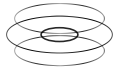


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| INSTRUMENTATION AND CONTROLS · CONTROL PANELS, JUNCTION BOXES AND UPS INTERFACE         |                                                                                                                 |                      |                        |          |          |
| Rev.                                                                                    | Date                                                                                                            | Revision description | Prepared               | Reviewed | Approved |
| A                                                                                       | 2026-09-29                                                                                                      | Issued for Review    |                        |          |          |
|                                                                                         |                                                                                                                 |                      |                        |          |          |

## NOTES

1. This datasheet covers control panels CP-102A (RTU), CP-102B (safety PLC) and CP-102C (measurement), telecommunications rack TR-102, the interface requirements for burner management panel CP-150, field junction boxes, local control stations, ESD pushbuttons, intrusion switches and the demarcation relay, and the instrumentation load on the 24 VDC UPS.
2. Controlling documents: GEN-DB-001, Basis of Design; INS-LST-001, Instrument Index; INS-LST-002, I/O List; INS-LST-003, Alarm and Trip Setpoints; INS-DWG-005, Control Panel Layout; INS-DWG-001, Control System and Network Architecture; INS-DWG-003, Instrument Location Plan; ELE-CAL-003, UPS and Battery Sizing.
3. Values marked typical are budgetary. The vendor shall confirm them with its proposal and final data (HOLD H-15).
4. Units are US customary. Pressures are gauge unless stated as absolute. Operating cases C1 to C7 are defined in GEN-DB-001, Section 6; normal conditions are case C2, maximum operating conditions the envelope of C1 to C7, and design conditions those of GEN-DB-001, Section 7.
5. Panel dimensions are typical and set the INS-DWG-005 layout; the systems integrator confirms them.
6. The UPS and battery are sized in ELE-CAL-003. This datasheet supplies the instrumentation and telecommunications load list and checks the battery capacity it needs by the same method.

## GENERAL

**Table 1-1: General Data**

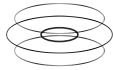
| Item                     | Value                                                     | Item             | Value                                                                     |
|--------------------------|-----------------------------------------------------------|------------------|---------------------------------------------------------------------------|
| Project                  | <div></div> <div></div> , <div></div> County, <div></div> | Service          | 120 MMSCFD gas receipt into the receiving pipeline operator's <div></div> |
| Form content             | ISA-20; tag numbers to ISA-5.1                            | Electrical codes | NFPA 70 (2023) Articles 500 and 501; API RP 500                           |
| Safety instrumented tags | IEC 61511 and IEC 61508                                   | Sour service     | Not required; sweet gas, H2S 4 ppmv maximum (NACE MR0175 not applied)     |

## SITE CONDITIONS

**Table 1-2: Site and Environmental Conditions**

| Item                       | Value                                                          | Item                     | Value                                                                                                                                    |
|----------------------------|----------------------------------------------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Ambient design temperature | -5 °F to 110 °F                                                | Electronics rating       | -40 °F to 158 °F (-40 °C to 70 °C)                                                                                                       |
| Solar radiation            | 1,000 W/m <sup>2</sup> ; sunshades where exposed               | Elevation and atmosphere | 1,150 ft MSL; 14.10 psia                                                                                                                 |
| Wind and ice               | 108 mph (ASCE 7-22, Exposure C); 0.5 in radial ice (HOLD H-06) | Area classification      | Class I, Division 2, Group D in process areas; Division 1 within 5 ft of vents and relief outlets (Volume 6 area classification drawing) |
| Temperature class          | T3 minimum (natural gas autoignition about 900 °F)             | Enclosure                | NEMA 4X (IP66) minimum; 316 SS or copper-free aluminum (below 0.4 % Cu), epoxy coated                                                    |



|                                                                                         |                                                                                                       |                 |                        |
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| Item                                                                                    | Value                                                                                                 | Item            | Value                  |
| Instrument power                                                                        | 24 VDC from the station UPS ( <div></div> GEN-DB-001, Section 9.8) unless noted                       |                 |                        |

## FIELD STATION TAG SCHEDULE

Table 1-3 lists every tag in  INS-LST-001 that references this datasheet, and Table 1-4 gives the process conditions at each tag.

