Medical Air / Surgical air station

HTM 2022 / 02-01

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Key features

1. High efficiency and reliability rotary screw air compressors
2. Air refrigeration dryers to ensure air pressure dew point complying to **ISO 8573-1**:2010 class 4 humidity
3. Wide range of Air storage tank equipped with internal **VITROFLEX** cladding (for use with medicinal air)
4. Adsorption dryers for medicinal use. They allow to dehydrate compressed air, reaching a deeper dew-point than by using a refrigerated air dryer (from -20° C down to -60/-70° C).They are also equipped with filters for oil and dust removal
5. Touch screen control panel with **PLC** designed to manage the whole air station in **DUPLEX,TRIPLEX,** or **QUADRUPLEX configuration** It ensures the monitoring of the whole air production system and it is provided with **AUTOMATIC RESTART** after a main power failure. All signals alarms and status are in compliance to the **HTM 2022** and **HTM 02-01** memorandum

General Description

Delta p compressed air systems are designed in accordance with **HTM 2022 / 02-01** standards requirements.
The following configurations are available:
- **DUPLEX CONFIGURATION**: composed by two compressor sources
- **TRIPLEX CONFIGURATION**: composed by three compressor sources
- **QUADRUPLEX CONFIGURATION**: composed by four compressor sources. In this configuration, compressors work coupled in pairs of two units for each source of supply, to ensure the full design flow

All these configurations may be arranged to supply both medical air (Air-400) and surgical air (Air-800).
Two working modes are provided:

1. AUTOMATIC MODE: the whole system is controlled by a PLC that provides to the management of:
- System Equipments
- Alarm conditions
- Changeovers
- Service informations

2. MANUAL MODE: by means of a selector switch on the panel, the user may select manually the duty equipment, bypassing the control of PLC. The manual mode could be used in when the following events occur:
- Maintenance
- Emergency conditions
- Anomaly of the system operation

All the configurations are provided with EMERGENCY RESERVE SOURCES to ensure the continuity of supply in case of failure of compressor sources. They are automatic cylinder manifold, monitored by an electronic alarm system that reports to a MODULAR CONTROL BOARD alarm conditions, when they occur.

All the configurations exhibit following main components :
1. Compressors
2. Refrigerator Dryers
3. Reservoirs
4. Air filtering units for medical application
5. Second stage panel
6. Modular control board
7. Cylinder Emergency reserve manifold

Number and arrangement of these components may vary depending on the configurations, as shown in figures

Modular control board features

The whole system is controlled by a MODULAR CONTROL BOARD (fully complying to **HTM 02-01** requirements) composed by:
1. PLC CONTROL PANEL: It provides for the control of the system logic receiving inputs from equipments and sensors and sending outputs to others control panels
2. STATUS CONTROL PANEL: It provides for the monitoring of all the alarm conditions of the plant and it is capable of report them to a remote repeater panel
3. COMPRESSOR CONTROL PANEL: One for each compressor present in the system. It controls the operating status of the single compressor
4. FILTERING UNIT CONTROL PANEL: By means of a differential pressure switch and a of an hygrometer mounted on filtering units, it ensures the monitoring of air pressure and of dew point, giving an alarm signal if these parameters are out of the normal range
AUTOMATIC RESTART AFTER POWER FAILURE IS PROVIDED

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Technical Data

AIR STATION GENERAL DATA

FLOW RATE: From 2 to 400 Nm^3/h of produced air
Further flow rates available on request

AIR OUTLET NOMINAL PRESSURE: 4 bar for medical air
7 bar for surgical air

COMPRESSOR WORKING PRESSURE: Systems with 10 bar and 13 bar rotary screw compressors are available as standard supply
Further working pressures are available on request

AIR TANKS: 11,5 or 16 bar (depending on the compressors) CE PED marked and with an internal treatement in VITROFLEX for use with medical air.
Wide range of volumes, depending on the size of the supply system, are available

AIR REFRIGERATION DRYERS: They ensure an air pressure dew point complying to **ISO 8573-1 :2010** class 4 humidity

FILTERING UNITS: Heatless adsorption are used, in order to reach the correct dew-point to ensure a good dehydration, from -20° C down to -60/-70° C.

