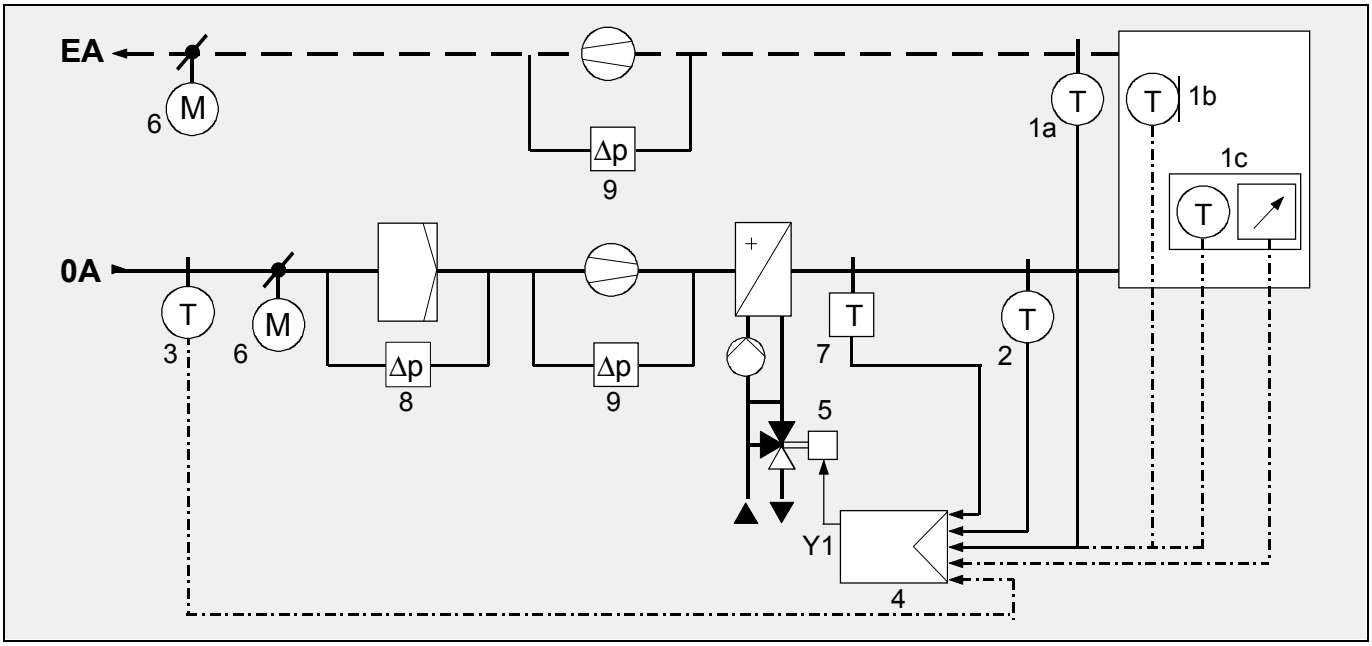
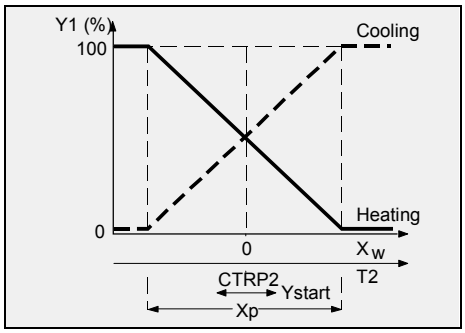
ROOM/CONTROL WITH LOW LIMIT DISCHARGE AIR TEMPERATURE CONTROL OR ROOM/RETURN AIR DISCHARGE AIR TEMPERATURE CASCADE CONTROL OF A HOT WATER HEATING COIL OR CHILLED WATER COOLING COIL FOR FULL OUTSIDE AIR PLANTS

R1

A heating and ventilation system with room/return air temperature control and low limit discharge air or cascade control is used where the base heating load is met by radiators and the ventilation system provides the supply of fresh outside air.
In cooling applications it is also used to supply fresh outside air using the same temperature control system as for heating control.



FUNCTIONAL DESCRIPTION



Temperature Control With Low Limit Control. The return or room air temperature sensor (1a, b or c) and the discharge air temperature sensor (2) measure the actual values and the controller (4) compares these values with the desired setpoints (W1) and (Wlim). If a deviation between these values exists, the lowest deviation signal of both is selected by the controller. Depending on this deviation signal the controller generates a 3-position control signal to reposition the valve (5) to maintain the desired room or discharge air temperature. In heating applications the controller output is reverse acting and direct acting for cooling applications.

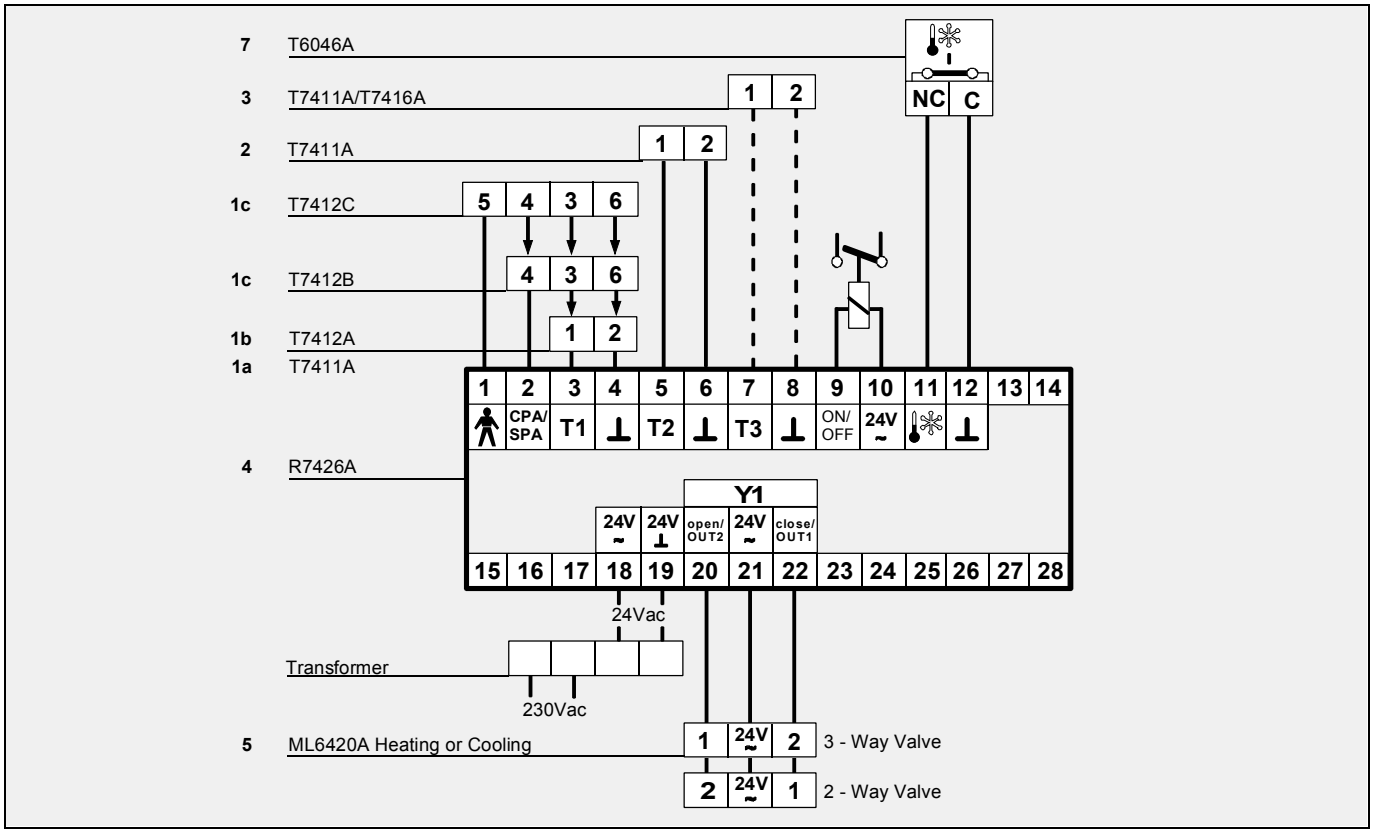
Cascade Temperature Control. The return or room air temperature sensor (1a, b or c) measures the actual value and the controller (4) compares this value with the desired setpoint (W1) of the master loop. Depending on the deviation an internal setpoint for the submaster loop, the discharge air temperature, is calculated. At zero deviation the discharge air temperature is controlled at the programmed setpoint (Wcas) and if a deviation exists, the discharge air setpoint is altered. The reset span of the discharge air setpoint is limited by the reset span adjustment (Rcas) and the limit setting (Wlim).
The discharge air temperature sensor (2) measures the actual value and the controller compares this value with the desired internal calculated setpoint. If a deviation exists, the controller generates a 3-position control signal to reposition the valve (5) to maintain the desired discharge air temperature. In heating applications the controller output is reverse acting and direct acting for cooling applications.

Freeze Protection. The freeze protection thermostat (7) switches the heating coil pump ON - if OFF - at temperatures below its adjustable setpoint. In parallel it provides a digital input signal to the controller (4) to switch the fan(s) OFF and close the dampers by an external installed relay logic and fully open the heating valve (5) to prevent the heating coil from freezing.

Time Control. Depending on the programmed time schedule of the internal controller real time clock the different operating control modes Comfort, Standby, Night or OFF are selected. In the OFF operating mode the controller automatically fully closes the heating valve (5), switches the fan(s) OFF and thereby closes the dampers (6) by an external installed relay logic.

If the controller switches from OFF to ON mode, the fan(s) switch ON after a time delay by an external installed time delay relay. This allows the dampers time to open. As alternative to the time delay relay the end-position switches of the damper actuators can be used to start the fan.

WIRING CONNECTIONS



EQUIPMENT LIST

Item	Quantity	Part Number	Description
1a or 1b or 1c	1	T7411A1001 or T7412A1018 or T7412B1057 T7412C1030	Duct Temperature Sensor 135mm length or Room Temperature Sensor or Room Temperature Sensor with CPA Room Temperature Sensor with CPA and Occupancy Switch
2	1	T7411A1001 or T7411A1019	Duct Temperature Sensor 135mm length or Duct Temperature Sensor 300mm length
4	1	R7426A1016 or R7426A1008	Temperature Controller with clock or without clock
5	1	ML6420A3007 and V5.....A.....	Valve Actuator and Valve
6	2	ML6184E1009 or ML6684E1008	Damper Actuator 24Vac, 17Nm or 230Vac, 17Nm
7	1	T6046A1006 or FT015 or FTB015	Freeze Protection Thermostat
8+9	3	DPS-Series	Differential Air Pressure Switch

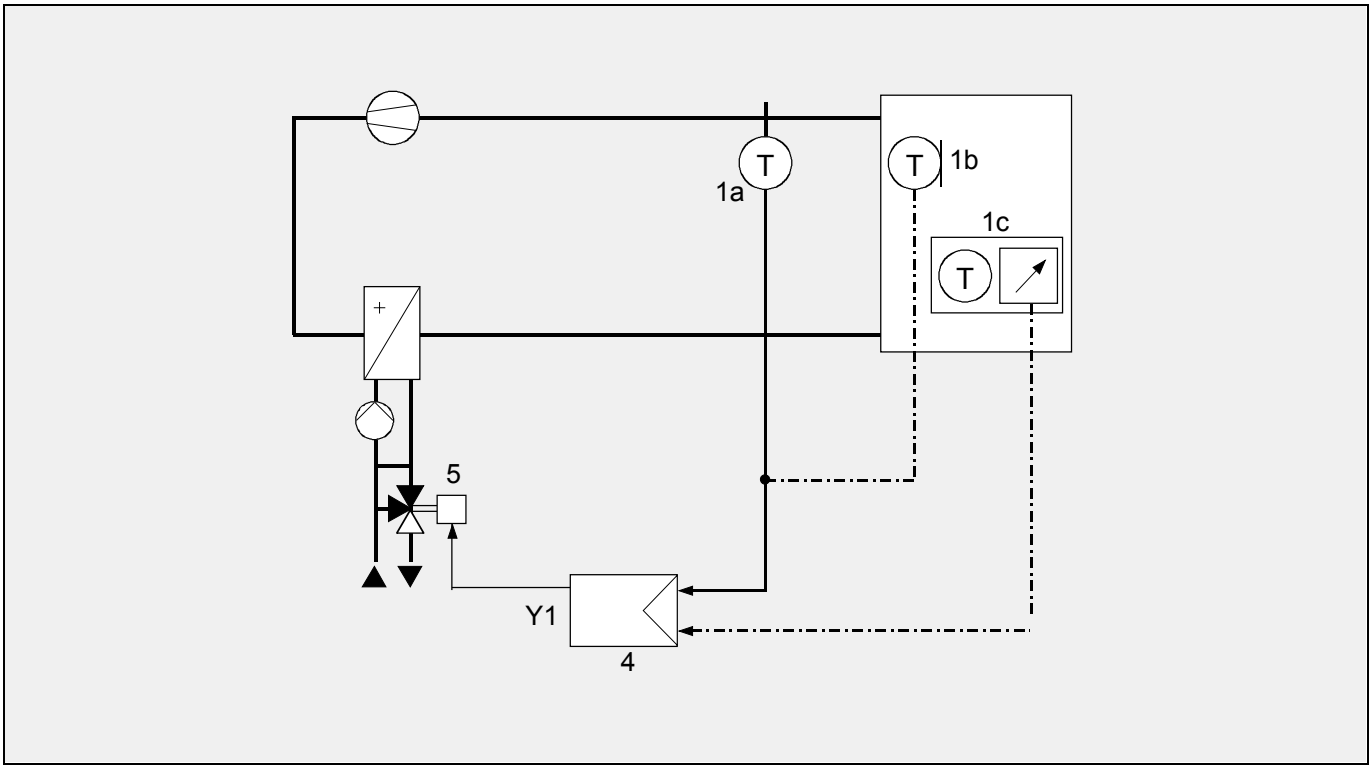
OPTIONS

Item	Quantity	Part Number	Description
3	1	T7411A1027 or T7416A1006	Outside Air Sensor, Duct Mounting or Wall Mounting

ROOM/CONTROL OF HOT WATER HEATING COIL OR CHILLED WATER COOLING COIL IN RECIRCULATION AIR VENTILATION SYSTEMS

R2

Recirculation air systems with room or return air temperature control are used for ventilation in factories, storage areas, department stores, etc.

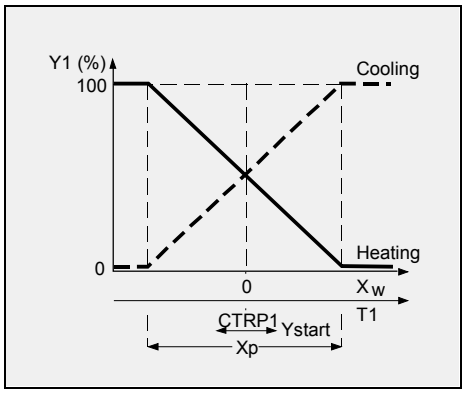


FUNCTIONAL DESCRIPTION

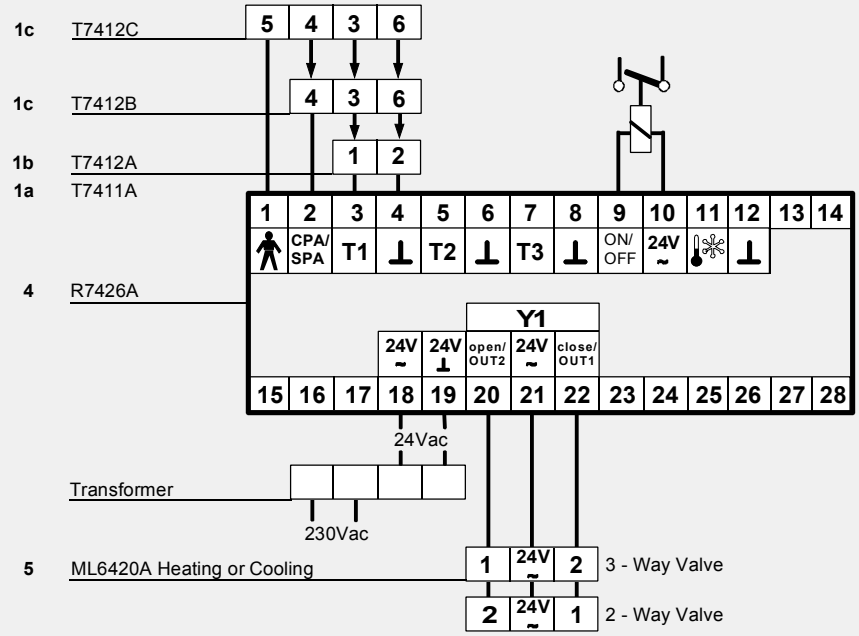
Temperature Control. The return or room air temperature sensor (1a, b or c) measures the actual value and the controller (4) compares this value with the desired setpoint. If a deviation between the two values exists, the controller (4) generates a 3-position control signal to reposition the valve (5) to maintain the desired room or return air temperature. In heating applications the controller output is reverse acting and direct acting for cooling applications.

Time Control. Depending on the programmed time schedule of the internal controller real time clock the different operating control modes Comfort, Standby, Night or OFF are selected. In the OFF operating mode the controller automatically fully closes the heating valve (5) and switches the fan OFF.

If the controller switches from OFF to ON mode the Plant/System On/off output switches the fan ON and the controller provides automatic control.



WIRING CONNECTIONS



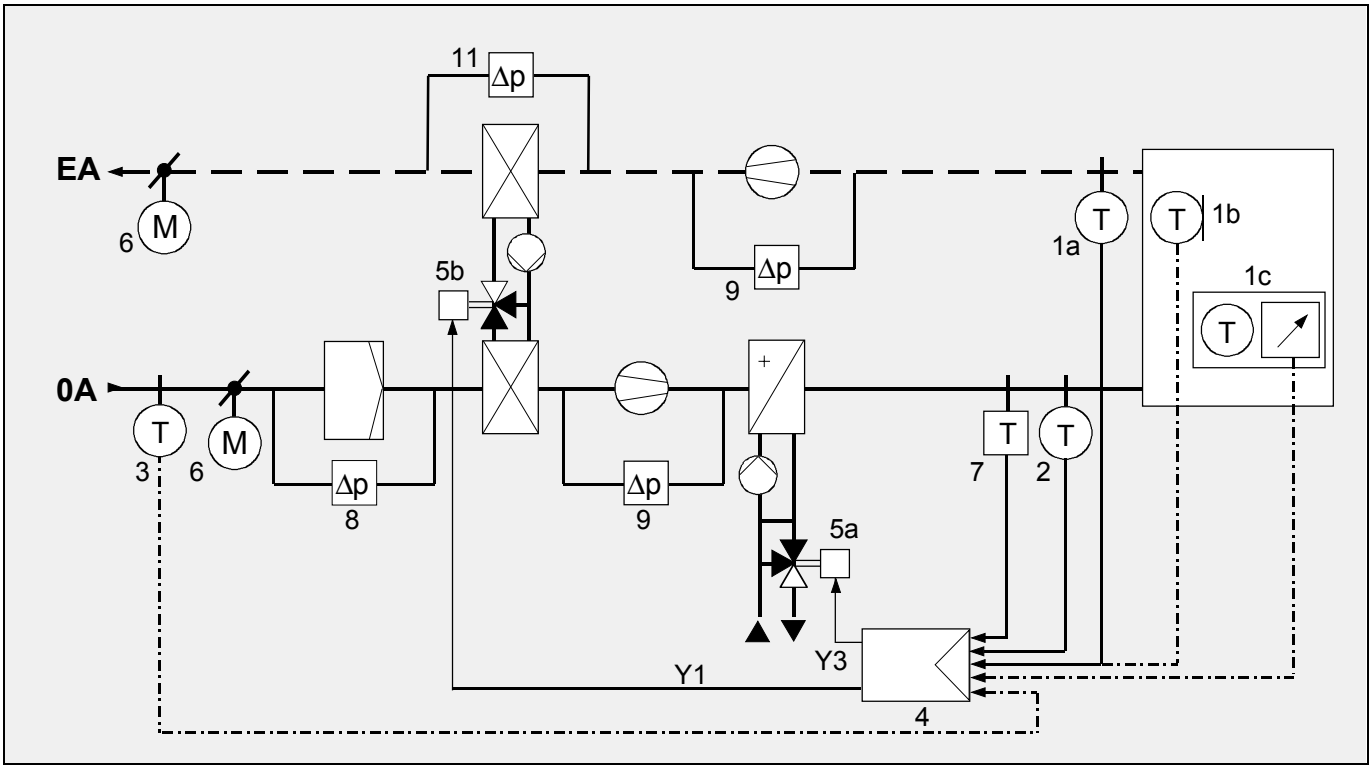
EQUIPMENT LIST

Item	Quantity	Part Number	Description
1a 1b or 1c	1	T7411A1001 T7411A1019 T7412A1018 or T7412B1057 T7412C1030	Duct Temperature Sensor 135mm length 300mm length Room Temperature Sensor or Room Temperature Sensor with CPA Room Temperature Sensor with CPA and Occupancy Switch
4	1	R7426A1016 or R7426A1008	Temperature Controller with clock or without clock
5	1	ML6420A3007 and V5.....A.....	Valve Actuator and Valve

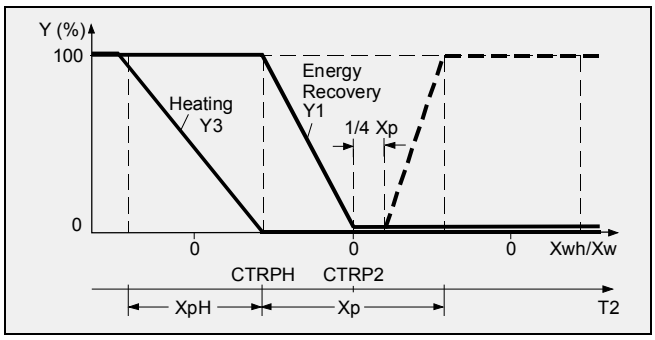
ROOM/DISCHARGE AIR TEMPERATURE CASCADE SEQUENCE CONTROL OF AN ENERGY RECOVERY SYSTEM WITH A HOT WATER HEATING COIL

R3

For use with ventilation systems comprising of an energy (heat) recovery system and a heating coil.



