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Worldwide Supplier of Gas Detection Solutions

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TN 2020: DS-400 Series Docking Station Performance Requirements

1. General Requirements	
Docking station	The manufacturer shall offer a fully automatic docking station for bump testing, calibrating and downloading testing gas calibration and gas monitoring results from the instrument, and transferring the downloaded information to a computer. The docking station shall be able to complete a bump test in 20 seconds. The docking station will include an SD card capable of storing up to 10,000 test records. The docking station shall allow the user to program the types and concentrations of gas used in the test and calibration procedures. Docking stations shall be available in single calibration gas inlet, and four calibration gas inlet versions. The docking station shall be capable of stand-alone operation, and shall be capable of performing bump tests and instrument calibrations without being connected to an external computer. The same docking station must be capable of being used to test all models of the manufacturer's multi-sensor instruments. The docking station shall utilize easily interchangeable cradles that allow it to be used to test either diffusion or sample pump equipped instruments.
Multi-docking station arrays:	It shall be possible to link up to three docking stations in a single integrated array mounted to a common baseplate. It shall be possible to provide power for up to three docking stations from a single 110-220 VAC power source. It shall be possible to connect the test gas for single inlet docking stations from inlet to inlet so that a single cylinder of test gas and demand flow regulator (DFR) can supply gas to all the docking stations in the array. Each docking station shall include an assignable IP address. It shall be possible to use a single data interface cable to communicate with multiple docking stations.

2. Test protocols	
Fresh air:	Automatic calibration
Gas response:	Automatic bump test Automatic or selective gas calibration
Response time:	User selectable bump test pass fail criteria based on t_{50}, t_{90} or automatically assigned thresholds
Alarm activation:	Bump test evaluates time for each tested sensor to activate alarm 1 and alarm 2 when exposed to gas (as long as the concentration is high enough to activate the alarm). Sensors that fail to respond in the proper time individually identified.
Visual alarms:	Bump test includes automatic visual (LED) alarm test
Audible alarms:	Bump test includes automatic audible alarm (horn) function test

4. Physical Characteristics	
Size:	Single gas inlet docking station: 4.7" x 5.1" x 8.9" in total size (120 x 130 x 225 mm) Four gas inlet docking station: 4.9" x 6.7" x 8.9" in total size (125 x 169 x 225 mm).
Weight:	DS-400 single gas inlet Docking Station: Less than 28.5 oz. (800 g) DS-404 four gas inlet Docking Station: Less than 52.91 oz. (1,500 g)
Handling:	The docking station shall be durable and easily transportable.
Housing material:	Impact proof, ABS housing.
Power:	The docking station shall be powered by means of either a standard 110 – 240 VAC wall cube power source, or a 12 VDC power adapter.
Display:	The docking station shall utilize the LCD display of the instrument to show the status and results of bump test, calibration, audible alarm and visual alarm test procedures. The LCD screen shall change colors from green to amber to indicate a failed test or malfunctioning sensor. The LCD shall indicate the charging status of the instrument when the docking station is being used to recharge the batteries in the instrument and or motorized pump. The LCD shall show the results for each sensor tested or calibrated. The docking station shall show the fresh air and span calibration reading for each sensor before and after adjustment.
Keypad buttons:	The docking station shall utilize the push-buttons of the instrument being tested to initiate bump test and calibration procedures, and to review results. There shall be no requirements to access hidden or internal switches for any docking station operations.
Data access:	Calibration results and other information shall be accessible directly through the instrument LCD. Results are permanently stored in non-volatile memory on an SD memory card installed in the docking station. Test and calibration data may be downloaded either by means of a data download cable connected to an external computer, or the SD card may be removed from the docking station and downloaded directly by means of an SD card reader to the user's computer.
Data retention:	Test and calibration data shall be stored in non-volatile memory on an SD card installed in the docking station, and shall not be lost or corrupted in the event of sudden power loss or while the docking station is unplugged.
RFI / EMI resistance	Complies with EMC Directive 89/336/EEC
Electromagnetic compatibility	Complies with DIN EN 50270
Temperature range:	50 - 90°F (10 - 32°C)
Warranty:	One year

