 TORUS		· Owner INSTRUMENT INDEX			Document No.	INS-LST-001
					Revision / Date	A · September 29, 2026
					Issue purpose	Issued for Review
INSTRUMENTATION AND CONTROLS · INSTRUMENT INDEX						
Rev.	Date	Revision description	Prepared	Reviewed	Approved	
A	2026-09-29	Issued for Review				

NOTES

This index lists the 240 instruments, automated valves, relief devices and instrument-related manual valves of the . It covers every tag in the instrument and valve register of GEN-DB-001, Basis of Design, every tag shown on the P&IDs PRO-DWG-101 to -113 (PRO-LST-101, P&ID Line and Tag Register), and the minor instruments that TORUS added during detailed instrumentation design: local gauges, level and position switches, local control stations and the fire and gas devices. The I/O list INS-LST-002, the alarm and trip schedule INS-LST-003 and the instrument location plan INS-DWG-003 are prepared from the same tag data, so tag, location and junction box entries agree across the four documents.

Tags follow ISA-5.1. The P&ID column gives the sheet on which the tag is shown. Locations are in feet in the plot frame of MEC-DWG-001, Plot Plan, measured from the southwest fence corner; valves are placed at their positions in the piping model and other instruments on the modelled pipe routes. Items inside control building B-102 are shown at the building centre (215, 25) and items inside analyzer shelter B-101 at (118, 118).

The System column names the logic solver that receives the primary signal: RTU is the basic process control system (BPCS) remote terminal unit in panel CP-102A; SIS is the safety programmable logic controller in CP-102B; FC is flow computer FQI-110 in CP-102C; BMS is burner management system BMS-150 in heater panel CP-150; LOCAL means the device has no I/O; PKG means the device is internal to a vendor package. Secondary signals, such as an actuator fault contact wired to the RTU from a safety shutdown valve, appear in INS-LST-002.

Datasheets numbered INS-DS-ONN are in this volume. Measurement items (ultrasonic meters, custody pressure and temperature transmitters, gas chromatograph, analyzers, composite sampler and fuel gas meter) are specified in Volume 2, and control valve bodies, relief valves and manual valves in Volumes 1 and 4. They are listed here so that the index is complete. Transmitter ranges were chosen so that normal operation falls between 25 % and 75 % of span and every trip point lies inside the calibrated range; custody transmitters PT-111 and PT-121 are absolute-pressure instruments, 0 to 1,500 psia. Switch setpoints marked “vendor” are typical and will be confirmed from vendor data (HOLD H-15). Instruments on the receiving pipeline operator’s side of the demarcation panel JB-W01 are the operator’s scope and are not tagged here (HOLD H-14).

SIS signals are wired through dedicated junction boxes (suffix S) and dedicated multicore cables, segregated from BPCS wiring so that no single cable or terminal fault can disable both a control function and the safety function that protects against it (IEC 61511-1 Clause 11.2). Custody measurement signals pass through the sealable junction box JB-110M.

INSTRUMENT INDEX

The index is arranged by P&ID sheet, Table 1-1 to Table 1-13.

Table 1-1: Inlet and Pig Receiver (P&ID PRO-DWG-101)

Tag	Service	P&ID	Type	Range / set	Signal	System	Loc. X, Y (ft)	JB	Datasheet
PT-101	Station inlet pressure, upstream of SDV-101	101	Pressure transmitter	0-2000 psig	4-20 mA HART	RTU	60.5, 27	JB-101	INS-DS-001
TT-101	Station inlet temperature (TW-101)	101	RTD Pt100 + head transmitter	-20 to 150 F	4-20 mA HART	RTU	62, 27	JB-101	INS-DS-002
TW-101	Thermowell for TT-101	101	Thermowell, 1-1/2 in RF flanged, 316 SS	-	-	LOCAL	62, 27	-	INS-DS-002
PI-101	Inlet local pressure gauge	101	Pressure gauge 4-1/2 in, liquid filled	0-2000 psig	-	LOCAL	59, 27	-	INS-DS-012
SDV-101	Station inlet shutdown valve (actuator, solenoid, limit switches ZSO/ZSC-101)	101	NPS 12 Cl 600 ball, electro-hydraulic spring-return FC	Open / closed	24 VDC DO	SIS	65.8, 26	JB-101S	INS-DS-006
ZSO-101	SDV-101 open limit switch (integral)	101	Limit switch	-	Dry contact DI	SIS	65.8, 26	JB-101S	INS-DS-006
ZSC-101	SDV-101 closed limit switch (integral)	101	Limit switch	-	Dry contact DI	SIS	65.8, 26	JB-101S	INS-DS-006
HS-101	SDV-101 local station (close / reset-open permissive)	101	Local control station, Ex d	Close / Reset	Dry contact DI	SIS	65.8, 21	JB-101S	INS-DS-014
XI-102	Pig passage signaler at PR-101 barrel	101	Intrusive pig signaler, flag + switch	Pig passed	Dry contact DI	RTU	30, 40	JB-101	INS-DS-013
PI-102	PR-101 barrel pressure gauge	101	Pressure gauge 4-1/2 in	0-2000 psig	-	LOCAL	26, 40	-	INS-DS-012
BDV-102	PR-101 barrel vent to VS-101 (manual)	101	Manual ball valve NPS 2	-	-	LOCAL	28, 41	-	Vol 1 PRO datasheet (process lead)
PT-102A	PR-101 barrel pressure (closure warning, SCADA indication)	101	Pressure transmitter	0-2000 psig	4-20 mA HART	RTU	27, 40	JB-101	INS-DS-001
HV-101H	SDV-101 equalizing bypass (added)	101	Manual needle/ball NPS 1 Cl 600	-	-	LOCAL	65.8, 28	-	Vol 1 PRO datasheet (process lead)
RO-102	PR-101 barrel vent restriction orifice, 3/16 in	101	Restriction orifice	-	-	LOCAL	28, 41	-	Vol 1 PRO-DS-013
RO-181	Blowdown restriction orifice	101	Restriction orifice	-	-	LOCAL	70.5, 27	-	Vol 1 PRO datasheet (process lead)
HV-101A	PR-101 mainline bypass valve (receiving: throttled / closed) (P&ID)	101	Manual valve (P&ID minor valve)	-	-	LOCAL	56.6, 26	-	Vol 1 PRO datasheet (process lead)
HV-101B	PR-101 barrel (trap) valve, full bore, gear operated (P&ID)	101	Manual valve (P&ID minor valve)	-	-	LOCAL	47.2, 40	-	Vol 1 PRO datasheet (process lead)
HV-101C	PR-101 kicker (barrel outlet) valve (P&ID)	101	Manual valve (P&ID minor valve)	-	-	LOCAL	60, 26	-	Vol 1 PRO datasheet (process lead)
HV-101D	PR-101 barrel pressurizing / equalizing valve (P&ID)	101	Manual valve (P&ID minor valve)	-	-	LOCAL	48, 33	-	Vol 1 PRO datasheet (process lead)