FUNCTIONAL DESCRIPTION



Temperature Control. The return or room air temperature sensor (1a, b or c) measures the actual value and the controller (4) compares this value with the desired setpoint (W1) of the master loop. Depending on the deviation an internal setpoint for the submaster loop, the discharge air temperature, is calculated. At zero deviation the discharge air temperature is controlled at the programmed setpoint (Wcas) and if a deviation exists, the discharge air setpoint is altered. The reset span of the discharge air setpoint is limited by the reset span adjustment (Rcas) and the limit setting (Wlim).

The discharge air temperature sensor (2) measures the actual value and the controller (4) compares this value with the desired internal calculated setpoint. If a deviation between the two values exists, the controller generates a 3-position control signal on outputs Y1 and Y3 to reposition either the energy recovery valve (5a) or the heating valve (5b) in sequence to maintain the desired discharge air temperature.

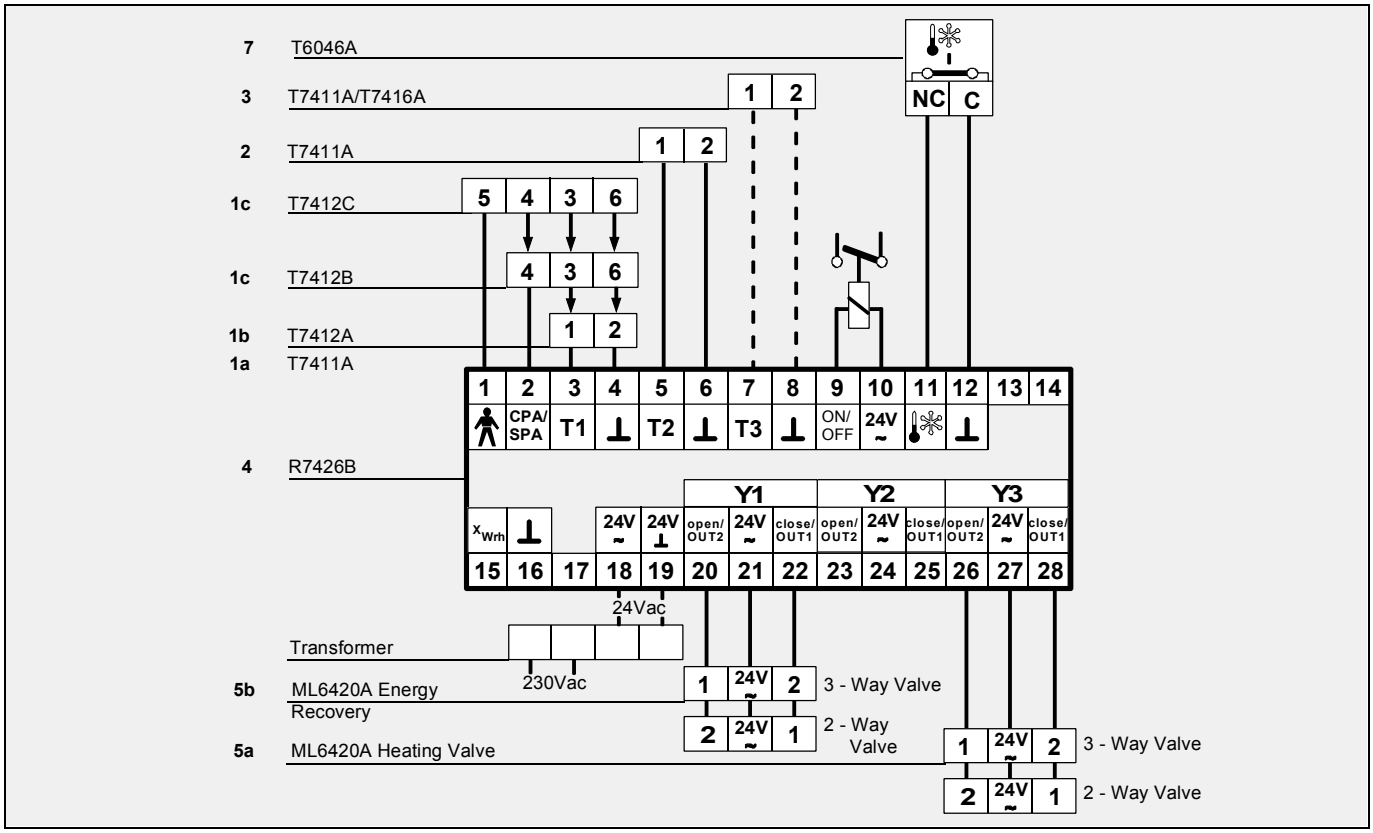
In an air-glycol-air heat recovery system it is important, to avoid icing of the exhaust air coil. This is achieved by the differential pressure switch (10). If the differential pressure switch indicates icing of the coil, the control valve (5b) will be closed by an additional, field mounted relay. Return air and warm water will be circulated through the exhaust air heat recovery coil to melt the ice deposits.

Freeze Protection. The freeze protection thermostat (7) switches the heating coil pump ON, - if OFF - at temperatures below its adjustable setpoint. In parallel it provides a digital input signal to the controller (4) to fully open the heating valve (5a), to switch OFF the fan(s) and close the dampers (6) by an external installed relay logic to protect the heating coil from freezing.

Time Control. Depending on the programmed time schedule of the internal controller real time clock the different operating control modes Comfort, Standby, Night or OFF are selected. In the OFF operating mode the controller automatically fully closes the valves (5a and 5b), switches the fan(s) OFF and thereby closes the dampers (6) by an external installed relay logic.

If the controller switches from OFF to ON mode, the fan(s) switch ON after a time delay by an external installed time delay relay. This allows the dampers time to open. As alternative to the time delay relay the end-position switches of the damper actuators can be used to start the fan.

WIRING CONNECTIONS



EQUIPMENT LIST

Item	Quantity	Part Number	Description
1a or 1b or 1c	1	T7411A1001 or T7412A1018 or T7412B1057 T7412C1030	Duct Temperature Sensor 135mm length or Room Temperature Sensor or Room Temperature Sensor with CPA Room Temperature Sensor with CPA and Occupancy Switch
2	1	T7411A1001 or T7411A1019	Duct Temperature Sensor 135mm length or Duct Temperature Sensor 300mm length
4	1	R7426B1014 or R7426B1006	Temperature Controller with clock or without clock
5a+5b	2	ML6420A3007 and V5.....A.....	Valve Actuator and Valve
6	2	ML6184E1009 or ML6684E1008	Damper Actuator 24Vac, 17Nm or 230Vac, 17Nm
7	1	T6046A1006 or FT015 or FTB015	Freeze Protection Thermostat
8+9+10	3	DPS-Series	Differential Air Pressure Switch

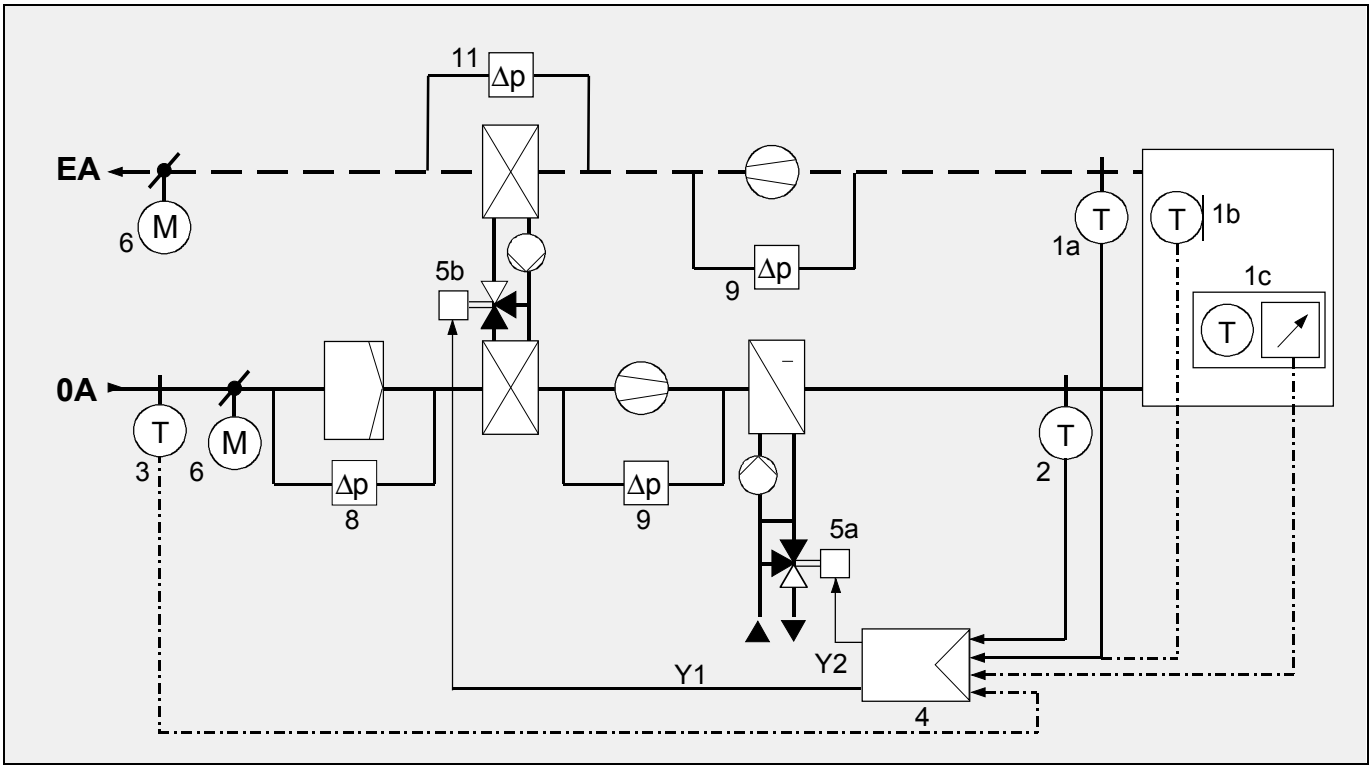
OPTIONS

Item	Quantity	Part Number	Description
3	1	T7411A1027 or T7416A1006	Outside Air Sensor, Duct Mounting or Wall Mounting

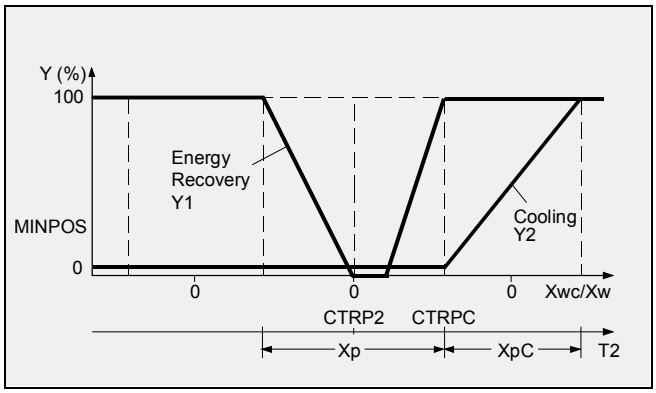
ROOM/DISCHARGE AIR TEMPERATURE CASCADE SEQUENCE CONTROL OF AN ENERGY RECOVERY SYSTEM WITH A CHILLED WATER COOLING COIL

R4

For use with ventilation systems comprising of an energy (heat/cool) recovery system and a cooling coil.



FUNCTIONAL DESCRIPTION



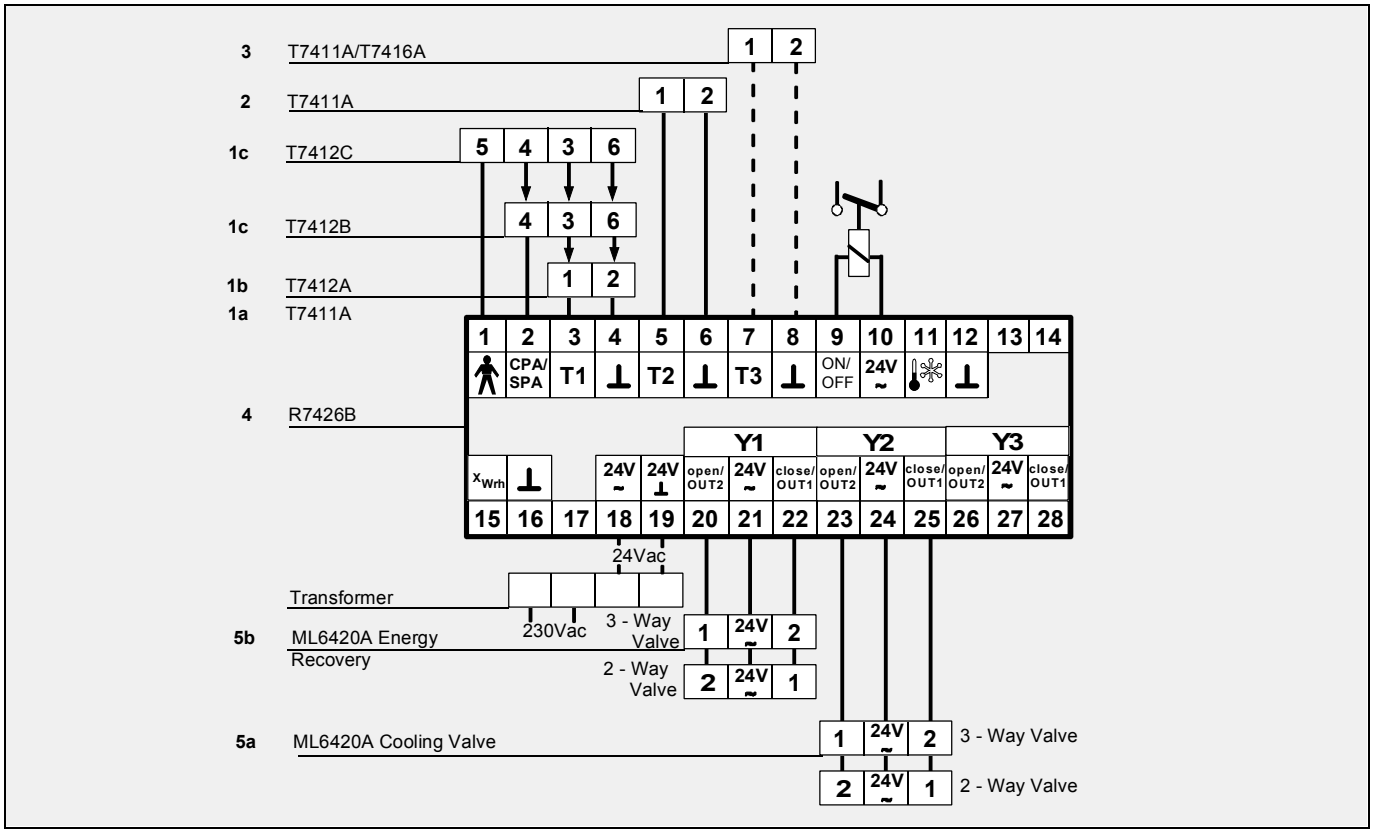
Temperature Control. The return or room air temperature sensor (1a, b or c) measures the actual value and the controller (4) compares this value with the desired setpoint (W1) of the master loop. Depending on the deviation an internal setpoint for the submaster loop, the discharge air temperature, is calculated. At zero deviation the discharge air temperature is controlled at the programmed setpoint (Wcas) and if a deviation exists, the discharge air setpoint is altered. The reset span of the discharge air setpoint is limited by the reset span adjustment (Rcas) and the limit setting (Wlim).

The discharge air temperature sensor (2) measures the actual value and the controller (4) compares this value with the desired internal calculated setpoint. If a deviation between the two values exists, the controller generates a 3-position control signal on output Y1or Y2 to reposition either the energy recovery valve (5b) or the cooling valve (5a) in sequence to maintain the desired discharge air temperature.

Time Control. Depending on the programmed time schedule of the internal controller real time clock the different operating control modes Comfort, Standby, Night or OFF are selected. In the OFF operating mode the controller automatically fully closes the valves (5a and 5b), switches the fan(s) OFF and thereby closes the dampers (6) by an external installed relay logic.

If the controller switches from OFF to ON mode, the fan(s) switch ON after a time delay by an external installed time delay relay. This allows the dampers time to open. As alternative to the time delay relay the end-position switches of the damper actuators can be used to start the fan.

WIRING CONNECTIONS



EQUIPMENT LIST

Item	Quantity	Part Number	Description
1a or 1b or 1c	1	T7411A1001 or T7412A1018 or T7412B1057 T7412C1030	Duct Temperature Sensor 135mm length or Room Temperature Sensor or Room Temperature Sensor with CPA Room Temperature Sensor with CPA and Occupancy Switch
2	1	T7411A1001 or T7411A1019	Duct Temperature Sensor 135mm length or Duct Temperature Sensor 300mm length
4	1	R7426B1014 or R7426B1006	Temperature Controller with clock or without clock
5a+5b	2	ML6420A3007 and V5.....A.....	Valve Actuator and Valve
6	2	ML6184E1009 or ML6684E1008	Damper Actuator 24Vac, 17Nm or 230Vac, 17Nm
8+9	3	DPS-Series	Differential Air Pressure Switch

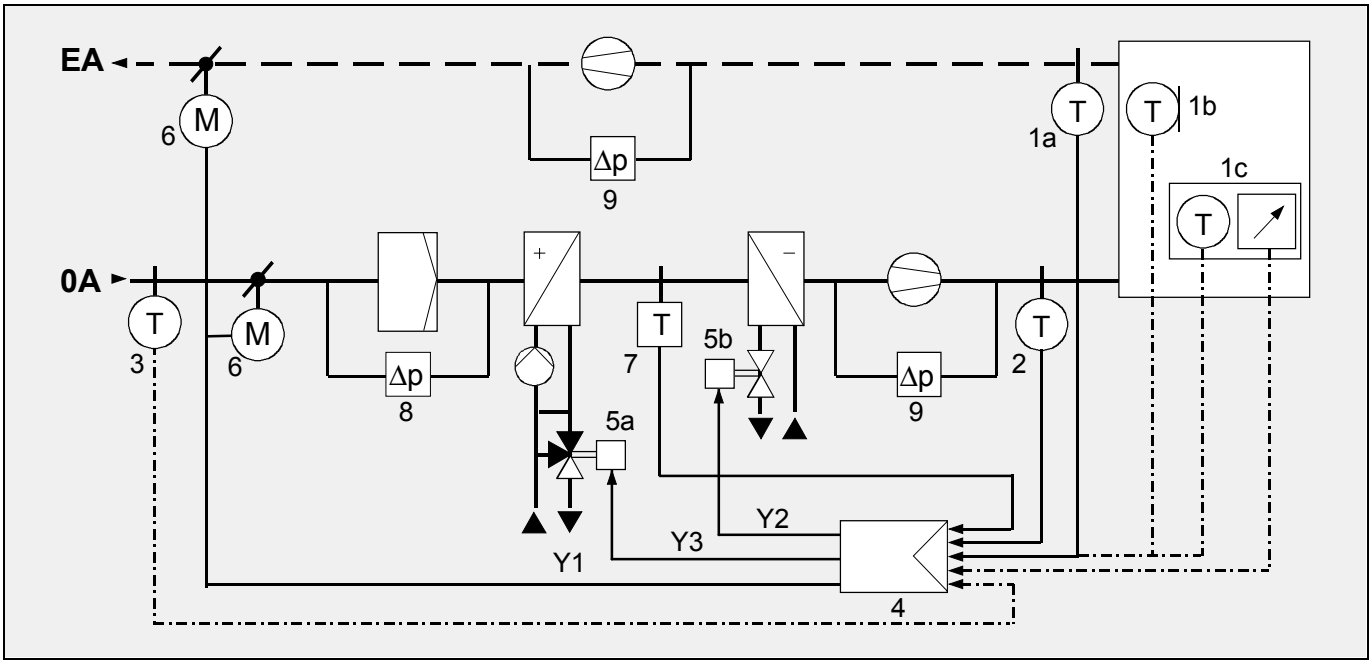
OPTIONS

Item	Quantity	Part Number	Description
3	1	T7411A1027 or T7416A1006	Outside Air Sensor, Duct Mounting or Wall Mounting

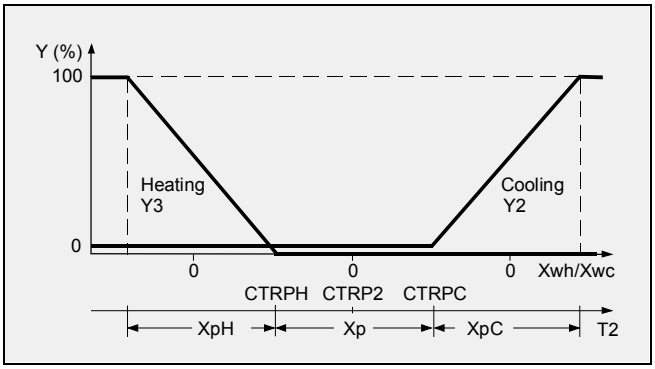
ROOM/DISCHARGE AIR CASCADE SEQUENCE CONTROL OF HOT WATER HEATING COIL AND CHILLED WATER COOLING COIL AND TWO POSITION (OPEN/CLOSED) DAMPER CONTROL

R5

For use with ventilation system comprising of heating and cooling coils with full outside air dampers.



