

Table 1: Installing, provisioning, and commissioning a 7705 SAR system (Continued)

Item		SAR-A	SAR-Ax	SAR-H	SAR-Hc	SAR-M	SAR-Wx	SAR-X	SAR-8	SAR-18
51	Identify wire groupings for T1/E1 cables (by color)	n	n	y ⁽⁶⁾	n	n	n	y	y	y
52	Make external sync 1.0/2.3 coaxial connections	y	y	y	n	y	n	y	y	n
53	Make external sync RJ-45 BITS connections	y	n	n	n	n	n	n	n	y
54	Make external sync IRIG-B connections	n	n	y	n	n	n	n	n	n
55	Make Optical Management Console connections	n	n	n	n	n	n	y	n	n
Initialize and provision										
56	Power up and verify the initialization	y	y	y	y	y	y	y	y	y
57	Connect an ASCII terminal or terminal emulator to the console port	y	y	y	y	y	y	y	y	y
58	Troubleshoot initial startup	y	y	y	y	y	y	y	y	y
59	(option) Initialize using Auto Discovery Protocol (ADP)	y	y	y	y	y	y	y	y	y
60	Assign an IP address to the management port	y	y	y	y	y	y	y	y	y
61	Configure static routes in the Boot Option File (BOF)	y	y	y	y	y	y	y	y	y
62	Connect to the management port (local or network)	y	y	y	y	y	y	y	y	y
63	Run a Telnet or SSH session	y	y	y	y	y	y	y	y	y
64	Configure in-band management access	n	n	n	n	n	n	n	n	n
Commission the system										
65	Configure the IOM on the CSMS	n ⁽⁷⁾	y	y						
66	Configure the MDAs (adapter cards)	n ⁽⁷⁾	y	y						
67	Configure the modules	n	n	y	n	y	n	n	n	n
68	Configure SNMP	y	y	y	y	y	y	y	y	y
69	Set the router name, date, and time	y	y	y	y	y	y	y	y	y
70	Configure synchronization	y	y	y	y	y	y	y	y	y
71	Configure an NTP server	y	y	y	y	y	y	y	y	y
72	Configure security	y	y	y	y	y	y	y	y	y
73	Create initial users for node commissioning	y	y	y	y	y	y	y	y	y
74	Configure an OAM reference point	y	y	y	y	y	y	y	y	y
Verify the system										
75	Check alarms	y	y	y	y	y	y	y	y	y

Notes:

- (1) Standard installation configuration consists of forward-facing flush-mount installation in a 19-inch equipment rack.
- (2) Applies to SAR-Wx variants equipped with GPS receivers only.
- (3) Applies to units equipped with a GNSS receiver port, module, or card only.
- (4) For power substation and railway network applications (i.e. IEEE 1613 and IEC 61850-3 compliance).
- (5) Applies to the Power Injector Card only.

(6) Applies to units equipped with a 4-port T1/E1 and RS-232 Combination module only.

(7) The IOM and MDAs are preconfigured by the 7705 SAR and are not user-configurable.

Installation site assessment

Before installing equipment at a site, the characteristics of the site should be considered to determine whether they will adversely affect the reliability of the equipment. The following section discusses some of the site factors to consider prior to deploying equipment.

Geographical location

Different geographical locations carry different risk factors. For example, coastal installations with prevailing winds from the sea may be affected by airborne sea salt particles (ASSP), which can be carried many kilometers inland. As well, installations near ancient seabeds that have very high levels of salt in the soil may be affected by ASSP during windy drought conditions. Mountainous regions near coasts cause unique fog conditions. High humidity environments often cross dew point thresholds at night.

Consider whether the installation site is in an area that has the potential to experience any of the following seasonal influences: hurricanes, cyclones, tidal or river flooding, recent volcanic activity, or forest fires.

Examine the local surrounding environment of the installation site for proximity to possible sources of contaminants that may cause or accelerate corrosion, especially in the presence of high humidity.