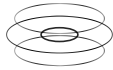
**Table 1-3: Tag Schedule**

| Tag    | Service                                                                                                                                                                                                               | P&ID                                                                                            | Range or set  | System       | JB       | Area classification                       |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|---------------|--------------|----------|-------------------------------------------|
| HS-101 | SDV-101 local station (close / reset-open permissive)                                                                                                                                                                 |  PRO-DWG-101   | Close / Reset | Safety PLC   | JB-101S  | Class I, Division 2, Group D              |
| HS-106 | SDV-106 local reset station                                                                                                                                                                                           |  PRO-DWG-102   | Reset         | Safety PLC   | JB-101S  | Class I, Division 2, Group D              |
| HS-165 | SDV-165 local reset station                                                                                                                                                                                           |  PRO-DWG-106   | Reset         | Safety PLC   | JB-101S  | Class I, Division 2, Group D              |
| HS-102 | SDV-102 local station (close / OPSS reset)                                                                                                                                                                            |  PRO-DWG-107   | Close / Reset | Safety PLC   | JB-130S  | Class I, Division 2, Group D              |
| HS-103 | SDV-103 local station (close / reset)                                                                                                                                                                                 |  PRO-DWG-108  | Close / Reset | Safety PLC   | JB-130S  | Class I, Division 2, Group D              |
| HS-201 | Station ESD pushbutton, main gate                                                                                                                                                                                     |  PRO-DWG-111 | None          | Safety PLC   | Home run | Unclassified at the gate (to be verified) |
| HS-202 | Station ESD pushbutton, B-102                                                                                                                                                                                         |  PRO-DWG-111 | None          | Safety PLC   | Home run | Unclassified (B-102 interior)             |
| HS-203 | Station ESD pushbutton, meter skid (west end, egress side)                                                                                                                                                            |  PRO-DWG-111 | None          | Safety PLC   | Home run | Class I, Division 2, Group D              |
| HS-204 | Station ESD pushbutton, heater                                                                                                                                                                                        |  PRO-DWG-111 | None          | Safety PLC   | Home run | Class I, Division 2, Group D              |
| HS-200 | ESD reset pushbutton on SIS panel CP-102B                                                                                                                                                                             |  PRO-DWG-111 | None          | Safety PLC   | Home run | Unclassified (B-102 interior)             |
| 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)                                                                                           |  PRO-DWG-113 | None          | BPCS RTU/PLC | Home run | Unclassified (B-102 interior)             |
| HS-215 |  remote shutdown command (from  RTU via JB-W01) |  PRO-DWG-111 | None          | Safety PLC   | JB-W01   | Class I, Division 2, Group D              |

**Table 1-4: Process Conditions**

| Tag    | Normal P and T         | Maximum operating P and T                                       | Design P and T                                 |
|--------|------------------------|-----------------------------------------------------------------|------------------------------------------------|
| HS-101 | 1,050 psig / 70 °F     | 1,150 psig / 45 to 120 °F                                       | 1,440 psig / -20 to 150 °F                     |
| HS-106 | 1,050 psig / 70 °F     | 1,150 psig / 45 to 120 °F                                       | 1,440 psig / -20 to 150 °F                     |
| HS-165 | 25 psig / ambient      | PSV-161 set (Class 150) / 110 °F                                | 285 psig (Class 150 at 100 °F) / -20 to 150 °F |
| HS-102 | 950 psig / 45 to 70 °F | 1,180 psig (PIC-134 clamp); 1,225 psig OPSS trip / 19 to 120 °F | 1,440 psig / -20 to 150 °F                     |
| HS-103 | 950 psig / 45 to 70 °F | 1,180 psig (PIC-134 clamp); 1,225 psig OPSS trip / 19 to 120 °F | 1,440 psig / -20 to 150 °F                     |
| HS-201 | Atmospheric / ambient  | Atmospheric / -5 to 110 °F                                      | Atmospheric / -5 to 110 °F                     |
| HS-202 | Atmospheric / ambient  | Atmospheric / -5 to 110 °F                                      | Atmospheric / -5 to 110 °F                     |