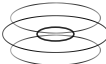
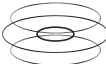
 TORUS	· Owner INSTRUMENT INDEX					Document No.	INS-LST-001			
						Revision / Date	A · September 29, 2026			
						Issue purpose	Issued for Review			
INSTRUMENTATION AND CONTROLS · INSTRUMENT INDEX										
Tag	Service	P&ID	Type	Range / set	Signal	System	Loc. X, Y (ft)	JB	Datasheet	
HV-101E	PR-101 barrel drain, isolation (P&ID)	101	Manual valve (P&ID minor valve)	-	-	LOCAL	26.5, 42.2	-	Vol 1 PRO datasheet (process lead)	
HV-101F	PR-101 barrel drain, throttling (P&ID)	101	Manual valve (P&ID minor valve)	-	-	LOCAL	26.5, 44.4	-	Vol 1 PRO datasheet (process lead)	

Table 1-2: Filter Separator V-101 (P&ID PRO-DWG-102)

Tag	Service	P&ID	Type	Range / set	Signal	System	Loc. X, Y (ft)	JB	Datasheet	
PDIT-103	V-101 filter section differential pressure	102	DP transmitter with 5-valve manifold	0-25 psid	4-20 mA HART	RTU	82, 44	JB-101	INS-DS-003	
PDI-103A	V-101 filter DP local gauge (teed off PDIT-103 impulse lines with 3-valve manifold)	102	DP gauge, 4-1/2 in	0-25 psid	-	LOCAL	81, 44	-	INS-DS-012	
PI-103	V-101 local pressure gauge	102	Pressure gauge 4-1/2 in	0-2000 psig	-	LOCAL	78, 44	-	INS-DS-012	
LT-104	V-101 sump level	102	Guided-wave radar, external cage	0-30 in	4-20 mA HART	RTU	86, 36	JB-101	INS-DS-004	
LIC-104	V-101 sump level controller	102	Software PID in RTU	0-30 in	-	RTU	215, 25	-	INS-RPT-001 (software function)	
LCV-104	V-101 sump dump valve to T-101	102	NPS 1 Cl 600 globe, electric modulating actuator, fail as-is	0-100 %	4-20 mA HART	RTU	81.2, 35	JB-101	INS-DS-008	
ZT-104	LCV-104 position feedback (integral)	102	Actuator position transmitter	0-100 %	4-20 mA HART	RTU	82.3, 35	JB-101	INS-DS-008	
LG-104	V-101 sump level gauge	102	Magnetic level gauge, external chamber	0-30 in	-	LOCAL	87, 36	-	INS-DS-004	
LSHH-105	V-101 high-high level (trips SDV-101)	102	Vibrating fork level switch, NAMUR/relay DPDT	Set 26 in	Dry contact DI	SIS	88, 36	JB-101S	INS-DS-005	
LSLL-106	V-101 low-low level (closes LCV-104 and SDV-106, blow-by protection)	102	Vibrating fork level switch	Set 3 in	Dry contact DI	SIS	89, 36	JB-101S	INS-DS-005	
SDV-106	V-101 liquid outlet shutdown valve, upstream of LCV-104	102	NPS 2 Cl 600 ball, electric spring-return FC actuator	Open / closed	24 VDC DO	SIS	87, 35	JB-101S	INS-DS-006	
ZSC-106	SDV-106 closed limit switch (integral)	102	Limit switch	-	Dry contact DI	SIS	87, 35	JB-101S	INS-DS-006	
HS-106	SDV-106 local reset station	102	Local control station	Reset	Dry contact DI	SIS	87, 31	JB-101S	INS-DS-014	
HV-103C	V-101 bypass valve upstream, locked closed (P&ID)	102	Manual ball NPS 12 Cl 600, LC	-	-	LOCAL	71.5, 30.8	-	Vol 1 PRO datasheet (process lead)	
HV-103D	V-101 bypass valve downstream, locked closed (P&ID)	102	Manual ball NPS 12 Cl 600, LC	-	-	LOCAL	71.5, 36.4	-	Vol 1 PRO datasheet (process lead)	
ZSO-103C	HV-103C not-closed position switch to RTU (added, HAZOP)	102	Proximity switch	-	Dry contact DI	RTU	71.5, 30.8	JB-101	INS-DS-006	
RO-104	Restriction orifice on 2-L-1060 limiting blow-by to T-101 emergency vent capacity (proposed, HZ-03)	102	Restriction orifice plate, Class 600	-	-	LOCAL	79, 35	-	Vol 1 PRO datasheet (process lead)	
PSV-101	V-101 relief, fire case, set 1,440 psig, to VS-101	102	Pressure relief valve	Set 1,440 psig	-	LOCAL	84, 42.5	-	Vol 1 PRO datasheet (process lead)	
HV-161A	Fuel gas take-off root valve (P&ID)	102	Manual ball NPS 2 Cl 600	-	-	LOCAL	80.2, 58.6	-	Vol 1 PRO datasheet (process lead)	
HV-101G	PSV-101 inlet isolation (car sealed open) (P&ID)	102	Manual valve (P&ID minor valve)	-	-	LOCAL	84, 43	-	Vol 1 PRO datasheet (process lead)	
HV-103A	V-101 inlet isolation valve (P&ID)	102	Manual valve (P&ID minor valve)	-	-	LOCAL	77.2, 26	-	Vol 1 PRO datasheet (process lead)	
HV-103B	V-101 outlet isolation valve (P&ID)	102	Manual valve (P&ID minor valve)	-	-	LOCAL	78.5, 50.2	-	Vol 1 PRO datasheet (process lead)	
HV-104A	LCV-104 upstream isolation (P&ID)	102	Manual valve (P&ID minor valve)	-	-	LOCAL	83.6, 35	-	Vol 1 PRO datasheet (process lead)	
HV-104B	LCV-104 downstream isolation (P&ID)	102	Manual valve (P&ID minor valve)	-	-	LOCAL	78.9, 35	-	Vol 1 PRO datasheet (process lead)	
HV-104C	LCV-104 manual bypass (throttling) (P&ID)	102	Manual valve (P&ID minor valve)	-	-	LOCAL	81.2, 36.7	-	Vol 1 PRO datasheet (process lead)	
HV-104D	V-101 filter section drain, isolation (P&ID)	102	Manual valve (P&ID minor valve)	-	-	LOCAL	92.5, 35.6	-	Vol 1 PRO datasheet (process lead)	
HV-104E	V-101 filter section drain, throttling (P&ID)	102	Manual valve (P&ID minor valve)	-	-	LOCAL	89.9, 33.5	-	Vol 1 PRO datasheet (process lead)	

Table 1-3: Metering (P&ID PRO-DWG-103)

Tag	Service	P&ID	Type	Range / set	Signal	System	Loc. X, Y (ft)	JB	Datasheet	
FE-111	Run 1 ultrasonic meter (multipath, AGA 9) with FT-111 electronics	103	Ultrasonic flow meter NPS 10 Cl 600	0-150 MMSCFD	RS-485 Modbus + dual pulse	FC	79.8, 93	JB-110M	Vol 2 MEA datasheet (measurement lead)	
FT-111	Run 1 USM transmitter (integral with FE-111)	103	USM electronics	0-150 MMSCFD	Serial + pulse	FC	79.3, 93	JB-110M	Vol 2 MEA datasheet (measurement lead)	
FC-111	Run 1 flow conditioner	103	Perforated plate flow conditioner	-	-	LOCAL	74.5, 93	-	Vol 2 MEA datasheet (measurement lead)	