FUNCTIONAL DESCRIPTION



Temperature Control. The return or room air temperature sensor (1a, b or c) measures the actual value and the controller (4) compares this value with the desired setpoint (W1) of the master loop. Depending on the deviation an internal setpoint for the submaster loop, the discharge air temperature, is calculated. At zero deviation the discharge air temperature is controlled at the programmed setpoint (Wcas) and if a deviation exists, the discharge air setpoint is altered. The reset span of the discharge air setpoint is limited by the reset span adjustment (Rcas) and the limit setting (Wlim). The discharge air temperature sensor (2) measures the actual value and the controller (4) compares this value with the desired internal calculated setpoint. If a deviation between the two values exists, the controller generates a 3-position control signal to reposition the heating or cooling valve to maintain the desired discharge air temperature.

If the temperature is below the heating setpoint the heating valve (5a) is modulated via output Y3 and if the temperature is above the cooling setpoint the cooling valve (5b) is modulated via output Y2 to maintain the desired discharge air temperature.

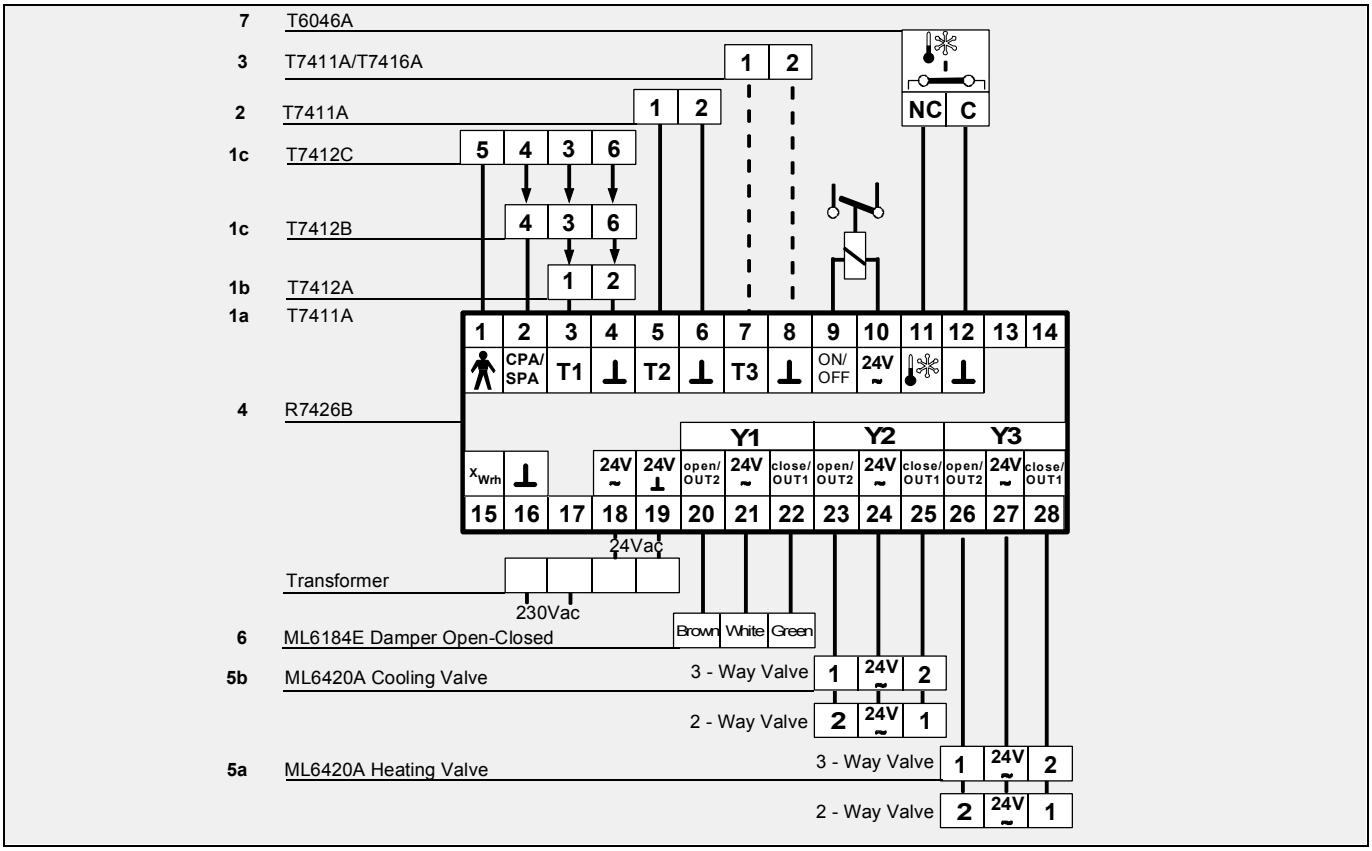
Damper Control. If the controller switches from OFF to ON mode (Comfort, Standby or Night) the controller drives the damper actuators to the open position via output Y1.
If the controller switches to the OFF mode it drives the dampers and valves automatically to their closed positions.

Freeze Protection. The freeze protection thermostat (7) switches the heating coil pump ON - if OFF - at temperatures below its adjustable setpoint. In parallel it provides a digital input signal to the controller (4) to fully open the heating valve (5a) and close the dampers (6) and cooling valve (5b) – if open - to prevent the heating coil from freezing.

Time Control. Depending on the programmed time schedule of the internal controller real time clock the different operating control modes Comfort, Standby, Night or OFF are selected. In the OFF operating mode the controller automatically fully closes the valves (5a and 5b) and dampers (6) and switches the fan(s) OFF.

If the controller switches from OFF to ON mode, the fan(s) switch ON after a 3 minute time delay to allow the dampers time to open. As alternative the end-position switches of the damper actuators can be used to start the fan.

WIRING CONNECTIONS



EQUIPMENT LIST

Item	Quantity	Part Number	Description
1a or 1b or 1c	1	T7411A1001 or T7412A1018 or T7412B1057 T7412C1030	Duct Temperature Sensor 135mm length or Room Temperature Sensor or Room Temperature Sensor with CPA Room Temperature Sensor with CPA and Occupancy Switch
2	1	T7411A1001 or T7411A1019	Duct Temperature Sensor 135mm length or Duct Temperature Sensor 300mm length
4	1	R7426B1014 or R7426B1006	Temperature Controller with clock or without clock
5a+5b	2	ML6420A3007 and V5.....A.....	Valve Actuator and Valve
6	2	ML6184E1009	Damper Actuator 24Vac, 17Nm
7	1	T6046A1006 or FT015 or FTB015	Freeze Protection Thermostat
8+9	3	DPS-Series	Differential Air Pressure Switch

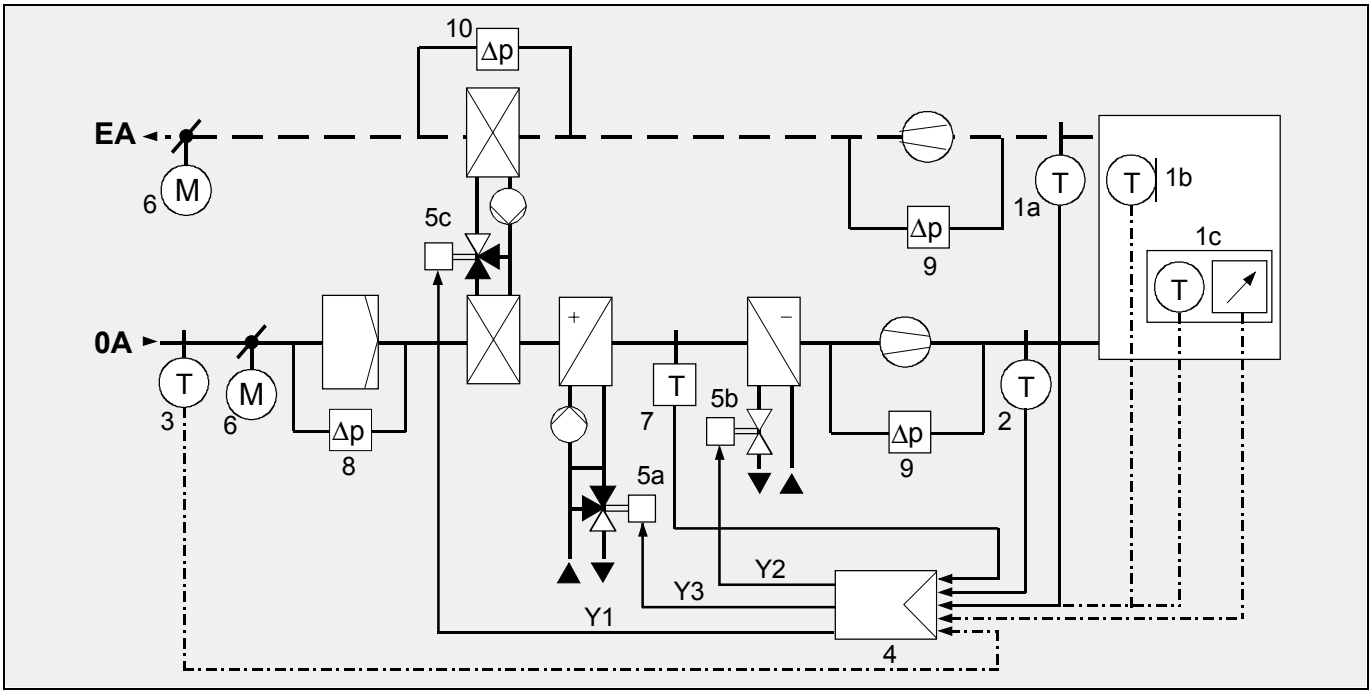
OPTIONS

Item	Quantity	Part Number	Description
3	1	T7411A1027 or T7416A1006	Outside Air Sensor, Duct Mounting or Wall Mounting

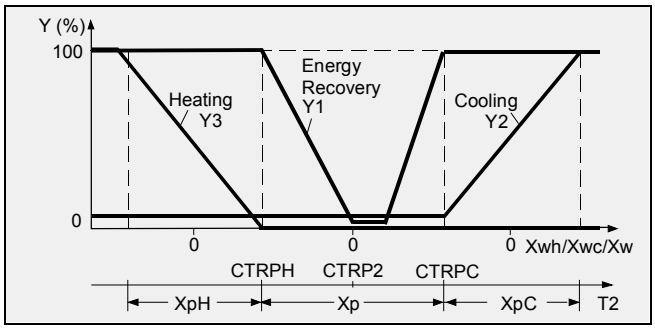
ROOM/DISCHARGE AIR TEMPERATURE CASCADE SEQUENCE CONTROL OF ENERGY RECOVERY SYSTEM, HOT WATER HEATING AND CHILLED WATER COOLING COILS

R6

For use with ventilation system comprising of an energy (heat/cool) recovery system, heating and cooling coils.



FUNCTIONAL DESCRIPTION

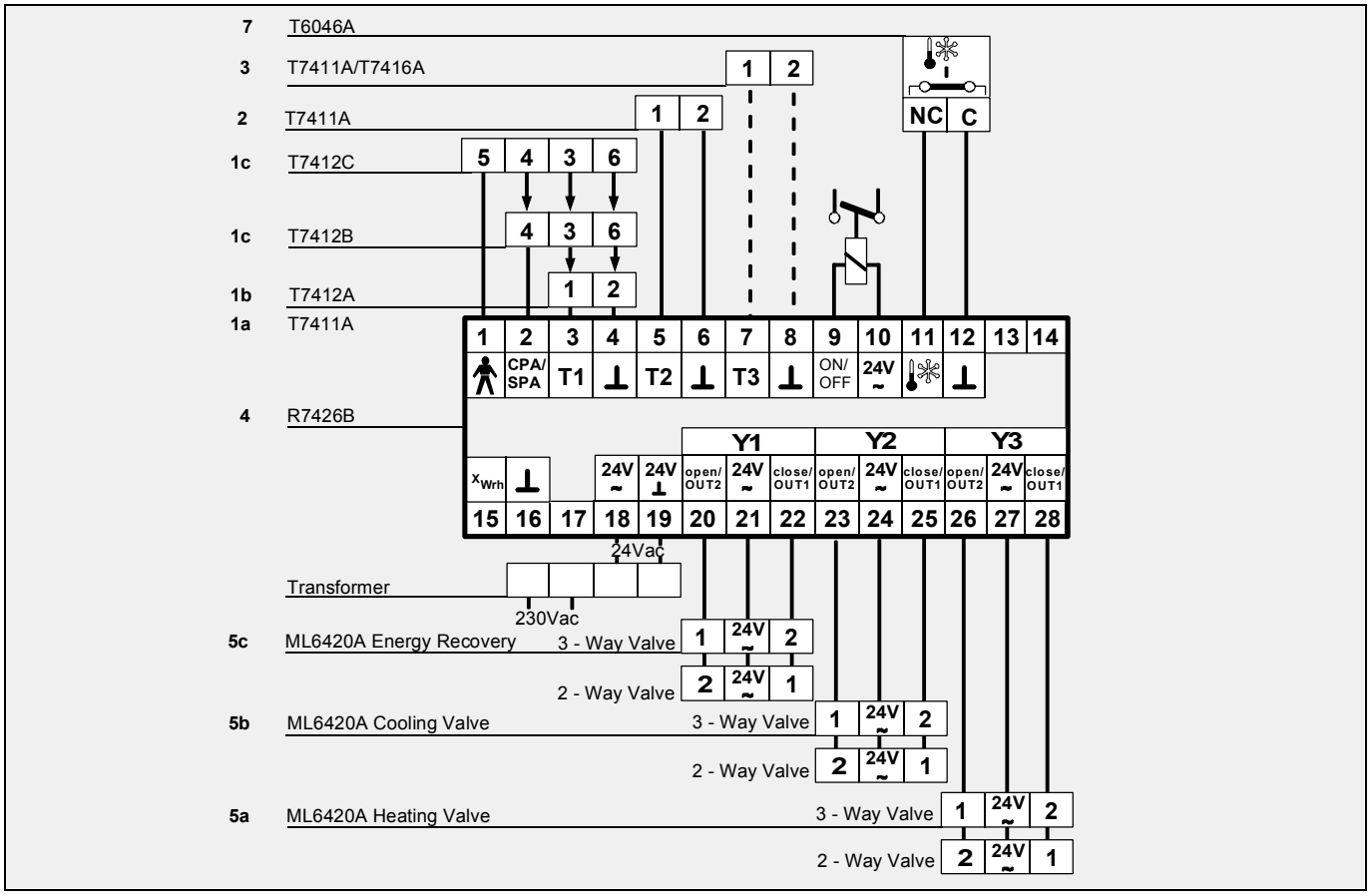


Temperature Control. The return or room air temperature sensor (1a, b or c) measures the actual value and the controller (4) compares this value with the desired setpoint (W1) of the master loop. Depending on the deviation an internal setpoint for the submaster loop, the discharge air temperature, is calculated.
The discharge air temperature sensor (2) measures the actual value and the controller (4) compares this value with the desired internal calculated setpoint. If a deviation between the two values exists, the controller generates a 3-position control signal to reposition either the energy recovery valve (5c) or the heating valve (5a) or the cooling valve (5b) in sequence to maintain the desired discharge air temperature. If the actual temperature is below the setpoint, the controller modulates first via output Y1 the heat recovery valve (5c) into the open position and if fully open, the heating valve (5a) is opened in sequence via output Y3. If the actual temperature increases the sequence of operation is reversed.
If the actual temperature exceeds the setpoint by more than 25% of the throttling range (Xp1) - dead band between heating and cooling - the controller starts to open the energy recovery valve (5c) to reclaim cooling energy. If the temperature continues to increase and the energy recovery valve is fully open the controller (4) generates an output signal via Y2 to open the cooling coil valve (5b).
In an air-glycol-air heat recovery system it is important to avoid icing of the exhaust air coil. This is achieved by the differential pressure switch (10). If the differential pressure switch indicates icing of the coil, the control valve (5c) will be closed by an additional, field mounted relay. Return air and warm water will circulate through the heat recovery exhaust air coil to melt the ice deposits.

Freeze Protection. The freeze protection thermostat (7) switches the heating coil pump ON - if OFF - at temperatures below its adjustable setpoint. In parallel it provides a digital input signal to the controller (4) to fully open the heating valve (5a), to switch OFF the fan(s) and thereby to close the damper actuators by an external installed relay logic to protect the heating coil from freezing.

Time Control. Depending on the programmed time schedule of the internal controller real time clock the different operating control modes Comfort, Standby, Night or OFF are selected. In the OFF operating mode the controller automatically fully closes the valves (5a, 5b and 5c) and switches the fan(s) OFF and thereby closes the dampers (6) by an external installed relay logic. If the controller switches from OFF to ON mode, the fan(s) switch ON after a time delay by an external installed time delay relay. This allows the dampers time to open. As alternative to the time delay relay the end-position switches of the damper actuators can be used to start the fan.

