THIS PRINT IS PROVIDED ON A RESTRICTED BASIS AND IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO SOLAR TURBINES INCORPORATED.

SHEET	5	4	3	2	1
REV	A		A	A	A

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED
	N/C	INITIAL SUBMITTAL (ERC)	08-08-00	DEPAZ
	A	REVISED TO REFLECT AS SHIPPED CONFIGURATION. (ERC) f.t.	01-02-01	DEPAZ

NOTES:

1. SYMBOLS IN THE LEGEND ARE DERIVED FROM ISO STANDARD 1219 (ANSI Y32.10) AND ARE CONSIDERED BASIC STANDARDS. NOT ALL SYMBOLS MAY BE USED ON THIS DRAWING. SYMBOLS SHOWN MAY BE COMBINED.

2. PIPE AND TUBE SIZES SHOWN ARE MINIMUM. ACTUAL SIZES MAY BE LARGER EXCEPT AS NOTED. ALL LINE SIZES ARE IN INCHES. NO METRIC EQUIVALENTS HAVE BEEN ADOPTED.

3. EXTERNAL CONNECTION. REFER TO MECHANICAL INSTALLATION DRAWING 59111-149223 FOR PHYSICAL LOCATION OF CIRCLED CONNECTION POINTS IDENTIFIED BY NUMBER. (FOR EXAMPLE: (2)).

4. CUSTOMER FURNISHED PIPING.

5. LOOSE SHIPPED FOR SITE INSTALLATION.

6. REFERENCE ENGINE DRAIN SYSTEM SCHEMATIC 59111-B149543.

7. EXTERNAL PIPING IS TO BE VERIFIED TO BE CLEAN OF DIRT AND RUST PRIOR TO MAKING CONNECTIONS TO TURBOMACHINERY FLANGES OR EXTERNALLY MOUNTED OIL COOLERS. UNDER NO CIRCUMSTANCES IS PIPING TO BE CLEANED AFTER CONNECTIONS ARE MADE TO THE TURBINE OR OIL COOLERS.

8. REFERENCE ONLY. PART OF ENGINE ASSEMBLY.

LEGEND

(REFERENCE INDICATORS)

FLUID LINES

SYMBOL	DESCRIPTION
	MAIN LINE
	BRANCH LINE
	PILOT/CONTROL LINE
	DRAIN/VENT LINE
	FLEXIBLE LINE/JOINT
	ENCLOSURE/MODULE OUTLINE
	COMPONENT GROUPING
	LINES CROSSING
	LINES JOINING
	PORT, BLANK FLANGED
	PORT, PLUGGED
	FLOW DIRECTION (HYDRAULIC)
	FLOW DIRECTION (PNEUMATIC)
	REDUCER/ENLARGER
	FLANGED CONNECTION
	QUICK DISCONNECT CONNECTION
	THREADED OR WELDED CONNECTION
	VENT
	DRAIN, BELOW FLUID LEVEL
	DRAIN, ABOVE FLUID LEVEL
	DISTRIBUTION BLOCK/MANIFOLD

ACTUATORS CONTROLS AND COMPONENTS

SYMBOL	DESCRIPTION
	SPRING
	SPRING ASSEMBLY, (ADJUSTABLE)
	LEVER, MANUAL
	PUSHBUTTON, MANUAL
	FLOAT
	BEARING, JOURNAL/ROLLER
	BEARING, BALL
	BEARING, THRUST
	SEAL
	LABYRINTH SEAL
	THERMAL, REMOTE
	THERMAL, LOCAL
	ROTATING SHAFT
	FAN
	SOLENOID
	REMOTE PILOT
	INTERNAL PILOT
	SERVO
	VARIABLE
	PRESSURE COMPENSATED