 TORUS		· Owner INSTRUMENT INDEX			Document No.	INS-LST-001				
					Revision / Date	A · September 29, 2026				
					Issue purpose	Issued for Review				
INSTRUMENTATION AND CONTROLS · INSTRUMENT INDEX										
Tag	Service	P&ID	Type	Range / set	Signal	System	Loc. X, Y (ft)	JB	Datasheet	
PT-111	Run 1 static pressure at meter tap	103	Absolute pressure transmitter (custody)	0-1500 psia	4-20 mA HART	FC	79.3, 94	JB-110M	Vol 2 MEA datasheet (measurement lead)	
TT-111	Run 1 temperature, 2 to 5 D downstream of meter (TW-111)	103	RTD + transmitter (custody)	-20 to 150 F	4-20 mA HART	FC	91, 93	JB-110M	Vol 2 MEA datasheet (measurement lead)	
TW-111	Thermowell for TT-111	103	Thermowell	-	-	LOCAL	91, 93	-	Vol 2 MEA datasheet (measurement lead)	
TW-112	Run 1 test thermowell	103	Thermowell	-	-	LOCAL	93, 93	-	Vol 2 MEA datasheet (measurement lead)	
MOV-111	Run 1 inlet isolation, DBB	103	NPS 10 Cl 600 DBB ball, electric MOV, fail as-is	Open / closed	DI/DO	RTU	67, 93	JB-110	INS-DS-007	
MOV-112	Run 1 outlet isolation, DBB	103	NPS 10 Cl 600 DBB ball, electric MOV	Open / closed	DI/DO	RTU	100, 93	JB-110	INS-DS-007	
FE-121	Run 2 ultrasonic meter with FT-121 electronics	103	Ultrasonic flow meter NPS 10 Cl 600	0-150 MMSCFD	RS-485 Modbus + dual pulse	FC	79.8, 101	JB-110M	Vol 2 MEA datasheet (measurement lead)	
FT-121	Run 2 USM transmitter (integral with FE-121)	103	USM electronics	0-150 MMSCFD	Serial + pulse	FC	81, 101	JB-110M	Vol 2 MEA datasheet (measurement lead)	
FC-121	Run 2 flow conditioner	103	Perforated plate flow conditioner	-	-	LOCAL	74.5, 101	-	Vol 2 MEA datasheet (measurement lead)	
PT-121	Run 2 static pressure at meter tap	103	Absolute pressure transmitter (custody)	0-1500 psia	4-20 mA HART	FC	81, 102	JB-110M	Vol 2 MEA datasheet (measurement lead)	
TT-121	Run 2 temperature (TW-121)	103	RTD + transmitter (custody)	-20 to 150 F	4-20 mA HART	FC	91, 101	JB-110M	Vol 2 MEA datasheet (measurement lead)	
TW-121	Thermowell for TT-121	103	Thermowell	-	-	LOCAL	91, 101	-	Vol 2 MEA datasheet (measurement lead)	
TW-122	Run 2 test thermowell	103	Thermowell	-	-	LOCAL	93, 101	-	Vol 2 MEA datasheet (measurement lead)	
MOV-121	Run 2 inlet isolation, DBB	103	NPS 10 Cl 600 DBB ball, electric MOV	Open / closed	DI/DO	RTU	66.8, 101	JB-110	INS-DS-007	
MOV-122	Run 2 outlet isolation, DBB	103	NPS 10 Cl 600 DBB ball, electric MOV	Open / closed	DI/DO	RTU	100, 101	JB-110	INS-DS-007	
MOV-115	Series-verification crossover (normally closed, locked out in remote)	103	NPS 10 Cl 600 DBB ball, electric MOV	Open / closed	DI/DO	RTU	83, 97	JB-110	INS-DS-007	
PI-115A	MOV-115 body-cavity bleed pressure gauge (seal check)	103	Pressure gauge 4-1/2 in	0-2000 psig	-	LOCAL	83, 98	-	INS-DS-012	
PI-113	Meter inlet header local gauge	103	Pressure gauge 4-1/2 in	0-2000 psig	-	LOCAL	64, 97	-	INS-DS-012	
FQI-110	Dual-run flow computer (API 21.1, AGA 8, AGA 9)	103	Flow computer	-	Ethernet / serial	FC	215, 25	HOME	Vol 2 MEA datasheet (measurement lead)	
SP-141	Pressure-reducing sample probe on 12-G-1020	103	Insertion probe, regulating	-	-	LOCAL	104, 116	-	Vol 2 MEA datasheet (measurement lead)	
PSV-141B	Sample line relief at the SP-141 probe regulator outlet, outside B-101, outlet 1/2-V-1121-T1 to bleed header 1120 (limits RO-141A inflow if the probe regulator fails open; GEN-RPT-003)	103	Relief valve 1/4 in, 316 SS	Set 50 psig	-	LOCAL	104.5, 116	-	Vol 2 MEA datasheet (measurement lead)	
HV-111A	MOV-111 body bleed valve (DBB) (P&ID)	103	Manual valve (P&ID minor valve)	-	-	LOCAL	66, 94	-	Vol 1 PRO datasheet (process lead)	
HV-112A	MOV-112 body bleed valve (DBB) (P&ID)	103	Manual valve (P&ID minor valve)	-	-	LOCAL	102, 94	-	Vol 1 PRO datasheet (process lead)	
HV-115A	MOV-115 body bleed valve (DBB) (P&ID)	103	Manual valve (P&ID minor valve)	-	-	LOCAL	104, 97	-	Vol 1 PRO datasheet (process lead)	
HV-121A	MOV-121 body bleed valve (DBB) (P&ID)	103	Manual valve (P&ID minor valve)	-	-	LOCAL	66, 100	-	Vol 1 PRO datasheet (process lead)	
HV-122A	MOV-122 body bleed valve (DBB) (P&ID)	103	Manual valve (P&ID minor valve)	-	-	LOCAL	102, 100	-	Vol 1 PRO datasheet (process lead)	

INSTRUMENTATION AND CONTROLS · INSTRUMENT INDEX

Table 1-4: Analyzers and Sampling (P&ID PRO-DWG-104)

