



THE RUGGLES-KLINGEMANN MFG. CO., INC.

EST. 1917

Built to Last

PRODUCT CATALOGUE

Precision Industrial Valves

Engineered for power generation, propulsion, refinery, and construction applications where dependable fluid control is essential. Trusted by utilities & OEM's worldwide.

01

Fig. 533 & 533T

Solenoid Operated Dump Valve · 3/4"

02

Fig. 645

Relief Valve · 3/4" Sub-Plate Mounted

03

Control Valves

1" and 1-1/2" · Pressure Equalizing

04

Differential Pressure Regulators (DPR)

1-1/2" through 4" · Normal & Emergency

05

Differential Governors

Fig. 581 / 584 · Flanged & Weld-End

All products are engineered specifically for turbine shaft seal oil systems used in hydrogen-cooled turbine generators. Custom sizes, materials, and configurations are available on request. Steel and stainless steel are standard construction; other materials compatible with media handled are also available.

01

SECTION 01

Solenoid Operated Dump Valve

The R-K Fig. 533 and 533T are 3/4" two-way hydraulic dump valves for turbine oil systems, rated to 200 psig and 600 psig respectively. Available in energize-to-open or energize-to-close (fail-safe) configurations.

Fig. 533 & 533T

3/4" Two-Way Hydraulic Dump Valve

DWG: 4S-4640-8 / 4S-4640-9 | G.E. REF: 114A8218

OVERVIEW

The R-K Fig. 533 valve is designed for installation in turbine systems for oil up to 200 psig. Balanced piston design for pressure dump service — normally closed while turbine runs, opens on shutdown to dump pressure to the reservoir tank.

The Fig. 533T variant features a Teflon plug that eliminates sensitivity to particulate contamination, prevents mechanical jamming, and resists cold jamming from wax buildup.

Available as fail-safe energize-to-close (opens on loss of current) or energize-to-open configuration.

RECOMMENDED SPARE PARTS

2-Year Interval	O-rings, spring, gasket, solenoid coil
6-Year Interval	O-rings, spring, gasket, solenoid assy

SPECIFICATIONS — FIG. 533

Connection Size	3/4" I.P.S.
Max. Pressure	200 psig
Body Material	Bronze & Stainless Steel
Operation	Direct acting, continuous duty
Conduit	1/2" I.P.S.
Voltages	115/230 VAC · 24/110/125/250 VDC
Approvals	FM Class I, Div. 1, Group D
G.E. Drawing	114A8218, Pt. 1-36

SPECIFICATIONS — FIG. 533T

Max. Pressure	600 psig
Special Feature	Teflon plug — jam resistant
G.E. Drawing	354A1617 PT#1

