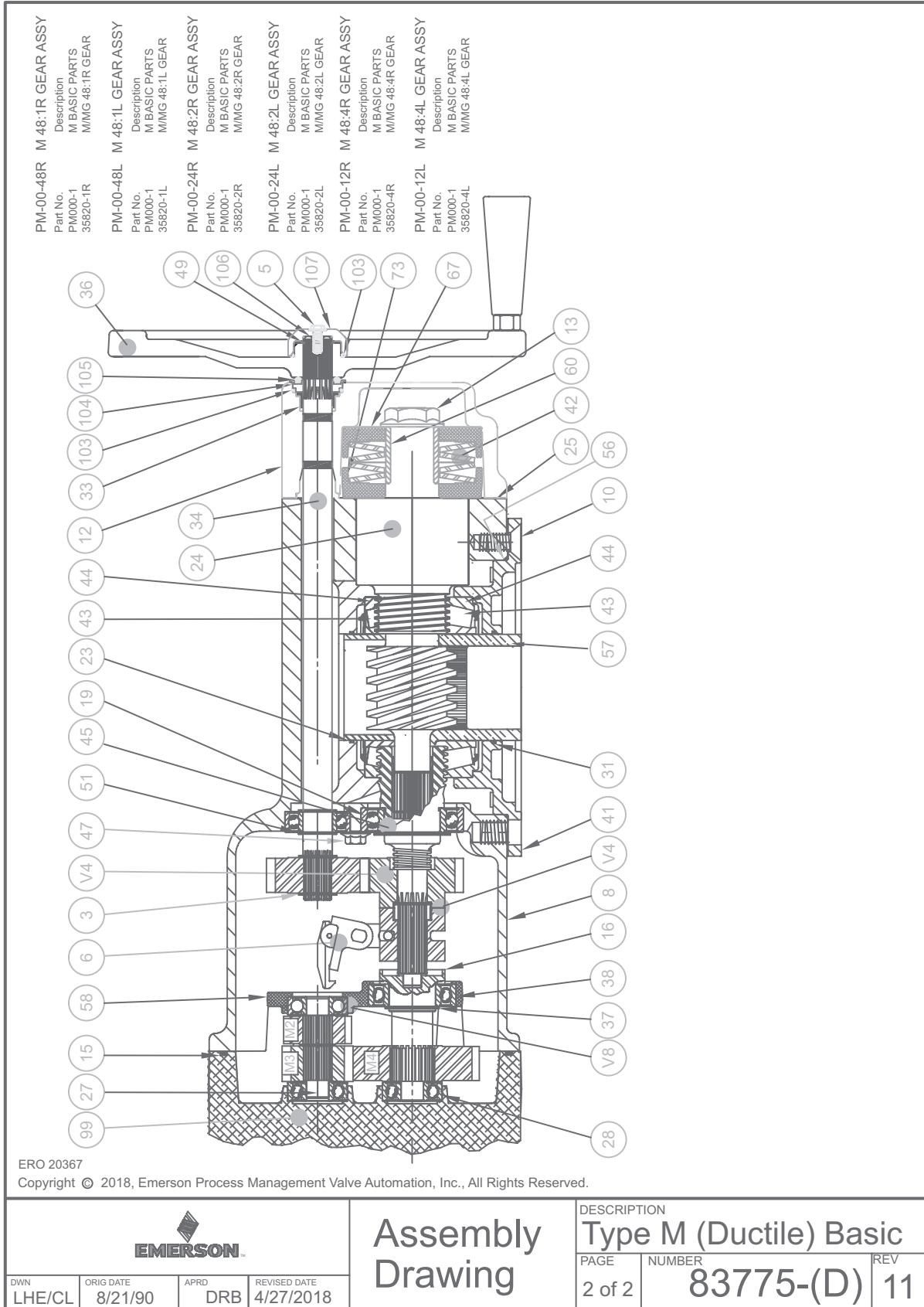
Item	Qty	Code	Part No.	Description
3	4	R001	4060001059	RTN 5100-59
4	1	CA01	35735	56 CLUTCH CAM
5	1	CA01	35730	184 & 215 CLUTCH CAM
6	4	S10/3S	34094	THWS 10-24 X .48
7	1	CB01	84781	P/S CLUTCH ASSY
8	1	SE01	4045264217	O-RNG 5-642-70D
9	1	CI03	35505-1	MAIN HOUSING
10	3	SO11	3000600885	PLUG 1/2 NPT
11	4	S23/6	4042100044	FHCS 3/8-16 x .75
12	4	S11/6S	4042533049	HHCS 3/8-16 x 1.25 SS
15	1	CA01	34873-1	TORQUE SPRING CVR
17	1	SE01	4045216317	O-RNG 588-163-70D
18	1	CB02	83730 or -1	* G/L PINION ASSY
18	1	CB02	83729	TQ LIMIT GEAR ASSY
20	2	SE01	4045212817	O-RNG 588-128-70D
22	2	SE01	4045202117	O-RNG 588-021-70D
23	1	SE01	4045222817	O-RNG 588-228-70D