WIRING CONNECTIONS



EQUIPMENT LIST

Item	Quantity	Part Number	Description
1a or 1b or 1c	1	T7411A1001 or T7412A1018 or T7412B1057 T7412C1030	Duct Temperature Sensor 135mm length or Room Temperature Sensor or Room Temperature Sensor with CPA Room Temperature Sensor with CPA and Occupancy Switch
2	1	T7411A1001 or T7411A1019	Duct Temperature Sensor 135mm length or Duct Temperature Sensor 300mm length
4	1	R7426B1014 or R7426B1006	Temperature Controller with clock or without clock
5a+5b+5c	3	ML6420A3007 and V5.....A.....	Valve Actuator and Valve
6	2	ML6184E1009 ML6184E1008	Damper Actuator 24Vac, 17Nm or 230Vac, 17Nm
7	1	T6046A1006 or FT015 or FTB015	Freeze Protection Thermostat
8+9+10	3	DPS-Series	Differential Air Pressure Switch

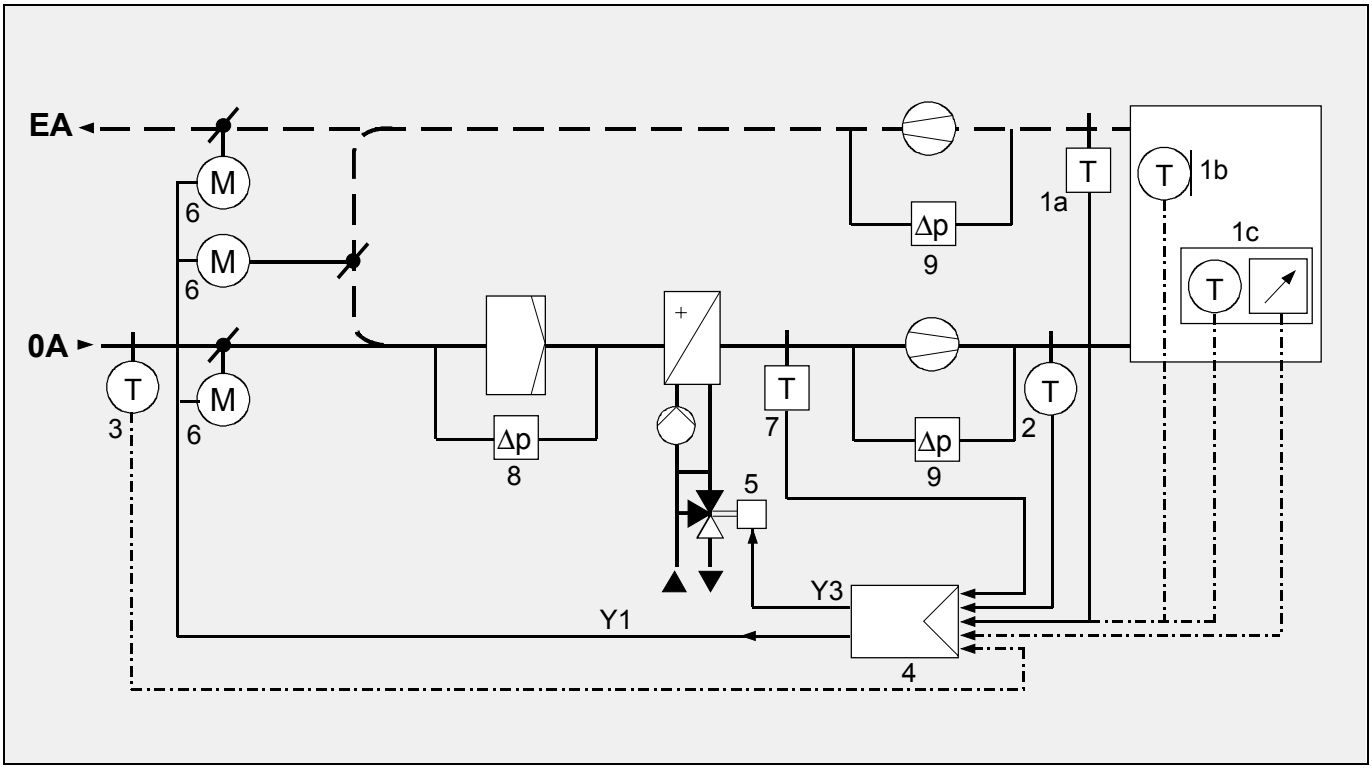
OPTIONS

Item	Quantity	Part Number	Description
3	1	T7411A1027 or T7416A1006	Outside Air Sensor, Duct Mounting or Wall Mounting

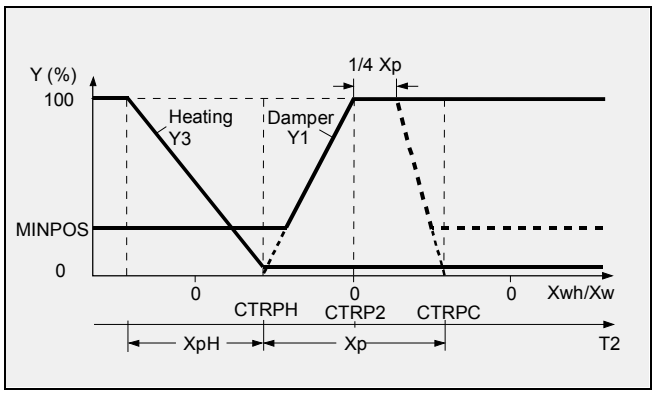
ROOM/DISCHARGE AIR TEMPERATURE CASCADE SEQUENCE CONTROL OF MIXED AIR DAMPERS AND HOT WATER HEATING COIL

R7

For use with ventilation systems comprising of mixed air dampers and a heating coil.



FUNCTIONAL DESCRIPTION



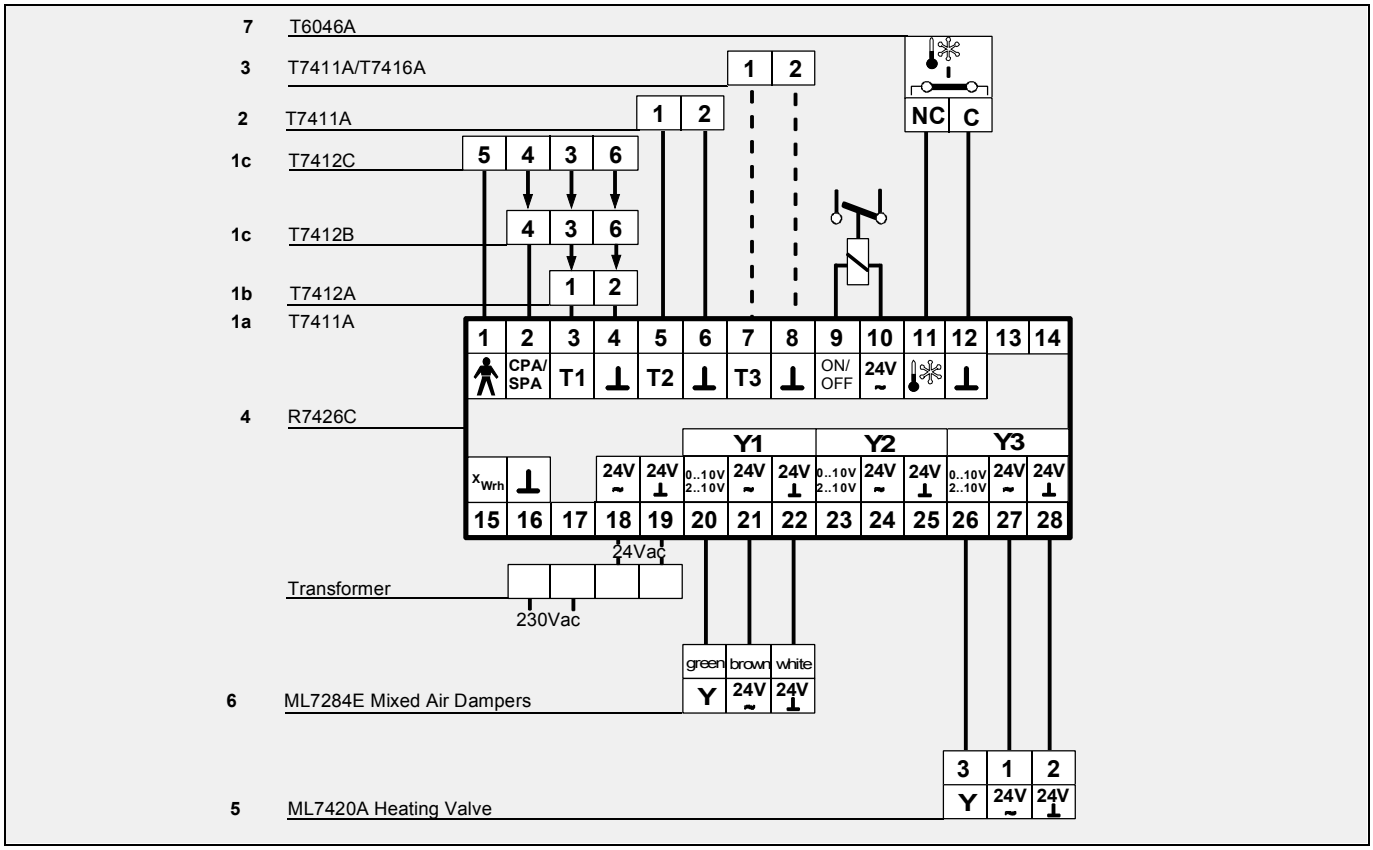
Temperature Control. The return or room air temperature sensor (1a, b or c) measures the actual value and the controller (4) compares this value with the desired setpoint (W1) of the master loop. Depending on the deviation an internal setpoint for the submaster loop, the discharge air temperature, is calculated. At zero deviation the discharge air temperature is controlled at the programmed setpoint (Wcas) and if a deviation exists, the discharge air setpoint is altered. The reset span of the discharge air setpoint is limited by the reset span adjustment (Rcas) and the limit setting (Wlim).

The discharge air temperature sensor (2) measures the actual value and the controller (4) compares this value with the desired internal calculated setpoint. If a deviation between the two values exists, the controller generates two 0(2)…10Vdc control signals in sequence via outputs Y1 and Y3 corresponding to the 0…100% correctional signal to reposition the mixed air dampers or the heating valve to maintain the desired discharge air temperature. The minimum outside air damper position adjustment (MINPOS) on the controller determines the position to which the outside air damper will be driven even though the temperature input condition demands that it should drive to the fully closed position.

Freeze Protection. The freeze protection thermostat (7) switches the heating coil pump ON - if OFF - at temperatures below its adjustable setpoint. In parallel it provides a digital input signal to the controller (4) to fully open the heating valve (5), to close the outside and exhaust air dampers (6) and to switch OFF the fan(s) to protect the heating coil from freezing.

Time Control. Depending on the programmed time schedule of the internal controller real time clock the different operating control modes Comfort, Standby, Night or OFF are selected. In the OFF operating mode the controller automatically fully closes the heating valve (5) and the outside and exhaust air dampers (6), opens the return air damper (6) and switches the fan(s) OFF. If the controller switches from OFF to ON mode the Plant/System On/Off output switches the fan(s) ON and the controller provides automatic control.

WIRING CONNECTIONS



EQUIPMENT LIST

Item	Quantity	Part Number	Description
1a or 1b or 1c	1	T7411A1001 or T7412A1018 or T7412B1057 T7412C1030	Duct Temperature Sensor 135mm length or Room Temperature Sensor or Room Temperature Sensor with CPA Room Temperature Sensor with CPA and Occupancy Switch
2	1	T7411A1001 or T7411A1019	Duct Temperature Sensor 135mm length or Duct Temperature Sensor 300mm length
4	1	R7426C1012 or R7426C1004	Temperature Controller with clock or without clock
5	1	ML7420A3006 and V5.....A.....	Valve Actuator 0(2)...10Vdc and Valve
6	3	ML7284E1006 or ML7174E2007	Damper Actuator 24Vac, 17Nm or 24Vac , 8Nm
7	1	T6046A1006 or FT015 or FTB015	Freeze Protection Thermostat
8+9	3	DPS-Series	Differential Air Pressure Switch

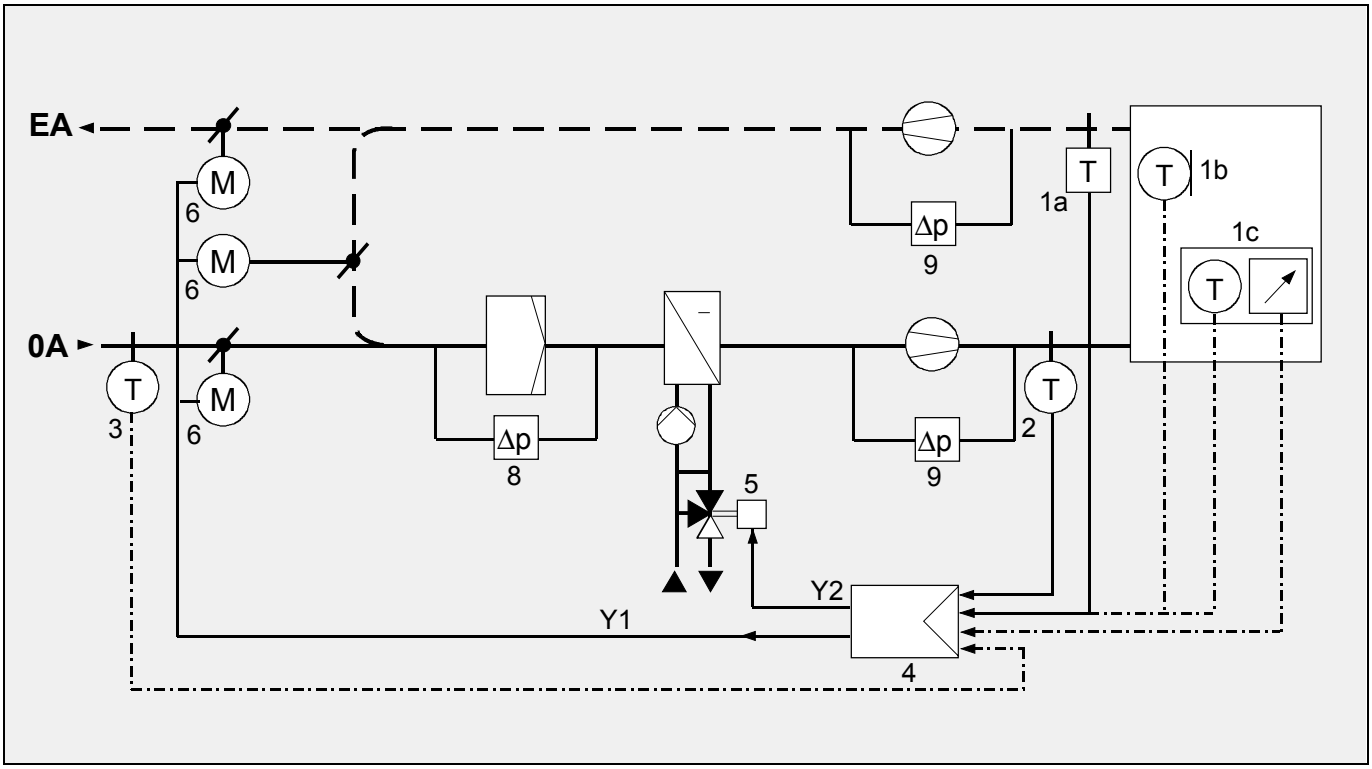
OPTIONS

Item	Quantity	Part Number	Description
3	1	T7411A1027 or T7416A1006	Outside Air Sensor, Duct Mounting or Wall Mounting

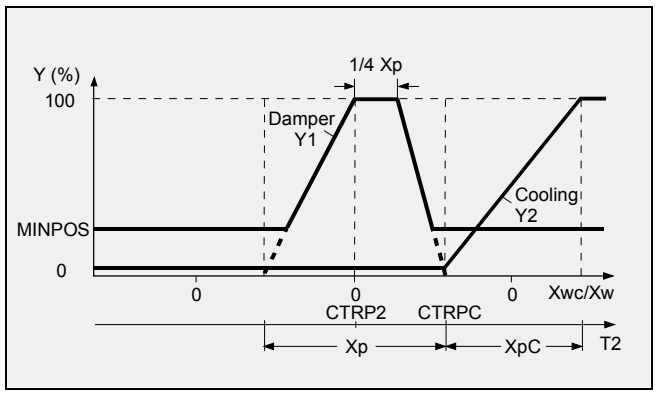
ROOM/DISCHARGE AIR TEMPERATURE CASCADE SEQUENCE CONTROL OF MIXED AIR DAMPERS AND CHILLED WATER COOLING COIL

R8

Used with ventilation system comprising of mixed air dampers and a cooling coil.



FUNCTIONAL DESCRIPTION



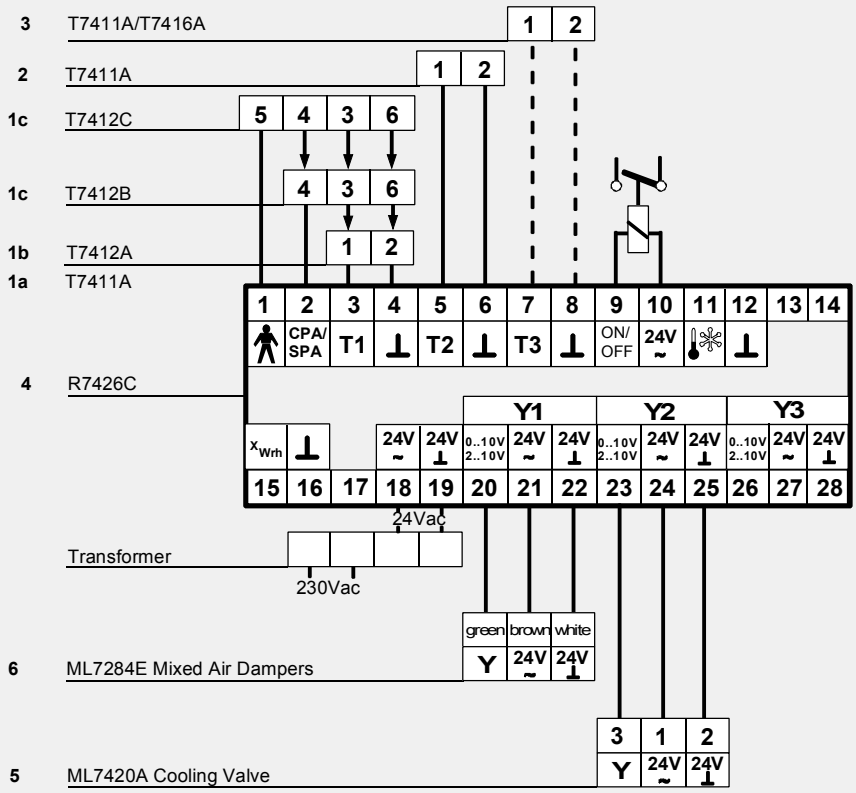
Temperature Control. The return or room air temperature sensor (1a, b or c) measures the actual value and the controller (4) compares this value with the desired setpoint (W1) of the master loop. Depending on the deviation an internal setpoint for the submaster loop, the discharge air temperature, is calculated. At zero deviation the discharge air temperature is controlled at the programmed setpoint (Wcas) and if a deviation exists, the discharge air setpoint is altered. The reset span of the discharge air setpoint is limited by the reset span adjustment (Rcas) and the limit setting (Wlim).

The discharge air temperature sensor (2) measures the actual value and the controller (4) compares this value with the desired internal calculated setpoint. If a deviation between the two values exists, the controller generates two 0(2)…10Vdc control signals in sequence via outputs Y1 and Y2 corresponding to the 0…100% correctional signal to reposition the mixed air dampers (6) or cooling valve (5) to maintain the desired discharge air temperature. The minimum outside air damper position adjustment (MINPOS) on the controller determines the position to which the outside air damper will be driven even though the temperature input condition demands that it should drive to the fully closed position.

Time Control. Depending on the programmed time schedule of the internal controller real time clock the different operating control modes Comfort, Standby, Night or OFF are selected. In the OFF operating mode the controller automatically fully closes the cooling valve (5) and the outside and exhaust air dampers (6), opens the return air damper (6) and switches the fan(s) OFF.

If the controller switches from OFF to ON mode the Plant/System On/Off output switches the fan(s) ON and the controller provides automatic control.

WIRING CONNECTIONS



EQUIPMENT LIST

Item	Quantity	Part Number	Description
1a or 1b or 1c	1	T7411A1001 or T7412A1018 or T7412B1057 T7412C1030	Duct Temperature Sensor 135mm length or Room Temperature Sensor or Room Temperature Sensor with CPA Room Temperature Sensor with CPA and Occupancy Switch
2	1	T7411A1001 or T7411A1019	Duct Temperature Sensor 135mm length or Duct Temperature Sensor 300mm length
4	1	R7426C1012 or R7426C1004	Temperature Controller with clock or without clock
5	1	ML7420A3006 and V5.....A.....	Valve Actuator 0(2)...10Vdc and Valve
6	3	ML7284E1006 or ML7174E2007	Damper Actuator 24Vac, 17Nm or 24Vac , 8Nm
8+9	3	DPS-Series	Differential Air Pressure Switch

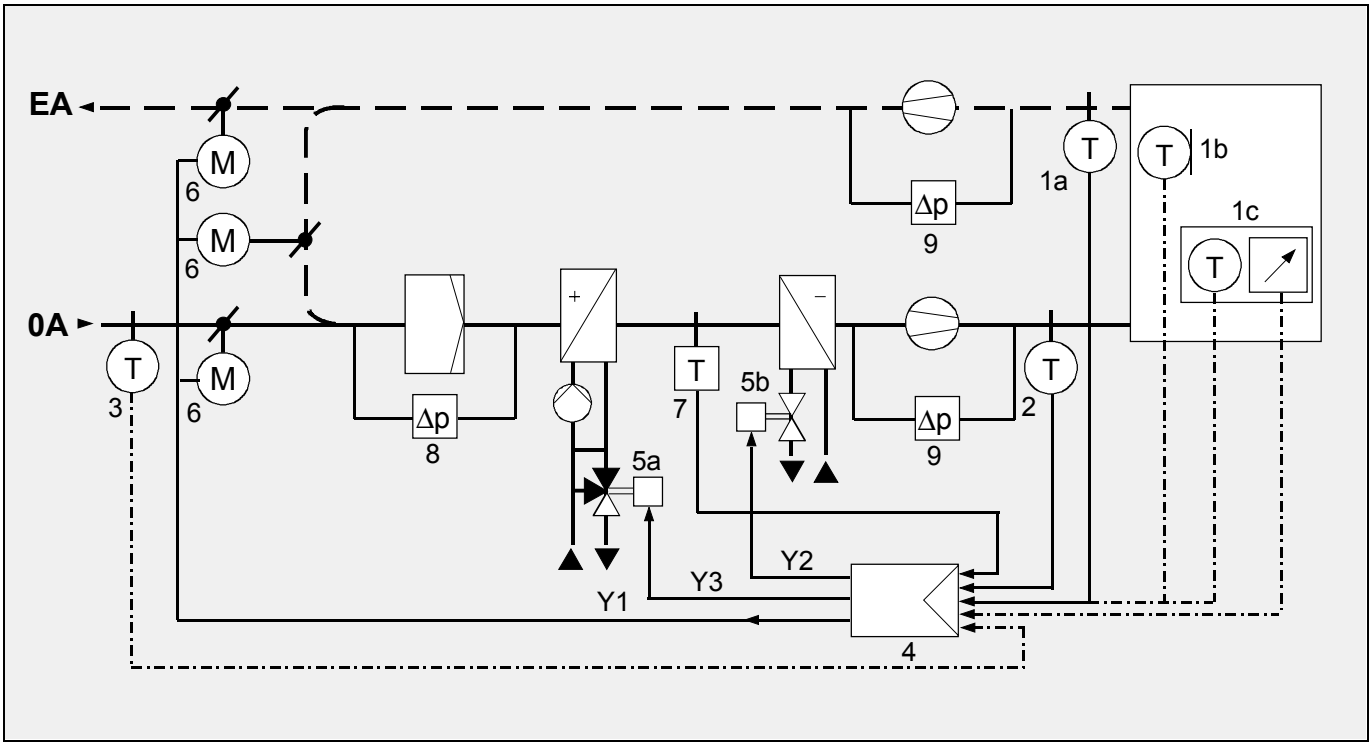
OPTIONS

Item	Quantity	Part Number	Description
3	1	T7411A1027 or T7416A1006	Outside Air Sensor, Duct Mounting or Wall Mounting

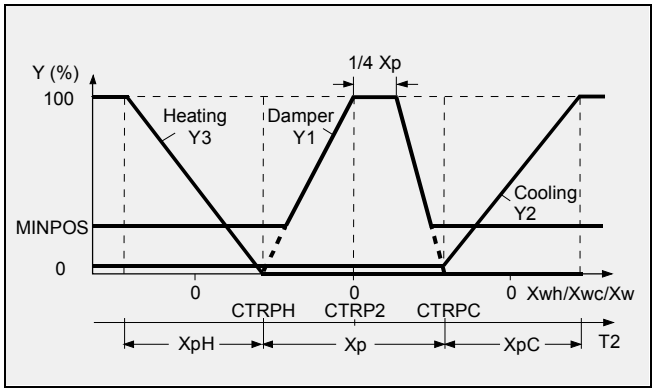
ROOM/DISCHARGE AIR TEMPERATURE CASCADE SEQUENCE CONTROL OF MIXED AIR DAMPERS, HOT WATER AND CHILLED WATER VALVES

R9

Use with ventilation system comprising of mixed air dampers, heating and cooling coils.