Tag	Service	P&ID	Type	Range / set	Signal	System	Loc. X, Y (ft)	JB	Datasheet
AT-141	Gas chromatograph C6+ BTU (AE-141 sample system)	104	Process GC, TCD, C6+	HHV 900-1300 Btu/scf	Ethernet Modbus TCP	FC	118, 118	HOME	Vol 2 MEA datasheet (measurement lead)
AE-141	GC sample conditioning system	104	Sample system	-	-	PKG	118, 118	-	Vol 2 MEA datasheet (measurement lead)
AT-142	Water vapor analyzer (TDL)	104	TDLAS moisture analyzer	0-20 lb/MMscf	4-20 mA HART	RTU	118, 118	JB-140	Vol 2 MEA datasheet (measurement lead)
AT-143	H2S analyzer	104	Lead-acetate tape or TDL H2S analyzer	0-16 ppmv (0-1.0 gr/100 scf)	4-20 mA HART	RTU	118, 118	JB-140	Vol 2 MEA datasheet (measurement lead)
AT-144	O2 analyzer (electrochemical)	104	Trace O2 analyzer	0-100 ppmv	4-20 mA HART	RTU	118, 118	JB-140	Vol 2 MEA datasheet (measurement lead)
SMP-146	Flow-proportional composite sampler with cylinder	104	Composite sampler (API 14.1)	-	DO pulse / DI	FC	105, 116	JB-140	Vol 2 MEA datasheet (measurement lead)
PSV-141G	Sample system relief (P&ID)	104	Relief valve 1/4 in, 316 SS	Set by MEA	-	LOCAL	106, 116	-	Vol 2 MEA datasheet (measurement lead)
PSL-141L	GC carrier gas low pressure, alarm to RTU (P&ID)	104	Pressure switch	Set by MEA	Dry contact DI	RTU	118, 118	JB-140	Vol 2 MEA datasheet (measurement lead)
PCV-141E	Sample conditioning pressure regulator (P&ID)	104	Regulator	-	-	LOCAL	118, 118	-	Vol 2 MEA datasheet (measurement lead)
PCV-141K	Carrier gas two-stage regulator (P&ID)	104	Regulator	-	-	LOCAL	118, 118	-	Vol 2 MEA datasheet (measurement lead)
PCV-141M	Calibration gas two-stage regulator (P&ID)	104	Regulator	-	-	LOCAL	118, 118	-	Vol 2 MEA datasheet (measurement lead)
PI-141F	Conditioned sample pressure gauge (P&ID)	104	Pressure gauge	-	-	LOCAL	118, 118	-	Vol 2 MEA datasheet (measurement lead)
FI-141C	Sample bypass variable-area flow indicator (P&ID)	104	Rotameter	-	-	LOCAL	118, 118	-	Vol 2 MEA datasheet (measurement lead)
FI-141J	AT-141 sample variable-area flow indicator (P&ID)	104	Rotameter	-	-	LOCAL	118, 118	-	Vol 2 MEA datasheet (measurement lead)
FI-142B	AT-142 sample flow indicator (P&ID)	104	Rotameter	-	-	LOCAL	118, 118	-	Vol 2 MEA datasheet (measurement lead)
FI-143B	AT-143 sample flow indicator (P&ID)	104	Rotameter	-	-	LOCAL	118, 118	-	Vol 2 MEA datasheet (measurement lead)
FI-144B	AT-144 sample flow indicator (P&ID)	104	Rotameter	-	-	LOCAL	118, 118	-	Vol 2 MEA datasheet (measurement lead)
RO-141A	Sample line restriction orifice 1/32 in downstream of SDV-141, limits B-101 leak rate (added)	104	Restriction orifice fitting, 316 SS	-	-	LOCAL	114, 114	-	Vol 2 MEA datasheet (measurement lead)
SDV-141	Analyzer sample inlet shutoff at B-101 wall (added, F&G action)	104	3/8 in tubing solenoid valve 316 SS, NC, Ex d	Open / closed	24 VDC DO	SIS	114, 114	JB-140S	INS-DS-006
HV-141A	Sample conditioning inlet isolation (P&ID)	104	Manual valve (P&ID minor valve)	-	-	LOCAL	118, 118	-	Vol 2 MEA datasheet (measurement lead)
HV-141D	Sample bypass (speed loop) needle valve (P&ID)	104	Manual valve (P&ID minor valve)	-	-	LOCAL	118, 118	-	Vol 2 MEA datasheet (measurement lead)
HV-141H	AT-141 sample inlet needle valve (P&ID)	104	Manual valve (P&ID minor valve)	-	-	LOCAL	118, 118	-	Vol 2 MEA datasheet (measurement lead)
HV-142A	AT-142 sample inlet needle valve (P&ID)	104	Manual valve (P&ID minor valve)	-	-	LOCAL	118, 118	-	Vol 2 MEA datasheet (measurement lead)
HV-143A	AT-143 sample inlet needle valve (P&ID)	104	Manual valve (P&ID minor valve)	-	-	LOCAL	118, 118	-	Vol 2 MEA datasheet (measurement lead)
HV-144A	AT-144 sample inlet needle valve (P&ID)	104	Manual valve (P&ID minor valve)	-	-	LOCAL	118, 118	-	Vol 2 MEA datasheet (measurement lead)
HV-146A	SMP-146 inlet isolation (P&ID)	104	Manual valve (P&ID minor valve)	-	-	LOCAL	105, 116	-	Vol 2 MEA datasheet (measurement lead)

Table 1-5: Line Heater H-101 (P&ID PRO-DWG-105)

Tag	Service	P&ID	Type	Range / set	Signal	System	Loc. X, Y (ft)	JB	Datasheet
TT-151	H-101 bath temperature	105	RTD + transmitter	0-250 F	4-20 mA HART	RTU	185, 144	JB-150	INS-DS-002
TIC-152	Heater gas outlet temperature controller (slave of TIC-135)	105	Software PID in RTU	0-250 F	-	RTU	215, 25	-	INS-RPT-001 (software function)
BMS-150	Burner management system, IEC 61508 SIL 2 certified	105	Packaged BMS controller	-	Modbus RTU + hardwired	BMS	214, 132	CP-150	H-101 heater package datasheet (Vol 1/4) + BMS reqmts INS-RPT-001 Sec 8
LSL-154	H-101 low bath level (burner trip)	105	Float or vibrating level switch	Set by vendor (min 2 in above firetube)	Dry contact DI	BMS	190, 144	CP-150	INS-DS-005
LSH-154B	H-101 bath / expansion tank high level, coil leak detection, BMS trip (proposed, HZ-05)	105	Float or vibrating level switch	Set by vendor	Dry contact DI	BMS	188, 144	CP-150	INS-DS-005
LG-154A	H-101 bath / expansion tank level gauge	105	Reflex level gauge	-	-	LOCAL	190, 144	-	H-101 heater package datasheet (Vol 1/4) + BMS reqmts INS-RPT-001 Sec 8

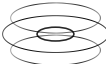
 TORUS		· Owner INSTRUMENT INDEX					Document No.	INS-LST-001		
							Revision / Date	A · September 29, 2026		
							Issue purpose	Issued for Review		
INSTRUMENTATION AND CONTROLS · INSTRUMENT INDEX										
Tag	Service	P&ID	Type	Range / set	Signal	System	Loc. X, Y (ft)	JB	Datasheet	
TSHH-155	H-101 high-high bath temperature (burner trip)	105	Temperature switch, manual reset	Set 200 F	Dry contact DI	BMS	192, 144	CP-150	INS-DS-005	
TT-156	H-101 gas outlet temperature (TW-156), PV of TIC-152	105	RTD + transmitter	-20 to 250 F	4-20 mA HART	RTU	170, 138.5	JB-150	INS-DS-002	
TY-156	TT-156 high-high trip relay: RTU DO hardwired to BMS-150 DI TS-156 (burner trip at 140 F)	105	Hardwired trip, RTU DO to BMS DI	140 F	24 VDC DO / DI	RTU	215, 25	HOME	INS-RPT-001 (software function)	
TW-156	Thermowell for TT-156	105	Thermowell	-	-	LOCAL	170, 138.5	-	INS-DS-002	
TI-151A	H-101 bath local thermometer	105	Bimetal dial thermometer 5 in	0-250 F	-	LOCAL	186, 144	-	INS-DS-012	
PI-156A	H-101 gas outlet local gauge	105	Pressure gauge 4-1/2 in	0-2000 psig	-	LOCAL	171, 138.5	-	INS-DS-012	
PSV-157	Heater coil relief, set 1,440 psig	105	Pressure relief valve	Set 1,440 psig	-	LOCAL	177, 141	-	Vol 1 PRO datasheet (process lead)	
HV-158A	Heater inlet valve	105	Manual ball NPS 12 Cl 600	-	-	LOCAL	157.5, 148	-	Vol 1 PRO datasheet (process lead)	
HV-158B	Heater outlet valve	105	Manual ball NPS 12 Cl 600	-	-	LOCAL	164.5, 138.5	-	Vol 1 PRO datasheet (process lead)	
HV-158C	Heater bypass valve	105	Manual ball NPS 12 Cl 600	-	-	LOCAL	150, 143.9	-	Vol 1 PRO datasheet (process lead)	
ZSO-158C	HV-158C bypass open position switch (added, heater mode confirmation)	105	Proximity switch	-	Dry contact DI	RTU	150, 143.9	JB-150	INS-DS-006	
ZSC-158C	HV-158C bypass closed position switch (added)	105	Proximity switch	-	Dry contact DI	RTU	150, 143.9	JB-150	INS-DS-006	
RO-182	Blowdown restriction orifice	105	Restriction orifice	-	-	LOCAL	110, 90	-	Vol 1 PRO datasheet (process lead)	