ATEX VERSIONS

Fig. 533X	G.E. 381A7014P034
	G.E. 381A7014P029



Fig. 533 — 3/4" Solenoid Operated Valve

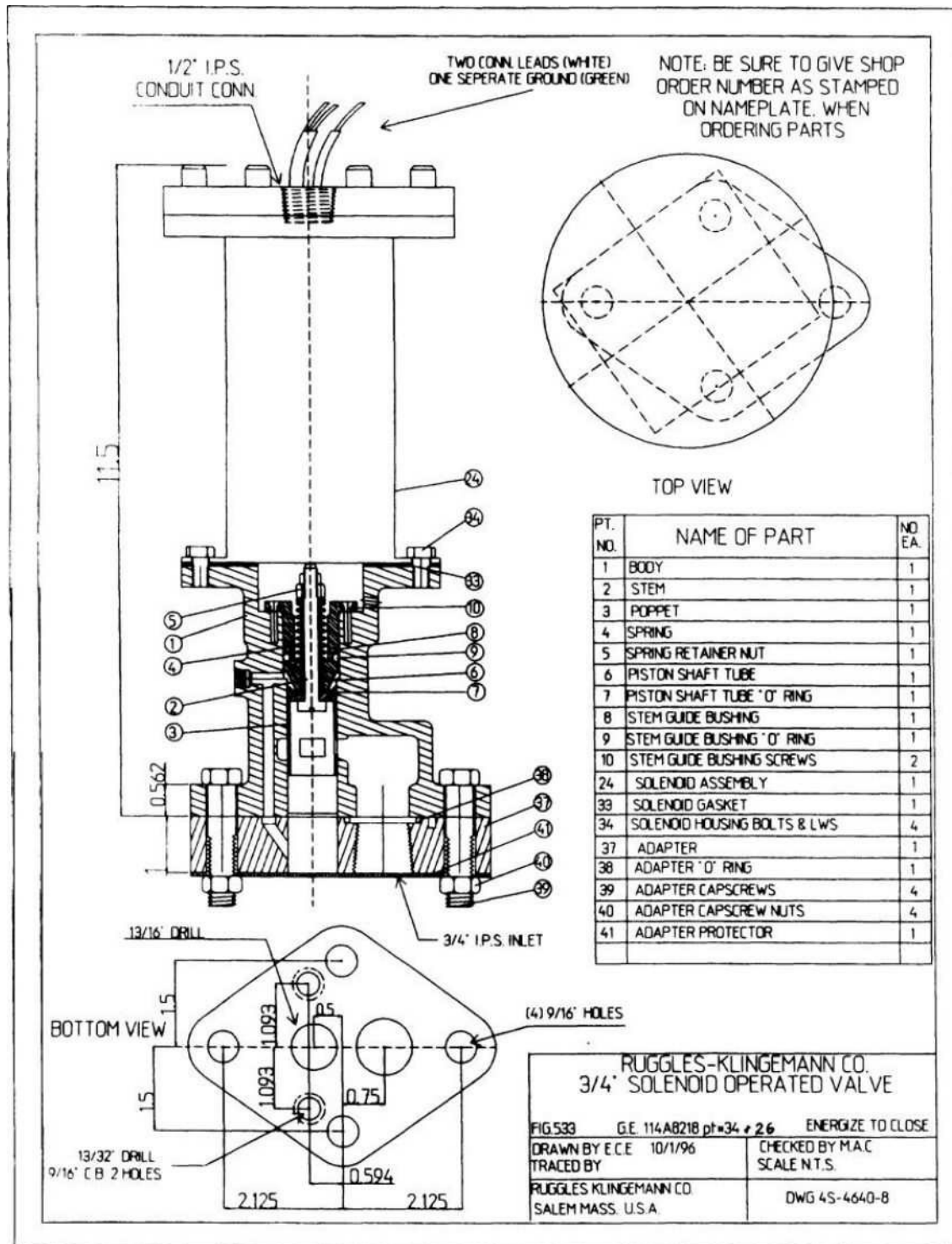


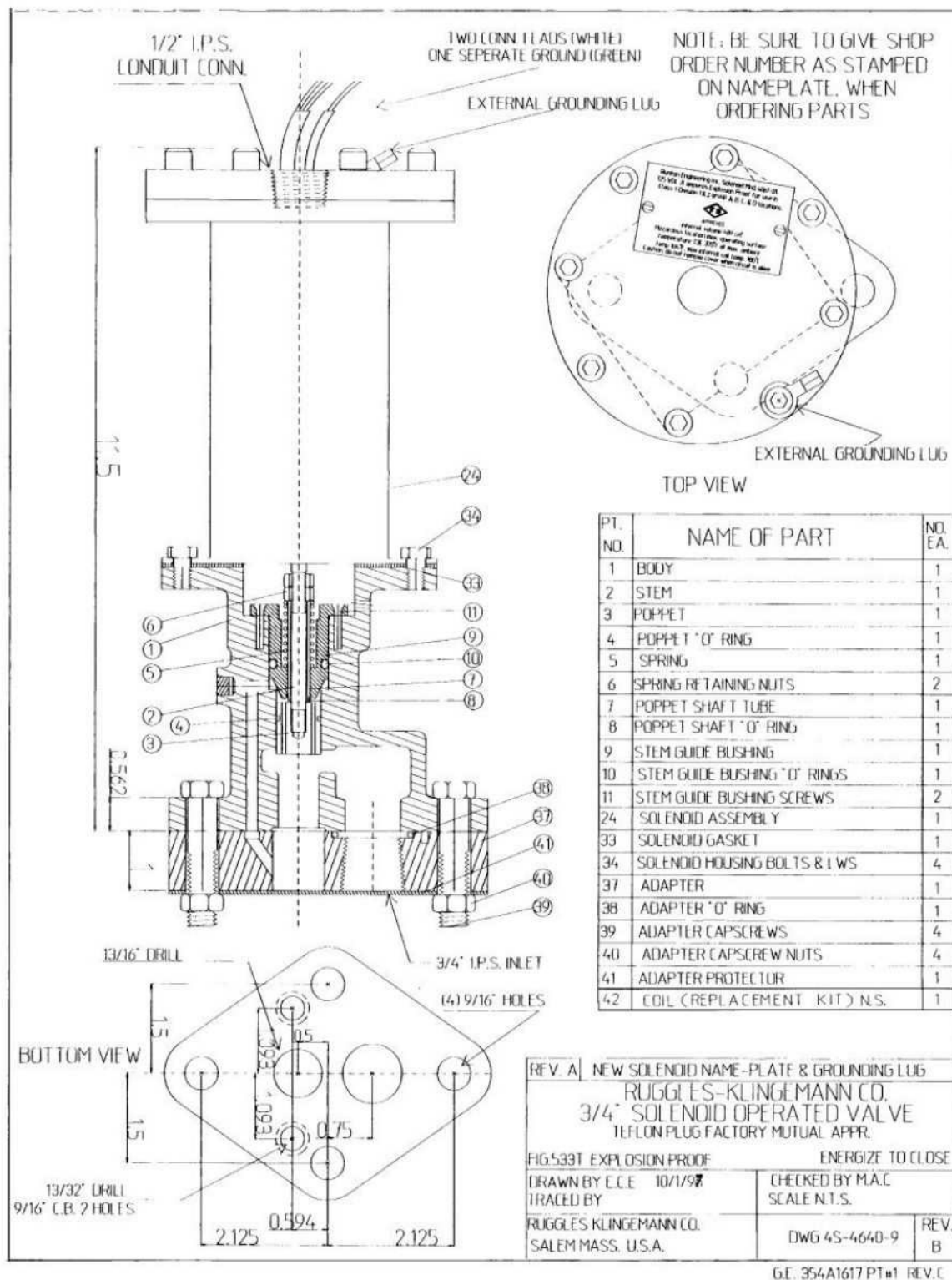
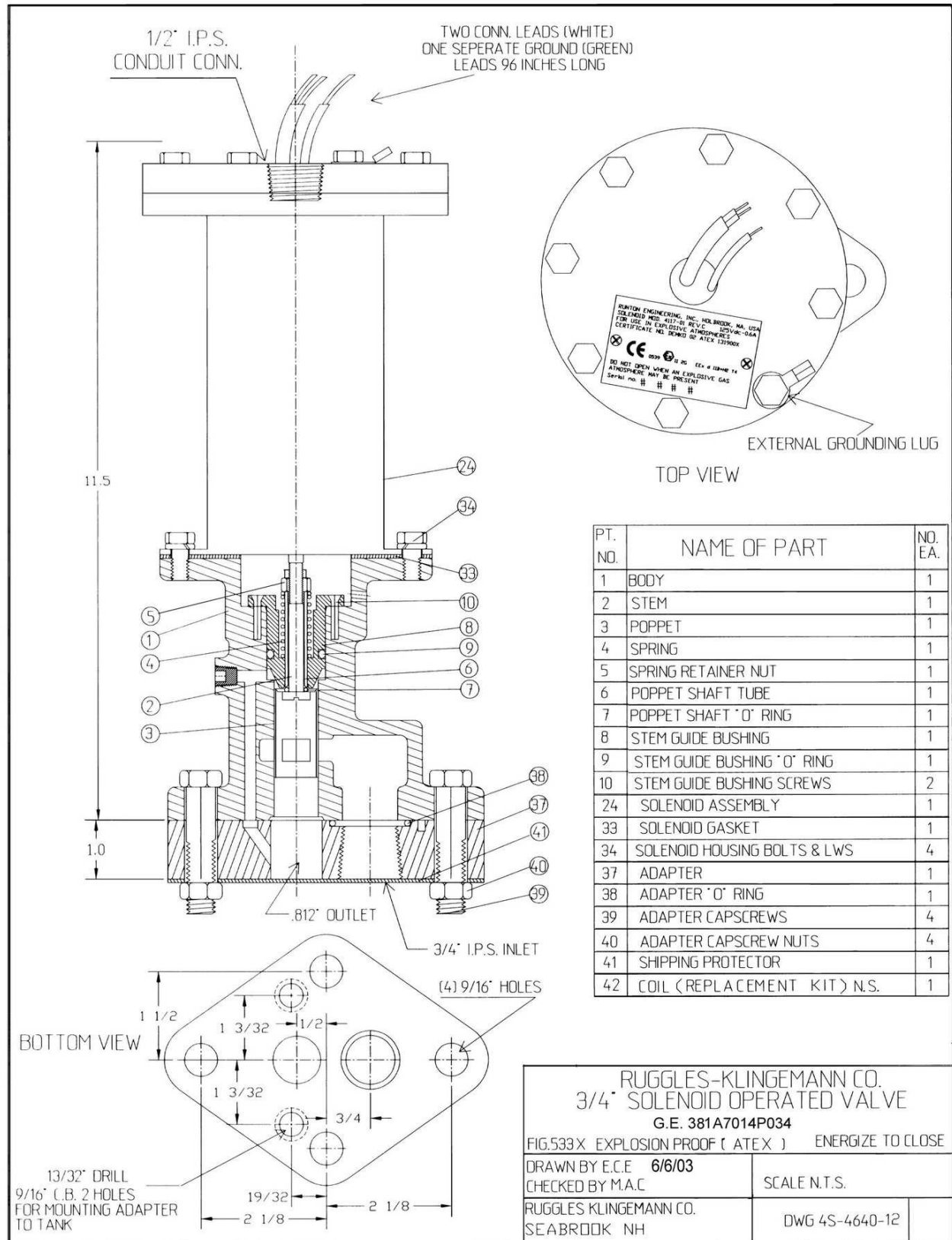
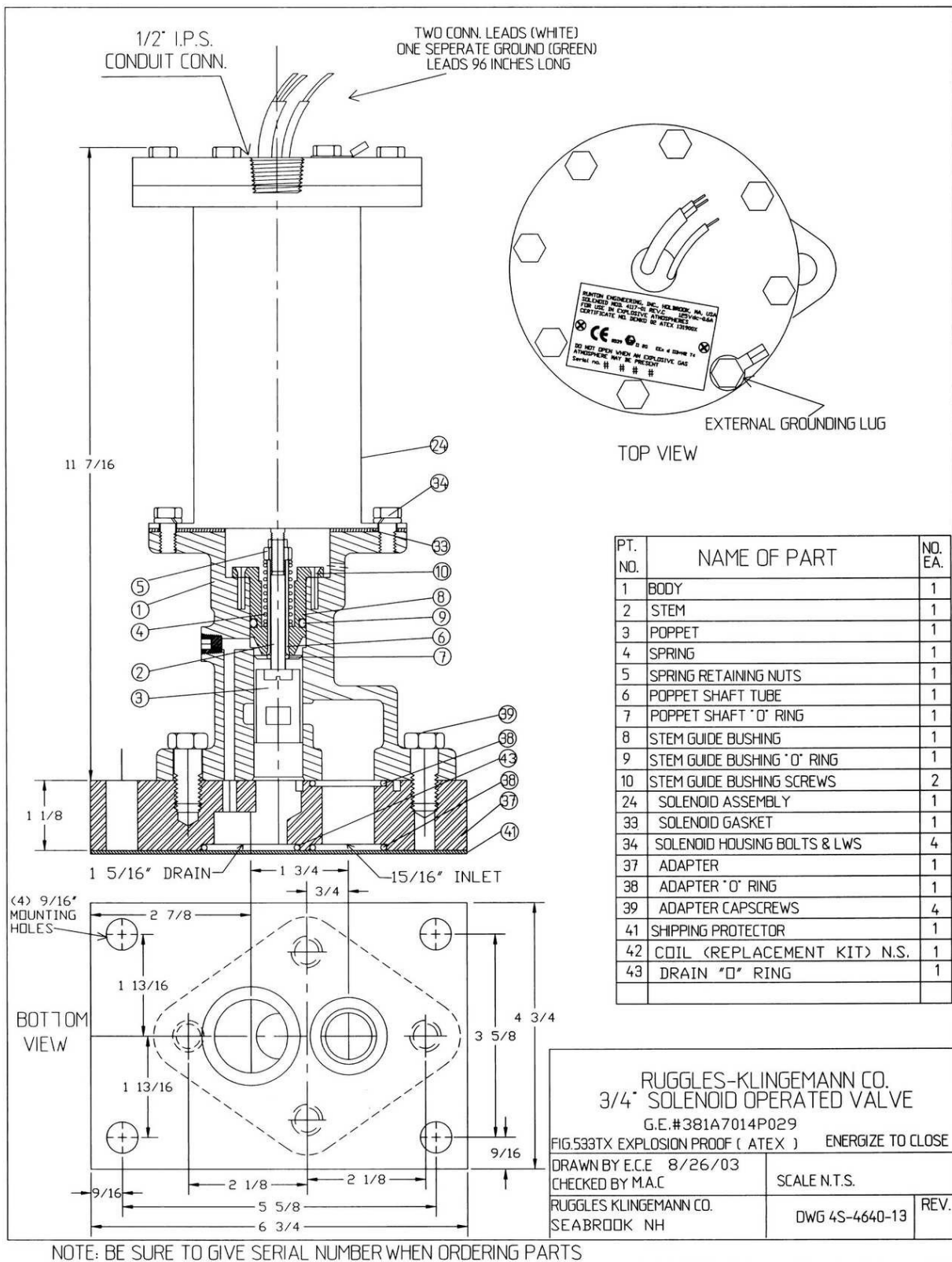
Fig. 533T — 3/4" Solenoid Operated Valve (Teflon Plug)