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|----------------------------------------------------------------------------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------|------------------------|-----------------|------------------------|--|--|---------------|-------------------|---------------------------------------------------------------------------------|--|--|--|-----|----------------|---------------------------|----------------|--------|-----------------------|----------------------------|----------------------------|--------|-----------------------|----------------------------|----------------------------|--------|-----------------------|----------------------------|----------------------------|--------|-----------------------|----------------------------|----------------------------|--------|-----------------------|----------------------------|----------------------------|
|                                                                                                    |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            | Document No.    | INS-DS-014             |                 |                        |  |  |               |                   |                                                                                 |  |  |  |     |                |                           |                |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |
|                                                                                                    |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            | Revision / Date | A · September 29, 2026 |                 |                        |  |  |               |                   |                                                                                 |  |  |  |     |                |                           |                |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |
|                                                                                                    |                       | Issue purpose                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Issued for Review          |                 |                        |                 |                        |  |  |               |                   |                                                                                 |  |  |  |     |                |                           |                |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |
| INSTRUMENTATION AND CONTROLS · CONTROL PANELS, JUNCTION BOXES AND UPS INTERFACE                    |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |                 |                        |                 |                        |  |  |               |                   |                                                                                 |  |  |  |     |                |                           |                |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |
| Tag                                                                                                | Normal P and T        | Maximum operating P and T                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Design P and T             |                 |                        |                 |                        |  |  |               |                   |                                                                                 |  |  |  |     |                |                           |                |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |
| HS-203                                                                                             | Atmospheric / ambient | Atmospheric / -5 to 110 °F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Atmospheric / -5 to 110 °F |                 |                        |                 |                        |  |  |               |                   |                                                                                 |  |  |  |     |                |                           |                |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |
| HS-204                                                                                             | Atmospheric / ambient | Atmospheric / -5 to 110 °F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Atmospheric / -5 to 110 °F |                 |                        |                 |                        |  |  |               |                   |                                                                                 |  |  |  |     |                |                           |                |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |
| HS-200                                                                                             | Atmospheric / ambient | Atmospheric / -5 to 110 °F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Atmospheric / -5 to 110 °F |                 |                        |                 |                        |  |  |               |                   |                                                                                 |  |  |  |     |                |                           |                |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |
| ZS-211                                                                                             | Atmospheric / ambient | Atmospheric / -5 to 110 °F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Atmospheric / -5 to 110 °F |                 |                        |                 |                        |  |  |               |                   |                                                                                 |  |  |  |     |                |                           |                |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |
| HS-215                                                                                             | Atmospheric / ambient | Atmospheric / -5 to 110 °F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Atmospheric / -5 to 110 °F |                 |                        |                 |                        |  |  |               |                   |                                                                                 |  |  |  |     |                |                           |                |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |        |                       |                            |                            |

## PANELS IN B-102

Table 1-5 describes the panels. Heat release is from Table 1-6.

**Table 1-5: Panels in Control Building B-102**

| Panel   | Content                                                                                 | Enclosure                                        | Size, W<br>x H x D | Access                                        | Power                                                      | Heat<br>(W) |
|---------|-----------------------------------------------------------------------------------------|--------------------------------------------------|--------------------|-----------------------------------------------|------------------------------------------------------------|-------------|
| CP-102A | RTU, local display, switch SW-102A, interposing relays, marshalling                     | NEMA 12 free-standing, 14 ga steel, ANSI 61 gray | 36 x 90<br>x 24 in | Front, three-point latch, lockable            | Two 24 VDC UPS feeds; 120 VAC utility for light and outlet | 119         |
| CP-102B | Safety PLC, loop-monitor relays, marshalling, HS-200 key switches, first-out lamps      | NEMA 12 free-standing, yellow nameplate          | 36 x 90<br>x 24 in | Front, key under safety system access control | Two 24 VDC UPS feeds                                       | 126         |
| CP-102C | Flow computer, switch SW-102C, surge protectors, custody terminals with seal provision  | NEMA 12 wall mounted, sealable                   | 24 x 36<br>x 12 in | Sealable door for witness seal                | 24 VDC UPS                                                 | 54          |
| TR-102  | Router, radio or satellite terminal, firewall, switch SW-102D, time server, fiber patch | 19 in rack, 42U, lockable                        | 24 x 84<br>x 36 in | Front and rear                                | 24 VDC UPS                                                 | 94          |