Table 1-6: Fuel Gas FG-101 (P&ID PRO-DWG-106)

Tag	Service	P&ID	Type	Range / set	Signal	System	Loc. X, Y (ft)	JB	Datasheet		
PCV-161	First-cut regulator to 150 psig	106	Self-operated regulator	Set 150 psig	-	LOCAL	93, 55	-	FG-101 fuel gas skid datasheet (Vol 1/4)		
PCV-162	Second-cut regulator (burner and generator supply)	106	Self-operated regulator	Set 25 psig	-	LOCAL	97, 55	-	FG-101 fuel gas skid datasheet (Vol 1/4)		
PSV-161	Fuel gas relief downstream of PCV-161	106	Pressure relief valve	Set 250 psig	-	LOCAL	95, 57	-	Vol 1 PRO datasheet (process lead)		
FT-163	Fuel gas meter (Coriolis), Owner allocation	106	Coriolis meter NPS 1	0-8 Mscf/h	4-20 mA HART + pulse	RTU	96, 54	JB-101	Vol 2 MEA datasheet (measurement lead)		
PT-164	Fuel gas pressure downstream of PCV-162	106	Pressure transmitter	0-60 psig	4-20 mA HART	RTU	98, 56	JB-101	INS-DS-001		
PI-161A	Fuel gas intermediate pressure gauge (downstream PCV-161)	106	Pressure gauge 4-1/2 in	0-300 psig	-	LOCAL	94, 55	-	INS-DS-012		
PI-162A	Fuel gas supply pressure gauge (downstream PCV-162)	106	Pressure gauge 4-1/2 in	0-60 psig	-	LOCAL	98, 55	-	INS-DS-012		
PDI-161A	FG-101 filter DP gauge	106	DP gauge (FG-101 skid supply)	0-15 psid	-	LOCAL	91, 55	-	INS-DS-012		
SDV-165	Fuel gas shutoff, H-101 branch only (closes on ESD I-01 and BMS trip I-06)	106	NPS 2 Cl 600 ball, electro-hydraulic spring-return FC	Open / closed	24 VDC DO	SIS	101.4, 55	JB-101S	INS-DS-006		
ZSC-165	SDV-165 closed limit switch (added)	106	Limit switch	-	Dry contact DI	SIS	100.8, 55	JB-101S	INS-DS-006		
HS-165	SDV-165 local reset station (added)	106	Local control station	Reset	Dry contact DI	SIS	100.8, 51	JB-101S	INS-DS-014		
E-161	Fuel gas electric preheater upstream of PCV-161, 5 kW rated, duty 3.9 kW at 105 F	106	Electric process heater, explosion-proof, with integral controller	5 kW	Power by ELE	LOCAL	91, 56	-	FG-101 fuel gas skid datasheet (Vol 1/4)		
TIC-161A	E-161 integral outlet temperature thermostat (P&ID)	106	Integral temperature controller	SP per LST-003	-	PKG	91, 57	-	FG-101 fuel gas skid datasheet (Vol 1/4)		
TSH-161B	E-161 high element temperature cutout (P&ID); alarm contact to RTU	106	Temperature switch, manual reset	Vendor	Dry contact DI	RTU	91, 57	JB-101	FG-101 fuel gas skid datasheet (Vol 1/4)		
XA-161	E-161 controller common alarm (low outlet temperature / heater fault / power off) (added)	106	Alarm relay contact	-	Dry contact DI	RTU	91, 57	JB-101	FG-101 fuel gas skid datasheet (Vol 1/4)		
TI-161C	Fuel gas temperature downstream of PCV-161 (P&ID)	106	Bimetal dial thermometer 5 in	-50 to 150 F	-	LOCAL	94, 56	-	INS-DS-012		
TW-161C	Thermowell for TI-161C (P&ID)	106	Thermowell	-	-	LOCAL	94, 56	-	INS-DS-002		
HV-161B	FG-101 inlet isolation (P&ID)	106	Manual ball NPS 2 Cl 600	-	-	LOCAL	90, 55	-	Vol 1 PRO datasheet (process lead)		
HV-161C	PCV-161 upstream isolation (P&ID)	106	Manual ball NPS 2 Cl 600	-	-	LOCAL	92, 55	-	Vol 1 PRO datasheet (process lead)		
HV-161D	FG-101 filter drain valve (P&ID)	106	Manual valve	-	-	LOCAL	91, 54	-	Vol 1 PRO datasheet (process lead)		
HV-162A	PCV-162 upstream isolation (P&ID)	106	Manual ball NPS 2 Cl 150	-	-	LOCAL	96, 55	-	Vol 1 PRO datasheet (process lead)		
HV-162B	PCV-162 downstream isolation (P&ID)	106	Manual ball NPS 2 Cl 150	-	-	LOCAL	98, 55	-	Vol 1 PRO datasheet (process lead)		

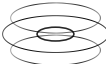
 TORUS	· Owner INSTRUMENT INDEX					Document No.	INS-LST-001				
						Revision / Date	A · September 29, 2026				
						Issue purpose	Issued for Review				
INSTRUMENTATION AND CONTROLS · INSTRUMENT INDEX											
Tag	Service	P&ID	Type	Range / set	Signal	System	Loc. X, Y (ft)	JB	Datasheet		
HV-165A	H-101 fuel supply isolation (P&ID)	106	Manual ball NPS 1 Cl 150	-	-	LOCAL	100, 55	-	Vol 1 PRO datasheet (process lead)		
HV-165B	G-101 fuel supply isolation (P&ID)	106	Manual ball NPS 1 Cl 150	-	-	LOCAL	99.8, 53	-	Vol 1 PRO datasheet (process lead)		

Table 1-7: Control Valves and Overpressure Shutdown (P&ID PRO-DWG-107)