FLUID DEVICES

LETTER CODE	SYMBOL	DESCRIPTION
AC		ACCUMULATOR
ACP		ACCUMULATOR, EXTERNALLY LOADED
ACP		ACCUMULATOR, PRE-LOADED
AO		ADJUSTABLE ORIFICE
AT		AIR TANK
B	M	MOTOR, ELECTRIC (AC OR DC)
BP	M	PUMP/MOTOR ASSEMBLY (AC OR DC)
CYL		CYLINDER/LINEAR ACTUATOR
CYL		CYLINDER/LINEAR ACTUATOR, SPRING RETRACTED
CYL		CYLINDER, ROTARY ACTUATOR
E	M	ENGINE, COMBUSTION
FG	FG	FLOW, SIGHT GLASS
FM		FLOW METER
FO		FIXED ORIFICE
FA		FLAME ARRESTOR
FS		FILTER/STRAINER
FSA		FILTER/COALESCER, AUTOMATIC DRAIN TRAP
FSA		FILTER/COALESCER, MANUAL DRAIN TRAP

LETTER CODE	SYMBOL	DESCRIPTION
FSA		DRAINER/COALESCER, AUTOMATIC DRAIN TRAP
		PANEL MOUNTED (ANY INSTRUMENT)
H		HEATER
HX		HEAT EXCHANGER
L		SOLENOID VALVE, 2 POSITION (TYP.)
L		SOLENOID VALVE, 3 POSITION (TYP.)
L		SERVO VALVE (PROPORTIONAL)
LG	LG	LEVEL SIGHT GLASS
LI		LEVEL INDICATOR
LU		LUBRICATOR
M		MOTOR, FLUID
M		MOTOR, PNEUMATIC
MU		MUFFLER/SILENCER
		NOZZLE, FLUID
P		PUMP, FLUID
P		PUMP, PNEUMATIC (COMPRESSOR/BLOWER)
P		PUMP, FLUID DRIVEN (INTEGRAL UNIT) (PROPORTIONAL)
PCV		VALVE, PRESSURE CONTROL (N.O.) (PROPORTIONAL)

LETTER CODE	SYMBOL	DESCRIPTION
PCV		VALVE, PRESSURE CONTROL (N.C.)
PDI		DIFFERENTIAL PRESSURE INDICATOR
PDI		DIFFERENTIAL PRESSURE INDICATOR (POP-UP BUTTON)
PI		PRESSURE INDICATOR
		FLOW SENSOR
R		RESERVOIR
R		RESERVOIR, LIQUID DRAINER
RT	RTD	RTD
S		SWITCH, PRESSURE
S		SWITCH, TEMPERATURE
S		SWITCH, LEVEL
S		SWITCH, DIFFERENTIAL PRESSURE
TB		THERMAL BARRIER
TC	TC	THERMOCOUPLE
TCV		TEMPERATURE CONTROL VALVE (PROPORTIONAL)
TF		TRANSMITTER, FLOW
TI		TEMPERATURE INDICATOR
TP		TRANSMITTER, PRESSURE

LETTER CODE	SYMBOL	DESCRIPTION
TPD		TRANSMITTER, ΔP
TV		PROXIMITER
TW	TW	THERMOWELL
VCH		VALVE, CHECK
VCS		VALVE, CHECK SPRING LOADED
VF		VALVE, FLOAT CONTROLLED
VGL		VALVE GAS LOADER (PROPORTIONAL)
VH		VALVE, HAND, 2-WAY
VH		VALVE, HAND, 3-WAY
VI		VALVE, INSTRUMENT
VFD		VARIABLE FREQUENCY DRIVER
VLF		VALVE, LIQUID FUEL REGULATING (PROPORTIONAL)
VMF		VALVE, FLOW MODULATING (PROPORTIONAL)
VR		VALVE, RELIEF
VT		VALVE, TRANSFER
V2P		VALVE, 2 POSITION
V3P		VALVE, 3 POSITION
Z		PRECIPITATOR, ELECTROSTATIC
Z		CONDUCTIVITY SENSOR

CUSTOMER
NETWORK ELECTRIC CONGRESS

☒	SUBMITTED FOR REVIEW	DATE 08-14-00
☐	CERTIFIED AS NOTED WITH ( )	DATE
☒	CERTIFIED FOR CONSTRUCTION	DATE 01-03-01

SYMBOLS

- (2) DENOTES EXTERNAL CONNECTION POINT
- 2 INDICATES REFERENCE TO NOTE
- A DENOTES REVISION
- 2 DENOTES COMPONENT OR INSTRUMENTATION
- A/12 DENOTES DRAWING ZONE LOCATION