Fig. 533X — ATEX Explosion Proof Solenoid Dump Valve



NOTE: BE SURE TO GIVE SERIAL NUMBER WHEN ORDERING PARTS

Fig. 533TX — ATEX Solenoid Dump Valve (Teflon Plug)



02

SECTION 02

Fig. 645 Relief Valve

A 3/4" pilot-operated pressure relief valve with a set range of 100 to 3,000 psi. Sub-plate mounted for compact installation. Two sub-assembly design separates pilot and main poppet functions for stable regulation.

Fig. 645

3/4" Pilot-Operated Pressure Relief Valve · Sub-Plate Mounted

DWG: 3S-5472-P | BOM: BM10129 | BOOKLET: RKI-645

OVERVIEW

The Fig. 645 is a pilot-operated pressure regulator. The pilot valve (part 9) is a needle valve with an adjustable spring. It opens when fluid pressure forces the needle against the spring, bleeding excess pressure from above the main poppet (part 5), causing it to rise and open.

The valve is initially closed until inlet pressure reaches the maximum setting, then opens to dump fluid to the recirculation tank. Returns to closed when inlet pressure falls below setting.

Maintains a constant differential to outlet pressure. Outlet back pressure must not exceed 150 PSI above atmospheric.

REMOTE REGULATION

A remote pilot connected to the vent port can regulate pressures below the maximum set point. Remote valve must have a capacity of 1/2 GPM minimum.

SPECIFICATIONS

Connection Size	3/4"
Mounting	Sub-plate mounted
Pressure Range	100 to 3,000 PSI
Max. Back Pressure	150 PSI above atmospheric
Pressure Setting	Turn knob (Pt. 10) clockwise
Temp. Rise	~0.08 deg F per 100 PSI diff.
Operation	Pilot-operated, two sub-assemblies
Pilot Valve	Needle type, adjustable spring (Pt. 9)
Remote Pilot Flow	1/2 GPM minimum