Tag	Service	P&ID	Type	Range / set	Signal	System	Loc. X, Y (ft)	JB	Datasheet
FY-131	Low-select FIC-131 / PIC-134 to duty control valve (P&ID function)	107	Software function in RTU	-	-	RTU	215, 25	-	INS-RPT-001 (software function)
PY-133	OPSS 2oo3 voting and PAHH trip function in safety PLC (P&ID function)	107	Software function in safety PLC	-	-	SIS	215, 25	-	INS-RPT-001 (software function)
HV-133D	Line 1033 maintenance vent to VS-101 (P&ID)	107	Manual valve NPS 1	-	-	LOCAL	167.5, 90	-	Vol 1 PRO datasheet (process lead)
FCV-131	Flow control valve, duty (FIC-131 / PIC-134 low select)	107	NPS 8 Cl 600, electric modulating actuator, handwheel	0-100 %	4-20 mA HART	RTU	150, 94	JB-130	INS-DS-008
FCV-132	Flow control valve, standby	107	NPS 8 Cl 600, electric modulating actuator, handwheel	0-100 %	4-20 mA HART	RTU	150, 86	JB-130	INS-DS-008
ZT-131	FCV-131 position feedback (integral)	107	Actuator position transmitter	0-100 %	4-20 mA HART	RTU	150, 94	JB-130	INS-DS-008
ZT-132	FCV-132 position feedback (integral)	107	Actuator position transmitter	0-100 %	4-20 mA HART	RTU	150, 86	JB-130	INS-DS-008
FIC-131	Station flow controller (nomination setpoint)	107	Software PID in RTU	0-150 MMSCFD	-	RTU	215, 25	-	INS-RPT-001 (software function)
PIC-134	Outlet pressure override controller (low-select)	107	Software PID in RTU	0-2000 psig	-	RTU	215, 25	-	INS-RPT-001 (software function)
TIC-135	Control valve outlet temperature master (cascade to TIC-152)	107	Software PID in RTU	-20 to 150 F	-	RTU	215, 25	-	INS-RPT-001 (software function)
HV-131A	FCV-131 upstream isolation	107	Manual ball NPS 8 Cl 600	-	-	LOCAL	143.2, 94	-	Vol 1 PRO datasheet (process lead)
HV-131B	FCV-131 downstream isolation	107	Manual ball NPS 8 Cl 600	-	-	LOCAL	156.8, 94	-	Vol 1 PRO datasheet (process lead)
HV-132A	FCV-132 upstream isolation	107	Manual ball NPS 8 Cl 600	-	-	LOCAL	143.2, 86	-	Vol 1 PRO datasheet (process lead)
HV-132B	FCV-132 downstream isolation	107	Manual ball NPS 8 Cl 600	-	-	LOCAL	156.8, 86	-	Vol 1 PRO datasheet (process lead)
ZSO-131A	HV-131A open position switch (added, FCV switchover permissive)	107	Proximity switch	-	Dry contact DI	RTU	144.4, 94	JB-130	INS-DS-006
ZSO-131B	HV-131B open position switch (added, FCV switchover permissive)	107	Proximity switch	-	Dry contact DI	RTU	155.6, 94	JB-130	INS-DS-006
ZSO-132A	HV-132A open position switch (added, FCV switchover permissive)	107	Proximity switch	-	Dry contact DI	RTU	144.4, 86	JB-130	INS-DS-006
ZSO-132B	HV-132B open position switch (added, FCV switchover permissive)	107	Proximity switch	-	Dry contact DI	RTU	155.6, 86	JB-130	INS-DS-006
PT-133A	OPSS pressure transmitter A (2oo3), downstream of control valves	107	Pressure transmitter, SIL 2 capable (IEC 61508 cert.)	0-2000 psig	4-20 mA HART	SIS	170, 90	JB-130S	INS-DS-001
PT-133B	OPSS pressure transmitter B (2oo3), downstream of control valves	107	Pressure transmitter, SIL 2 capable (IEC 61508 cert.)	0-2000 psig	4-20 mA HART	SIS	171, 90	JB-130S	INS-DS-001
PT-133C	OPSS pressure transmitter C (2oo3), downstream of control valves	107	Pressure transmitter, SIL 2 capable (IEC 61508 cert.)	0-2000 psig	4-20 mA HART	SIS	172, 90	JB-130S	INS-DS-001
SDV-102	OPSS shutdown valve, stroke 4 s or less	107	NPS 12 Cl 600 ball, electro-hydraulic spring-return FC, mandatory quarterly PST via SY-102 pulse	Open / closed	24 VDC DO	SIS	185, 90	JB-130S	INS-DS-006
ZSO-102	SDV-102 open limit switch (integral)	107	Limit switch	-	Dry contact DI	SIS	185, 90	JB-130S	INS-DS-006
ZSC-102	SDV-102 closed limit switch (integral)	107	Limit switch	-	Dry contact DI	SIS	185, 90	JB-130S	INS-DS-006
HS-102	SDV-102 local station (close / OPSS reset)	107	Local control station, key-operated reset	Close / Reset	Dry contact DI	SIS	185, 84	JB-130S	INS-DS-014
PT-134	Outlet pressure, PIC-134 override	107	Pressure transmitter	0-2000 psig	4-20 mA HART	RTU	164, 90	JB-130	INS-DS-001
TT-135	Control valve outlet temperature (TW-135), hydrate monitoring, cascade master PV	107	RTD + transmitter	-20 to 150 F	4-20 mA HART	RTU	175, 90	JB-130	INS-DS-002
TW-135	Thermowell for TT-135	107	Thermowell	-	-	LOCAL	175, 90	-	INS-DS-002
TSV-136	Thermal relief between SDV-102 and SDV-103	107	Thermal relief valve NPS 3/4 x 1	Set 1,440 psig	-	LOCAL	193, 90	-	Vol 1 PRO datasheet (process lead)
PI-138	Gauge between SDV-102 and SDV-103 (added)	107	Pressure gauge 4-1/2 in	0-2000 psig	-	LOCAL	198, 91	-	INS-DS-012
HV-102H	SDV-102 equalizing bypass (added)	107	Manual needle/ball NPS 1 Cl 600	-	-	LOCAL	185, 92	-	Vol 1 PRO datasheet (process lead)
PI-137	Control valve outlet local gauge (added)	107	Pressure gauge 4-1/2 in	0-2000 psig	-	LOCAL	162, 90	-	INS-DS-012

Table 1-8: Outlet (P&ID PRO-DWG-108)