QUALITY OF PRODUCED AIR: Medical Air in accordance with requirements of European Pharmacopoeia Monograph (**SEE TABLE 1**)

TABLE 1

MEDICAL AIR CONTAMINANTS TABLE - IN ACCORDANCE TO EUROPEAN PHATMACOPOEIA MONOGRAPH

CONTAMINANT	MAX VALUE ADMITTED
OXYGEN CONCENTRATION	≥ 20,4% (V/V) and ≤ 21,4% (V/V)
TOTAL OIL CONCENTRATION	≤ 0,1 mg/m^3
CO CONCENTRATION	≤ 5 ppm
CO_2 CONCENTRATION	≤ 500 ppm
WATER VAPOUR CONTENT	≤ 67 ppm
SO_2 CONCENTRATION	≤ 1 ppm
NO + NO_2 CONCENTRATION	≤ 2 ppm

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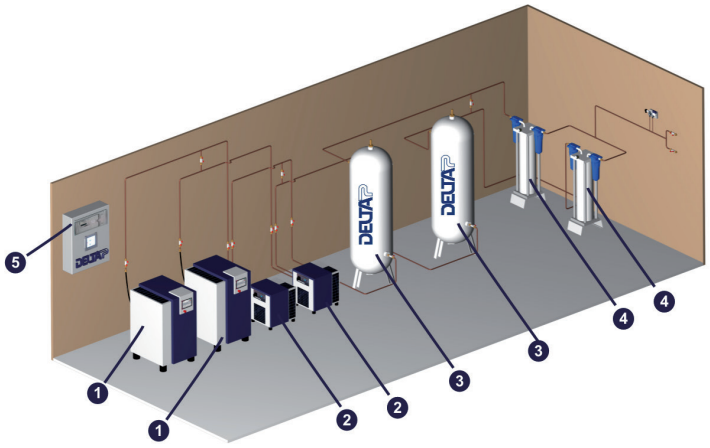
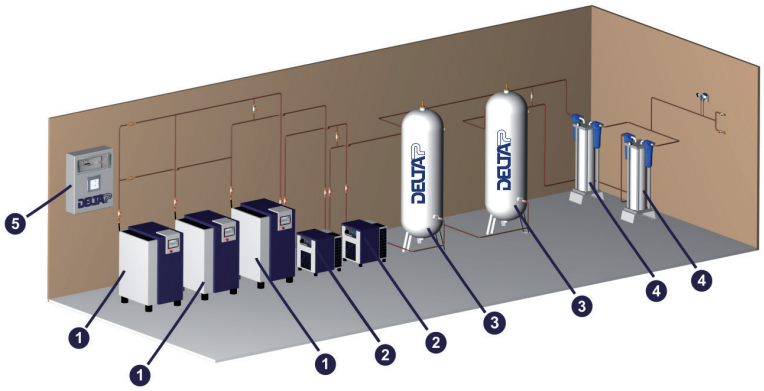
DUPLEXCONFIGURATION - TIPICAL LAYOUT 3D



1. Air compressor
2. Air dryer
3. Air receiver
4. Filtering unit
5. Control panel

TRIPLEXCONFIGURATION - TIPICAL LAYOUT 3D



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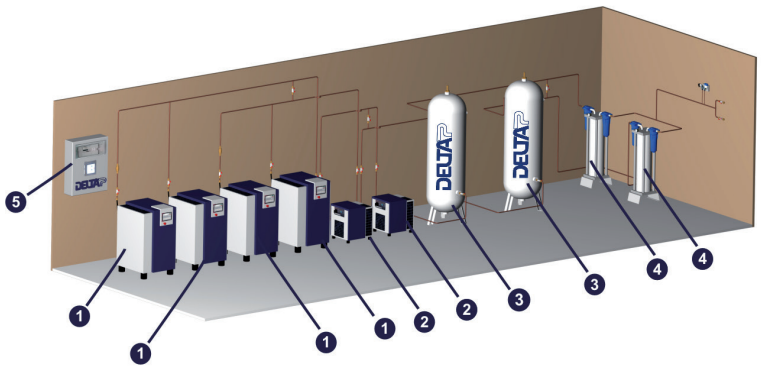
QUADRUPLEX CONFIGURATION - TIPICAL LAYOUT 3D