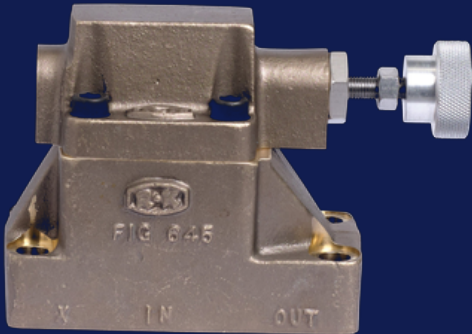


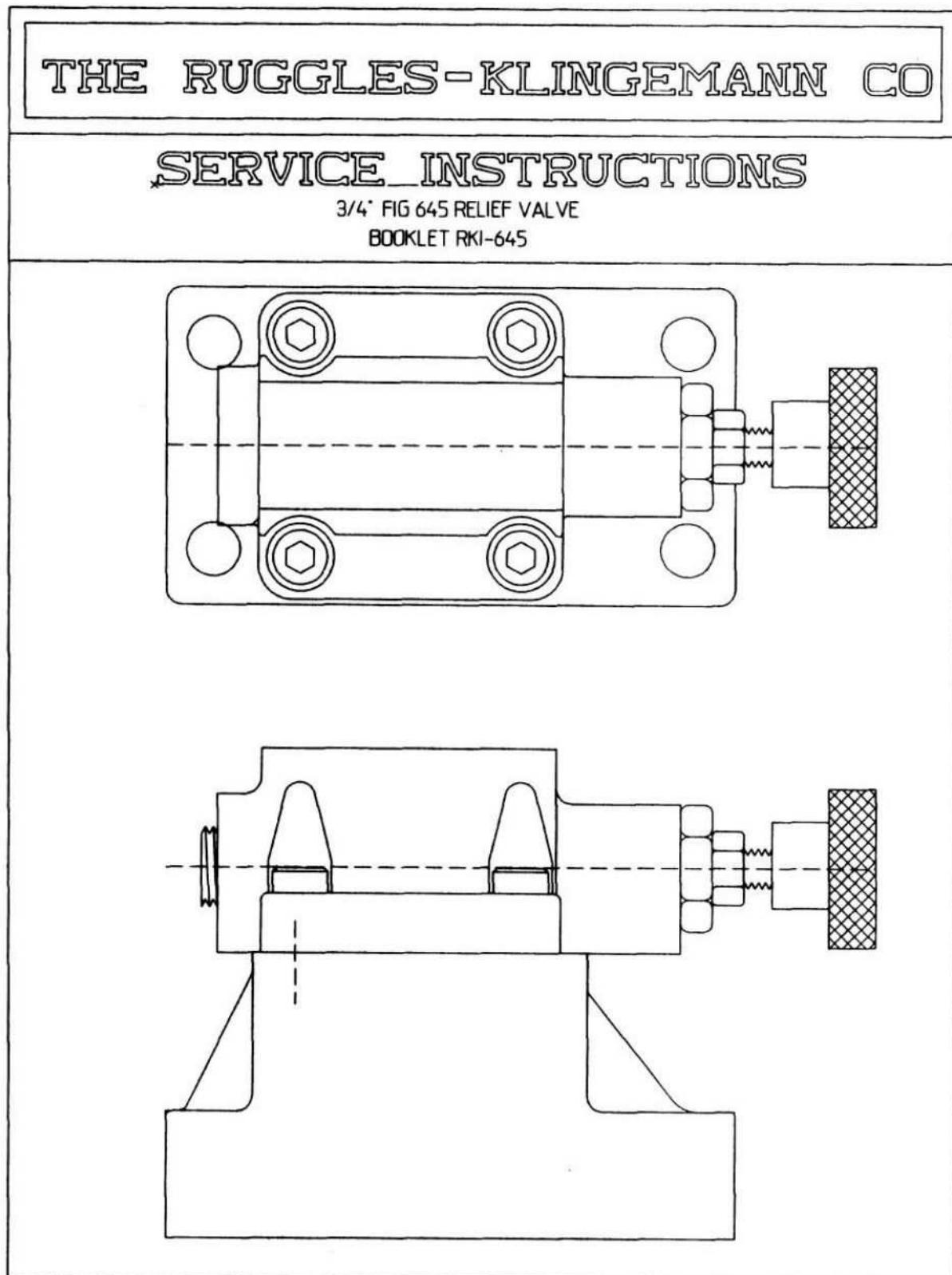
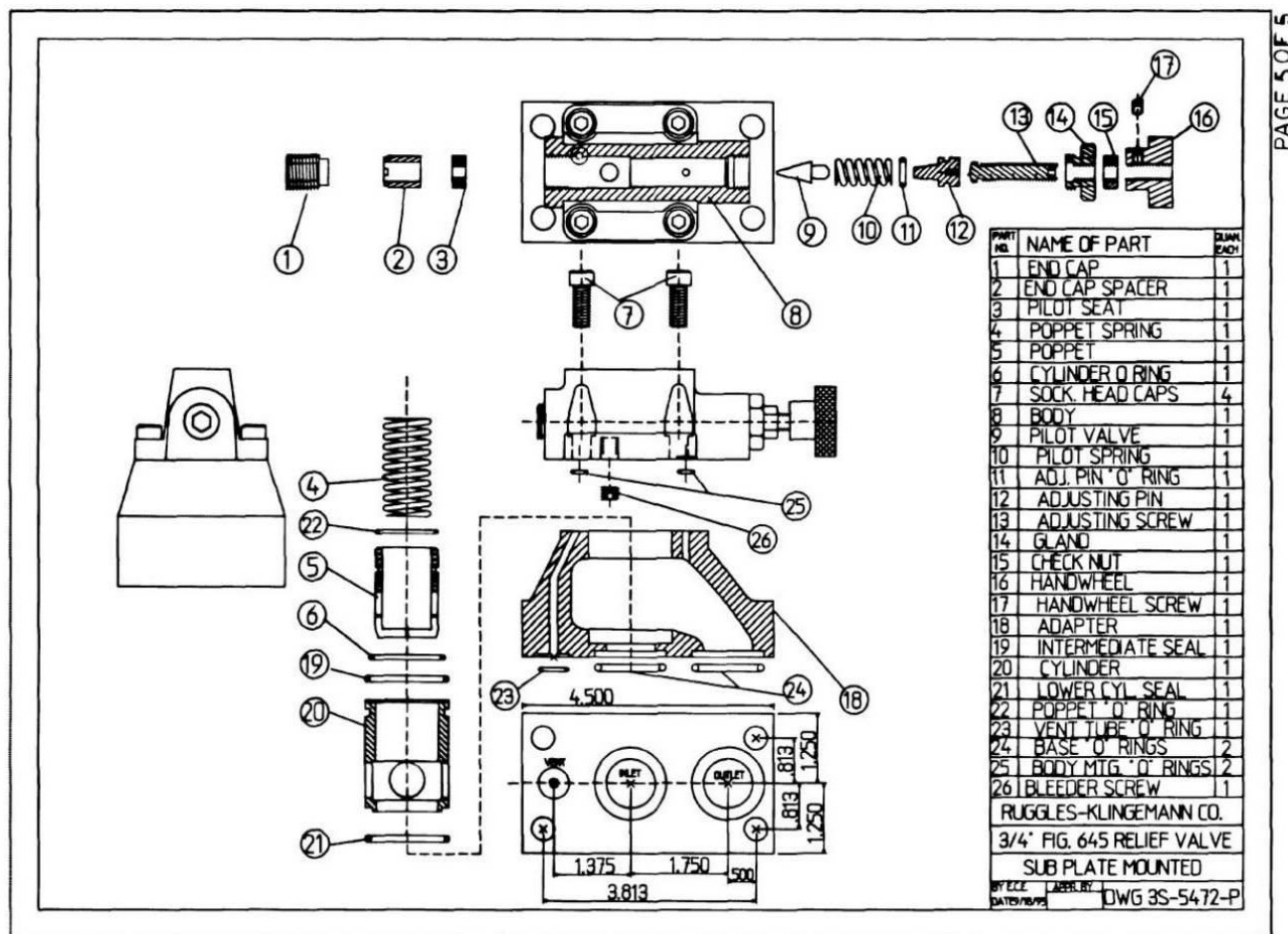
Fig. 645 — Service Instructions Drawing

Fig. 645 — Parts Breakdown (BOM)



PAGE 5 OF 5

B/M 10129

03

SECTION 03

Control Valves

The R-K 1" and 1-1/2" Control Valves are primarily used as pressure equalizing devices in shaft seal oil systems of hydrogen-cooled turbine generators. A 2" water column differential is sufficient to produce significant poppet travel and flow change.

1" & 1-1/2" Control Valves

Shaft Seal Oil System · Pressure Equalizing Device

DWG: 4G-3791-3 (1") | 4G-5203 (1-1/2") | REF: WEST. 19C1964

OVERVIEW

The R-K Control Valve controls flow volume using a piston assembly to translate system pressure forces into a linear force, positioning the poppet for more or less flow through the valve seats.

A differential of just 2 inches water column causes the poppet to travel approximately 0.375 inches, significantly changing flow volume.

An increase in air-side seal oil pressure causes the valve to increase flow. An increase in hydrogen-side pressure causes it to decrease flow, equalizing seal pressure.

FLOW RANGES

1" Valve	0.75 to 5 GPM
1-1/2" Valve	0.75 to 22 GPM

INSTALLATION

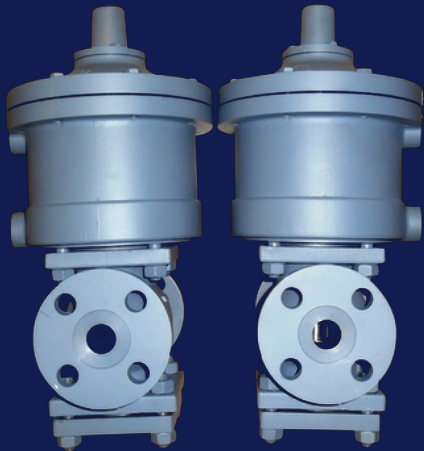
- Install horizontal; cylinder (Pt. 8) below body (Pt. 1)
- Body-nearest connection = hydrogen-side seal oil
- Farthest connection = air-side seal oil
- "OIL" nameplate affixed at air-side connection

SPECIFICATIONS

Sizes Available	1" and 1-1/2"
Feeler Connections	3/8" I.P.S. (any 90 deg orientation)
Sensitivity	2" H2O = ~0.375" poppet travel
Poppet/Seat Clearance	0.0005" to 0.0015"
Piston/Cylinder Clearance	0.002" to 0.004"
Standard Material	Steel (stainless available)
Installation	Horizontal; cylinder below body
Adjustment	Adjusting screw Pt. 22

MAINTENANCE NOTES

- Replace O-rings (Pts. 28 & 29) and cylinder cover gasket (Pt. 12) at every disassembly
- Use silicone grease on O-rings during installation
- Inspect poppet (Pt. 7) and seat rings (Pts. 5 & 6) for wear
- Allowable poppet-to-seat clearance: 0.0005" to 0.0015"



4 3/4' HOLES
ON 3 1/2" B.C.

11/16

1/16

4 7/8

2

3 15/16

13 1/4

3/8 I.P.S.
HYDROGEN
SIDE SEAL
OIL CONN.

3/8 I.P.S. AIR
SIDE SEAL
OIL CONN.

OIL TAG

NAMEPLATE

4 3/16

INLET TAG

PT. NO.	NAME OF PART	QTY
1	BODY	1
2	BOTTOM COVER	1
3	BOTTOM COVER STUD BOLTS	4
4	BOTTOM COVER STUD BOLT NUTS	8
5	• UPPER SEAT RING	1
6	• LOWER SEAT RING	1
7	• POPPET	1
8	CYLINDER	1
9	CYLINDER STUDS	4
10	CYLINDER STUD NUTS	4
11	CYLINDER COVER	1
12	▢ CYLINDER COVER GASKET	1
13	CYLINDER COVER CAPSCREWS	8
14		
15	PISTON	1
16	PISTON NUT	1
17	▢ PISTON SPRING	1
18	PISTON SPRING RETAINER	1
19	SPECIAL STEM NUTS	2
20		
21	STEM SPRING	1
22	ADJUSTING SCREW	1
23	ADJUSTING SCREW CHECKNUT	1
24	ADJUSTING SCREW CAP	1
25	ADJ. SCREW CAP CAPSCREWS	4
26	▢ "O" RING	1
27	• STEM	1
28	▢ BOTTOM COVER "O" RING	1
29	▢ CYLINDER COVER "O" RING	1
30	▢ ADJUSTING CAP GASKET	1

FEELER CONN.