Tag	Service	P&ID	Type	Range / set	Signal	System	Loc. X, Y (ft)	JB	Datasheet
HV-103H	SDV-103 equalizing bypass (added)	108	Manual needle/ball NPS 1 CI 600	-	-	LOCAL	212, 92	-	Vol 1 PRO datasheet (process lead)
XY-103Q	BPCS close request to SDV-103 (gas quality shut-in), RTU DO hardwired to SIS DI XS-103Q (added)	108	Panel-to-panel hardwire in B-102	-	24 VDC DO / DI	RTU	215, 25	HOME	INS-RPT-001 (software function)
CKV-171	Outlet check valve	108	NPS 12 CI 600 piggable check	-	-	LOCAL	200, 90	-	Vol 1 PRO datasheet (process lead)
SDV-103	Station outlet shutdown valve	108	NPS 12 CI 600 ball, electro-hydraulic spring-return FC	Open / closed	24 VDC DO	SIS	212, 90	JB-130S	INS-DS-006
ZSO-103	SDV-103 open limit switch (integral)	108	Limit switch	-	Dry contact DI	SIS	212, 90	JB-130S	INS-DS-006
ZSC-103	SDV-103 closed limit switch (integral)	108	Limit switch	-	Dry contact DI	SIS	212, 90	JB-130S	INS-DS-006
HS-103	SDV-103 local station (close / reset)	108	Local control station	Close / Reset	Dry contact DI	SIS	212, 84	JB-130S	INS-DS-014
PT-172	Station outlet pressure downstream of SDV-103	108	Pressure transmitter	0-2000 psig	4-20 mA HART	RTU	216, 92	JB-170	INS-DS-001
TT-173	Station outlet (delivery) temperature (TW-173)	108	RTD + transmitter	-20 to 150 F	4-20 mA HART	RTU	216, 94	JB-170	INS-DS-002
TW-173	Thermowell for TT-173	108	Thermowell	-	-	LOCAL	216, 94	-	INS-DS-002
PI-174	Outlet local gauge	108	Pressure gauge 4-1/2 in	0-2000 psig	-	LOCAL	216.5, 93	-	INS-DS-012
IJ-102	Outlet insulating joint	108	Monolithic IJ NPS 12	-	-	LOCAL	220, 152.5	-	Vol 1 PRO datasheet (process lead)
HV-172A	Outlet lateral maintenance blowdown valve, locked closed (P&ID)	108	Manual ball NPS 2	-	-	LOCAL	216, 97.5	-	Vol 1 PRO datasheet (process lead)
RO-172B	Outlet lateral blowdown restriction orifice (P&ID)	108	Restriction orifice	-	-	LOCAL	216.5, 98	-	Vol 1 PRO datasheet (process lead)
RO-183	Blowdown restriction orifice	108	Restriction orifice	-	-	LOCAL	195, 86	-	Vol 1 PRO datasheet (process lead)

Table 1-9: Vent and Blowdown (P&ID PRO-DWG-109)

Tag	Service	P&ID	Type	Range / set	Signal	System	Loc. X, Y (ft)	JB	Datasheet
HV-180A	VS-101 base drain valve (P&ID)	109	Manual valve NPS 2	-	-	LOCAL	40, 158	-	Vol 1 PRO datasheet (process lead)
HV-180B	VS-101 purge / snuffing connection valve (P&ID)	109	Manual valve NPS 1	-	-	LOCAL	41, 158	-	Vol 1 PRO datasheet (process lead)
BDV-181	Inlet section blowdown, manual, with RO-181	109	Manual ball NPS 2	-	-	LOCAL	70, 27	-	Vol 1 PRO datasheet (process lead)
BDV-182	Meter and heater section blowdown, with RO-182	109	Manual ball NPS 2	-	-	LOCAL	110, 90	-	Vol 1 PRO datasheet (process lead)
BDV-183	Outlet section blowdown (SDV-102 to SDV-103), with RO-183	109	Manual ball NPS 2	-	-	LOCAL	195, 86	-	Vol 1 PRO datasheet (process lead)

Table 1-10: Drains and T-101 (P&ID PRO-DWG-110)

Tag	Service	P&ID	Type	Range / set	Signal	System	Loc. X, Y (ft)	JB	Datasheet
LT-191	T-101 level (non-contact radar)	110	Non-contact 80 GHz radar	0-96 in	4-20 mA HART	RTU	30, 104	JB-101	INS-DS-004
LSHH-192	T-101 high-high level (closes LCV-104 and SDV-106)	110	Vibrating fork level switch, top mounted	Set 86.4 in	Dry contact DI	SIS	32, 104	JB-101S	INS-DS-005
PVRV-193	T-101 pressure-vacuum relief valve	110	PVRV	Vendor	-	LOCAL	30, 100	-	T-101 tank datasheet (Vol 4)
FA-193	T-101 flame arrestor	110	Flame arrestor	-	-	LOCAL	30, 100	-	T-101 tank datasheet (Vol 4)
EV-193	T-101 16 in emergency vent (pressure-relief manway)	110	Emergency vent 16 in	Vendor	-	LOCAL	30, 100	-	Vol 1 PRO-DS-008
LG-191A	T-101 local level gauge (float and board)	110	Float and gauge board	0-96 in	-	LOCAL	28, 104	-	T-101 tank datasheet (Vol 4)
HV-191A	T-101 inlet isolation valve (locked open) (P&ID)	110	Manual valve (P&ID minor valve)	-	-	LOCAL	29, 81.3	-	Vol 1 PRO datasheet (process lead)
HV-191B	T-101 inlet isolation valve (locked open) (P&ID)	110	Manual valve (P&ID minor valve)	-	-	LOCAL	26.5, 81.5	-	Vol 1 PRO datasheet (process lead)
HV-191D	T-101 loadout isolation valve (P&ID)	110	Manual valve (P&ID minor valve)	-	-	LOCAL	30, 106.5	-	Vol 1 PRO datasheet (process lead)
HV-191E	Truck loadout valve (P&ID)	110	Manual valve (P&ID minor valve)	-	-	LOCAL	30, 116	-	Vol 1 PRO datasheet (process lead)
HV-191F	T-101 bottom drain / water draw valve (P&ID)	110	Manual valve (P&ID minor valve)	-	-	LOCAL	35, 97	-	Vol 1 PRO datasheet (process lead)
HV-191G	Secondary containment drain valve (P&ID)	110	Manual valve (P&ID minor valve)	-	-	LOCAL	44.5, 90	-	Vol 1 PRO datasheet (process lead)

Table 1-11: Safety Instrumented System Logic (P&ID PRO-DWG-111)

Tag	Service	P&ID	Type	Range / set	Signal	System	Loc. X, Y (ft)	JB	Datasheet
HS-201	Station ESD pushbutton, main gate	111	ESD pushbutton, mushroom latching, NC	-	Dry contact DI	SIS	244, 48	HOME	INS-DS-014
HS-202	Station ESD pushbutton, B-102	111	ESD pushbutton	-	Dry contact DI	SIS	215, 33	HOME	INS-DS-014
HS-203	Station ESD pushbutton, meter skid (west end, egress side)	111	ESD pushbutton	-	Dry contact DI	SIS	57, 92	HOME	INS-DS-014
HS-204	Station ESD pushbutton, heater	111	ESD pushbutton	-	Dry contact DI	SIS	168, 128	HOME	INS-DS-014
HS-200	ESD reset pushbutton on SIS panel CP-102B (added)	111	Key-operated reset	-	Dry contact DI	SIS	215, 25	HOME	INS-DS-014
GD-205	Combustible gas detector B-101 (1 of 2)	111	IR point detector, 0-100 % LEL	0-100 % LEL	4-20 mA (3-wire)	SIS	116, 120	JB-140S	INS-DS-009
GD-206	Combustible gas detector B-101 (2 of 2)	111	IR point detector	0-100 % LEL	4-20 mA (3-wire)	SIS	121, 116	JB-140S	INS-DS-009
GD-207	Combustible gas detector B-102 HVAC intake	111	IR point detector	0-100 % LEL	4-20 mA (3-wire)	SIS	224, 31	HOME	INS-DS-009
FSL-208	B-101 ventilation fan failure (SIS, drives B-101 power isolation)	111	Airflow switch (duct)	-	Dry contact DI	SIS	118, 123	JB-140S	INS-DS-005
XS-212	B-102 smoke detector (added)	111	Photoelectric smoke detector, 4-wire	-	Dry contact DI	SIS	215, 25	HOME	INS-DS-009
BE-213	H-101 burner area fire detector UV/IR (detects fire at H-101 per Basis of Design Sec. 9.3; location per SAF-RPT-003)	111	UV/IR flame detector, Ex d	-	4-20 mA	SIS	215, 152	HOME	INS-DS-009
HS-215	remote shutdown command (from RTU via JB-W01)	111	Interposing relay contact	-	Dry contact DI	SIS	214, 197.5	JB-W01	INS-DS-014
XY-214	B-101 and B-102 area beacon / horn (added)	111	Beacon + horn, Ex d	-	24 VDC DO	SIS	215, 33	HOME	INS-DS-009