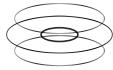
## PANEL HEAT AND UPS LOAD

TORUS built the 24 VDC load from the module counts of  INS-DS-010 and DS-011 and typical device ratings (HOLD H-15). Table 1-6 gives the load of each panel; the heat released is the DC load divided by a power supply efficiency of 0.90, with field loop power counted inside the panel, which is conservative. The panels release 394 W (1,345 Btu/h) into B-102. Table 1-7 adds the field devices on the same supply.

**Table 1-6: Panel DC Load**

| Panel   | Item                                  | Qty | W each | W    |
|---------|---------------------------------------|-----|--------|------|
| CP-102A | RTU CPU and backplane                 | 1   | 12.00  | 12.0 |
| CP-102A | Local display, 12 in touch panel      | 1   | 20.00  | 20.0 |
| CP-102A | Managed switch SW-102A (control zone) | 1   | 12.00  | 12.0 |
| CP-102A | Interposing relays (DO)               | 15  | 0.50   | 7.5  |
| CP-102A | RTU AI module                         | 2   | 4.00   | 8.0  |
| CP-102A | RTU AO module                         | 1   | 5.00   | 5.0  |
| CP-102A | RTU DI module                         | 3   | 4.50   | 13.5 |
| CP-102A | RTU DO module                         | 2   | 4.00   | 8.0  |
| CP-102A | RTU PI module                         | 1   | 4.00   | 4.0  |



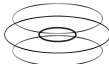
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| Panel                                                                                          | Item                                                                                                  | Qty             | W each                 | W    |
| CP-102A                                                                                        | RTU SER module                                                                                        | 1               | 3.50                   | 3.5  |
| CP-102A                                                                                        | Field loop power, two-wire AI and AO (24 V x 20 mA)                                                   | 29              | 0.48                   | 13.9 |
| CP-102B                                                                                        | Safety CPU (redundant pair)                                                                           | 2               | 15.00                  | 30.0 |
| CP-102B                                                                                        | Communication module (read-only Modbus TCP)                                                           | 1               | 5.00                   | 5.0  |
| CP-102B                                                                                        | Loop-monitor relays                                                                                   | 30              | 0.80                   | 24.0 |
| CP-102B                                                                                        | Safety AI module (SIL rated)                                                                          | 3               | 5.50                   | 16.5 |
| CP-102B                                                                                        | Safety DI module (SIL rated)                                                                          | 3               | 6.00                   | 18.0 |
| CP-102B                                                                                        | Safety DO module (SIL rated)                                                                          | 3               | 5.50                   | 16.5 |
| CP-102B                                                                                        | Field loop power AI (PT-133, detectors)                                                               | 7               | 0.48                   | 3.4  |
| CP-102C                                                                                        | Flow computer FQI-110 (dual run)                                                                      | 1               | 25.00                  | 25.0 |
| CP-102C                                                                                        | Managed switch SW-102C (measurement zone)                                                             | 1               | 12.00                  | 12.0 |
| CP-102C                                                                                        | Serial isolators and surge protectors                                                                 | 4               | 1.00                   | 4.0  |
| CP-102C                                                                                        | Fiber media converters (B-102 end)                                                                    | 2               | 3.00                   | 6.0  |
| CP-102C                                                                                        | Field loop power AI (PT and TT-111, 121)                                                              | 4               | 0.48                   | 1.9  |
| TR-102                                                                                         | Cellular router CR-102                                                                                | 1               | 12.00                  | 12.0 |
| TR-102                                                                                         | Secondary path, larger of radio and satellite terminal (average)                                      | 1               | 30.00                  | 30.0 |
| TR-102                                                                                         | Firewall FW-102                                                                                       | 1               | 20.00                  | 20.0 |
| TR-102                                                                                         | Managed switch SW-102D (DMZ)                                                                          | 1               | 15.00                  | 15.0 |
| TR-102                                                                                         | GPS time server GPS-102                                                                               | 1               | 8.00                   | 8.0  |

Note 1: Panel totals: CP-102A 107.4 W; CP-102B 113.4 W; CP-102C 48.9 W; TR-102 85.0 W.

