

Maintaining a dental treatment unit

- Principles of operation
 - function
 - use
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- construction
 - components
 - system diagram
 - inputs/outputs
- troubleshooting
 - identifying common faults
 - replacing components
 - rectifying faults
- preventive maintenance
 - replacing components
 - calibrating
- safety considerations
 - user and patient safety
 - electrical safety
- performance monitoring
 - calibration
 - quality assurance and control



13.5.4 Maintaining a dental treatment unit

Unit B 13.5 Maintaining dental and dental laboratory equipment

Module 279 18 B Medical Instrumentation I

Dental treatment unit: principles of operation



Dental treatment units are placed on service pedestals **mounted** to the floor to bring the tools to a height convenient for use by the dentist

A dental treatment unit, is a utility outlet and stand-by tool for dentists which provides:

- **tools** used by the dentist (drills, etc.)
- **delivery of water, air and suction** to the patient
- the **removal** of expectorated waste (spit) foreign matter from the patient's mouth.

Dental treatment units may be integrated with the dental chair and light



Dental treatment unit: Components

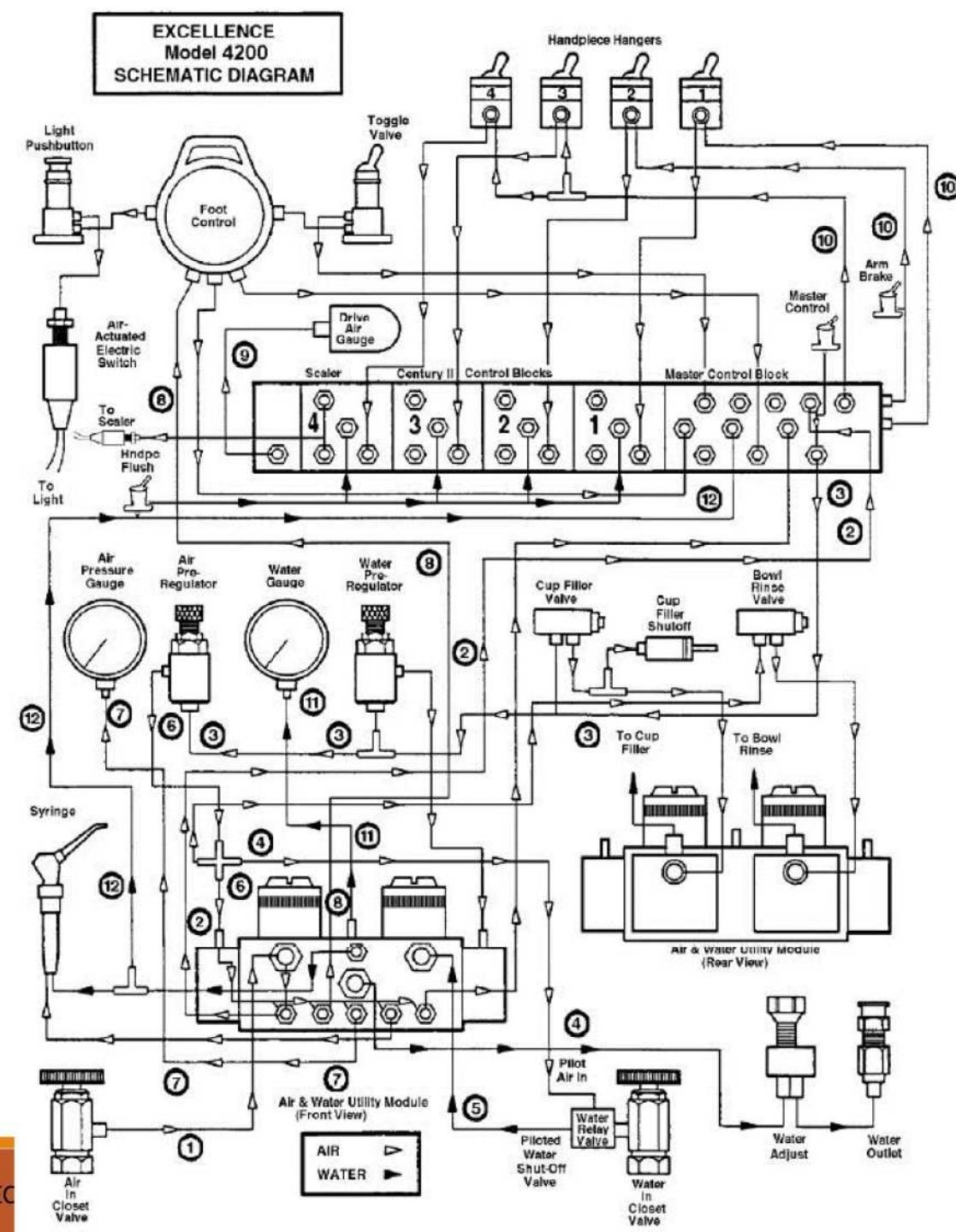
The normal utilities in dental units are:

- **Air blowing** foreign matter from the area where the dental procedure is to be performed and for drying moisture from tooth surfaces. This air service can also be used to power the high- and low-speed air drills.
- **Suction** (vacuum) used to remove saliva from the mouth during dental procedures. The suction system presents a unique problem in that it must be gentle enough to prevent injury to mucous membranes yet strong enough to carry out waste material.
- **Water** to rinse the patient's mouth and for cooling high- and low-speed air drills.
- **Electrical power** for the dental chair service and for lighting
- Movable (articulating) **support arms** for holding tools, service trays and task lighting. Task lighting is normally fixed in intensity but has a high degree of positional adjustment.
- **Sink drain**, commonly called a **cuspidor**, for the removal of the expectorant (spit) of the patient
- **Gas** for burners to heat wax used in the formation of dental impressions.



Dental treatment unit: Construction

see further construction details in the 'Dental Lecture notes.pdf'
and
A-dec Service Guide Volume II
and
<http://armymedical.tpub.com/MD0371/MD03710048.htm>

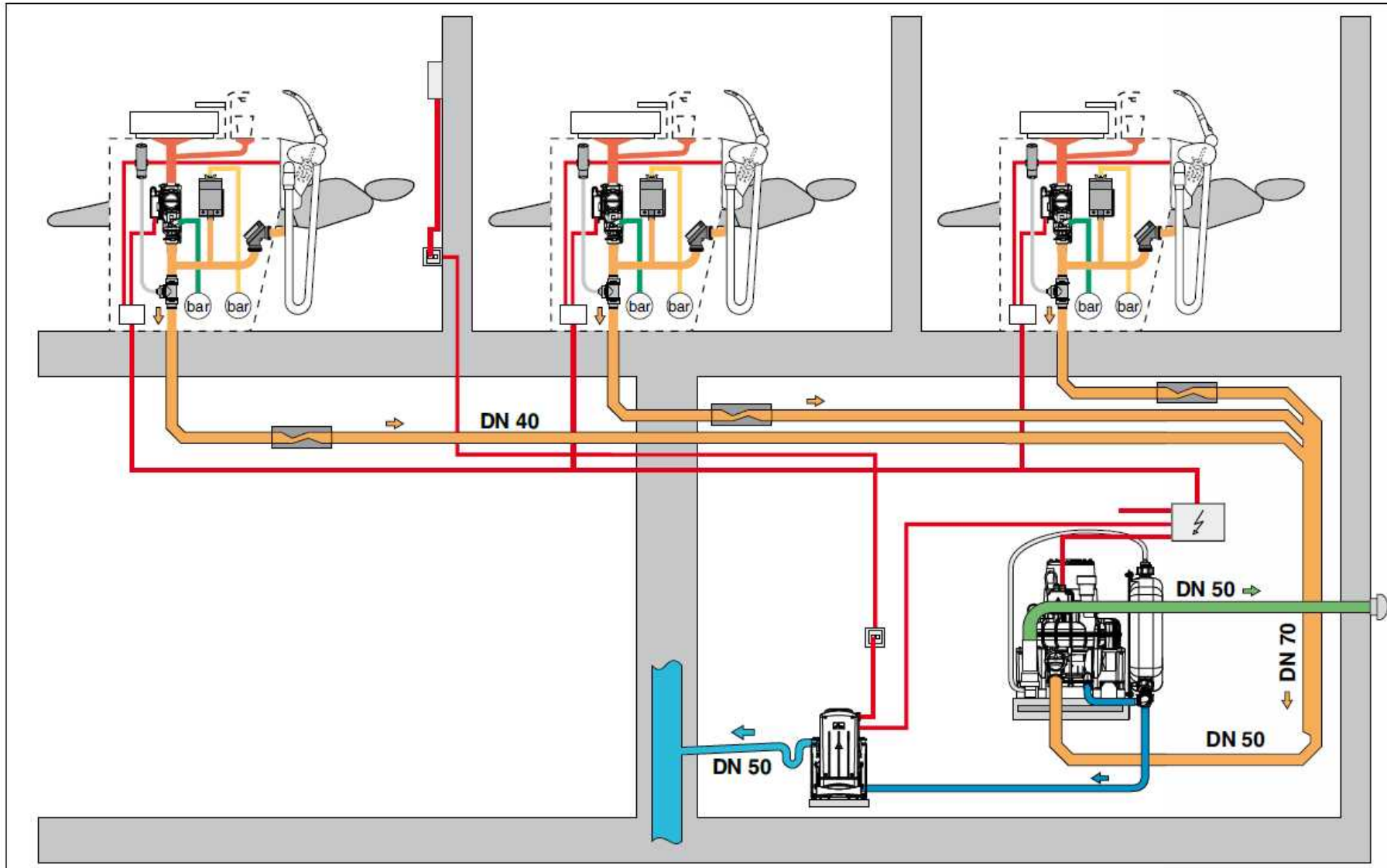


Dental treatment unit: Construction



Handpiece Control/
Delivery Head

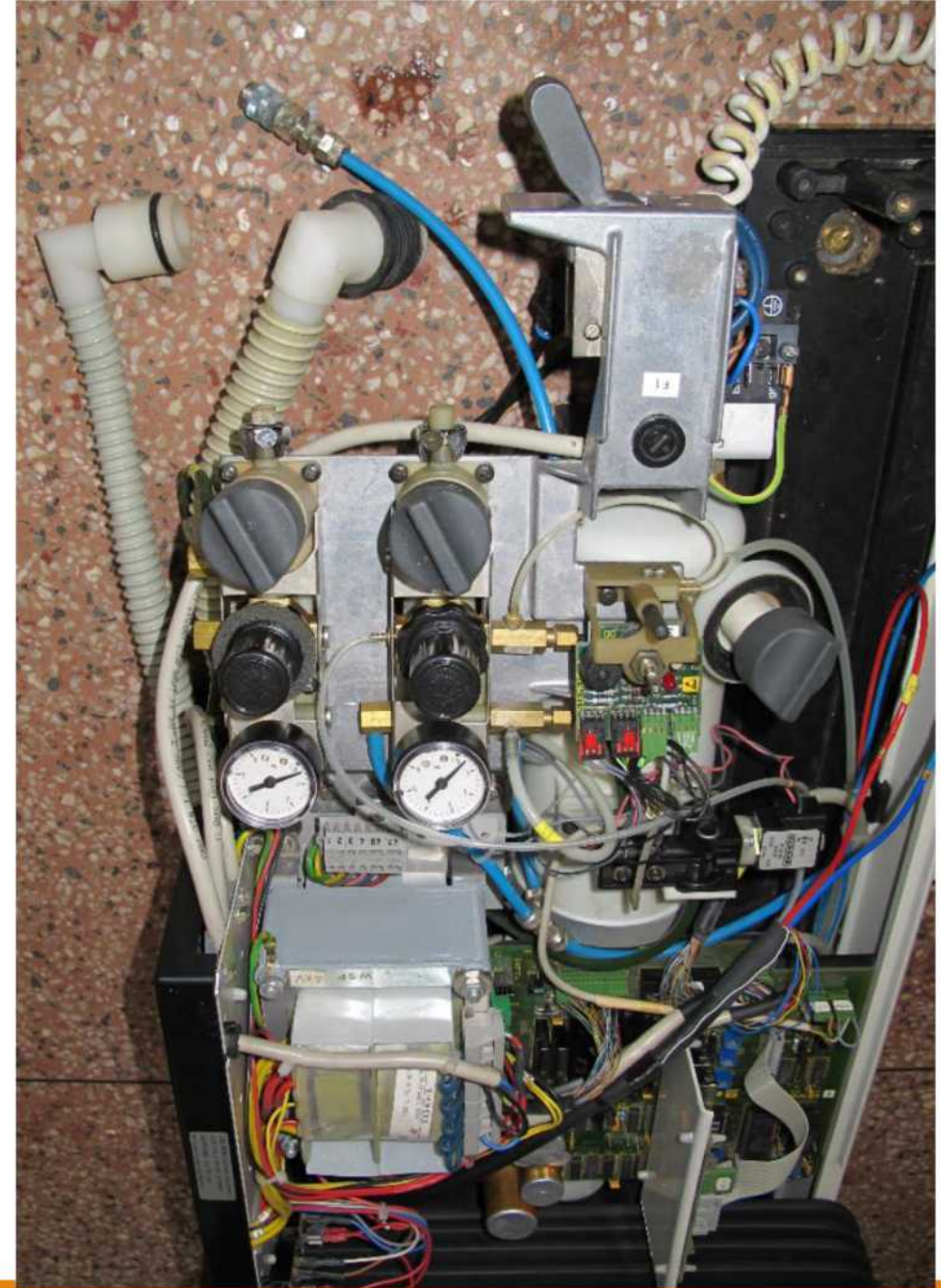