3. Operation	
Number / types of gases:	Single inlet docking station: User programmable for one cylinder of any supported single or multi component calibration gas mixture. Four inlet docking station: User programmable for one to four cylinders of any supported single or multi component mixture. Each inlet may be individually programmed for each type of single or multi-component gas. The gas from each inlet may be separately programmed for use in bump test only, calibration only, or for use in all test and calibration procedures.
Interface:	The pushbuttons and display of the instrument being tested shall provide the graphical and operational interface for the docking station.
Time stamp:	The docking station shall include a real-time clock capable of being periodically updated from an external computer.
Programming:	The docking station shall be capable of being programmed by means of a data cable connected from an Ethernet connection in the docking station to a USB port in an external computer.
Automatically generated reports of bump test and calibration results	Standard accessories included with each docking station shall include browser based software for automatically generating reports (full or simplified) of test and calibration results.
Automatically generated certificates of bump test and calibration results	Standard accessories included with each docking station shall include browser based software for automatically generating certificates of test and calibration results.
Internet connectivity:	It shall be possible to connect the docking station by means of the data cable to an external addressable USB hub, which in turn may be connected via Ethernet cable to an external computer or Ethernet portal.

3. Activity record content	
Activity record content	The docking station shall log significant instrument calibration and test results, settings and adjustments including (but not limited to) the following: • Serial number of instrument tested • Serial number of docking station • Lot / serial number of gas used (if entered in docking station) • Location and user information (if entered in instrument) • Alarm settings for each instrument tested or calibrated • Pass fail bump test results for each sensor • Pass fail fresh air and gas calibration results for each sensor • Time to A1 during bump test for each sensor • Time to A2 during bump test for each sensor (if gas concentration high enough to test A2 setting) • Reading for each sensor before and after fresh air calibration • Reading for each sensor before and after gas calibration • Next calibration due date (if assigned) • Next bump test due date (if assigned) • Next inspection due date (if assigned) • Any sensors omitted from bump test or calibration

6. Supported types of test and calibration gas	
Gases supported:	It shall be possible to use a pull down menu to program each docking station gas inlet for use with gas mixtures that include any of the following gases. It shall be possible to specify the gases and concentrations of up to six gases in a single multi-component mixture. • Methane • Propane • Butane • Pentane • Acetylene • Ethylene • Nonane • Hydrogen sulfide • Hydrogen • Carbon monoxide • Carbon dioxide • Oxygen • Ammonia • Nitrogen • Sulfur dioxide • Isobutylene • Nitrogen dioxide • Nitric oxide • Hydrogen cyanide • VOC (can be used for various VOC gas mixtures)

3. Gas connections and pump	
Inlets:	Single inlet docking station: One gas inlet and one fresh air inlet Four inlet docking station: Four gas inlets and one fresh air inlet
Outlets:	One gas outlet for exhausted gas
Flow rate:	The built in docking station pump shall have automatic variable flow rate control to minimize the amount of gas consumed during testing and calibration procedures, and to maximize the flow of fresh air during purging in order to minimize the delay times between tests. The docking station will utilize flow rates optimized for the particular gas and tubing length used to deliver gas to the docking station.
Regulator(s):	Gas is provided to the docking station from external cylinder(s) equipped with a demand flow type (DFR) regulator.

5. Standard accessories	
Accessories included with each docking station:	Docking station configuration software for programming the docking station. Data downloading software for downloading test and calibration results to an external computer. USB interface cable used to connect the docking station to an external computer or USB hub. 110 – 220 VAC wall cube power adapter 1 GB SD memory card (installed) Browser based software for automatically generating reports (full or simplified) of test and calibration results. Browser based software for automatically generating certificates of test and calibration results.
Optional accessories	Interchangeable docking station single cradle for diffusion G450 and G460 instruments Interchangeable double cradle for MP-2 motorized pump equipped G450 and G460 instruments 12 VDC power adapter Bayonet type power connectors used to directly connect one docking station to the next to allow a single power source to be used to provide power for up to three docking stations. Data interface linkage cables used to directly connect one docking station to the next in order to allow a single data download cable to communicate between docking stations that are linked into an array to communicate with an external computer. Baseplate and mounting accessories for docking stations configured in three unit arrays. Demand flow regulators (DFRs) designed for various cylinder inlet and cylinder types.