24	1	CB03	P3643-	* WORM ASSEMBLY
25	1	SE01	4045215417	O-RNG 588-154-70D
29	3	S12/4	4042520020	* HHW LCS 1/4-20 x 1.00
31	3	S13/	4042505031	(184 & 215 Frame)
31	1	SE01	4045222817	O-RNG 588-228-70D
33	1	BR06	35009	FLANGED BEARING
34	1	CB04	83422	H/W SHAFT ASSY
36	1	CB05	83787-	* HANDWHEEL ASSY
41	1	CI03	84449-	* HANDWHEEL ASSY
42	1	CI03	35589-1	MOUNTING BASE
43	1	CB06	P3439-	* TORQUE SPG PARTS
44	2	B002	4000500114	THRUST/BRG CONE
44	2	B002	4000500113	THRUST/BRG CUP
45	1	CB07	83631	CLUTCH SHAFT ASSY
47	1	S12/4	4042520012	HHW LCS 1/4-20 X .75
49	1	R002	4060012059	RTN 5108-59 SS
50	1	CI01	38548	2" NPT Plug (Iron)
56	1	SE01	4045205017	O-RNG 588-050-70D
57	1	BR09	35820-	* M/MG GEAR
62	2	S11/6S	4042533052	HHCS 3/8-16 x 2.0 SS
62	2	S11/6S	4042533049	HHCS 3/8-16 x 1.25 SS
65	2	S11/6S	4042533053	HHCS 3/8-16 x 2.25SS
66	1	S22/6	4042209315	(184 & 215 Frame)
66	1	S22/6	4042209315	SHSS 3/8-16 x 1/2
75	1	CB08	83741	* MCP BASE ASSY
76	1	CB08	83768-	* MCP ELECTRIC CVR
81	4	CB08	84350-	* M2CP ELECTRIC CVR
81	4	CB17	35890	HHC-N-S 3/8-16 X 1.0
99	1	CB09	P3803-	* MOTOR ASSEMBLY
103	2	SE01	4045202117	O-RNG 588-021-70D
104	1	SE01	36806-1	HANDWHEEL SEAL
105	1	SE09	36811	HW SEAL (.671 ID)
106	1	SE01	4045200817	O-RNG 588-008-70D
107	1	SE01	36793	HANDWHEEL COVER
107	4	S11/4S	4042533004	* HHCS 1/4-20 X .75 SS

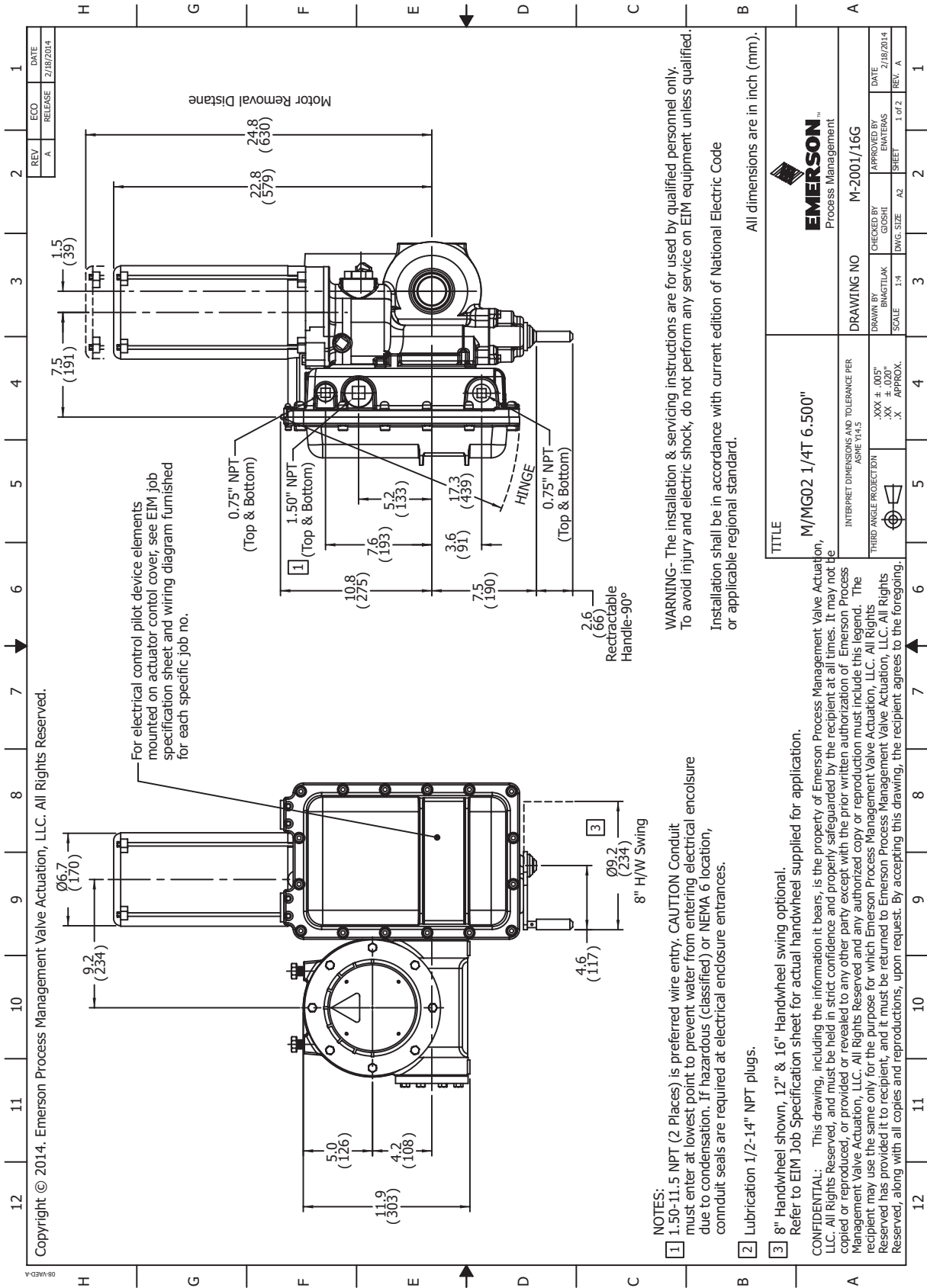