FSCM NO. 66195	*THIS IS A PROPRIETARY DESIGN OF SOLAR TURBINES INCORPORATED. REPRODUCTION, MANUFACTURE OR USE OF ANY ASSEMBLY, SUBASSEMBLY OR PART INDICATED HEREIN OR THE USE OF THE DESIGN OF ANY SUCH ASSEMBLY, SUBASSEMBLY OR PART, IS PERMISSIBLE ONLY IF EXPRESSLY AUTHORIZED IN WRITING BY SOLAR TURBINES INCORPORATED.*
APPROVED	DRAWING TITLE: TAURUS 60 IPG GENERATOR SET LUBE OIL SYSTEM SCHEMATIC
PROJECT J. PLESCIA 08-14-00	
DESIGN I. DEPAZ 08-08-00	
CHECK W. LELAND 08-15-00	
DRAFT J.B. BANKS 08-15-00	Solar® Turbines — A Caterpillar Company
SOLAR PROJECT ITEM NO. 2-59111	
CUSTOMER IDENT. NO.	
CUSTOMER SEE ABOVE	DRAWING NO. 59111-B149544 REV A
	SHEET 1 OF 5

SCHEMATIC FUNCTIONAL COMPONENT TABLE

REFERENCE DESIGNATOR	DRAWING ZONE	COMPONENT PART NUMBER	UNIQUE	COMPONENT DESCRIPTION	COMPONENT FUNCTION	COMPONENT SETTING	SYSTEM NORMAL OR OPERATING DESIGN VALUE	NOTES
B321	C37	PART OF BP902		MOTOR, AC	PRE/POST LUBE PUMP DRIVER		460 VAC, 2 HP, 3Ø, 60 HZ, 1750 RPM, 2.9 FLA SPACE HEATER: 115 VAC, 1Ø, 60 HZ, 30 WATTS	
B322	B37	186408-1		MOTOR, DC	BACKUP POST LUBE PUMP DRIVE		120 VDC, 1.5 HP (1.1 KW), 1750 RPM, 13 FLA	
A B598-1	E35	PART OF HX901-1		MOTOR, AC	OIL COOLER FAN		460 VAC, 5 HP (3.73 KW), 3Ø, 60 HZ, 1750 RPM SPACE HEATER: 115 VAC, 25 WATTS	
BP902	D37	190855-500		PUMP/AC MOTOR ASSEMBLY WITH RELIEF VALVE	PRE/POST LUBE SUPPLY	15 PSIG CRACKING PRESSURE	31.5 GPM AT 15 PSIG	
CYL901	H35	964527C2		CYLINDER, HYDRAULIC	GUIDE VANE ACTUATOR	4 INCH STROKE, 3.25 INCH BORE	MAXIMUM OPERATING PRESSURE: 150 PSIG	8
FG901-1	H35	120111-5 (2 EACH)		GAGE, SIGHT	TURBINE BEARING OIL DRAIN			
FG901-2	H35	120111-5 (2 EACH)		GAGE, SIGHT	TURBINE BEARING OIL DRAIN			