FUNCTIONAL DESCRIPTION



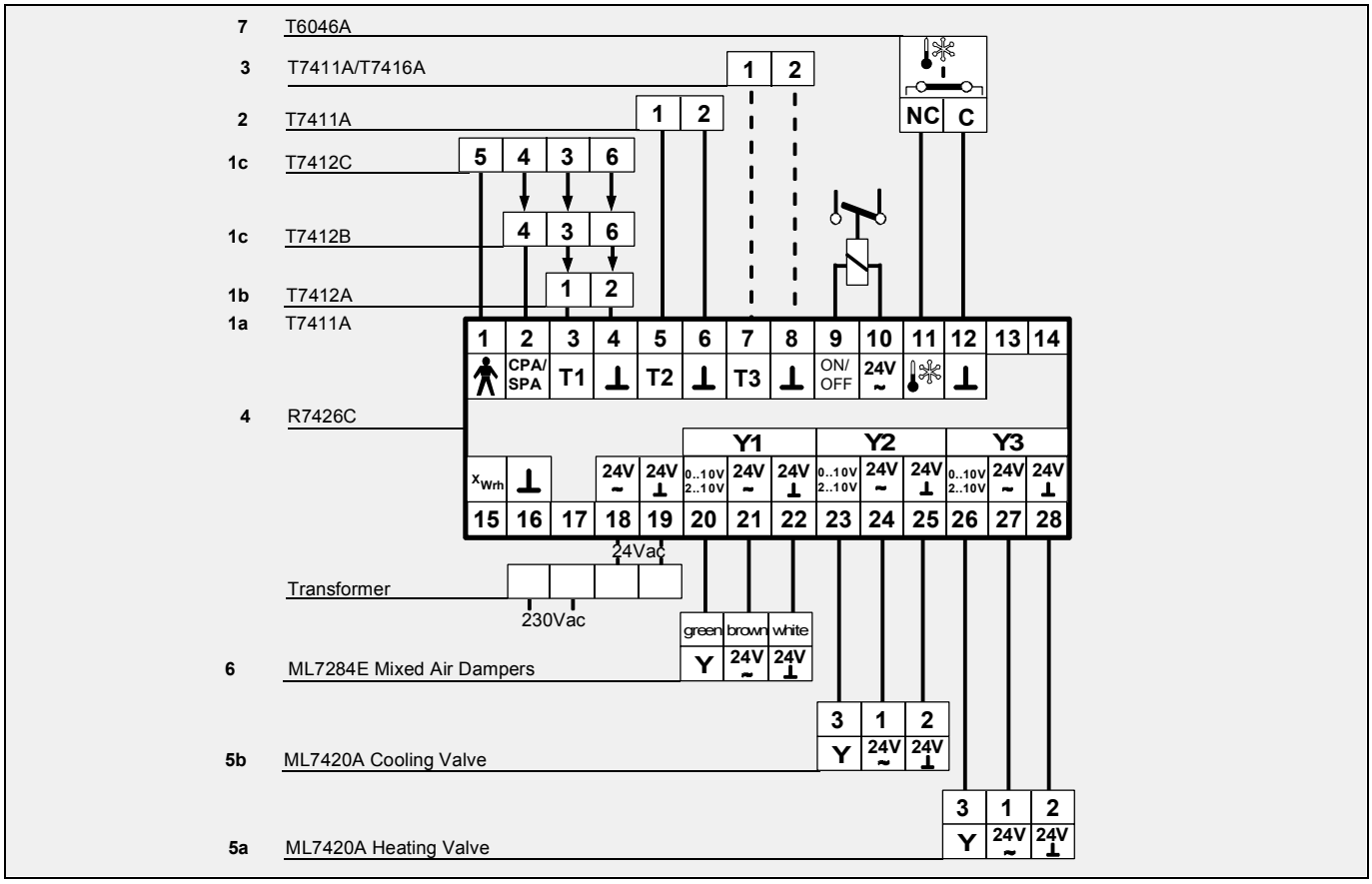
Temperature Control. The return or room air temperature sensor (1a, b or c) measures the actual value and the controller (4) compares this value with the desired setpoint (W1) of the master loop. Depending on the deviation an internal setpoint for the submaster loop, the discharge air temperature, is calculated. At zero deviation the discharge air temperature is controlled at the programmed setpoint (Wcas) and if a deviation exists, the discharge air setpoint is altered. The reset span of the discharge air setpoint is limited by the reset span adjustment (Rcas) and the limit setting (Wlim).
The discharge air temperature sensor (2) measures the actual value and the controller (4) compares this value with the desired internal calculated setpoint. If a deviation between the two values exists, the controller generates three 0(2)…10Vdc control signals in sequence via outputs Y1, Y2 and Y3 corresponding to the 0…100% correctional signal to reposition the mixed air dampers or heating or cooling valve to maintain the desired discharge air temperature. The minimum outside air damper position adjustment (MINPOS) on the controller determines the position to which the outside air damper will be driven even though the temperature input condition demands that it should drive to the fully closed position.

Freeze Protection. The freeze protection thermostat (7) switches the heating coil pump ON - if OFF - at temperatures below its adjustable setpoint. In parallel it provides a digital input signal to the controller (4) to fully open the heating valve (5a), to close the outside and exhaust air dampers (6) and cooling valve - if open - and to switch OFF the fan(s) to prevent the heating coil from freezing.

Time Control. Depending on the programmed time schedule of the internal controller real time clock the different operating control modes Comfort, Standby, Night or OFF are selected. In the OFF operating mode the controller automatically fully closes the valves (5a and 5b) and the outside and exhaust air dampers (6), opens the return air damper (6) and switches the fan(s) OFF.

If the controller switches from OFF to ON mode the Plant/System On/Off output switches the fan(s) ON and the controller provides automatic control.

WIRING CONNECTIONS



EQUIPMENT LIST

Item	Quantity	Part Number	Description
1a or 1b or 1c	1	T7411A1001 or T7412A1018 or T7412B1057 T7412C1030	Duct Temperature Sensor 135mm length or Room Temperature Sensor or Room Temperature Sensor with CPA Room Temperature Sensor with CPA and Occupancy Switch
2	1	T7411A1001 or T7411A1019	Duct Temperature Sensor 135mm length or Duct Temperature Sensor 300mm length
4	1	R7426C1012 or R7426C1004	Temperature Controller with clock or without clock
5a+5b	2	ML7420A3006 and V5.....A.....	Valve Actuator 0(2)...10Vdc and Valve
6	3	ML7284E1006 ML7174E2007	Damper Actuator 24Vac, 17Nm or 24Vac, 8Nm
7	1	T6046A1006 or FT015 or FTB015	Freeze Protection Thermostat
8+9	3	DPS-Series	Differential Air Pressure Switch

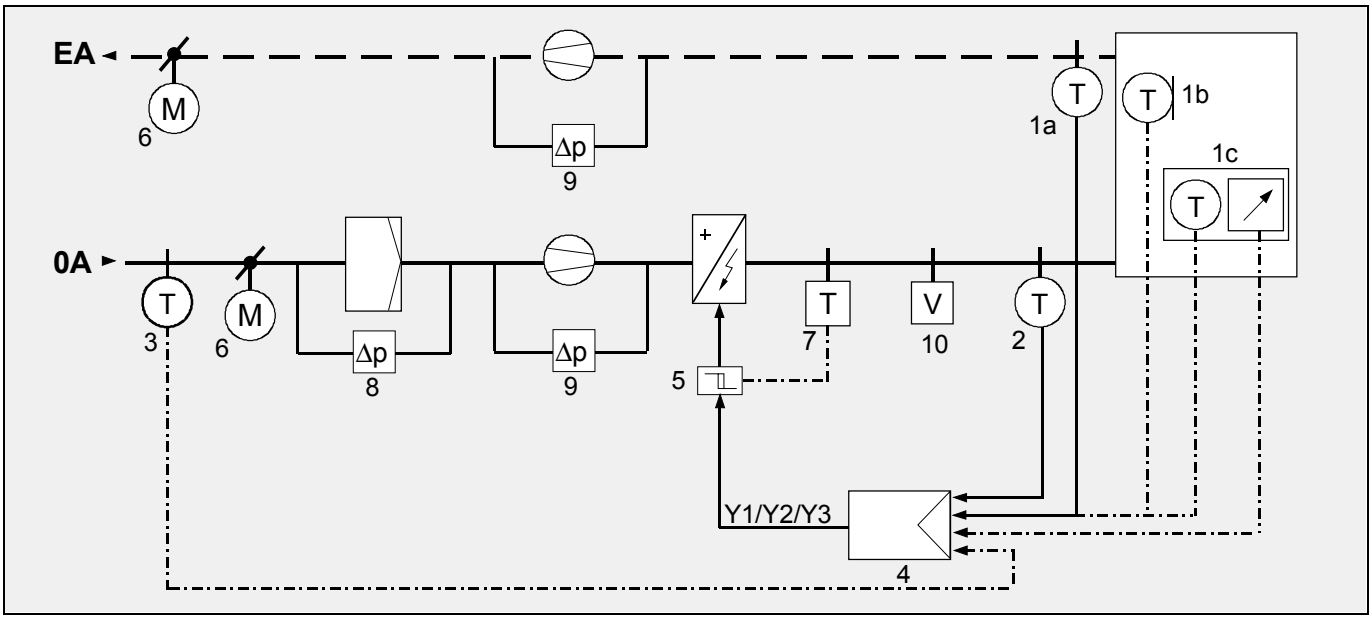
OPTIONS

Item	Quantity	Part Number	Description
3	1	T7411A1027 or T7416A1006	Outside Air Sensor, Duct Mounting or Wall Mounting

ROOM/CONTROL WITH LOW LIMIT DISCHARGE AIR TEMPERATURE CONTROL OR ROOM/RETURN AIR - DISCHARGE AIR TEMPERATURE CASCADE CONTROL OF ELECTRIC AIR HEATER BATTERY OR DIRECT EXPANSION COOLING SYSTEM (UP TO 6-STAGES/STEPS) R10

Used with ventilation system using electric air heating, where the base heating load is met by a radiator heating system and the ventilation system is used to ensure the supply of outside air.
Instead of electric heating, the controller can be used to control up to 6-stages of direct expansion cooling.

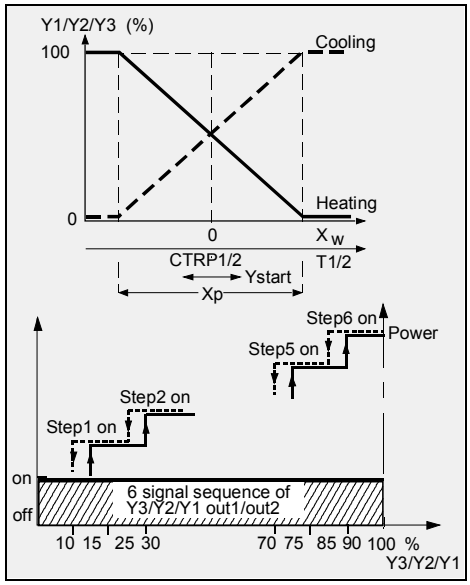
- Heating mode: 4 stages, sequentially switched steps to operate external relays or
  4 binary coded switching outputs to provide up to 15 load steps.
- Cooling mode: 2 stages, sequentially switched steps to operate external relays.



FUNCTIONAL DESCRIPTION

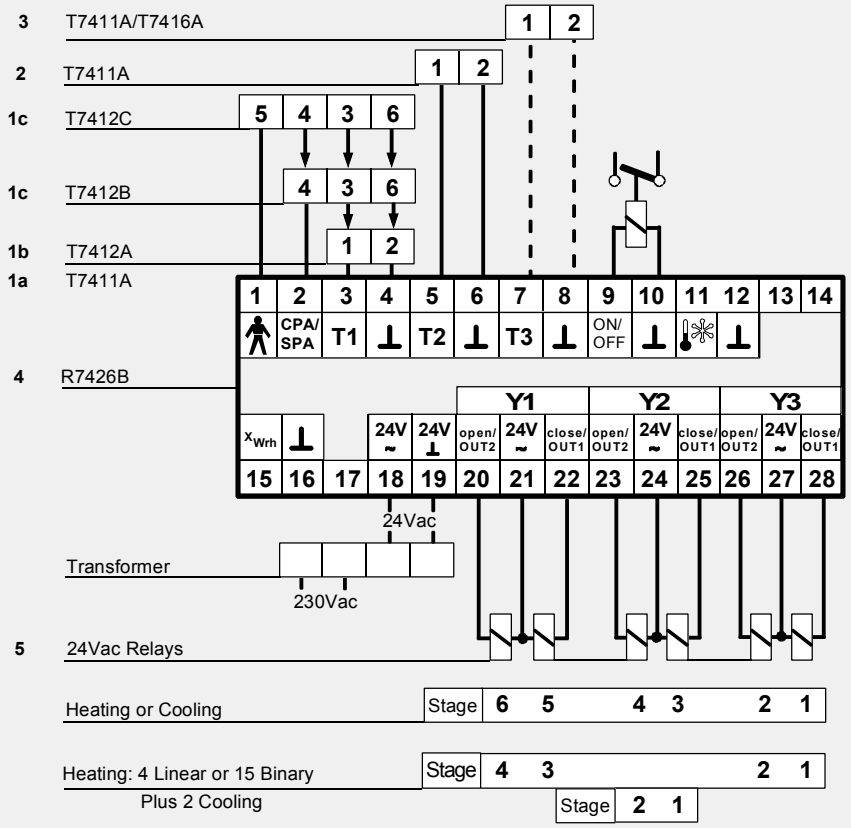
Temperature Control With Low Limit Control. The return or room air temperature sensor (1a, b or c) and the discharge air temperature sensor (2) measure the actual values and the controller (4) compares these values with the desired setpoints (W1) and (Wlim). If a deviation between these values exists, the lowest deviation signal of both is selected by the controller. Depending on this deviation signal the controller selects the number of stages/steps required to maintain the desired room or return air or low limit discharge air temperature.

Cascade Temperature Control. The return or room air temperature sensor (1a, b or c) measures the actual value and the controller (4) compares this value with the desired setpoint (W1) of the master loop. Depending on the deviation an internal setpoint for the submaster loop, the discharge air temperature, is calculated.
The discharge air temperature sensor (2) measures the actual value and the controller compares this value with the desired internal calculated setpoint. If a deviation exists, the controller selects the number of stages/steps required to maintain the desired discharge air temperature.
For both applications the controller output is reverse acting for heating mode and direct acting for cooling mode.
When configured for heating and cooling sequence operation, the controller will first select the heating or cooling mode and than the number of stages/steps required.



Time Control. Depending on the programmed time schedule of the internal controller real time clock the different operating control modes Comfort, Standby, Night or OFF are selected. In the OFF operating mode the controller automatically switches OFF the selected number of stages/steps and the fan(s) and thereby closes the dampers (6) by an external installed relay logic.
If the controller switches from OFF to ON mode, the fan(s) switch ON after a time delay by an external installed time delay relay. This allows the dampers time to open. As alternative to the time delay relay the end-position switches of the damper actuators can be used to start the fan.

WIRING CONNECTIONS



EQUIPMENT LIST

Item	Quantity	Part Number	Description
1a or 1b or 1c	1	T7411A1001 or T7412A1018 or T7412B1057 T7412C1030	Duct Temperature Sensor 135mm length or Room Temperature Sensor or Room Temperature Sensor with CPA Room Temperature Sensor with CPA and Occupancy Switch
2	1	T7411A1001 or T7411A1019	Duct Temperature Sensor 135mm length or Duct Temperature Sensor 300mm length
4	1	R7426B1014 or R7426B1006	Temperature Controller with clock or without clock
5	1 or 6	RY6	Auxiliary Relay Module with 6 relays 24Vac coil relays
6	2	ML6184E1009 ML6684E1008	Damper Actuator 24Vac, 17Nm or 230Vac, 17Nm
7	1	L4064K1006	High Limit Thermostat
8+9+10	4	DPS-Series	Differential Air Pressure Switch

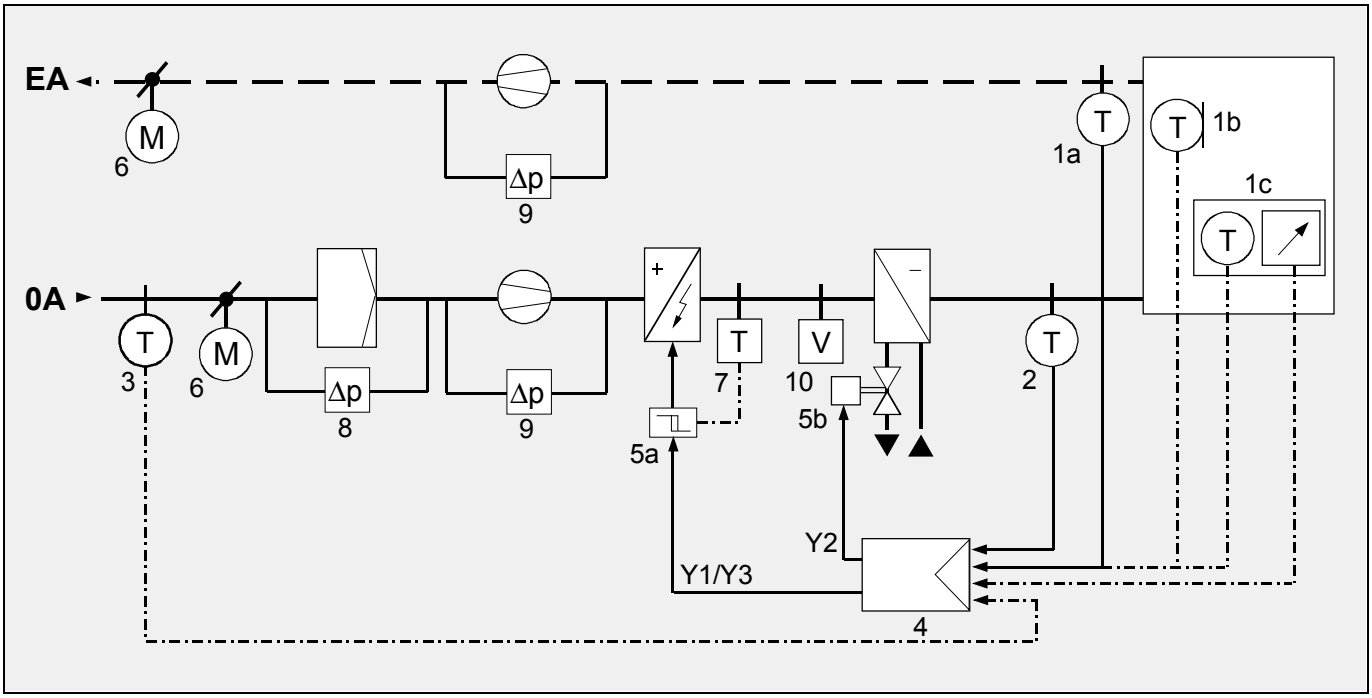
OPTIONS

Item	Quantity	Part Number	Description
3	1	T7411A1027 or T7416A1006	Outside Air Sensor, Duct Mounting or Wall Mounting

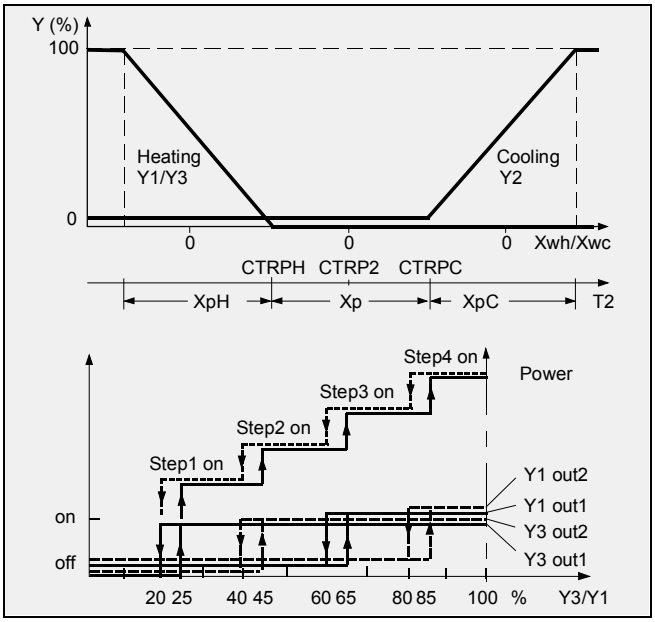
ROOM/DISCHARGE AIR TEMPERATURE CASCADE SEQUENCE CONTROL OF ELECTRIC AIR HEATER AND CHILLED WATER COOLING COIL

R11

Use with ventilation system comprising of an electric air heater and a cooling coil.