**Table 1-7: 24 VDC UPS Load List**

| Load                                                                | Location | W     |
|---------------------------------------------------------------------|----------|-------|
| CP-102A                                                             | Panel    | 107.4 |
| CP-102B                                                             | Panel    | 113.4 |
| CP-102C                                                             | Panel    | 48.9  |
| TR-102                                                              | Panel    | 85.0  |
| Dump solenoids SY-101, SY-102, SY-103, SY-165 (8 W each, energized) | Field    | 32.0  |
| SDV-106 actuator interposing relay (actuator on the 120 VAC UPS)    | Field    | 2.0   |
| SDV-141 sample shutoff solenoid                                     | Field    | 4.0   |
| Ultrasonic meter electronics FT-111, FT-121                         | Field    | 20.0  |
| Gas chromatograph AT-141 electronics (oven heaters excluded)        | Field    | 30.0  |
| Moisture analyzer AT-142                                            | Field    | 30.0  |
| H2S analyzer AT-143                                                 | Field    | 30.0  |
| O2 analyzer AT-144                                                  | Field    | 10.0  |
| Composite sampler SMP-146 controller                                | Field    | 5.0   |
| Gas detectors GD-205, 206, 207                                      | Field    | 15.0  |
| Flame detector BE-213                                               | Field    | 5.0   |
| Smoke detector XS-212 and beacons at standby                        | Field    | 3.0   |



|                                                                                         |                                                                                   |                 |                        |
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| INSTRUMENTATION AND CONTROLS · CONTROL PANELS, JUNCTION BOXES AND UPS INTERFACE         |                                                                                   |                 |                        |
| Load                                                                                    |                                                                                   | Location        | W                      |
| Total continuous load                                                                   |                                                                                   |                 | 541                    |

Note 1: Burner management, electric actuators, electro-hydraulic pump motors and chromatograph oven heaters are not on the 24 VDC supply.

Note 2: The secondary communications path carries the larger of the radio and satellite options, because only one will be installed.

The battery must carry this load for 8 h without the generator (  GEN-DB-001, Section 9.8). The check follows IEEE 485 with the cell data and factors of  ELE-CAL-003: a constant-power load drawn at the end-of-discharge voltage of 21.6 V (12 cells at 1.80 V), a capacity rating factor of 8.696 h for 480 min, and factors of 1.11 for a 60 °F minimum electrolyte temperature, 1.1 design margin and 1.25 aging.

$$I = \frac{P}{V_{end}} = \frac{541}{21.6} = 25.0 \text{ A}$$

$$C = I K_t F_{temp} F_{margin} F_{aging} = 25.0(8.696)(1.11)(1.1)(1.25) = 332 \text{ Ah}$$

The charger must restore this capacity in 12 h while carrying the load at the 27.0 V float voltage, which needs about 50 A.

**The instrumentation and telecommunications load is 541 W and needs a 24 VDC battery of at least 332 Ah at the 8 h rate.  ELE-CAL-003 carries this load list and, with its duty-cycle analysis, selects a 400 Ah battery with two 50 A chargers, which covers it.**

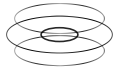
## FIELD JUNCTION BOXES

Table 1-8 gives the terminal count of each junction box from the points of  INS-LST-002, with 20 % spare.