FEELER CONN.

PT.2(L.H.)

PT.1(R.H.)

R-K
1" CONTROL VALVE

DRAWN BY E.C. 7/8/88
CHECKED BY MAC 3/9/92
THE RUGGLES-KLINGENMANN CO
SALEM MASS

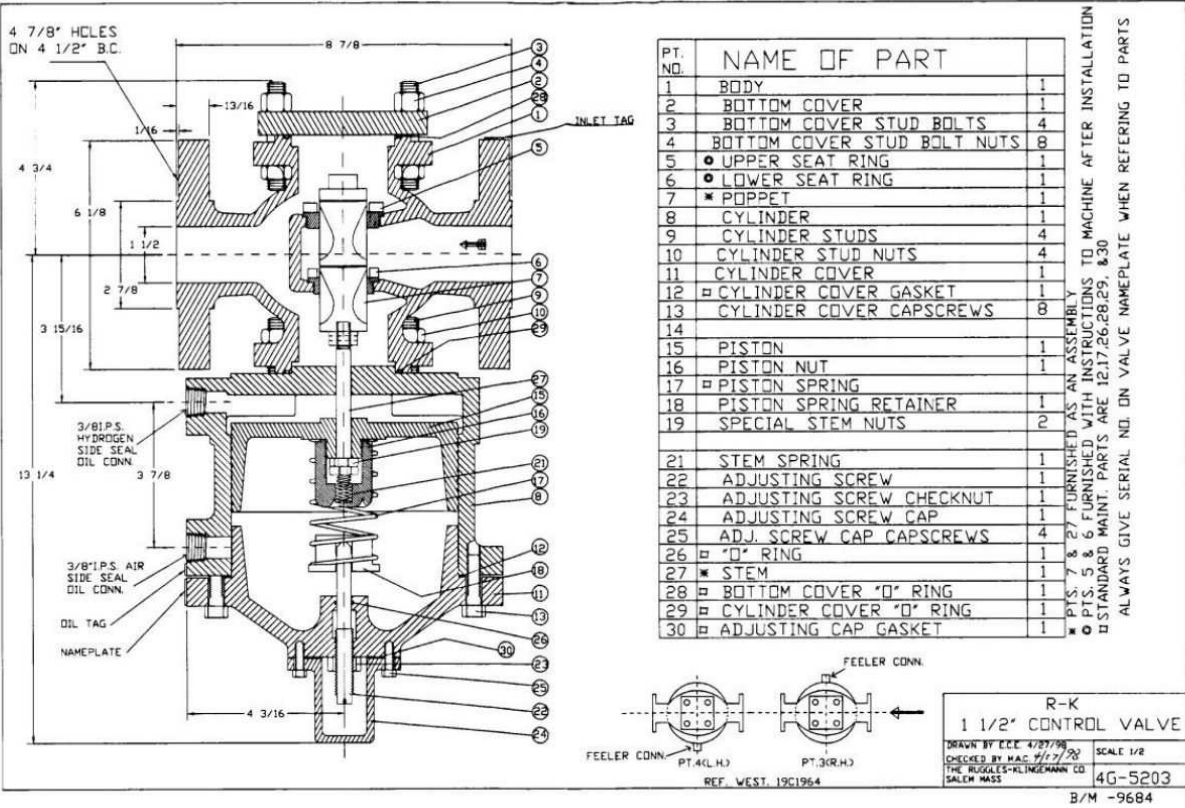
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REF. WEST. 19C1964

4G-3791-3

B/M -8394-1

1-1/2" Control Valve — Assembly Drawing



04

SECTION 04

Differential Pressure Regulators (DPR)

The R-K DPR series maintains oil pressure at turbine shaft seals above hydrogen pressure by a specified differential. Available in Normal (relief) and Emergency (back-up supply) configurations, 1-1/2" through 4".

Differential Pressure Regulators (DPR)

1-1/2" · 2" · 2-1/2" · 3" · 4" | Normal & Emergency

DWG: 3S-4697 / G-2857 / 3S-4573 / 3G-4580 / G-4536 / 3G-5116 / 3G-5117

OVERVIEW

The R-K DPR is used in turbine shaft seal oil systems for hydrogen-cooled generators. Seal oil is maintained at higher pressure than hydrogen gas, ensuring hydrogen containment within the generator by oil circulating around shaft ends.

Two configurations operate in a fail-safe system:

NORMAL — GROUP 1

Throttles bypass flow when H2 pressure rises, increasing system oil pressure until balance is restored. Opens to relieve excess oil pressure when H2 pressure falls.

EMERGENCY — GROUP 2

Opens when oil pressure is lost, allowing oil from an emergency supply to flow in, ensuring continuous supply to gland seals at all times.

KEY FEATURES

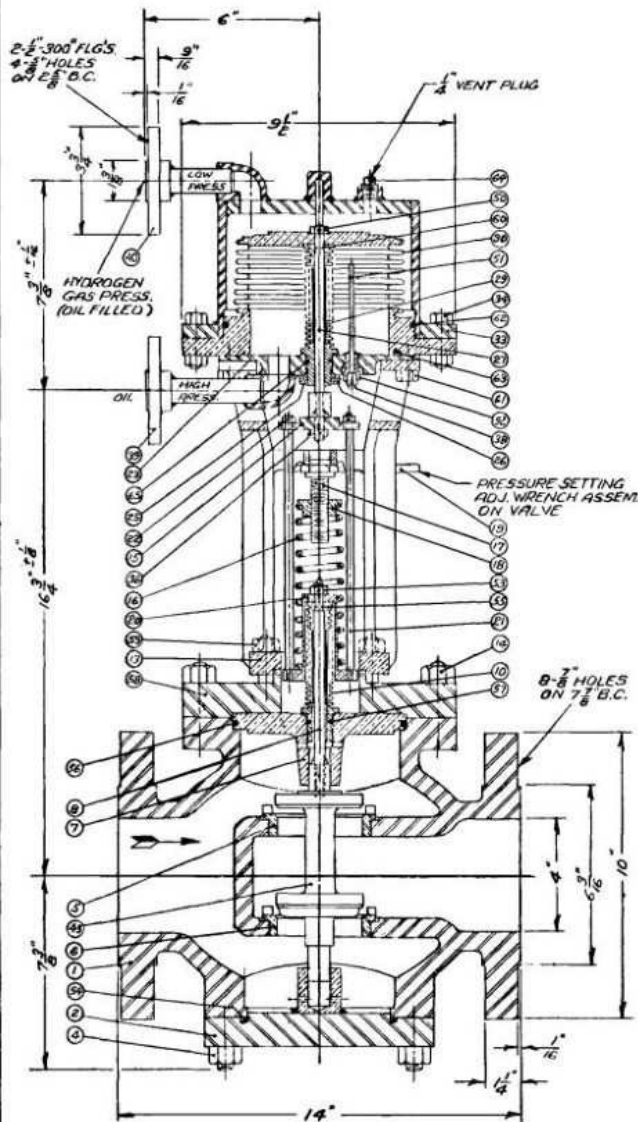
- Long-lasting bellows seals with metal seats
- Bellows rated 35 or 80 lbs. max (one side)
- Adjustable differential pressure via on-body wrench
- 300 lb. class flanges standard

SIZE & PERFORMANCE MATRIX

4" Normal (3G-5116)	250 GPM · 8-19 psi diff.
4" Emergency (3G-5117)	170 GPM · 5-13 psi diff.
3" Emergency (3G-5117)	170 GPM · 5-13 psi diff.
2-1/2" Normal (3G-4580)	81 GPM · 8-19 psi diff.
2-1/2" Emerg. (3G-4580)	90 GPM max · 5-13 psi
2" & 1-1/2" (3S-4573)	90 GPM max · 5-13 psi
3" Normal (G-4536)	140 GPM · 8-19 psi diff.
Bellows Max.	35 or 80 lbs. (one-side limit)
Flange Rating	300 lb. class standard