FUNCTIONAL DESCRIPTION



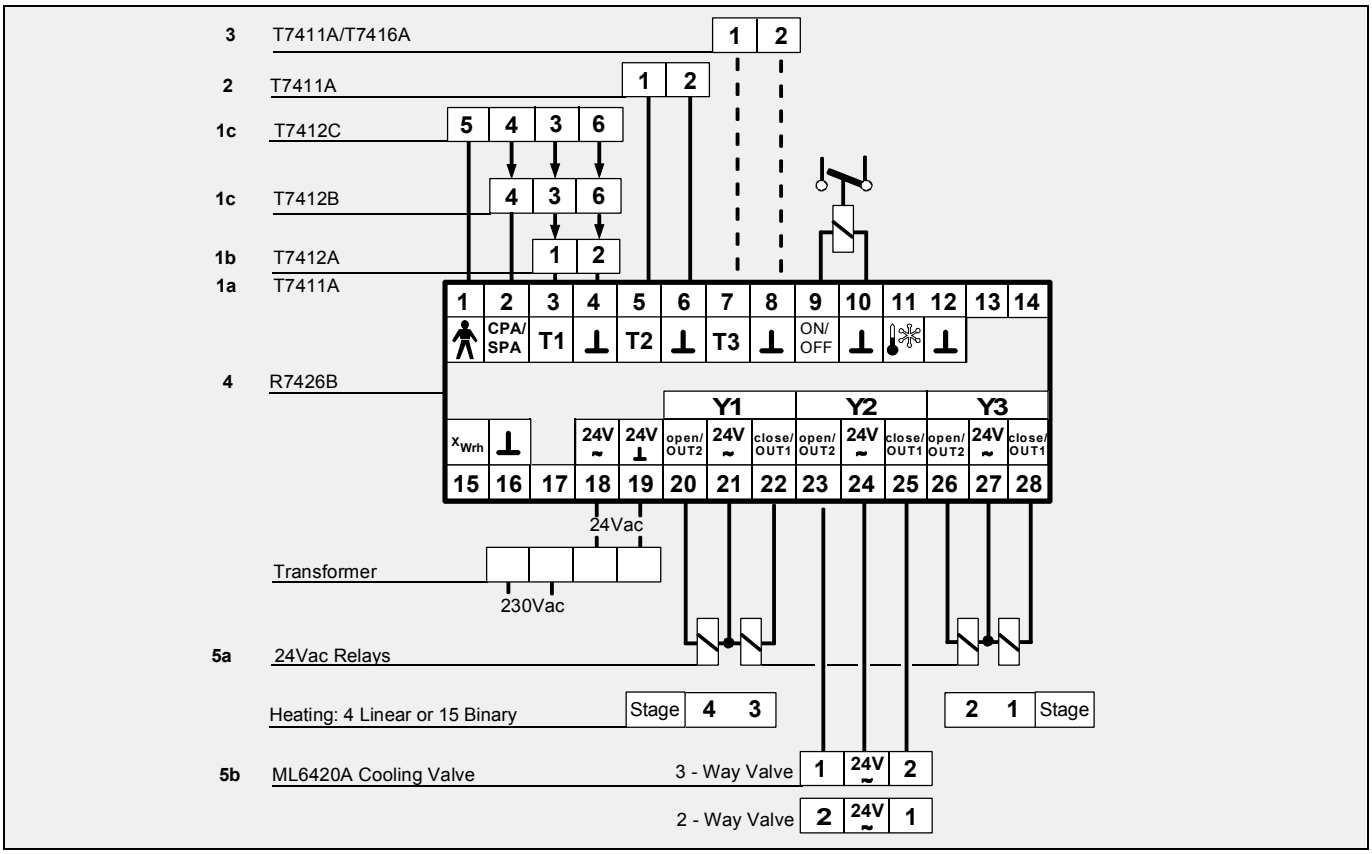
Temperature Control. The return or room air temperature sensor (1a, b or c) measures the actual value and the controller (4) compares this value with the desired setpoint (W1) of the master loop. Depending on the deviation an internal setpoint for the submaster loop, the discharge air temperature, is calculated. At zero deviation the discharge air temperature is controlled at the programmed setpoint (Wcas) and if a deviation exists, the discharge air setpoint is altered. The reset span of the discharge air setpoint is limited by the reset span adjustment (Rcas) and the limit setting (Wlim).
The discharge air temperature sensor (2) measures the actual value and the controller (4) compares this value with the desired internal calculated setpoint. If a deviation between the two values exists, the controller selects the corresponding number of stages/steps (up to 4 stages linear or 15 stages binary) for heating or generates a 3-position control signal to reposition the cooling valve to maintain the desired discharge air temperature.

If the temperature is below the heating setpoint the heating stages are switched via output Y3 and Y1 and if the temperature is above the cooling setpoint, the cooling valve (5b) is modulated via output Y2.

Time Control. Depending on the programmed time schedule of the internal controller real time clock the different operating control modes Comfort, Standby, Night or OFF are selected. In the OFF operating mode the controller automatically switches OFF the selected number of heating stages/steps, closes the cooling valve (5b), switches the fan(s) OFF and thereby closes the dampers (6) by an external installed relay logic.

If the controller switches from OFF to ON mode, the fan(s) switch ON after a time delay by an external installed time delay relay. This allows the dampers time to open. As alternative to the time delay relay the end-position switches of the damper actuators can be used to start the fan.

WIRING CONNECTIONS



EQUIPMENT LIST

Item	Quantity	Part Number	Description
1a or 1b or 1c	1	T7411A1001 or T7412A1018 or T7412B1057 T7412C1030	Duct Temperature Sensor 135mm length or Room Temperature Sensor or Room Temperature Sensor with CPA Room Temperature Sensor with CPA and Occupancy Switch
2	1	T7411A1001 or T7411A1019	Duct Temperature Sensor 135mm length or Duct Temperature Sensor 300mm length
4	1	R7426B1014 or R7426B1006	Temperature Controller with clock or without clock
5a	1 or 4	RY4	Auxiliary Relay Module with 4 relays 24Vac coil relays
5b	1	ML6420A3007 and V5...A....	Valve Actuator and Valve
6	2	ML6184E1009 or ML6684E1008	Damper Actuator 24Vac, 17Nm or 230Vac, 17Nm
7	1	L4064K1006	High Limit Thermostat
8+9+10	3 or 4	DPS-Series	Differential Air Pressure Switch

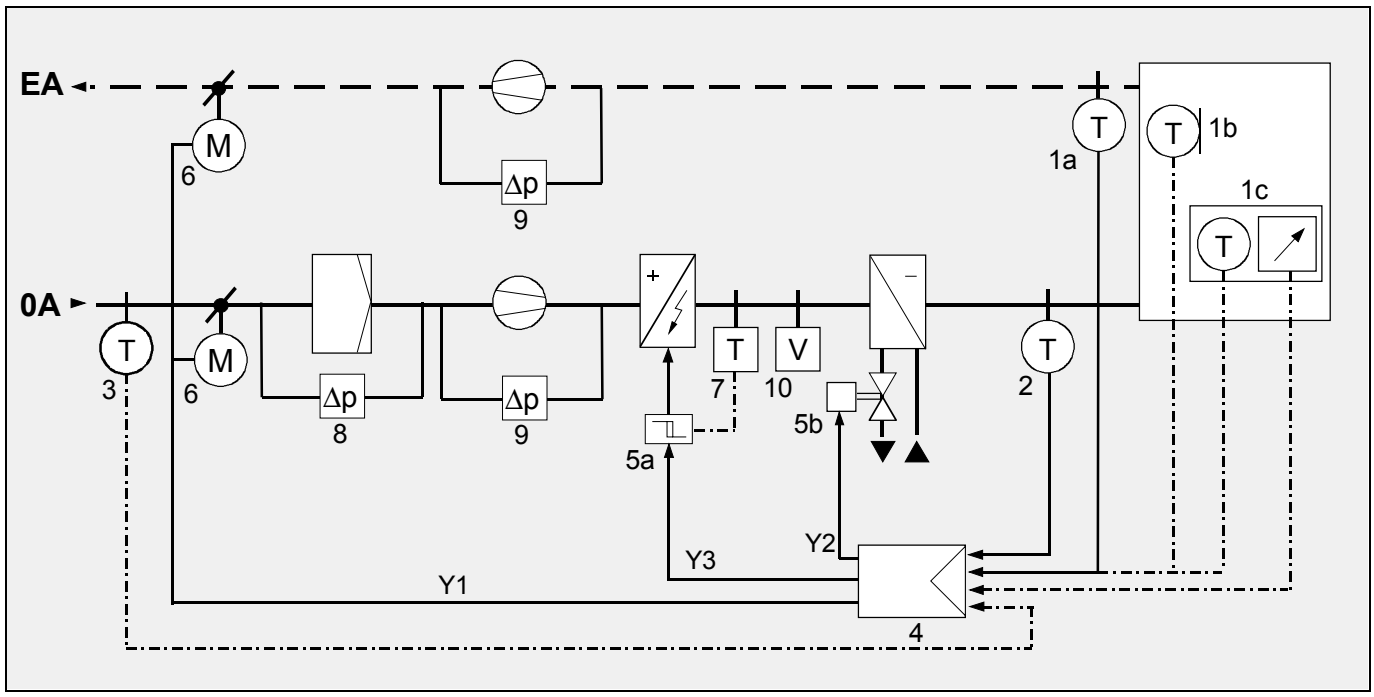
OPTIONS

Item	Quantity	Part Number	Description
3	1	T7411A1027 or T7416A1006	Outside Air Sensor, Duct Mounting or Wall Mounting

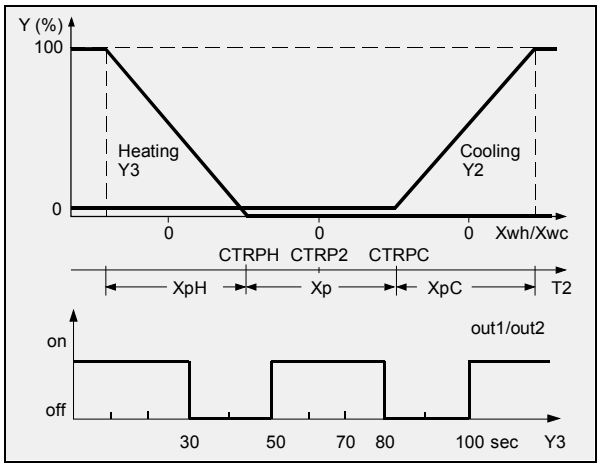
ROOM/DISCHARGE AIR TEMPERATURE CASCADE SEQUENCE CONTROL OF ELECTRIC AIR HEATER AND CHILLED WATER COOLING COIL AND TWO POSITION (OPEN/CLOSE) DAMPER CONTROL

R12

For use with ventilation system comprising of an electric air heater and a cooling coil with full outside air dampers.



FUNCTIONAL DESCRIPTION



Temperature Control. The return or room air temperature sensor (1a, b or c) measures the actual value and the controller (4) compares this value with the desired setpoint (W1) of the master loop. Depending on the deviation an internal setpoint for the submaster loop, the discharge air temperature, is calculated. At zero deviation the discharge air temperature is controlled at the programmed setpoint (Wcas) and if a deviation exists, the discharge air setpoint is altered. The reset span of the discharge air setpoint is limited by the reset span adjustment (Rcas) and the limit setting (Wlim).
The discharge air temperature sensor (2) measures the actual value and the controller (4) compares this value with the desired internal calculated setpoint. If a deviation between the two values exists, the controller generates a pulse width modulated output signal on output Y3 to drive one or up to three solid state relays (5a) in parallel for proportional control of the electric air heater or a 3-position control signal on output Y2 to reposition the cooling valve (5b) to maintain the desired discharge air temperature.

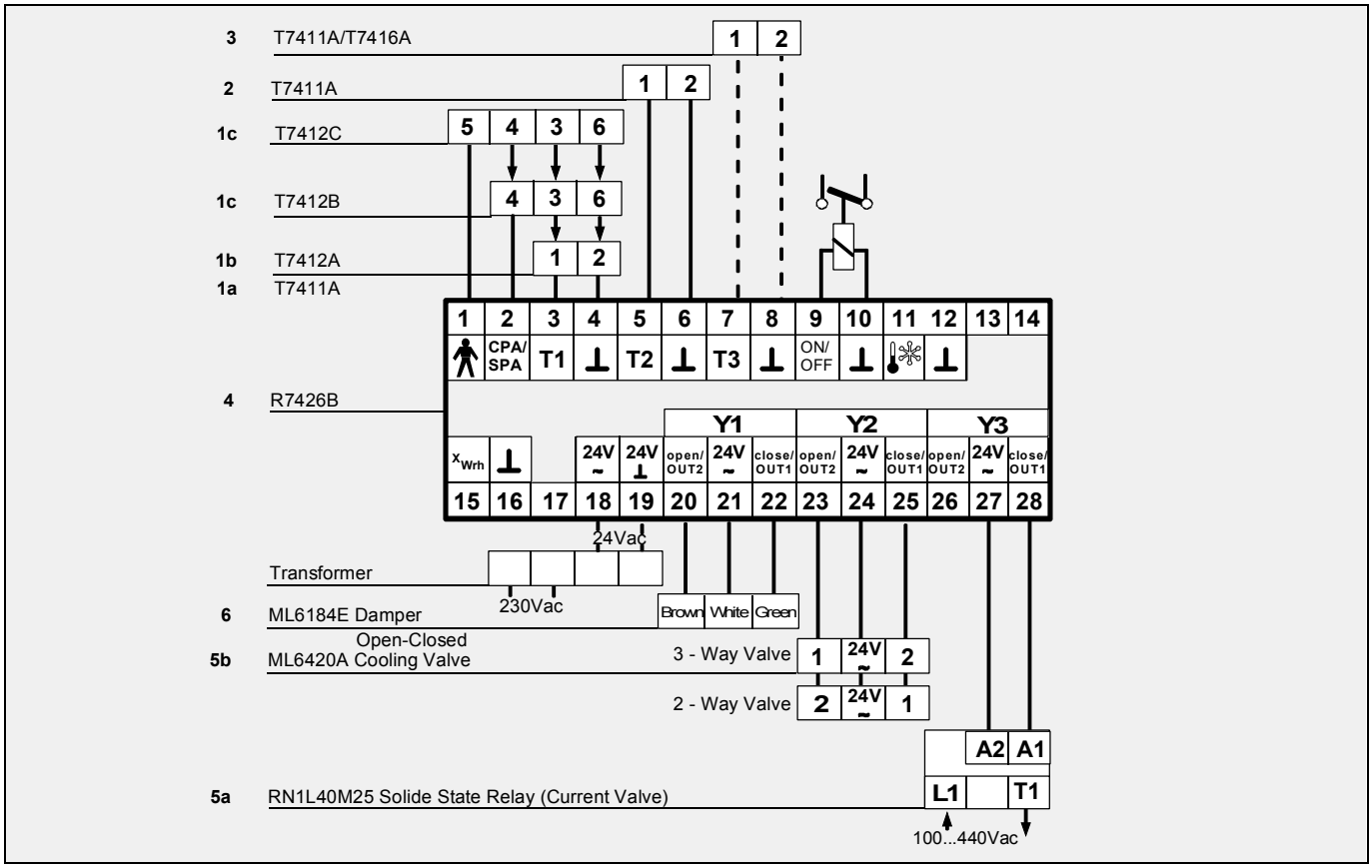
If the temperature is below the heating setpoint the solid state relay(s) (5a) is modulated via output Y3 and if the temperature is above the cooling setpoint the cooling valve (5b) is modulated via output Y2.

Damper Control. If the controller switches from OFF to ON mode the controller drives the damper actuators (6) to the open position via output Y1.
If the controller switches to OFF mode the controller drives the dampers automatically to the closed position.

Time Control. Depending on the programmed time schedule of the internal controller real time clock the different operating control modes Comfort, Standby, Night or OFF are selected. In the OFF operating mode the controller automatically generates on all outputs a 0% output signal to switch OFF the electric air heater, to fully close the cooling valve (5b) and dampers (6) and to switch OFF the fan(s).

If the controller switches from OFF to ON mode, the fan(s) switch ON after a 3 minute time delay to allow the dampers time to open. As alternative the end-position switches of the damper actuators can be used to start the fan.

WIRING CONNECTIONS



EQUIPMENT LIST

Item	Quantity	Part Number	Description
1a or 1b or 1c	1	T7411A1001 or T7412A1018 or T7412B1057 T7412C1030	Duct Temperature Sensor 135mm length or Room Temperature Sensor or Room Temperature Sensor with CPA Room Temperature Sensor with CPA and Occupancy Switch
2	1	T7411A1001 or T7411A1019	Duct Temperature Sensor 135mm length or Duct Temperature Sensor 300mm length
4	1	R7426B1014 or R7426B1006	Temperature Controller with clock or without clock
5a	up to 3	RN1L40M25	Solid State Relay (Current Valve)
5b	1	ML6420A3007 and V5...A....	Valve Actuator and Valve
6	2	ML6184E1009	Damper Actuator 24Vac, 17Nm
7	1	L4064K1006	High Limit Thermostat
8+9+10	3 or 4	DPS-Series	Differential Air Pressure Switch

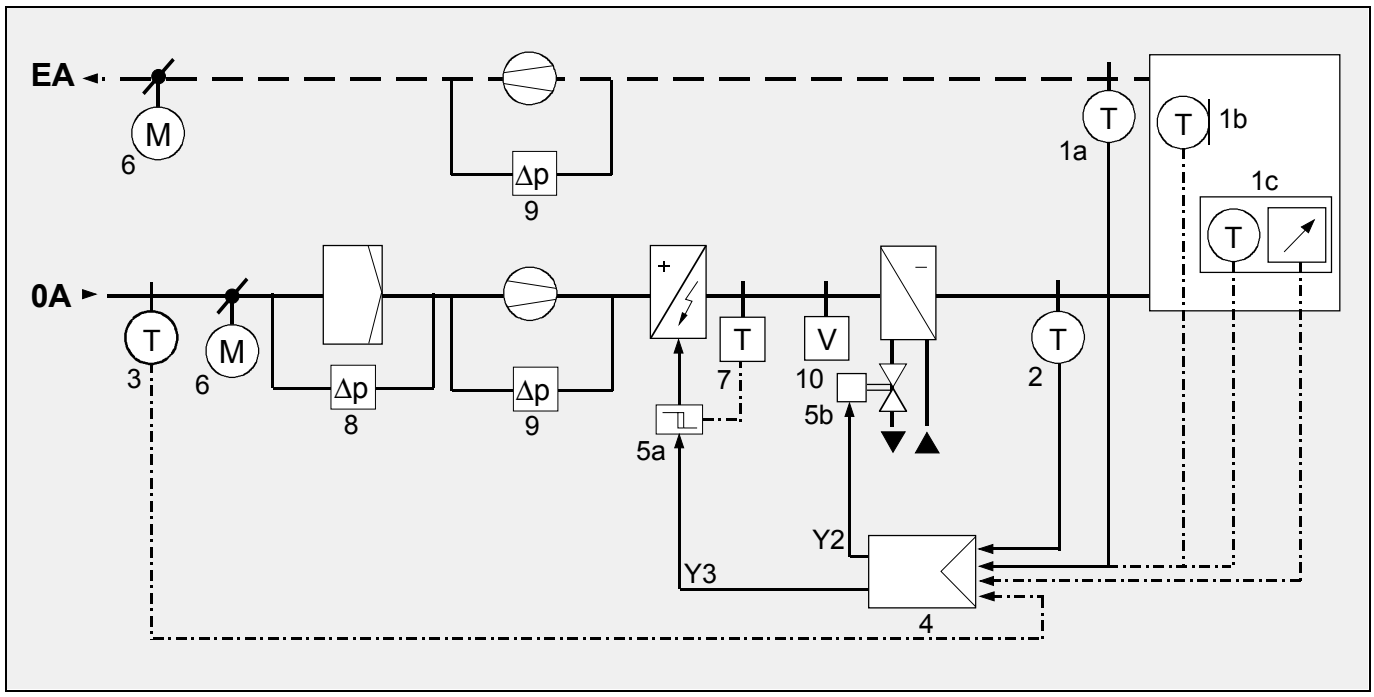
OPTIONS

Item	Quantity	Part Number	Description
3	1	T7411A1027 or T7416A1006	Outside Air Sensor, Duct Mounting or Wall Mounting

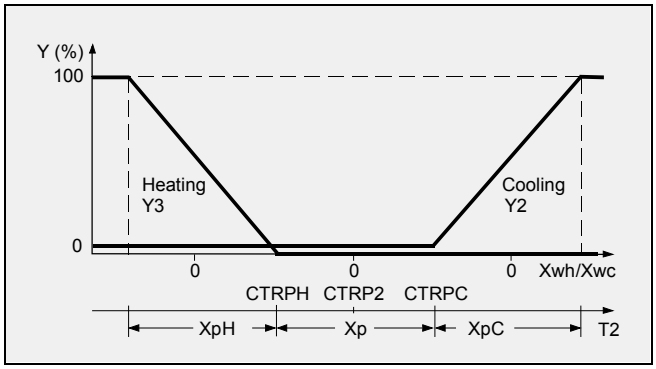
ROOM/DISCHARGE AIR TEMPERATURE CASCADE SEQUENCE CONTROL OF ELECTRIC AIR HEATER AND CHILLED WATER COOLING COIL

R13

Used with ventilation system comprising of an electric air heater and a cooling coil.