**Table 1-8: Field Junction Boxes**

| JB      | Service                                                        | Analog points | Discrete points | Serial | Terminals | With 20 % spare | Size           |
|---------|----------------------------------------------------------------|---------------|-----------------|--------|-----------|-----------------|----------------|
| CP-150  | BMS-150 local panel at H-101 (unclassified side of firebox)    | 0             | 19              | 1      | 41        | 50              | 20 x 20 x 8 in |
| JB-101  | BPCS JB, inlet / pig receiver / V-101 / fuel gas / T-101       | 11            | 10              | 0      | 53        | 64              | 20 x 20 x 8 in |
| JB-101S | SIS JB, SDV-101, V-101 level trips, SDV-106, SDV-165, LSHH-192 | 0             | 14              | 0      | 28        | 34              | 16 x 16 x 8 in |
| JB-110  | BPCS JB, meter run MOVs                                        | 0             | 30              | 0      | 60        | 72              | 20 x 20 x 8 in |
| JB-110M | Measurement JB (sealable), PT/TT-111/121, USM pulse outputs    | 8             | 0               | 2      | 30        | 36              | 16 x 16 x 8 in |
| JB-130  | BPCS JB, control valve station, PT-134, TT-135                 | 6             | 10              | 0      | 38        | 46              | 16 x 16 x 8 in |
| JB-130S | SIS JB, OPSS PT-133A/B/C, SDV-102, SDV-103                     | 3             | 10              | 0      | 29        | 35              | 16 x 16 x 8 in |
| JB-140  | BPCS JB at B-101, analyzers, sampler, shelter HVAC             | 4             | 6               | 0      | 24        | 29              | 16 x 16 x 8 in |
| JB-140S | SIS JB at B-101, GD-205/206, SDV-141                           | 2             | 2               | 0      | 10        | 12              | 16 x 16 x 8 in |



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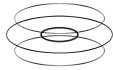
Note 1: Three terminals per analog, pulse or serial point including the shield; two per discrete point.

## SPECIFICATION

**Table 1-9: Specification, Panels, Junction Boxes and Field Stations**

| Item                                              | Requirement                                                                                                                                                                                                                                                                              |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Field junction box enclosure                      | Division 2 areas: 316 SS NEMA 4X, hinged door, stainless hardware. Division 1 areas: explosion-proof cast aluminum with conduit seals; breather and drain                                                                                                                                |
| Segregation                                       | Safety junction boxes (suffix S) separate from control boxes; custody box JB-110M sealable; no intrinsically safe circuits                                                                                                                                                               |
| Terminals                                         | DIN rail, spring clamp or screw, 2.5 mm <sup>2</sup> ; gray for control, yellow marked for safety; knife disconnect for DI and DO; fused terminals for 24 VDC distribution; 20 % spare                                                                                                   |
| Cable entries                                     | Bottom entry through gland plate; listed glands for TC-ER-HL cable in Division 2, conduit with seals in Division 1                                                                                                                                                                       |
| Grounding                                         | Isolated instrument ground bar for shields, insulated from the enclosure, and a separate safety ground; shields grounded at the panel end only (IEEE 1100)                                                                                                                               |
| Local control stations HS-101, 102, 103, 106, 165 | Explosion-proof, two operators (CLOSE mushroom, normally closed; RESET, normally open), HS-102 reset key operated, labeled; 4 ft above grade on a 2 in stand, at least 10 ft from the valve on the escape side                                                                           |
| ESD pushbuttons HS-201 to HS-204                  | Red mushroom, push to latch, turn to release, normally closed contact with line-monitoring resistor, explosion-proof, hinged cover, EMERGENCY SHUTDOWN sign, 4 ft above grade                                                                                                            |
| HS-200                                            | Key switches on CP-102B: ESD reset HS-200R and maintenance override enable HS-200B                                                                                                                                                                                                       |
| Intrusion switches ZS-211A to ZS-211F             | Wide-gap industrial magnetic door and gate contacts, normally closed, to RTU inputs; explosion-proof at B-101                                                                                                                                                                            |
| HS-215 remote shutdown relay                      | Interposing relay in JB-W01, coil driven by the receiving pipeline operator's dry contact; the safety PLC monitors the normally closed relay contact (open = shutdown); no SIL claimed. Terminals labeled OWNER and OPERATOR (HOLD H-14)                                                 |
| Panel construction                                | UL 508A listed; wireways 40 % maximum fill; 20 % spare DIN rail; LED light and 120 VAC outlet; thermostatic filtered fan; drawing pocket                                                                                                                                                 |
| Wiring colors                                     | 24 VDC positive red, 0 V blue, 120 VAC black and white, ground green; yellow ferrule markers on safety circuits; analog pairs black and white                                                                                                                                            |
| Wire                                              | 16 AWG MTW or TEW for signals, 14 AWG for power; ferrules on all stranded ends                                                                                                                                                                                                           |
| Labeling                                          | Engraved lamacoid nameplates for panels and devices; heat-shrink wire markers at both ends with terminal address                                                                                                                                                                         |
| Panel grounding                                   | Instrument reference and safety ground bars in each panel, bonded at one point to the B-102 ground (IEEE 1100, NFPA 70 Article 250)                                                                                                                                                      |
| Surge protection                                  | Surge protective device on every field cable leaving the building and on each antenna feed (IEEE C62.41)                                                                                                                                                                                 |
| CP-150 interface                                  | Burner management panel supplied with H-101 to API RP 556: NEMA 4X, Class I, Division 2 listed; accepts safety trip HS-150T (de-energize to trip) and RTU enable HS-150P; provides trip XA-150 and flame-proven XL-150 contacts, Modbus RTU with first-out and bath temperature; 120 VAC |