FG901-3	H32	960913C1		GAGE, SIGHT	GENERATOR DRAIN, SHAFT END			
FG901-4	H32	960913C1		GAGE, SIGHT	GENERATOR DRAIN, EXCITER END			
FO901	E35	PART OF HX901-1		ORIFICE, FIXED	LUBE OIL COOLER VACUUM BREAK	0.125 INCH DIAMETER ORIFICE		
A FO902-1	G32	124427-3402		ORIFICE, FIXED	GENERATOR SUPPLY, SHAFT END	0.094 INCH DIAMETER ORIFICE	1.3-1.5 GPM AT 55 PSIG (HEADER PRESSURE)	
A FO902-2	G32	124427-3402		ORIFICE, FIXED	GENERATOR SUPPLY, EXCITER END	0.094 INCH DIAMETER ORIFICE	1.3-1.5 GPM AT 55 PSIG (HEADER PRESSURE)	
FS901-1	D33	190549-101 190181-1		FILTER HOUSING FILTER ELEMENT KIT	MAIN LUBE FILTER	5 MICRON NOMINAL	150 PSIG MAXIMUM	
FS901-2	D32	190549-101 190181-1		FILTER HOUSING FILTER ELEMENT KIT	MAIN LUBE FILTER	5 MICRON NOMINAL	150 PSIG MAXIMUM	
FS903-2	E35	186211-1		FILTER	ACTUATORS	10 MICRON NOMINAL	150 PSIG MAXIMUM	
FS975-1	B37	190187-100		STRAINER	TANK FILL	20 MESH		
FSA901	C38	1030923-1		SEPARATOR, AIR/OIL	TANK VENT		130 SCFM, 95% EFFICIENT	5
H390-1	A36	186220-26		HEATER WITH THERMOSTAT	MAINTAIN LUBE TANK TEMPERATURE	SET THERMOSTAT TO MAXIMUM SETTING; BACKUP PROTECTION ONLY	4.5 KW, 460 VAC, 3Ø	
HX901-1	E35	1024568-6		COOLER, AIR/OIL	LUBE OIL COOLING		110°F MAXIMUM AMBIENT	5
L339	G35	1016391-2		VALVE, CONTROL, SOLENOID OPERATED	GUIDE VANE ACTUATOR DIRECTIONAL CONTROL		150 PSIG MAXIMUM	
LG901	A38	REFERENCE (190671-400)		SIGHT GLASS, LEVEL	LUBE OIL TANK LEVEL			
P901	B35	186204-1		PUMP, HYDRAULIC 2-ELEMENTS	LUBE SUPPLY		150 PSIG, 140 GPM, 2000 RPM	
P903	C37	186215-1		PUMP, HYDRAULIC, WITH RELIEF VALVE	BACKUP POST LUBE, DC MOTOR DRIVEN		15 PSIG, 23 GPM, 1750 RPM	
PCV901	B34	PART OF VMF921 (REF. 1008942-6)		VALVE, PRESSURE CONTROL	MAIN LUBE PRESSURE CONTROL	55 PSIG	55 PSIG NOMINAL	