4" Normal Differential Regulator



* NORMAL DIFF. REGULATOR
250 GPM
8 TO 19 LBS. DIFF.
POPPET 4W-SPRING #14 - (.254" WIRE)

PT NO.	NAME OF PART	NO OF PTS
1	BODY	1
2	BOTTOM COVER	1
4	" " STUDS & NUTS	8/8
5	UPPER SEAT RING	1
6	LOWER SEAT RING	1
7	TOP COVER	1
8	LOWER STEM & STOP COLLAR	1
10	TOP COVER STUFFING BELLOWS ASSEM.	1
13	YOKER	1
14	YOKER ADAPTER STUDS & NUTS TO BODY	8/8
15	CROSS BAR	1
16	SPRING	1
17	" " ADJ. STUD	1
18	" " RETAINER	1
19	" " ADJ. WRENCH	1
20	" " RETAINER & BELLOWS PROTECTOR	1
21	TIE ROD	2
22	" " NUTS	2
23	LOWER PRESS. COVER	1
25	PRESS. HEAD STUFFING BELLOWS CHECKNUT	1
26	" " " " LOCKSCREW	1
27	" " " " STEM SPACER	1
29	PRESS. HEAD STUFFING BELLOWS ASSEM.	1
30	PRESS. BELLOWS ASSEM.	1
33	UPPER PRESS. COVER	1
34	" " CAPSCREWS & NUTS	8/8
36	PRESS. HEAD STEM NUT (LOWER)	1
38	PRESS. COVER VENT PLUG	1
39	LOWER PRESS. COVER FLG.	1
40	UPPER PRESS. COVER FLG.	1
45	POCKET	1
50	PRESS. HEAD STEM NUT (UPPER)	1
51	VENT TUBE	1
52	PRESS. COVER VENT	1
53	LOWER STEM NUT	1
54	BOTTOM COVER "O" RING	1
55	LOWER STEM "O" RING	1
56	TOP COVER "O" RING	1
57	" " STUFFING BELLOWS "O" RING	1
58	YOKER ADAPTER	1
59	" " STUDS & NUTS TO ADAPTER	8/8
60	PRESS. HEAD STUFFING BELLOWS STEM "O" RING	1
61	INFL. BELLOWS "O" RING TO YOKER CAPSCREWS & "W"	8/8
62	" " "O" RING (OUTER)	1
63	" " "O" RING (INNER)	1
64	UPPER PRESS. COVER VENT PLUG	1
65	PRESS. HEAD STUFFING BELLOWS "O" RING	1
66	LOWER PRESS. COVER DRAIN PLUG (NOT SHOWN)	1

WHEN ORDERING, SPECIFY VALVE GROUP (NO.)

GROUP 1 GROUP 2 GROUP 3 GROUP 4



RUGGLES-KLINGEMANN MFG. CO.
SALEM, MASS.

4" GOVERNOR

300" FLGS.

80" 22.70" BELLOWS

CRANBY
H.L.T. 5/16/82

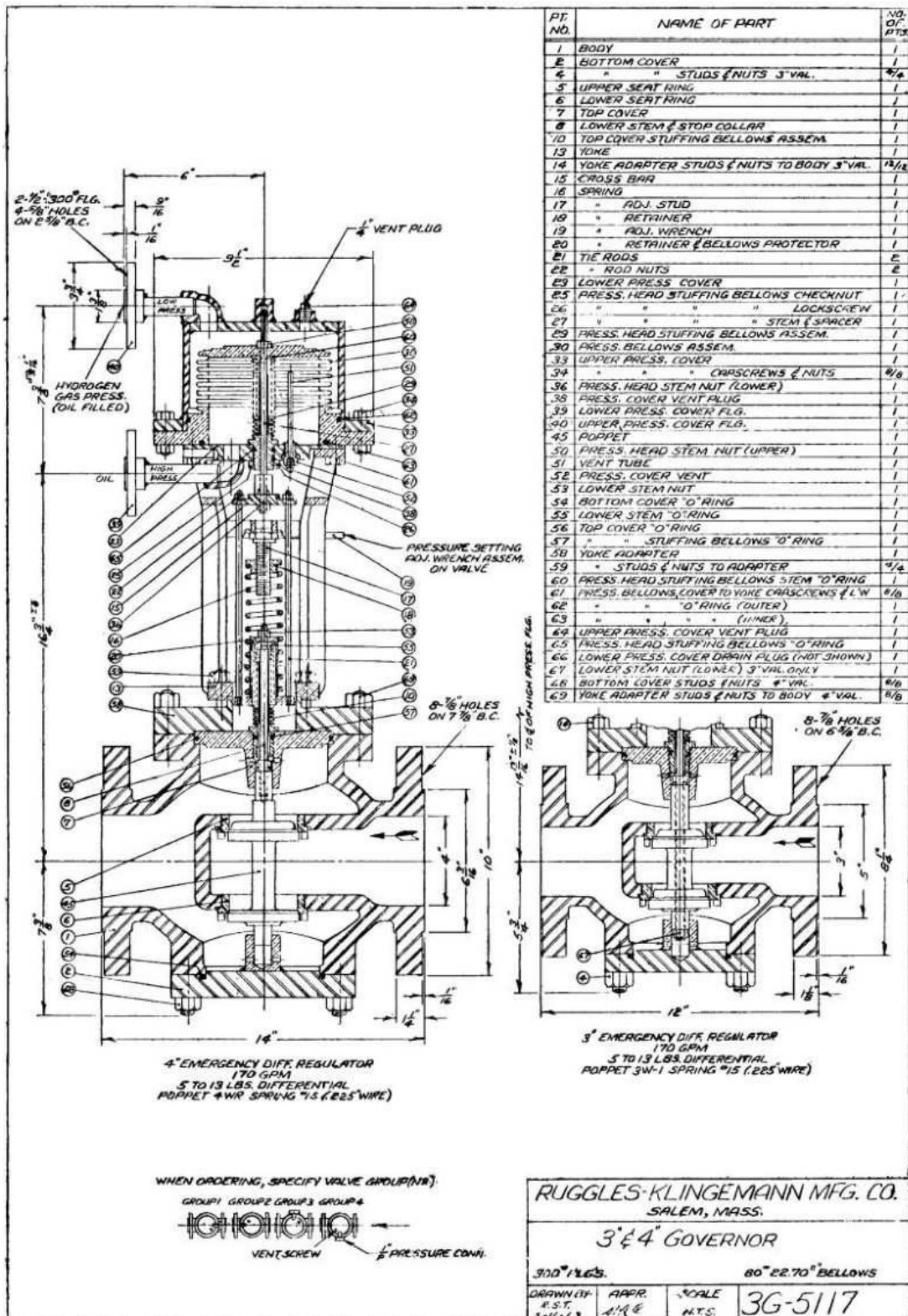
APPR.