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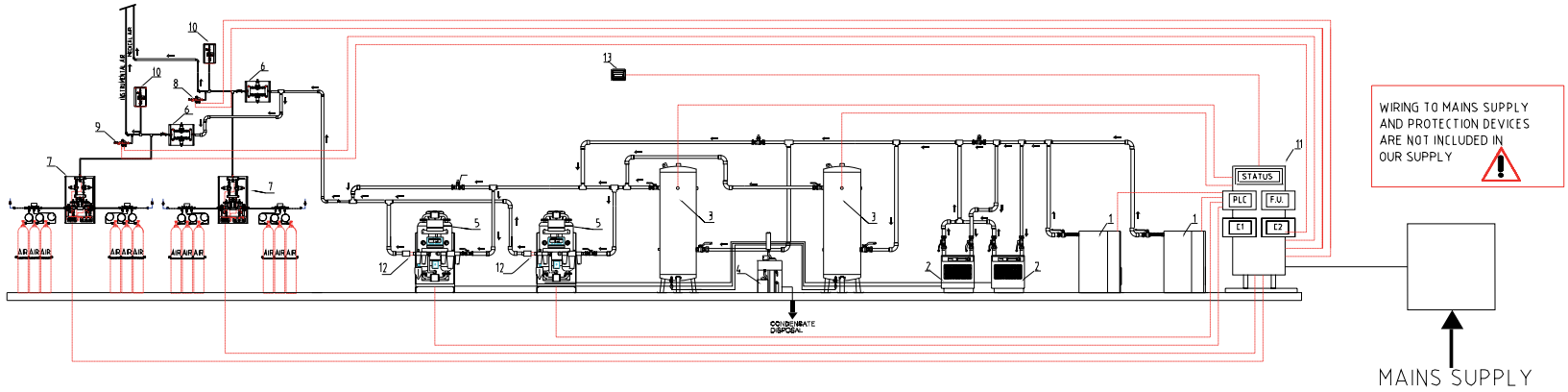
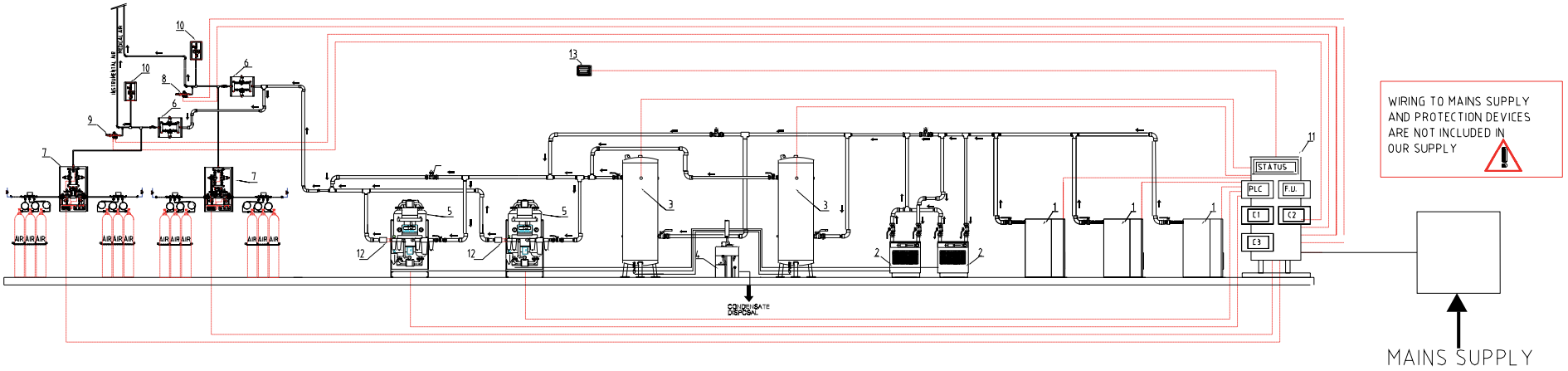
EXAMPLE OF TYPICAL DUPLEX CONFIGURATION FOR AIR-400 AND AIR-700 SUPPLY



EXAMPLE OF TYPICAL TRIPLEX CONFIGURATION FOR AIR-400 AND AIR-700 SUPPLY



N	DESCRIPTION	N	DESCRIPTION	N	DESCRIPTION	N	DESCRIPTION
1	Air Compressor	5	Filtering unit	8	Control unit, preset 3,6-5,7 bar	12	Solenoid valve
2	Air refrigerator dryer	6	Second stage panel with bypass - reducers 2251M	9	Control unit, preset 5,6-9.6 bar	13	Remote repeater alarm panel
3	Tank			10	NIST unit for AIR		
4	Condensate separator water-oil	7	Air automatic changeover manifold	11	Modular Control Board		