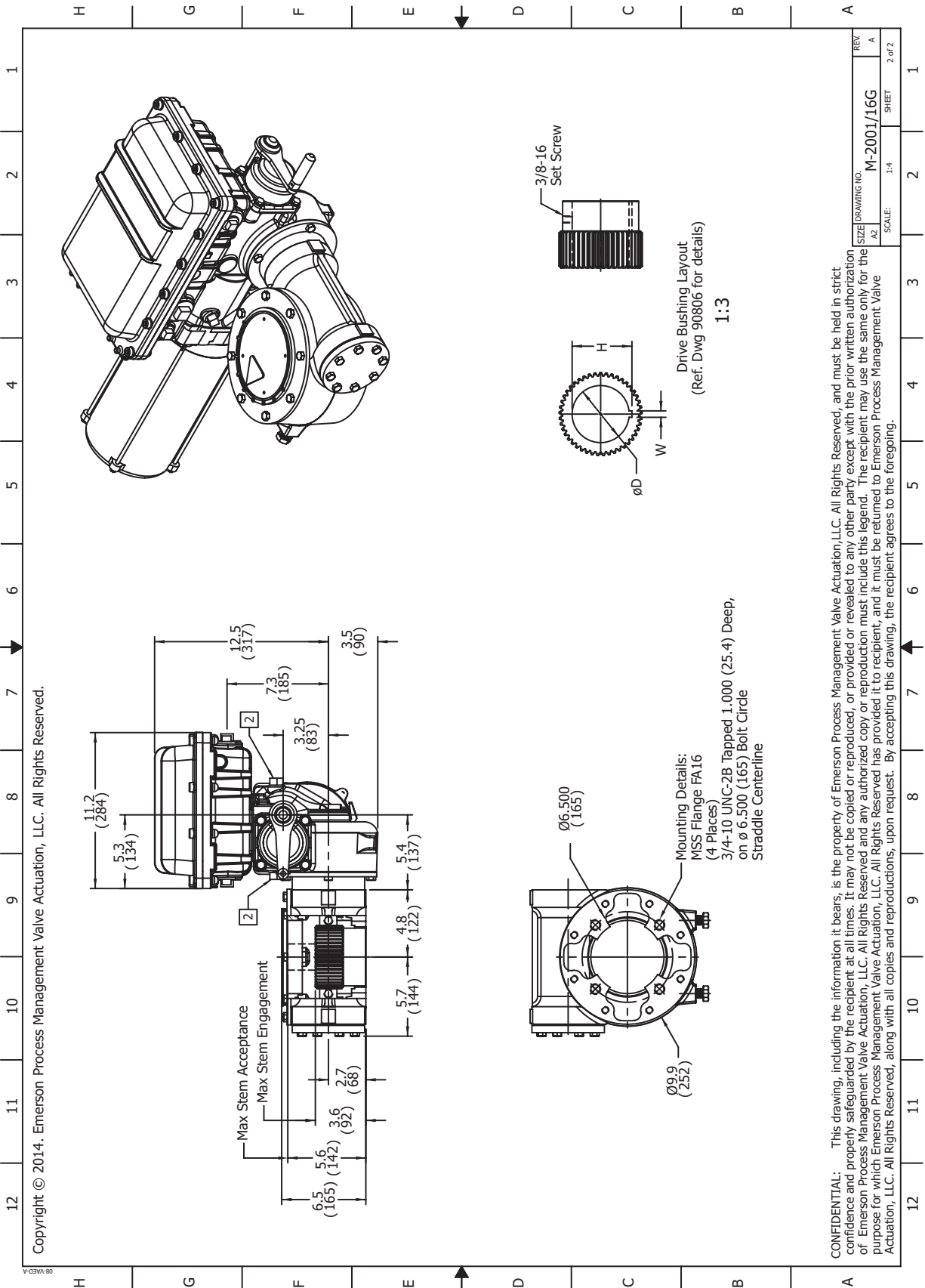
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- Notes:
 1) * Variable Parts:
 Refer to EIM JOB SPEC SHEET for specific parts for each actuator serial number.
 2) Code is Material Description and is not required for ordering of spare or maintenance parts.
 3) For Item Nos. shown but not listed in Basic M Parts Listing, refer to Exploded View 83920/83920-115

				<h1 style="text-align: center;">Assembly Drawing</h1>			DESCRIPTION		
							Type M (Ductile) Basic		
DWN	ORIG DATE	APRD	REVISED DATE	PAGE	NUMBER	REV			
LHE/CL	8/21/90	DRB	4/27/2018	1 of 2	83775-(D)	11			







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