SCALE

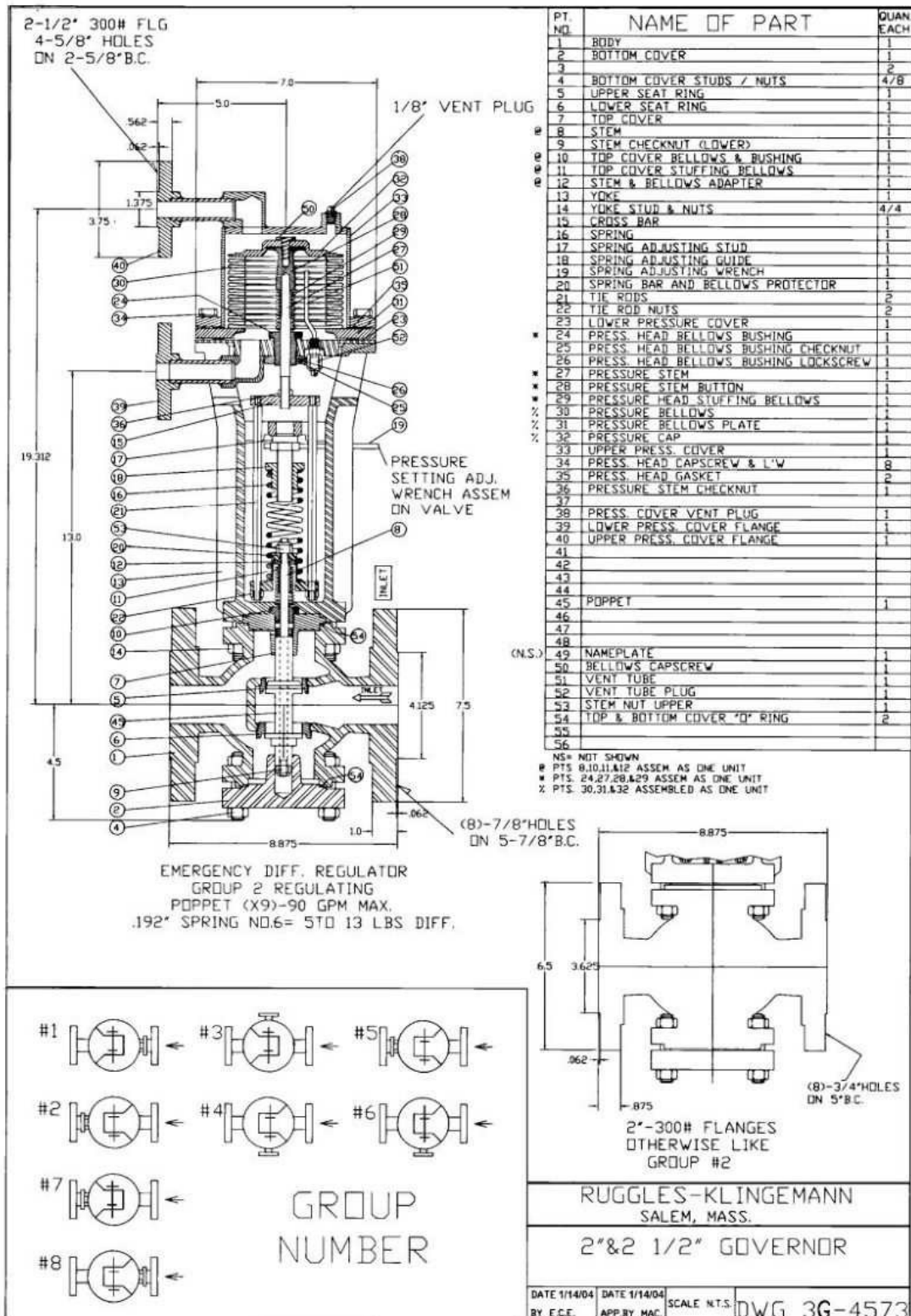
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WESTINGHOUSE DWG'S
893D644 & 4922D06

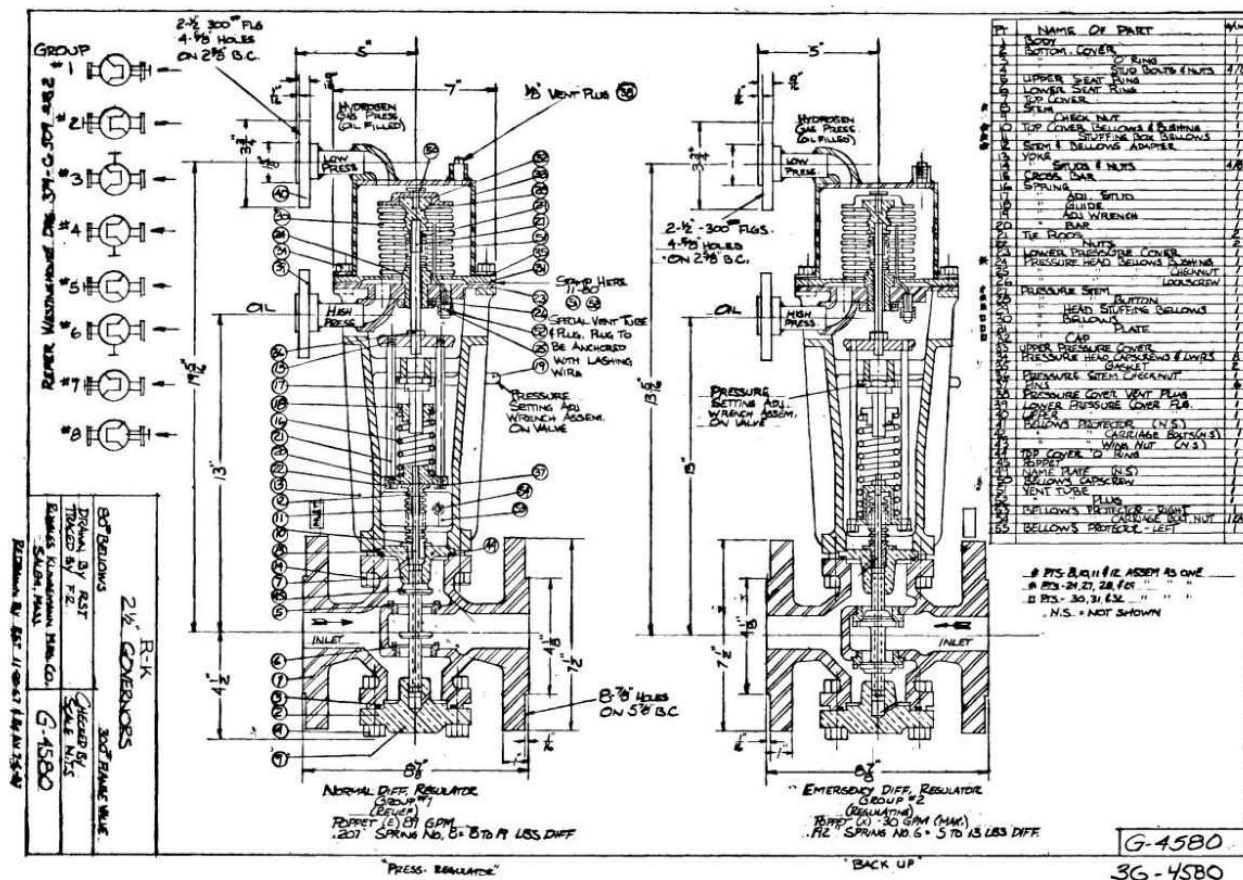
3" & 4" Emergency Differential Regulator