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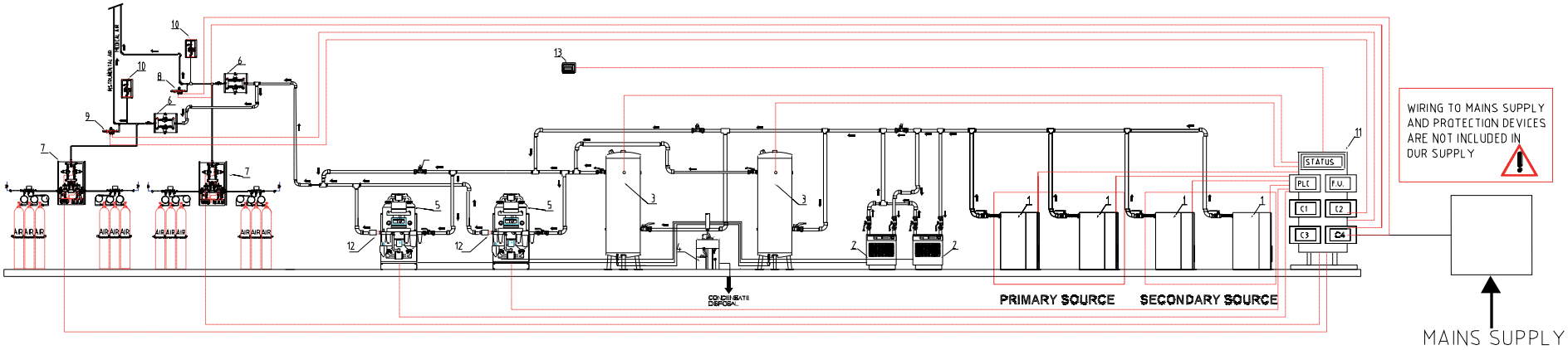
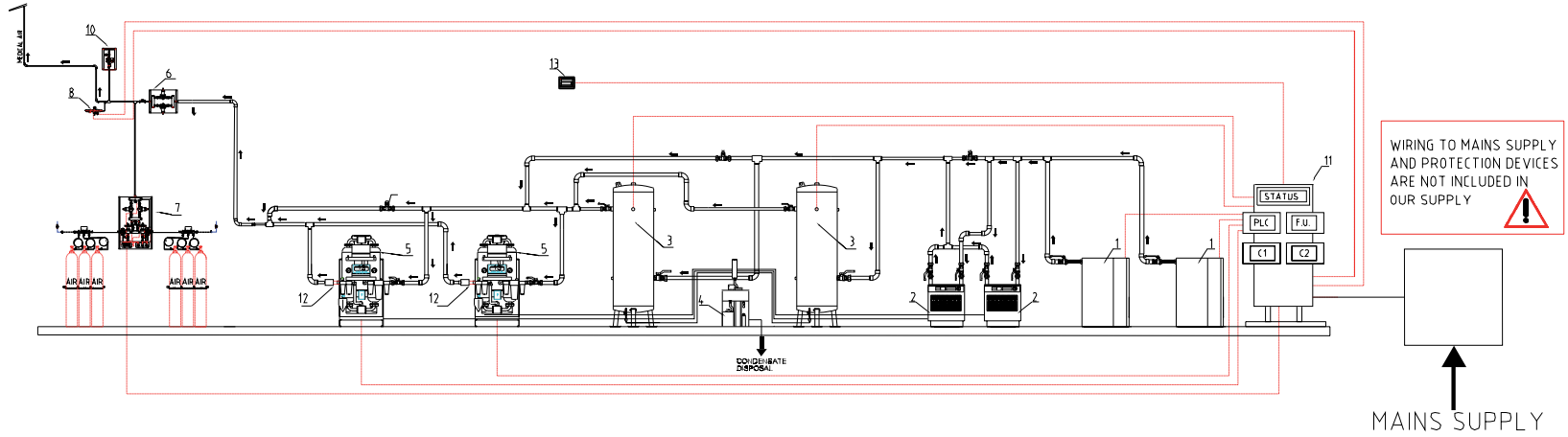
EXAMPLE OF TYPICAL QUADRUPLEX CONFIGURATION FOR AIR-400 AND AIR-700 SUPPLY



EXAMPLE OF TYPICAL DUPLEX CONFIGURATION FOR AIR-700 SUPPLY



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