|                                                                                                |                                                                                                                                                                                                  |                 |                        |
|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|
|  <b>TORUS</b> | <div><div></div><div></div> · Owner</div><br><b>CONTROL PANELS, JUNCTION BOXES<br/>AND UPS INTERFACE</b>                                                                                         | Document No.    | INS-DS-014             |
|                                                                                                |                                                                                                                                                                                                  | Revision / Date | A · September 29, 2026 |
|                                                                                                |                                                                                                                                                                                                  | Issue purpose   | Issued for Review      |
| INSTRUMENTATION AND CONTROLS · CONTROL PANELS, JUNCTION BOXES AND UPS INTERFACE                |                                                                                                                                                                                                  |                 |                        |
| Item                                                                                           | Requirement                                                                                                                                                                                      |                 |                        |
| Inspection and testing                                                                         | Factory acceptance test to the Volume 8 inspection and test plan: point to point, insulation resistance, functional test with simulated I/O; safety PLC test witnessed by the engineer of record |                 |                        |

## COMMISSIONING SPARES AND CALIBRATION EQUIPMENT

Table 1-10 lists the instrumentation spares and tools supplied for commissioning.

**Table 1-10: Commissioning Spares and Calibration Equipment**

| Item                                                                            | Qty         | Purpose                                                                                                                                                                                               |
|---------------------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HART communicator and documenting calibrator                                    | 1           | Pressure and temperature loop checks                                                                                                                                                                  |
| Pressure calibrator 0 to 3,000 psig with hand pump or deadweight tester         | 1           | Transmitter proof tests                                                                                                                                                                               |
| Dry block temperature calibrator, -20 to 300 °F                                 | 1           | Temperature loop calibration                                                                                                                                                                          |
| Gas detector calibration kit: two 50 % LEL methane cylinders, regulator, cups   | 1           | Bump test and calibration                                                                                                                                                                             |
| Portable four-gas monitors (LEL, O2, H2S, CO)                                   | 2           | Personal monitors (  SAF-RPT-003)                                                                                  |
| Spare pressure transmitter 0 to 2,000 psig, SIL 2 capable, same model as PT-133 | 1           | Also covers PT-101, 134 and 172                                                                                                                                                                       |
| Spare RTD element and transmitter                                               | 1           | All temperature loops                                                                                                                                                                                 |
| Spare SDV dump solenoid and limit switch                                        | 2 each      | SDV-101, 102 and 103                                                                                                                                                                                  |
| Spare RTU and safety PLC modules (AI, DI, DO)                                   | 1 each type |  INS-DS-010 and  INS-DS-011 |
| Spare infrared gas detector                                                     | 1           | GD-205 to 207                                                                                                                                                                                         |
| Spare vibrating fork switch, Class 600 flange                                   | 1           | LSHH-105 and LSLL-106                                                                                                                                                                                 |

## OPEN ITEMS

**Table 1-11: Open Items**

| HOLD | Item                                                      | Responsible party                                                                                           |
|------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| H-15 | Panel and device models and ratings                       | Systems integrator and vendors                                                                              |
| H-14 | Demarcation terminals                                     | Receiving pipeline operator                                                                                 |
| TBV  | Battery and charger reselection for the load in Table 1-7 | Volume 6,  ELE-CAL-003 |