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DRAWING NO. 59111-B149544 | REV A | SHEET 2

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SCHEMATIC FUNCTIONAL COMPONENT TABLE

REFERENCE DESIGNATOR	DRAWING ZONE	COMPONENT PART NUMBER	UNIQUE (6)	COMPONENT DESCRIPTION	COMPONENT FUNCTION	COMPONENT SETTING	SYSTEM NORMAL OR OPERATING DESIGN VALUE	NOTES
R901	A35	PART OF SKID		RESERVOIR, LUBE OIL	OIL STORAGE		NORMAL OPERATING RANGE: 340-460 GALLONS	
RT380	E33	964192C1		RTD	LUBE OIL HEADER TEMPERATURE	155°F ALARM 165°F SHUTDOWN	100 OHM PLATINUM	
RT390	A32	959839C1		RTD	MONITOR LUBE OIL TANK TEMPERATURE AND HEATER CONTROL	HEATER ON 65°F HEATER OFF 70°F	100 OHM PLATINUM	
S322-2	F33	190298-14		SWITCH, PRESSURE	BACKUP LUBE PUMP ACTIVATION, PLC FAILURE	6 PSIG INCREASING BY 4 PSIG DECREASING		
S322-3	C36	190298-14		SWITCH, PRESSURE	PRE/POST LUBE PUMP LOW PRESSURE TEST	6 PSIG INCREASING BY 4 PSIG DECREASING		
S322-5	B36	190298-53		SWITCH, PRESSURE	BACKUP LUBE PUMP LOW PRESSURE TEST	12 PSIG INCREASING BY 9 PSIG DECREASING		
S324-1	B38	190299-3		SWITCH, PRESSURE	TANK VENT ALARM	8.5 INCHES H_2O INCREASING 7.5 INCHES H_2O DECREASING		
S388-1	B34	186214-25		SWITCH, LEVEL	TANK LOW OIL ALARM	ALARM: 14.00 INCHES FROM TANK TOP		
S388-2	B34	PART OF S388-1		SWITCH, LEVEL	TANK LOW OIL SHUTDOWN	SHUTDOWN: 17.00 INCHES FROM TANK TOP		
TCV901-1	C34	PART OF VMF921 (REF. 190585-5)		VALVE, THERMAL BYPASS	OIL TEMPERATURE CONTROL	130°F START TO CLOSE, 150°F CLOSED		
TP380	F33	1029610-11		TRANSMITTER, PRESSURE	MONITOR LUBE OIL HEADER PRESSURE	0-100 PSIG = 4-20 MA. START PERMISSIVE: 6 PSIG. LOW PRESSURE ALARM: 42 PSIG. LOW PRESSURE SHUTDOWN: 25 PSIG	55 PSIG NOMINAL	
TPD397	D34	1013119-12		TRANSMITTER, ΔP	LUBE OIL FILTER ΔP	0-50 PSID = 4-20 MA. HIGH ΔP ALARM: 30 PSID INCREASING		
TW901-1	E33	186038-1		THERMOWELL	LUBE OIL HEADER RTD			
TW902	A32	186038-3		THERMOWELL	LUBE OIL TANK RTD			
VCH903	C34	1014122-3		VALVE, CHECK	MAIN LUBE PUMP SUPPLY	0.5 PSIG CRACKING PRESSURE		
VCS902-1	D33	120418-1		VALVE, CHECK SPRING	LUBE FILTER	0.4 PSIG CRACKING PRESSURE		
VCS902-2	E33	120418-1		VALVE, CHECK SPRING	LUBE FILTER	0.4 PSIG CRACKING PRESSURE		
VCS904-1	C36	909334C1		VALVE, CHECK SPRING	PRE/POST LUBE	0.5 PSIG CRACKING PRESSURE		
VCS904-2	C36	909334C1		VALVE, CHECK SPRING	BACKUP POST LUBE	0.5 PSIG CRACKING PRESSURE		
(A) VFD598-1	E35	1023825-2		VARIABLE FREQUENCY DRIVE	LUBE OIL COOLER			
VH902-1	D33	912415C1		VALVE, HAND	FILTER VENT (DIRTY SIDE)			
VH902-2	D33	912415C1		VALVE, HAND	FILTER VENT (DIRTY SIDE)			
VH903	D34	956805C1		VALVE, HAND	FILTER CROSSOVER			
VH904-1	D33	918201C2		VALVE, HAND	FILTER DRAIN (DIRTY SIDE)			
VH904-2	D32	918201C2		VALVE, HAND	FILTER DRAIN (DIRTY SIDE)			

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DRAWING NO. 59111-B149544 REV A SHEET 3

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SCHEMATIC FUNCTIONAL COMPONENT TABLE

REFERENCE DESIGNATOR	DRAWING ZONE	COMPONENT PART NUMBER	UNIQUE 6	COMPONENT DESCRIPTION	COMPONENT FUNCTION	COMPONENT SETTING	SYSTEM NORMAL OR OPERATING DESIGN VALUE	NOTES
VI901-1	D34	915370C1		VALVE, INSTRUMENT	GAGE BLOCK VALVE	OPEN		
VI901-3	D34	915370C1		VALVE, INSTRUMENT	GAGE BLOCK VALVE	OPEN		
VMF921	C35	190185-402		VALVE, ASSEMBLY	LUBE PRESSURE/TEMPERATURE CONTROL		55 PSIG NOMINAL, 140°F NOMINAL	
VMF922	G35	1041597-1		VALVE, ASSEMBLY	GUIDE VANE ACTUATOR CONTROL			
VR901	B35	PART OF VMF921 (REF.190583-1)		VALVE, RELIEF	MAIN LUBE RELIEF	145 PSIG CRACKING	100 PSIG NOMINAL	
VT901	C33	190552-1		VALVE, TRANSFER	MAIN LUBE FILTER			