Dental treatment unit: Construction



Construction example:
Suction system placed
in a basement or
integrated in the dental
treatment unit



Dental treatment unit: Construction



Dental treatment unit: Construction



DAILY MAINTENANCE INSTRUCTIONS

(DENTAL UNIT)

Daily Maintenance

Daily and before use:
1. Cleaning checking:
Check that equipment is clean. Especially verify cleanness of drain filter, vacuum filter, lighting, and spitton. Drain condensed water of compressor air tank.
2. General inspection:
Visually inspect unit, all screws are there is no bumpy part.
3. Accessory checking:
Verify all consumables and instrumetns are ready to use.
4. Functional checking:
Verify all lever, arm, chari roation, switch, and dial work normally.
5. Operational checking :
Verify there is no abnoraml sound or vibration when power on. Verify compressed air pressure is enough for operation. Veryfy normal movement of chair up/down, lamp on/off, function of air turbin/motor, vacuum and scaler.
Daily and after use:
6. Cleaning checking :
Check that equipment and accessories are clean and no damage after every operation.

Dental treatment unit: Preventive maintenance

Level 1 (2 man hours work)

- 1.0 clean the external controls, knobs, meters, and gauge surfaces of the dental unit
- 1.1 clean the internal chassis of the dental unit. Remove rust, dirt, lint, blood and other deposits
- 1.2 Perform internal and external visual inspection. Examine the following elements:
 - a. all service connections
 - b. electrical distribution and wiring
 - c. air and vacuum lines including filters
 - d. gas lines and fittings
 - e. water, gas, vacuum and air valves
 - f. cuspidor fittings and drain
 - g. function of all articulating arms
- 1.3 measure the chassis and control ground impedance
- 1.4 place the unit in an operational configuration
- 2.0 activate all functions and test for instrument leakage in the power-off and power-on modes:
 - a. grounded, correct polarity
 - b. ungrounded, correct polarity
 - c. ungrounded, reversed polarity
- 2.1 test function of water supply and drain system
- 2.2 test function of air delivery system
- 2.3 test function of vacuum system
- 2.4 test function of task illumination fixtures
- 2.5 test function of gas delivery system
- 2.6 perform visual inspection and electrical test of the unit's operational environment to insure operator and patient safety:
 - a. electrical distribution
 - b. mechanical clearance
 - c. structural integrity
- 2.7 if items 1.0 through 2.6 have been accomplished, all defects rectified and each unit is operating in an acceptable mode as unit specifications, return unit to service