Possible sources of contaminants include: landfills, fertilizer manufacturing, farming, sewage, geothermal activity, swamps or marshes, oceans, ancient seabeds, power generation, automotive and diesel combustion, fossil fuel processing, cement plants, construction sites, steel blast furnaces, steel electric furnaces, coke plants, pulp manufacturing, chlorine plants, rubber manufacturing, paint manufacturing, aluminum manufacturing, ore smelting, tobacco smoke, and battery manufacturing.

If there is any uncertainty surrounding the concentration of various contaminants at the installation site, then Corrosion Classification Coupons may be used to classify the severity of the environment according to the standard ISA 71.04.

Installation site type

The site must provide the appropriate environment for the installed equipment. This usually involves controlling ingress of contaminants and ensuring that humidity remains as low as possible.

Installations are typically in a hut, parking garage, room, or cabinet. Installation in data centers or telecom centers do not usually have high pollution levels but could still have high humidity levels.

• Room

Is the room connected to the heating, ventilation, and air conditioning (HVAC) system of the building? What protection is there to prevent ingress of dust, pollution, and humidity? To seal the environment properly, ensure that any doors, windows, vents, holes, or conduits are sealed or gasketed appropriately to ensure that the HVAC system can control the environment. These must be checked as part of routine site maintenance.

If outside air is brought in for ventilation, does it pass through a filter? What is the type and rating of the filter? Filters can help but the type of filter must be appropriate for the pollutants you are trying to exclude. For example, a standard fiberglass type air filter only prevents large debris and dirt from entering, but will do nothing to

prevent entry of small particles (such as ASSP), humid air or gaseous contaminants. It is important to understand the local conditions and consider what type of filtering is most appropriate. Minimum efficiency reporting value (MERV) charts may serve as a good source to understand particle sizes and filter options.

One simple yet effective way to keep pollutants out is to ensure that positive pressure is maintained inside the room or cabinet as compared to the outside by having fans blowing properly filtered air into the room.

Does the site have an air conditioner or dehumidifier? Is the rating and capacity adequate for the space? Where does the dehumidifier or air conditioner water drainage go?

Humidity reduction is one of the key elements in corrosion control. Air conditioners and dehumidifiers are recommended to reduce local relative humidity at the site. Another method is to keep the temperature in the cabinet high enough to maintain the relative humidity at less than 50%. Condensate, if allowed to stay in the site or enclosure, will evaporate over time and lead to higher relative humidity and corrosion.

• Cabinet

There are 3 major classifications of cabinets.

1. Direct air cooling (DAC) cabinets bring air into the cabinet to cool the equipment. DAC cabinets may or may not be filtered. Unfiltered air intake and exhaust is not recommended since issues will occur if unfiltered air is allowed into the cabinet. The ideal filter is a hydrophobic filter (GORE) since it filters particles smaller than 1 micron. Hydrophobic filters will prevent passage of water droplets but still allow water vapor to pass. Some chemical pollutants may require carbon or other types of filters particularly suited to the type of pollution.

2. Heat exchange (HEX) cabinets use a sealed cabinet and a heat exchanger to withdraw heat from the cabinet interior without bringing outside air into the cabinet. This results in no contamination influx and low humidity within the cabinet.

3. Air conditioned (AC) cabinets use a mechanical or thermal electric cooling (TEC) refrigeration unit to handle higher levels of heat in high-power installations. AC implementation is similar to HEX since the cabinet should be sealed. Proper AC implementation should never allow unfiltered air into the cabinet interior.

Site influences

Is backup power generation located in the same area as the communications equipment? Are batteries located in the same area as the equipment?