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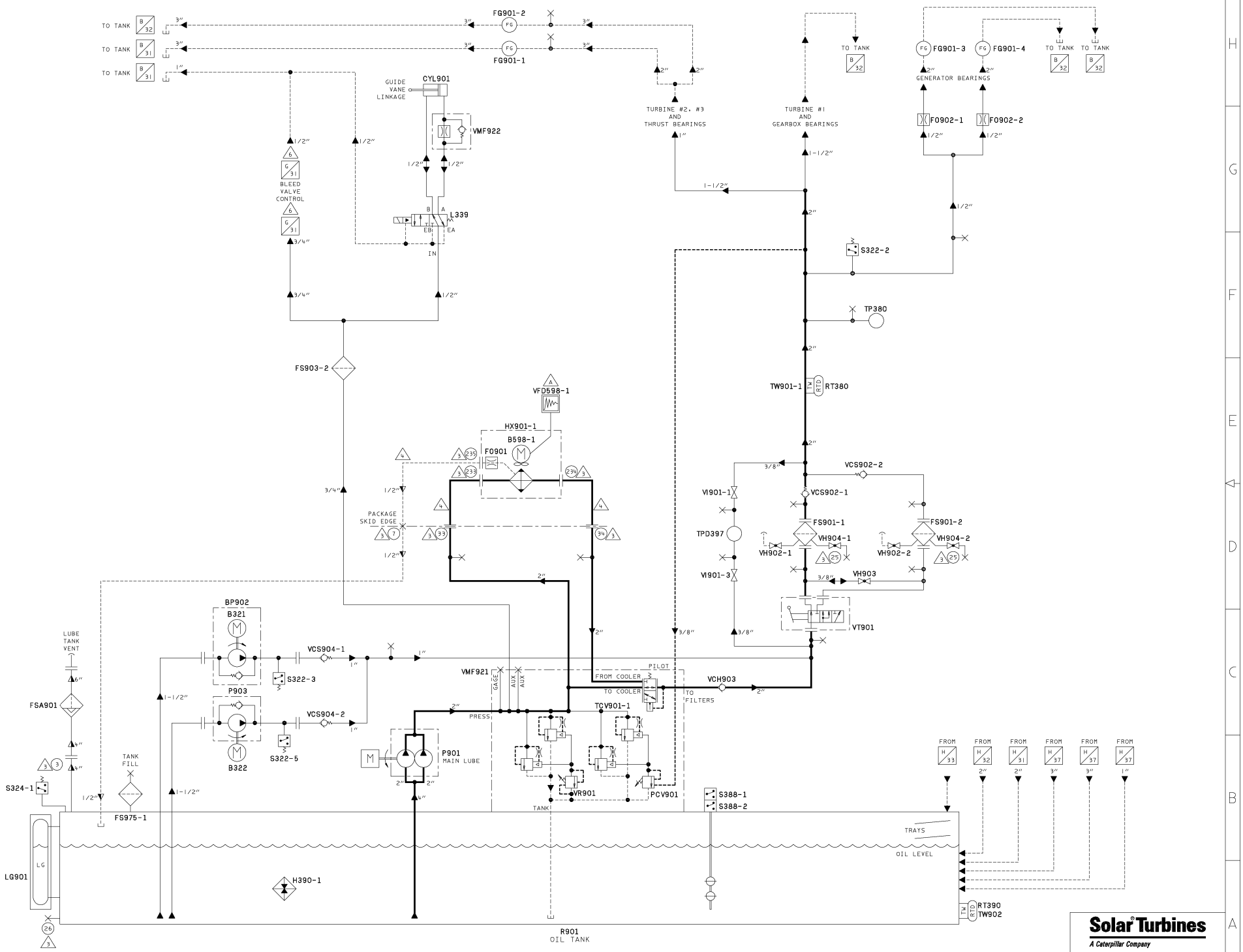

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DRAWING NO. 59111-B149544
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SHEET 5

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