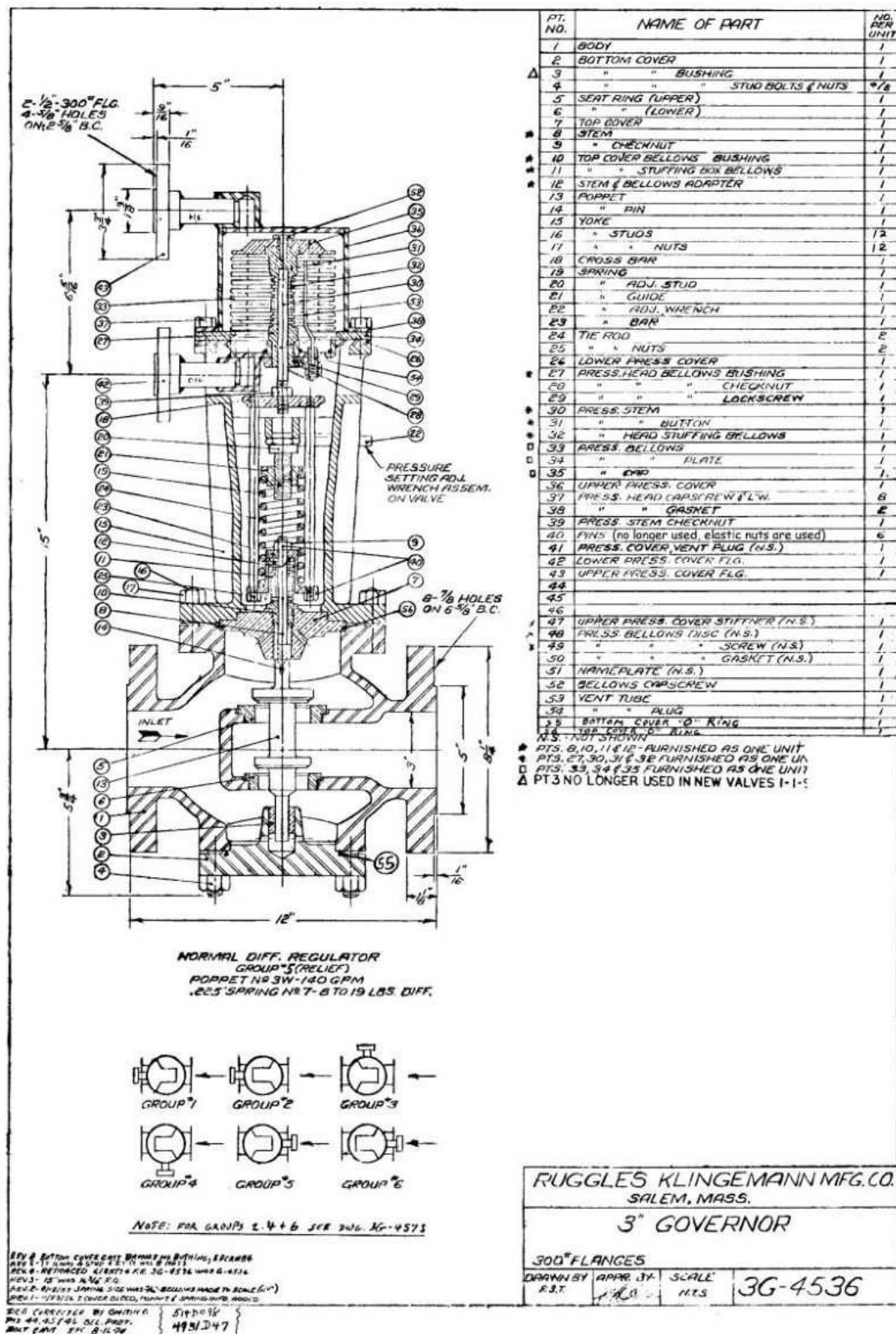
2" & 2-1/2" Differential Governor



2-1/2" Differential Governor (Normal & Emergency)



3" Normal Differential Governor



05

SECTION 05

Fig. 581 / 584 Governors

Originally designed to control oil flow to gland seals of hydrogen-cooled generators, the Fig. 581 (Flanged) and Fig. 584 (Weld-End) differential governors have broad application wherever differential pressures must be precisely controlled.

Fig. 581 & Fig. 584

Flanged / Socket Weld / Butt Weld Differential Governor · 1" to 4"

FIG. 581 — FLANGED | FIG. 584 — WELD-END

OVERVIEW

The R-K Differential Governor was originally designed to control oil flow to gland seals of hydrogen-cooled generators and has found wide application wherever differential pressures must be controlled in process and utility systems.

Available 1" to 4" in flanged, socket weld, or butt weld. Steel and stainless steel standard; other materials compatible with media available.

Features differential pressure setting adjustment at the top of the assembly, separate high and low pressure sensing connections, and vent plugs for controlled bleeding of sensing chambers.

PRESSURE CONNECTION GROUPS

Four orientations available — specify group number when ordering.

Group 1	Standard
Group 2	90 deg CW
Group 3	180 deg
Group 4	90 deg CCW

APPLICATIONS

- Oil flow control to gland seals of hydrogen-cooled turbine generators
- Differential pressure control in steam turbine lube oil systems
- Any application requiring precise differential pressure regulation

SPECIFICATIONS

Size Range	1" to 4"
End Connections	Flanged (581) / Socket or Butt Weld (584)
Std. Materials	Steel or Stainless Steel
Alt. Materials	Consult factory
Sensing Ports	Hi & Lo pressure, 4 orientations
Adjustment	Diff. pressure setting at top
Vent Plugs	Two — for chamber bleeding
Detail Drawings	Available on request

CONSTRUCTION DETAILS

- Fig. 581: Flanged per ASME standards, all pressure classes
- Fig. 584: Socket weld or butt weld end connections
- Dimension drawings available on request



Fig. 581 / 584 — Differential Governor Data Sheet



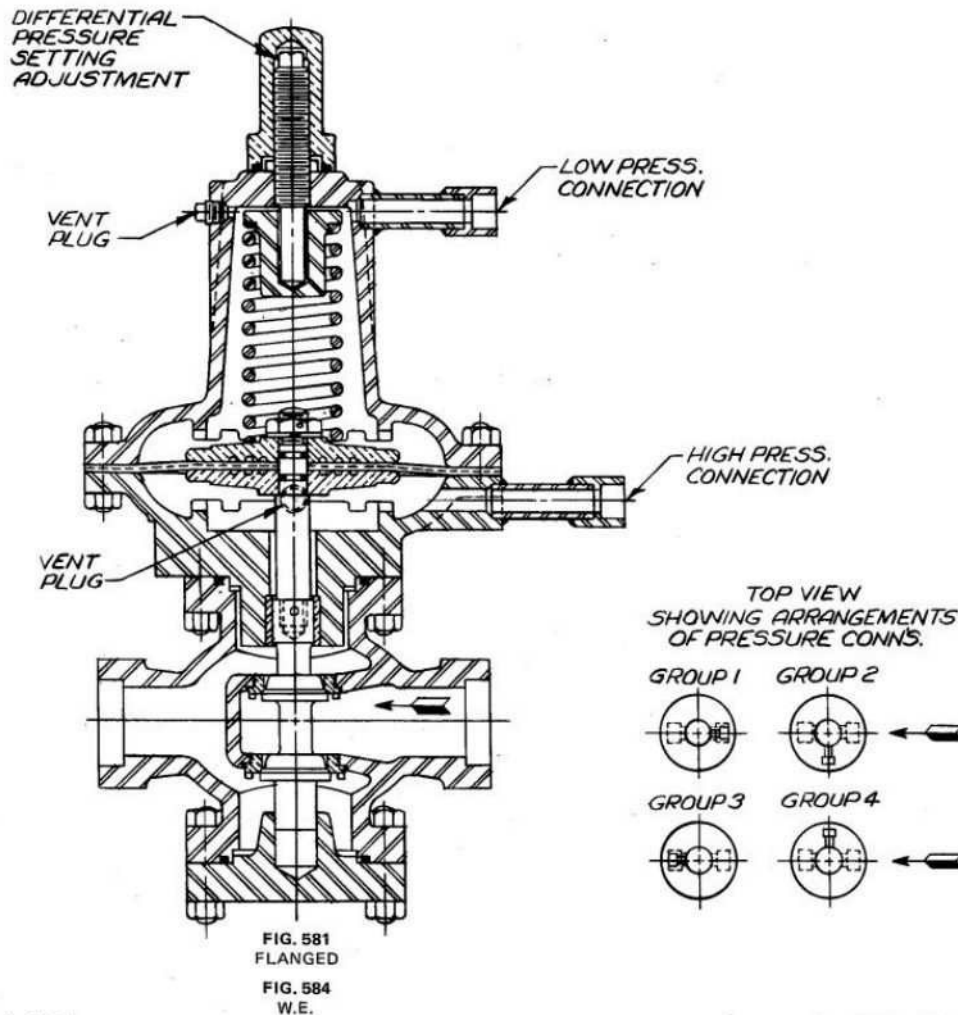
DIFFERENTIAL GOVERNOR

Originally designed to control oil flow to gland seals of hydrogen cooled generators—but has many other applications where differential pressures must be controlled.

1" to 4" flanged, socket weld or butt weld available. Detail dimension drawings on request. Steel and stainless steel normal construction. Other materials compatible with media handled also available.

ORDERING INSTRUCTIONS

When ordering specify GPM, media, viscosity, and specific gravity to be controlled. High, low, and differential pressures.



Litho in U.S.A.

Data Subject To Change



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