FUNCTIONAL DESCRIPTION



Temperature Control. The return or room air temperature sensor (1a, b or c) measures the actual value and the controller (4) compares this value with the desired setpoint (W1) of the master loop. Depending on the deviation an internal setpoint for the submaster loop, the discharge air temperature, is calculated. At zero deviation the discharge air temperature is controlled at the programmed setpoint (Wcas) and if a deviation exists, the discharge air setpoint is altered. The reset span of the discharge air setpoint is limited by the reset span adjustment (Rcas) and the limit setting (Wlim).

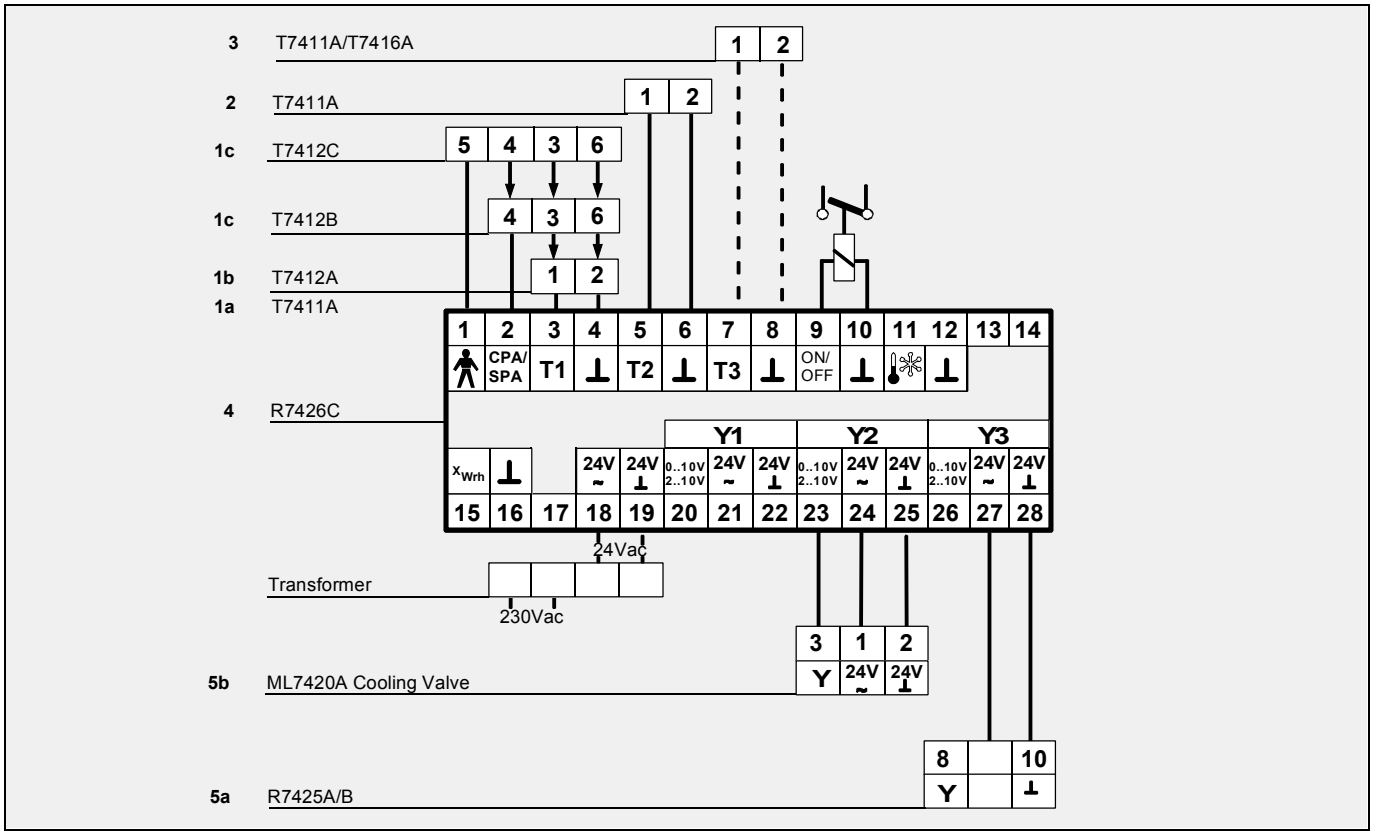
The discharge air temperature sensor (2) measures the actual value and the controller (4) compares this value with the desired internal calculated setpoint. If a deviation between the two values exists, the controller generates two 0(2)...10Vdc control signals in sequence via outputs Y2 and Y3 corresponding to the 0...100% correctional signal to drive the electric current valve (5a) for proportional control of the electric air heater or to reposition the cooling valve (5b) to maintain the desired discharge air temperature.

If the temperature is below the heating setpoint the controller generates a control signal on output Y3 to control the electric current valve (5a) and if the temperature is above the cooling setpoint, the controller generates a control signal on output Y2 to position the cooling valve (5b).

Time Control. Depending on the programmed time schedule of the internal controller real time clock the different operating control modes Comfort, Standby, Night or OFF are selected. In the OFF operating mode the controller automatically generates 0% output signals on Y2 and Y3 to switch OFF the electric heater , to close the cooling valve (5b) and to switch OFF the fan(s) by the Plant/System On/Off output and thereby close the dampers (6) by an external installed relay logic.

If the controller switches from OFF to ON mode, the fan(s) switch ON after a time delay by an external installed time delay relay. This allows the dampers time to open. As alternative to the time delay relay the end-position switches of the damper actuators can be used to start the fan.

WIRING CONNECTIONS



EQUIPMENT LIST

Item	Quantity	Part Number	Description
1a or 1b or 1c	1	T7411A1001 or T7412A1018 or T7412B1057 T7412C1030	Duct Temperature Sensor 135mm length or Room Temperature Sensor or Room Temperature Sensor with CPA Room Temperature Sensor with CPA and Occupancy Switch
2	1	T7411A1001 or T7411A1019	Duct Temperature Sensor 135mm length or Duct Temperature Sensor 300mm length
4	1	R7426C1012 or R7426C1004	Temperature Controller with clock or without clock
5a	1	R7425A/B	Electric Current Valve
5b	1	ML7420A3006 and V5....A....	Valve Actuator 0(2)...10Vdc and Valve
6	2	ML6184E1009 or ML6684E1008	Damper Actuator 24Vac, 17Nm or 230Vac, 17Nm
7	1	L4064K1006	High Limit Thermostat
8+9+10	3 or 4	DPS-Series	Differential Air Pressure Switch

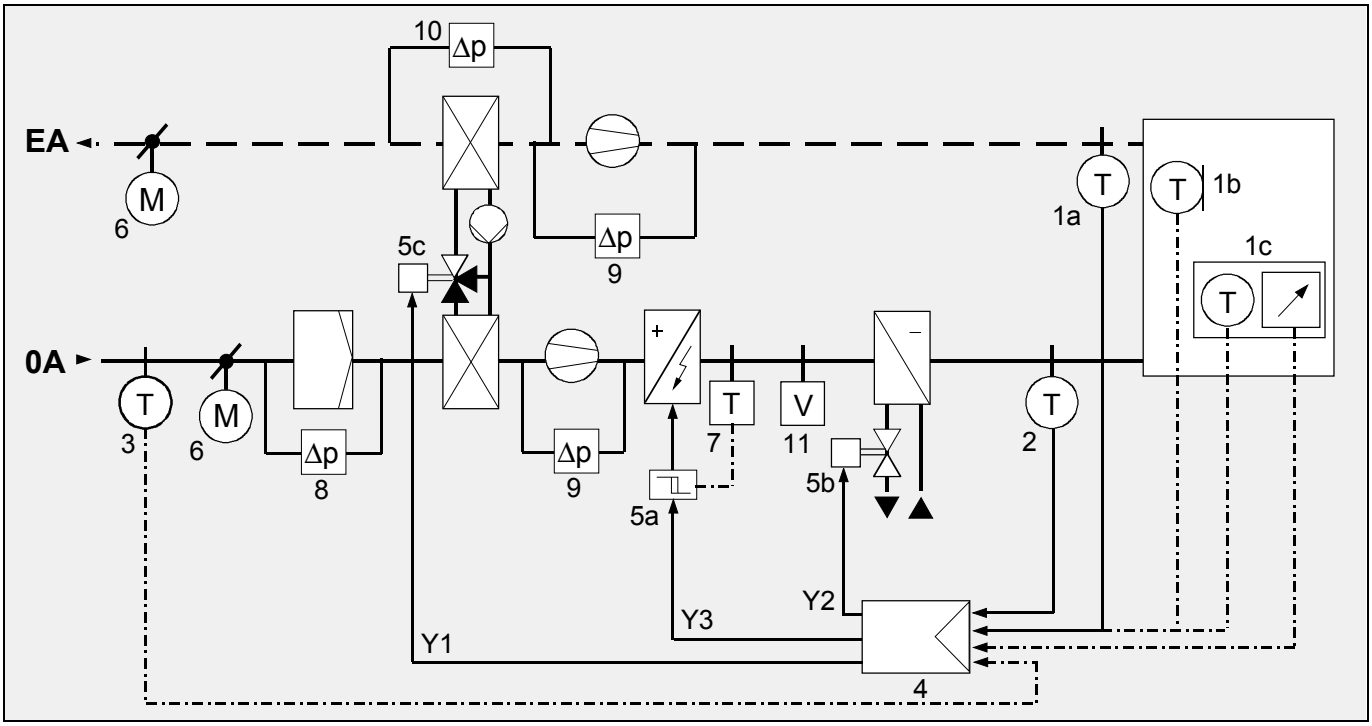
OPTIONS

Item	Quantity	Part Number	Description
3	1	T7411A1027 or T7416A1006	Outside Air Sensor, Duct Mounting or Wall Mounting

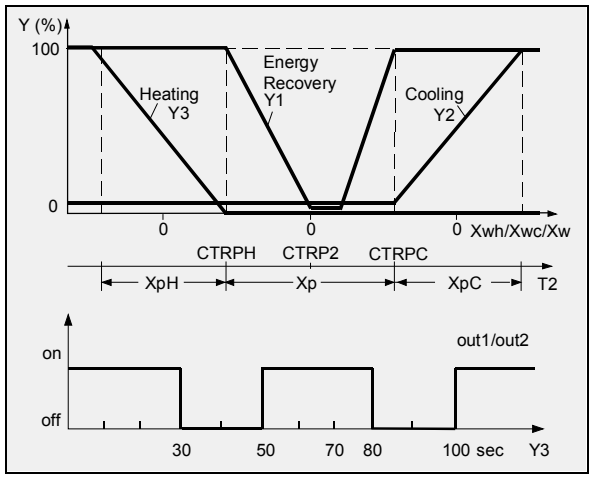
ROOM/DISCHARGE AIR TEMPERATURE CASCADE SEQUENCE CONTROL OF ENERGY RECOVERY SYSTEM, ELECTRIC AIR HEATER AND CHILLED WATER COOLING COIL

R14

For use with ventilation system comprising of an energy (heat/cool) recovery system, an electric air heater and a cooling coil.



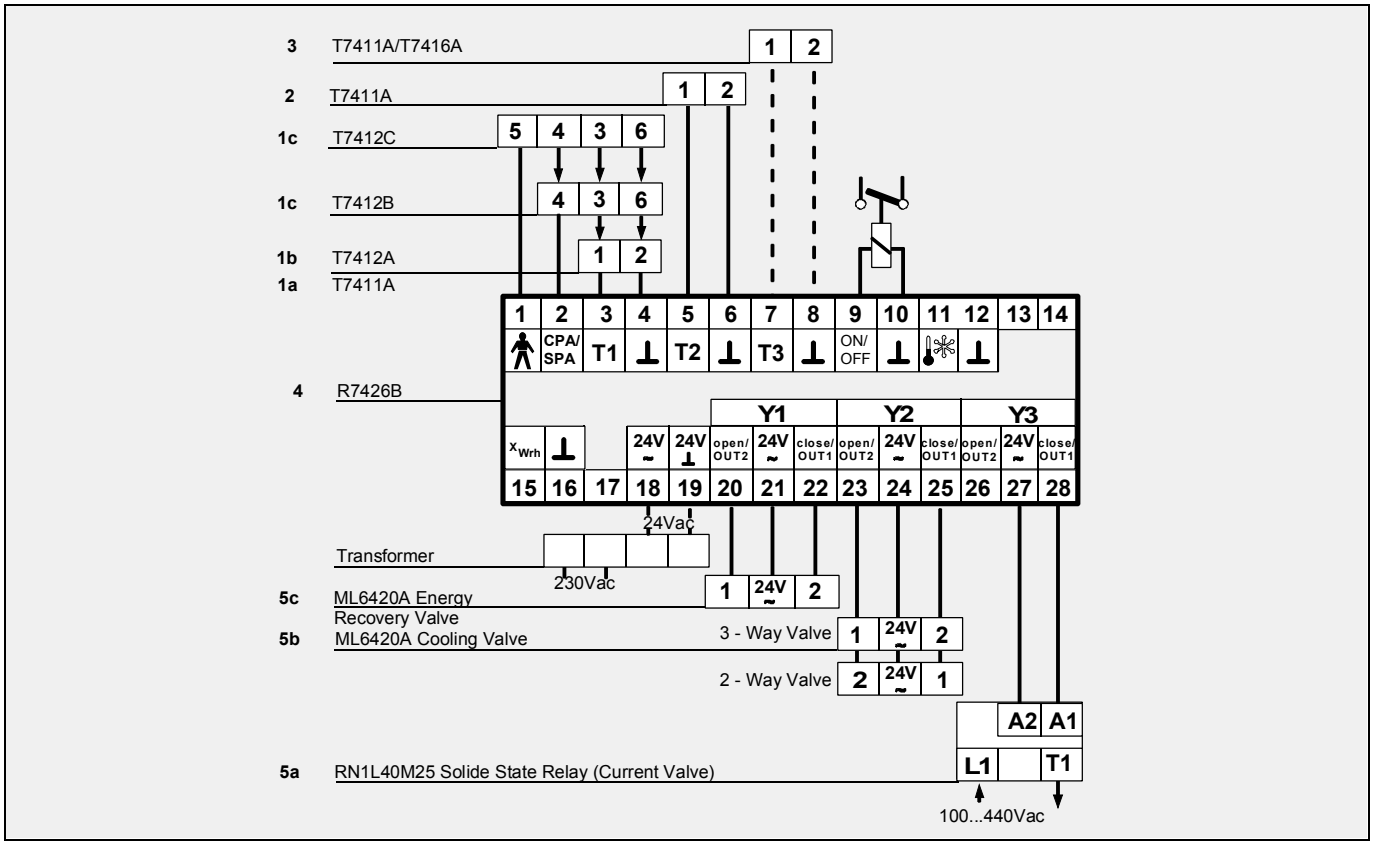
FUNCTIONAL DESCRIPTION



Temperature Control. The return or room air temperature sensor (1a, b or c) measures the actual value and the controller (4) compares this value with the desired setpoint (W1) of the master loop. Depending on the deviation an internal setpoint for the submaster loop, the discharge air temperature, is calculated.
The discharge air temperature sensor (2) measures the actual value and the controller (4) compares this value with the desired internal calculated setpoint. If a deviation between the two values exists, the controller generates the corresponding control signals to maintain the desired discharge air temperature.
If the actual temperature is below the setpoint the controller (4) generates first a 3-position control signal via output Y1 to reposition the energy recovery valve (5c) to reclaim heating energy. If the temperature continues to decrease and the energy recovery valve is fully open, the controller generates a pulse width modulated output via output Y3 to drive the solid state relay (5a) for proportional control of the electric air heater. If the temperature increases the sequence of operation is reversed.
If the actual temperature exceeds the setpoint by more than 25% of the throttling range (Xp2) – dead band between heating and cooling – the controller starts to open the energy recovery valve (5c) to reclaim cooling energy. If the temperature continues to increase and the energy recovery valve is fully open the controller (4) generates an output signal via Y2 to open the cooling coil valve (5b).
In an air-glycol-air heat recovery system it is important to avoid icing of the exhaust air coil. This is achieved by the differential pressure switch (10). If the differential pressure switch indicates icing of the coil, the control valve (5c) will be closed by an additional, field mounted relay. Return air and warm water will circulatethrough the heat recovery exhaust air coil to melt the ice deposits.

Time Control. Depending on the programmed time schedule of the internal controller real time clock the different operating control modes Comfort, Standby, Night or OFF are selected. In the OFF operating mode the controller automatically fully closes the valves (5b and 5c) and switches the electric air heater and the fan(s) OFF and thereby close the dampers (6) by an external installed relay logic.
If the controller switches from OFF to ON mode, the fan(s) switch ON after a time delay by an external installed time delay relay. This allows the dampers time to open. As alternative to the time delay relay the end-position switches of the damper actuators can be used to start the fan.