Table 1-12: H-101 Burner and BMS (P&ID PRO-DWG-112)

Tag	Service	P&ID	Type	Range / set	Signal	System	Loc. X, Y (ft)	JB	Datasheet
TCV-152	Burner fuel trim valve	112	NPS 1 globe, electric modulating actuator, fail as-is (min-fire stop)	0-100 %	4-20 mA HART	RTU	210, 138	JB-150	INS-DS-008
ZSL-152	TCV-152 low-fire position switch to BMS-150 (added, API 556 low-fire start interlock)	112	Actuator limit switch	-	Dry contact DI	BMS	210, 138	CP-150	INS-DS-008
ZT-152	TCV-152 position feedback (integral)	112	Actuator position transmitter	0-100 %	4-20 mA HART	RTU	210, 138	JB-150	INS-DS-008
BE-153A	H-101 burner flame detector A (flame rod), 1oo2 with BE-153B	112	Flame rod	Flame / no flame	BMS input	BMS	208, 140	CP-150	H-101 heater package datasheet (Vol 1/4) + BMS reqmts INS-RPT-001 Sec 8
BE-153B	H-101 burner flame detector B (UV scanner, diverse), 1oo2 with BE-153A	112	UV scanner, self-checking	Flame / no flame	BMS input	BMS	208, 141	CP-150	H-101 heater package datasheet (Vol 1/4) + BMS reqmts INS-RPT-001 Sec 8
BY-153	Pilot igniter (spark)	112	Ignition transformer	-	BMS DO	BMS	208, 139	CP-150	H-101 heater package datasheet (Vol 1/4) + BMS reqmts INS-RPT-001 Sec 8
XV-150A	Main burner safety shutoff valve 1 (P&ID I-06)	112	NPS 1 solenoid SSOV, NC, proof of closure	Open / closed	24 VDC DO	BMS	211, 138	CP-150	H-101 heater package datasheet (Vol 1/4) + BMS reqmts INS-RPT-001 Sec 8
XV-150B	Main burner safety shutoff valve 2 (P&ID I-06)	112	NPS 1 solenoid SSOV, NC, proof of closure	Open / closed	24 VDC DO	BMS	211, 138	CP-150	H-101 heater package datasheet (Vol 1/4) + BMS reqmts INS-RPT-001 Sec 8
XV-150C	Pilot safety shutoff valve (P&ID I-06)	112	NPS 1/2 solenoid SSOV, NC	Open / closed	24 VDC DO	BMS	211, 139	CP-150	H-101 heater package datasheet (Vol 1/4) + BMS reqmts INS-RPT-001 Sec 8
PCV-150	H-101 pilot gas regulator (P&ID, heater vendor)	112	Regulator	Vendor	-	LOCAL	211, 139	-	H-101 heater package datasheet (Vol 1/4) + BMS reqmts INS-RPT-001 Sec 8
HV-150A	H-101 main burner manual isolation (P&ID)	112	Manual ball NPS 1	-	-	LOCAL	212, 139	-	H-101 heater package datasheet (Vol 1/4) + BMS reqmts INS-RPT-001 Sec 8
PSL-164A	Burner fuel low pressure (BMS trip)	112	Pressure switch, manual reset	Set 5 psig (HOLD H-15)	Dry contact DI	BMS	212, 138	CP-150	INS-DS-005
PSH-164B	Burner fuel high pressure (BMS trip)	112	Pressure switch, manual reset	Set 20 psig (HOLD H-15)	Dry contact DI	BMS	212, 138	CP-150	INS-DS-005

Table 1-13: BPCS Interlocks and Station Alarms (P&ID PRO-DWG-113)

Tag	Service	P&ID	Type	Range / set	Signal	System	Loc. X, Y (ft)	JB	Datasheet
TT-208A	B-101 shelter temperature (added)	113	RTD + transmitter	0-150 F	4-20 mA HART	RTU	119, 118	JB-140	INS-DS-002
XS-209	Utility power failure / ATS position	113	ATS auxiliary contacts	-	Dry contact DI	RTU	215, 25	HOME	Vol 6 ELE (electrical lead)
XA-210	UPS common alarm	113	UPS contacts + DC bus monitor	-	Dry contact DI	RTU	215, 25	HOME	Vol 6 ELE (electrical lead)
ZS-211	Gate / building intrusion switches (A B-101, B B-102, C main gate, D emergency gate, E north pers. gate, F east pers. gate)	113	Magnetic door / gate switches	-	Dry contact DI	RTU	215, 25	HOME	INS-DS-014

SUMMARY AND JUNCTION BOXES

Table 1-14 summarizes the index by logic solver, and Table 1-15 lists the field junction boxes and panels shown on INS-DWG-003.

Table 1-14: Tags by System

System	Description	Tags
BMS	Burner management BMS-150 (CP-150 at H-101)	13
FC	Flow computer FQI-110 (CP-102C, B-102)	11
LOCAL	Local, no I/O	122
PKG	Vendor package internal	2
RTU	BPCS RTU/PLC (CP-102A, B-102)	53
SIS	Safety PLC (CP-102B, B-102)	39
Total		240

Table 1-15: Junction Boxes and Field Panels

Tag	Loc. X, Y (ft)	System	Description
JB-101	74, 31	RTU	BPCS JB, inlet / pig receiver / V-101 / fuel gas / T-101
JB-101S	77, 31	SIS	SIS JB, SDV-101, V-101 level trips, SDV-106, SDV-165, LSHH-192
JB-110	80, 86	RTU	BPCS JB, meter run MOVs
JB-110M	86, 86	FC	Measurement JB (sealable), PT/TT-111/121, USM pulse outputs
JB-130	148, 81	RTU	BPCS JB, control valve station, PT-134, TT-135
JB-130S	180, 82	SIS	SIS JB, OPSS PT-133A/B/C, SDV-102, SDV-103
JB-140	113, 112	RTU	BPCS JB at B-101, analyzers, sampler, shelter HVAC
JB-140S	116, 112	SIS	SIS JB at B-101, GD-205/206, SDV-141
JB-150	172, 131	RTU	BPCS JB, H-101 temperatures and TCV-152
JB-170	220, 82	RTU	BPCS JB, outlet PT-172 / TT-173
CP-150	216, 131	BMS	BMS-150 local panel at H-101 (unclassified side of firebox)
JB-W01	214, 197.5	WIL	demarcation panel at north fence (HOLD H-14)

TAGS PENDING ON THE P&IDS

Every tag in this index is shown on the issued P&IDs, and every non-equipment tag on the P&IDs is in this index.