Backup generators that are located in the same enclosed area as the communications equipment may cause a great deal of site pollution, such as nitrous oxides and hydrogen sulphides, which can be detrimental to the long-term reliability and performance of equipment. A best practice is to house motor generator sets in a separate enclosure from the communications equipment. Batteries will outgas during charge and discharge cycles. These gases are very corrosive and may also be explosive in sufficient concentration. Batteries should always be housed in a properly vented enclosure or compartment, separate from the communications equipment.

Is the equipment located above the water grade? Is there adequate water drainage and leak controls?

Many areas are prone to flooding during rainy season or spring thaws, and it is important for the site to be located above typically anticipated flood levels, or to have sump pumps to keep the installation site dry. Drainage with backflow preventers should be installed if the site has provision for water sources, such as cooling towers.

What protection is there to prevent entry of insects, pests, and vermin?

Pests and vermin such as insects, mice, and spiders prefer warm, sheltered areas. All entries into the enclosure or shelter should be appropriately sealed and regularly maintained.

Site assessment checklists

The following site assessment checklists are intended to act as a tool in assessing the potential risks that must be managed at an installation site. The checklists are not intended to provide an exhaustive list of all risk factors, but rather to indicate some of the most common risks.

The first two checklists indicate environmental factors that may result in malfunctioning or failing equipment if the installation site is not appropriately deployed and maintained to counteract the detrimental effects of the environment. For each risk factor that is present, you must consider how to best design the installation site to avoid the negative effects of the risk factor. The third checklist asks questions about specific characteristics of the installation site. If any of the site characteristics have a checkmark in the No column, measures must be taken to correct the installation site appropriately to reduce the risk of equipment damage.

Seasonal influences

Is the installation site in an area with the potential to experience any of these seasonal influences?

Checklist 1: Seasonal influences

Influence	Yes	No
Hurricanes		
Cyclones		
Tidal or river flooding		
Recent volcanic activity		
Forest fires		

Local risk factors

Is the local surrounding environment of the installation site in proximity to possible sources of contaminants or other risk factors that may cause or accelerate corrosion?

Checklist 2: Local risk factors

Risk factor	Yes	No
Landfills		
Fertilizer manufacturing		
Farming		
Sewage		
Geothermal activity		

Checklist 2: Local risk factors (Continued)

Risk factor	Yes	No
Swamps or marshes		
Oceans		
Ancient seabeds		
Power generation		
Automotive and diesel combustion		
Fossil fuel processing		
Cement plants		
Construction sites		
Steel blast furnaces		
Steel electric furnaces		
Coke plants		
Pulp and paper manufacturing		
Chlorine plants		
Rubber manufacturing		
Paint manufacturing		
Aluminum manufacturing		
Ore smelting		
Tobacco smoke		
Battery manufacturing		
Mountains near a coastline		
High humidity regions		
Fossil fuel use, such as open fires used by locals for cooking or burning farming byproducts		

Specific characteristics of the installation site

Does the installation site exhibit characteristics that may require upgrade or repair?

Checklist 3: Specific characteristics of the installation site

Characteristic	Yes	No
Is the installation site in a room that is part of the building HVAC system?		
Does the installation site have protection to prevent ingress of dust?		
Does the installation site have protection to prevent ingress of pollution?		
Does the installation site have protection to prevent ingress of humidity?		

Checklist 3: Specific characteristics of the installation site (Continued)

Characteristic	Yes	No
If outside air is brought in for ventilation, does it pass through a filter?		
If outside air is brought in for ventilation through a filter, is the type and rating of the filter appropriate to the environmental conditions?		
Does the site have an air conditioner?		
Is the rating and capacity adequate for the space?		
Is there proper drainage of water from the air conditioner?		
Does the site have a dehumidifier?		
Is the rating and capacity adequate for the space?		
Is there proper drainage of water from the dehumidifier?		
Is backup power generation located in a separate area from the communications equipment?		
Are batteries located in a separate area from the communications equipment?		
Is the equipment located above the water grade?		
Are there adequate water drainage and leak controls?		
Is there protection present to prevent entry of insects, pests, and vermin?		

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