Problem	Action												
Whip assemblies don't move freely or interfere with cover	Check for an improperly aligned mounting bracket. Slightly loosen the two screws securing the assembly in place (underside of control head). Do not remove the cover. Move the whip assembly until it moves freely.												
Water leaks from the water vent hole on control blocks	<p data-bbox="937 406 1592 442">Follow these steps to check for water leaks.</p> <table border="1" data-bbox="937 492 2517 1406"><thead><tr><th data-bbox="937 492 1031 521">Task</th><th data-bbox="1031 492 2517 521">Descriptions</th></tr></thead><tbody><tr><td data-bbox="937 564 980 592">1</td><td data-bbox="1031 564 2517 806">Check for a failed water valve cartridge<ul data-bbox="1108 635 2140 792" style="list-style-type: none">• determine which block is leaking• exchange the water valve cartridge with a known good one, and• test the unit.</td></tr><tr><td data-bbox="937 821 980 849">2</td><td data-bbox="1031 821 2517 906">If the water leakage has stopped, replace the failed water valve cartridge. Retest the unit and make sure there are no more leaks. If water is still leaking, continue with step 3.</td></tr><tr><td data-bbox="937 935 980 963">3</td><td data-bbox="1031 935 2517 1021">Remove the water flow adjustment stem from the control block and inspect the o-ring and stem. Replace defective parts and test the unit. If water is still leaking, continue with step 4.</td></tr><tr><td data-bbox="937 1049 980 1078">4</td><td data-bbox="1031 1049 2517 1349">Check for a leaking valve stem<ul data-bbox="1108 1120 2458 1342" style="list-style-type: none">• Tighten the valve stem to make sure it's not leaking and test the unit.• If the valve stem is still leaking, exchange it with a known good one and test the unit.• If the water leakage has stopped, replace the failed valve stem cartridge.• Test the unit.</td></tr><tr><td data-bbox="937 1378 980 1406">5</td><td data-bbox="1031 1378 2517 1406">Check for loose tie bolts.</td></tr></tbody></table>	Task	Descriptions	1	Check for a failed water valve cartridge <ul data-bbox="1108 635 2140 792" style="list-style-type: none">• determine which block is leaking• exchange the water valve cartridge with a known good one, and• test the unit.	2	If the water leakage has stopped, replace the failed water valve cartridge. Retest the unit and make sure there are no more leaks. If water is still leaking, continue with step 3.	3	Remove the water flow adjustment stem from the control block and inspect the o-ring and stem. Replace defective parts and test the unit. If water is still leaking, continue with step 4.	4	Check for a leaking valve stem <ul data-bbox="1108 1120 2458 1342" style="list-style-type: none">• Tighten the valve stem to make sure it's not leaking and test the unit.• If the valve stem is still leaking, exchange it with a known good one and test the unit.• If the water leakage has stopped, replace the failed valve stem cartridge.• Test the unit.	5	Check for loose tie bolts.
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Trouble shooting

find the service manual !

Dental treatment unit: Safety considerations

The major hazards associated with dental units are those related to the **interruption** of the utilities involved.

Electrical: if there is a ground fault in the electrical distribution inside the unit, a resultant electrical hazard occurs with equipment powered from the distribution.

The following safety factors must always be inspected for in the preventive maintenance cycle:

1. Ground integrity
2. Water or solutions inside the chassis
3. Controls and indicator integrity
4. Meter integrity
5. Integrity of line-voltage receptacles
6. Integrity of adjustable arms and holders
7. Integrity of task illumination fixtures

Proper maintenance and repair should eliminate the majority of hazards associated with dental units.

END

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see <https://www.thet.org/>