WIRING CONNECTIONS



EQUIPMENT LIST

Item	Quantity	Part Number	Description
1a or 1b or 1c	1	T7411A1001 or T7412A1018 or T7412B1057 T7412C1030	Duct Temperature Sensor 135mm length or Room Temperature Sensor or Room Temperature Sensor with CPA Room Temperature Sensor with CPA and Occupancy Switch
2	1	T7411A1001 or T7411A1019	Duct Temperature Sensor 135mm length or Duct Temperature Sensor 300mm length
4	1	R7426B1014 or R7426B1006	Temperature Controller with clock or without clock
5a	1	RN1L40M25	Solid State Relay, up to 3 possible for higher loads
5b + 5c	2	ML6420A3007 and V5....A....	Valve Actuator and Valve
6	2	ML6184E1009 or ML6684E1008	Damper Actuator 24Vac, 17Nm or 230Vac, 17Nm
7	1	L4064K1006	High Limit Thermostat
8+9+10	4	DPS-Series	Differential Air Pressure Switch
11	1	DPS-Series	Differential Air Pressure Switch

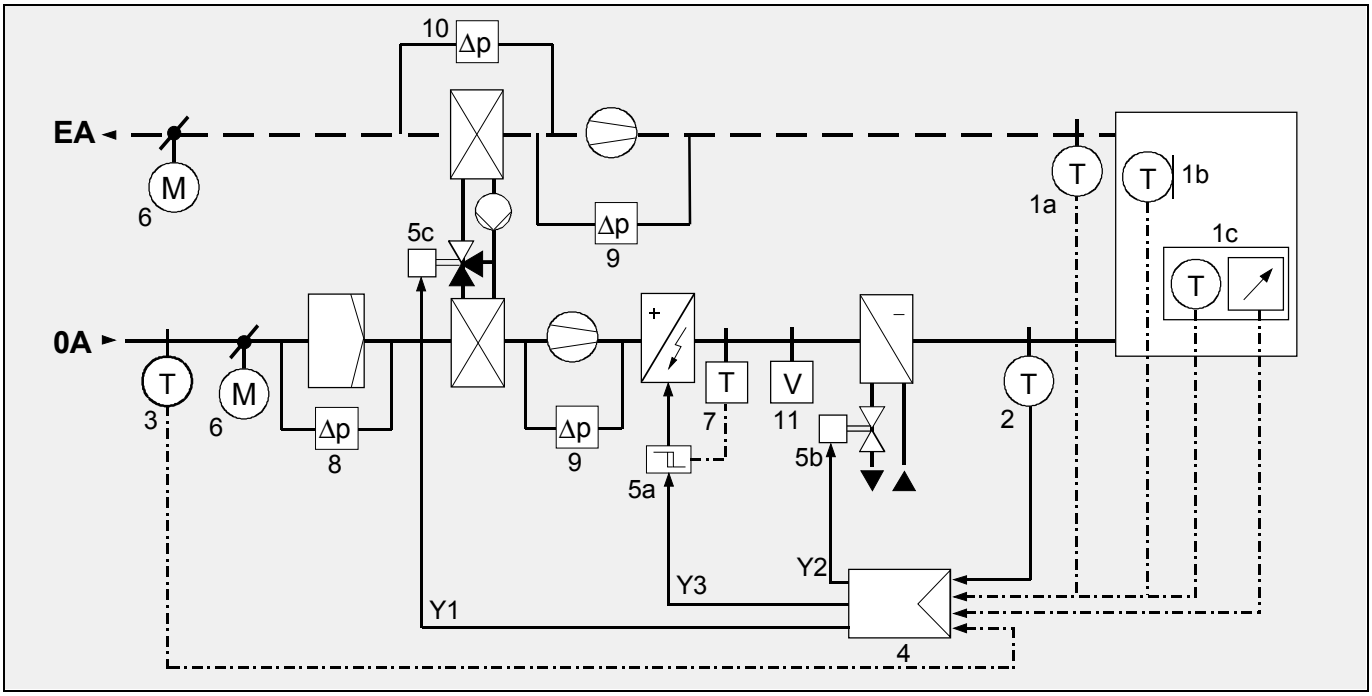
OPTIONS

Item	Quantity	Part Number	Description
3	1	T7411A1027 or T7416A1006	Outside Air Sensor, Duct Mounting or Wall Mounting

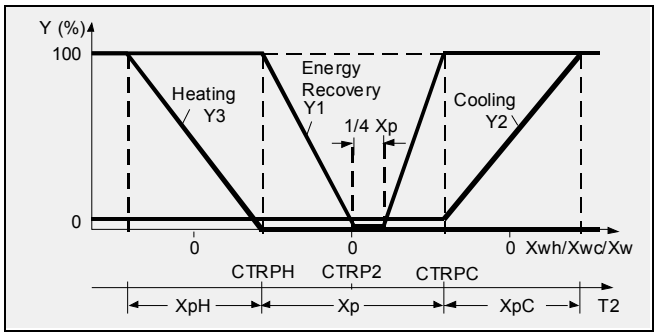
ROOM/DISCHARGE AIR TEMPERATURE CASCADE SEQUENCE CONTROL OF ENERGY RECOVERY SYSTEM, ELECTRIC AIR HEATER AND CHILLED WATER COOLING COIL

R15

For use with ventilation system comprising of an energy (heat/cool) recovery system, an electric air heater and a cooling coil.



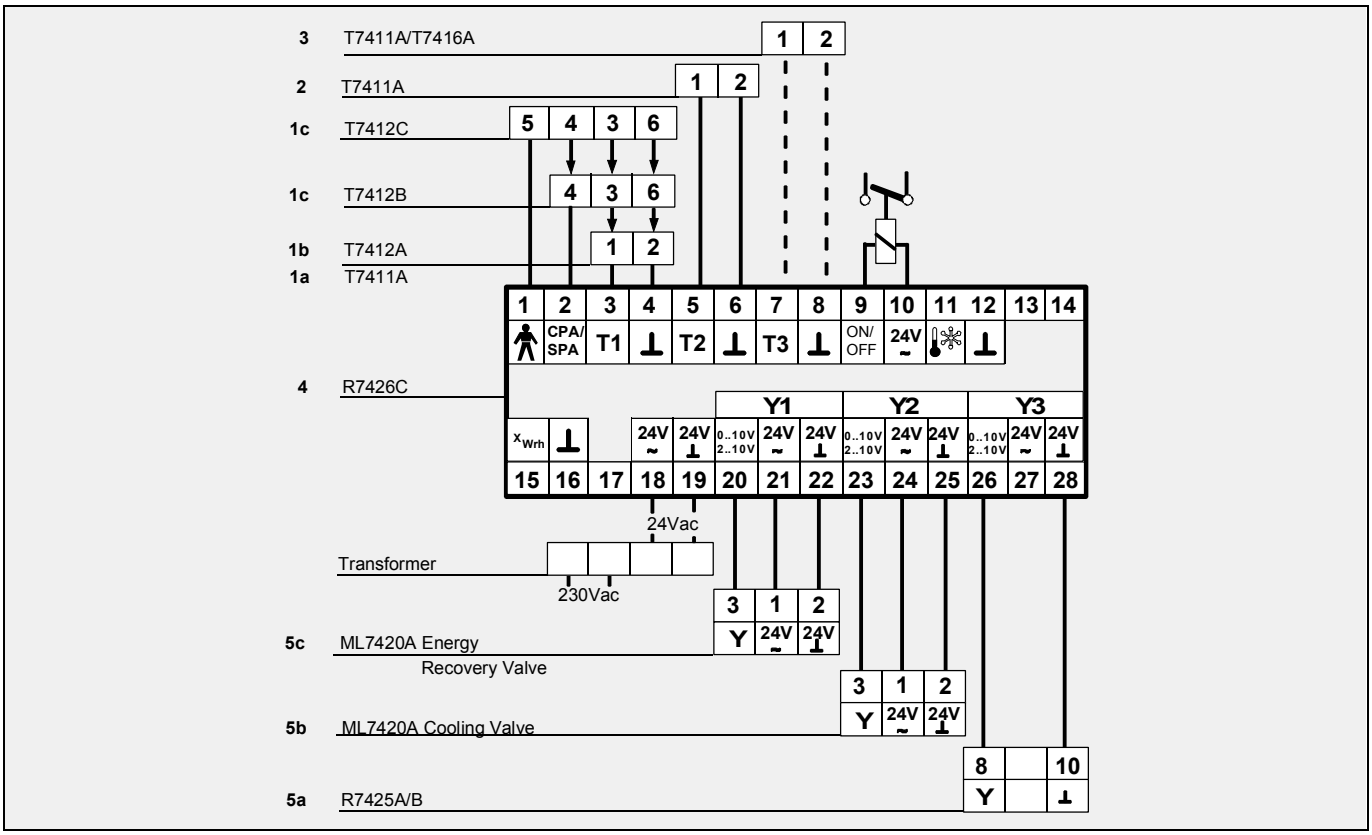
FUNCTIONAL DESCRIPTION



Temperature Control. The return or room air temperature sensor (1a, b or c) measures the actual value and the controller (4) compares this value with the desired setpoint (W1) of the master loop. Depending on the deviation an internal setpoint for the submaster loop, the discharge air temperature, is calculated. At zero deviation the discharge air temperature is controlled at the programmed setpoint (Wcas) and if a deviation exists, the discharge air setpoint is altered. The reset span of the discharge air setpoint is limited by the reset span adjustment (Rcas) and the limit setting (Wlim).
The discharge air temperature sensor (2) measures the actual value and the controller (4) compares this value with the desired internal calculated setpoint. If a deviation between the two values exists, the controller generates in correspondence to the 0...100% correctional signal 0(2)...10Vdc control signals in sequence via outputs Y1, Y2 and Y3 to position the energy recovery or cooling valve or to drive the electric current valve to maintain the desired discharge air temperature.
If the actual temperature is below the setpoint, the controller generates first a 0(2)...10Vdc control signal via output Y1 to reposition the energy recovery valve (5c) to reclaim heating energy. If the temperature continues to decrease and the energy recovery valve is fully open, the controller generates a 0(2)...10Vdc control signal via output Y3 to drive the electric current valve (5a) for proportional control of the electric air heater. If the temperature increases the sequence of operation is reversed.
If the actual temperature exceeds the setpoint by more than 25% of the throttling range (Xp2) - dead band between heating and cooling - the controller starts to open the energy recovery valve (5c) to reclaim cooling energy. If the temperature continues to increase and the energy recovery valve is fully open, the controller (4) generates a 0(2)...10Vdc control signal via Y2 to position the cooling valve (5b).
In an air-glycol-air heat recovery system it is important to avoid icing of the exhaust air coil. This is achieved by the differential pressure switch (10). If the differential pressure switch indicates icing of the coil, the control valve (5c) will be closed by an additional, field mounted relay. Return air and warm water will circulatethrough the heat recovery exhaust air coil to melt the ice deposits.

Time Control. Depending on the programmed time schedule of the internal controller real time clock the different operating control modes Comfort, Standby, Night or OFF are selected. In the OFF operating mode the controller automatically fully closes the valves (5b and 5c) and switches the electric air heater and the fan(s) OFF and thereby close the dampers (6) by an external installed relay logic. If the controller switches from OFF to ON mode, the fan(s) switch ON after a time delay by an external installed time delay relay. This allows the dampers time to open. As alternative to the time delay relay the end-position switches of the damper actuators can be used to start the fan.

WIRING CONNECTIONS



EQUIPMENT LIST

Item	Quantity	Part Number	Description
1a or 1b or 1c	1	T7411A1001 or T7412A1018 or T7412B1057 T7412C1030	Duct Temperature Sensor 135mm length or Room Temperature Sensor or Room Temperature Sensor with CPA Room Temperature Sensor with CPA and Occupancy Switch
2	1	T7411A1001 or T7411A1019	Duct Temperature Sensor 135mm length or Duct Temperature Sensor 300mm length
4	1	R7426C1012 or R7426C1004	Temperature Controller with clock or without clock
5a	1	R7425A/B	Electric Current Valve
5b + 5c	2	ML7420A3006 and V5....A....	Valve Actuator 0(2)...10Vdc and Valve
6	2	ML6184E1009 or ML6684E1008	Damper Actuator 24Vac, 17Nm or 230Vac, 17Nm
7	1	L4064K1006	High Limit Thermostat
8+9+10	4	DPS-Series	Differential Air Pressure Switch
11	1	DPS-Series	Differential Air Pressure Switch

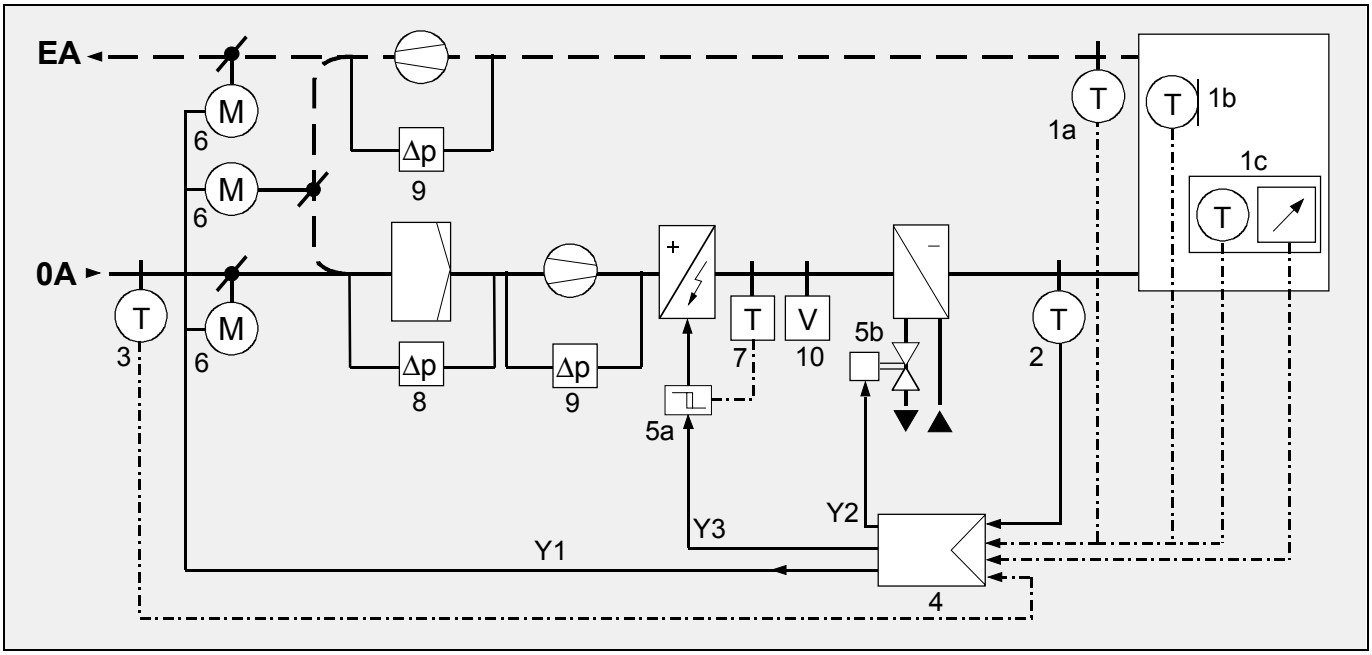
OPTIONS

Item	Quantity	Part Number	Description
3	1	T7411A1027 or T7416A1006	Outside Air Sensor, Duct Mounting or Wall Mounting

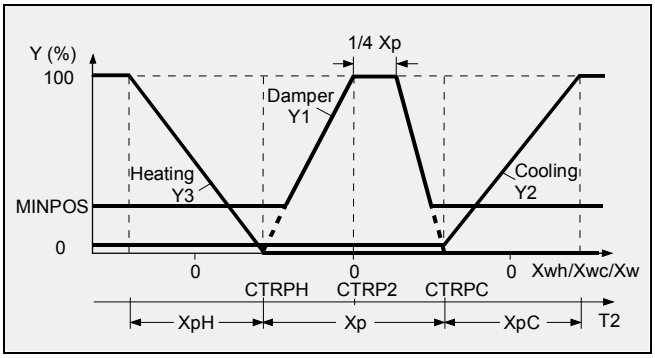
ROOM/ DISCHARGE AIR TEMPERATURE CASCADE SEQUENCE CONTROL OF MIXED AIR DAMPERS, ELECTRIC AIR HEATER AND CHILLED WATER COOLING COIL

R16

For use with ventilation system comprising of mixed air dampers, an electric air heater and a cooling coil.



FUNCTIONAL DESCRIPTION



Temperature Control. The return or room air temperature sensor (1a, b or c) measures the actual value and the controller (4) compares this value with the desired setpoint (W1) of the master loop. Depending on the deviation an internal setpoint for the submaster loop, the discharge air temperature, is calculated. At zero deviation the discharge air temperature is controlled at the programmed setpoint (Wcas) and if a deviation exists, the discharge air setpoint is altered. The reset span of the discharge air setpoint is limited by the reset span adjustment (Rcas) and the limit setting (Wlim).
The discharge air temperature sensor (2) measures the actual value and the controller (4) compares this value with the desired internal calculated setpoint. If a deviation between the two values exists, the controller generates in correspondence to the 0...100% correctional signal 0(2)...10Vdc control signals in sequence via outputs Y1, Y2 and Y3 to position the mixed air dampers or cooling valve or to drive the electric current valve to maintain the desired discharge air temperature.

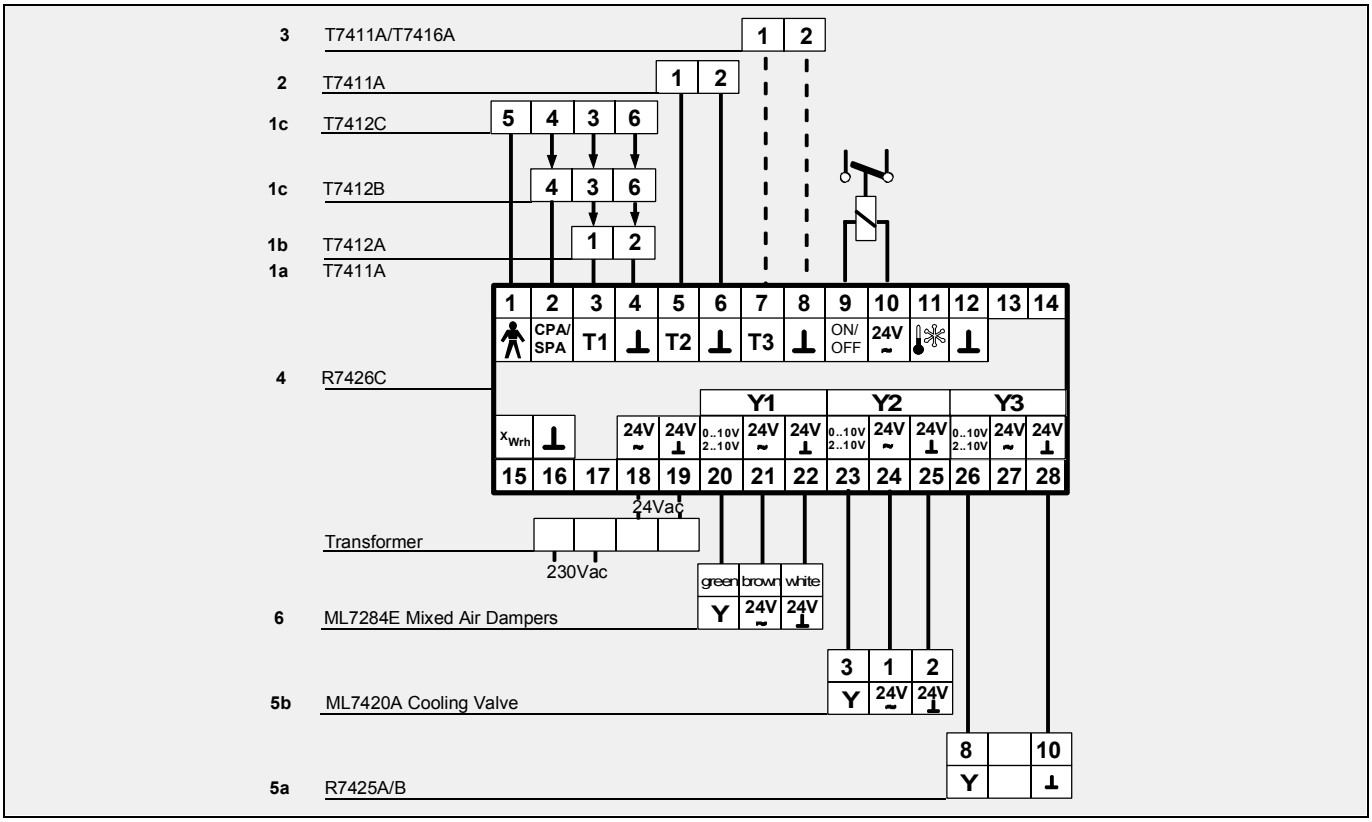
If the actual temperature is below the setpoint, the controller generates first a 0(2)...10Vdc control signal via output Y1 to reposition the mixed air damper (6). If the temperature continues to decrease and the mixed air dampers reached the minimum position (MINPOS), the controller generates a 0(2)...10Vdc control signal via output Y3 to drive the electric current valve (5a) for proportional control of the electric air heater. If the temperature increases the sequence of operation is reversed. If the actual temperature exceeds the setpoint by more than 25% of the throttling range (Xp2) - dead band between heating and cooling - the controller starts to close the mixed air damper (6). If the temperature continues to increase and the mixed air dampers reached the minimum position (MINPOS), the controller (4) generates a 0(2)...10Vdc control signal via Y2 to position the cooling valve (5b).

The minimum outside air damper position adjustment (MINPOS) on the controller determines the position to which the outside air damper will be driven even though the temperature input condition demands that it should drive to the fully closed position.

Time Control. Depending on the programmed time schedule of the internal controller real time clock the different operating control modes Comfort, Standby, Night or OFF are selected. In the OFF operating mode the controller automatically generates 0Vac (0%) control signals via output Y1, Y2 and Y3 to fully close the outside and exhaust air dampers (6) and the cooling valve (5b), open the return air damper and to switch OFF the electric air heater via the current valve (5a). In addition the fans are switched OFF by the Plant/System On/Off output.

If the controller switches from OFF to ON mode, the Plant/System On/Off output switches the fans ON and the controller provides automatic control.

WIRING CONNECTIONS



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6	2	ML7284E1006 or ML7174E1006	Damper Actuator 24Vac, 0...10Vdc, 17Nm or 24Vac, 0...10Vdc, 8Nm
7	1	L4064K1006	High Limit Thermostat
8+9	3	DPS-Series	Differential Air Pressure Switch
10	1	DPS-Series	Differential Air Pressure Switch

OPTIONS

Item	Quantity	Part Number	Description
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