

Modello	Descrizione
NC 7311	Control unit without supervision
NC7311MB2I	Control unit with RS232 serial interface for supervision system with ModBus driver, text in English or Italian
NC7311MB2F	As above with text in English or French
NC7311MB4I	Control unit with RS485 serial interface for Supervision system with ModBus driver, text in English or Italian
NC7311MB4F	As above with text in English or French

MODELS	ADDRESS CARDS
NS 71	numbered from 1 to 40
NS 72	numbered from 1 to 80
NS 73	numbered from 1 to 120
NS 74	numbered from 1 to 160

OPERATION

NC7311 unit works by assigning to the controllers one of the four possible operation modes, each corresponding to a different system operation requirement.

APPLICATION AND USE

NC7311 Control unit, connected to NR controllers, is used in centralized systems for room temperature control.

- NORMAL MODE (NM) with set point programmable by Control Unit
- RESETTABLE UNOCCUPIED MODE (RC), with set point ± 3.5 K (depending on SUMMER/WINTER operation) in respect with the Normal mode set point, resettable by sensor button.
- FIXED UNOCCUPIED MODE (RF) with the same set point as the (RC) mode, but imposed by the Control Unit.
- ANTI-FROST MODE (AF) with 8 °C set point

The modes vary according to daily and weekly schedules, holiday periods, public holidays and manual override activated by the operator. NM, RF and RC modes set point can be modified by SUMMER/WINTER compensation, taking into account the outside temperature detected by the suitable sensor.

For an easier operation responding to the real plant requirements, it is possible to subdivide the controllers into groups (up to four), each corresponding to a specific area.

Controllers belonging to the same group work with the same time schedules, modes, operation and calibration values, as specified further. The group assignation can be made according to the belonging to a homogeneous plant zone, this does not imply any connection variations.

If required, the controllers can be considered as "SINGLE". It is possible to assign to such controllers individual operation parameters, so as to allow independent management of particular premises.

Setting operations are carried out on the Control Unit, which cyclically supplies data to all the programmed controllers.



Setup operation parameters for each group
For each group (up to 4) it is possible to set:

- Controllers belonging to the group
- NORMAL mode set point
- Dead zone between heating and cooling action
- Actuator stroke time of duct C (heating)
- Actuator stroke time of duct F (cooling)
- P or P + I control
- Proportional band for both ducts (cooling and heating)
- Integration time
- Cooling qualification to RC and RF modes
- Start point and authority for summer/winter compensation
- Weekly and daily schedules
- Holiday periods and public holidays modes
- Overrides in the prefixed modes

Setting operation parameters for Single controllers

For every Single controller it is necessary to set the same parameters required by groups, except those related to daily and weekly schedules, holiday periods and public holidays, since they use the settings of the group they belong to.

Actuator stroke time

Note: for new MVT44 actuators, it is necessary to set a percentage value = 21% corresponding to a 100s stroke time of the actuator.

For a correct indication of the actuator position, each controller driving a bidirectional actuator requires the actuator stroke time actual value.

The operator must, therefore, input a value between 0 and 100 corresponding to 0...480 seconds stroke time only for those controllers driving bidirectional actuators.

Data display

It is possible to control operation and eventually change parameters using function keys and a large display (4 lines x 20 rows) on the front panel.

All data can be accessed by surfing the various menu pages. Besides all the programming data, for each controller it is possible to display:

- the group the controller belongs to
- status of single controller
- controlled size actual value (accuracy ± 0.5 K at 21 °C)
- actual set point value (including compensation and local recalibration)
- operation mode
- opening percentage of both heating and cooling actuators.

NOTE: For NR7320/40 controllers, the initial displayed value will be the fan speed (0,1,2,3), instead of the valve opening percentage.

Moreover, the Control Unit processes data from controllers and allows the following data display:

- minimum detected room temperature
- maximum detected room temperature
- average of the detected room temperatures
- percentage of controllers in NORMAL mode (NM)
- percentage of controllers in RC/RF UNOCCUPIED mode
- percentage of controllers in ANTI-FROST mode (AF)
- heating and cooling actuators average position

Weekly schedules

It is possible to create up to 5 different time schedules with a maximum of 6 mode changeovers. It is, furthermore, possible to assign to each group, for each day of the week, either one of the 5 time schedules, or the RF/AF/RC/NM modes.

For each group of controllers a specific weekly schedule can, therefore, be generated.

Holidays (yearly programme)

It is possible to set for each group up to 10 public holidays and 5 holiday periods having a different mode .

This implies the creation of a yearly schedule for each group, which automatically substitutes customary schedules during the specified periods.

Manual override

In some cases it can be necessary to alter the assigned schedules (i.e. meetings, steady conditions of vacant rooms, etc.). For this purpose it has been foreseen the possibility to force one or more groups and/or single controllers to a required mode, chosen among the four available (NM, RC, RF and AF).

There are two override features:

- Temporary: at 12:00 pm. control gets back to the former time schedule
- Permanent: the group or single controller remains in the assigned mode until automatic control is reset

Operation status of each group (MANual or AUTOMATIC) is permanently displayed on the Control Unit.

MANual indication is also activated for single controllers if at least one of them is under manual control.

Priorities

Operation priorities followed by Control Unit are:

- 1) Group "Permanent" override
- 2) Single controllers "Permanent" or "Temporary" override
- 3) Group "Temporary" override
- 4) Holiday period programme
- 5) Public holiday programme
- 6) Weekly schedule

Summer/winter changeover

The Control Unit has four inputs in order to set either summer or winter operation for each group.

Open contact corresponds to winter operation.

Cooling and heating qualifications

An input is provided on the Control Unit in order to inhibit the cooling action for the whole system (closed contact = cooling inhibited), and 4 inputs are provided for each group in order to inhibit the heating action (closed contact =heating inhibited). When actions are inhibited the relevant actuators are closed, independently from the mode set.

Programmed data storage

Programmed data are stored on an EEPROM memory chip and are not lost even when power supply fails.

Connection to controllers

Instructions and information between Control unit and controllers are exchanged through an intelligent two-wire polarised "BUS" connection.

This is a RS485 connection and it is particularly suitable for Building Automation Systems.

Overall time between call and reply for each controller is approximately 0.4 seconds.

The Control Unit identifies each controller through an "address card" to be inserted into the controller before switching it on. Such cards are marked by progressive numbers between 1 and 160 and are supplied in boxes identified by part number NS 71 ... 74.

Connection to supervisor

Four models, differing from serial interface and from display interface language, are available.

NC7311MB2I and NC7311MB2F are designed for a direct connection to the supervisor through a RS232 serial port. The connecting cable code is DG2CAV6.

NC7311MB4I and NC7311MB4F can be connected in parallel up to a maximum of 16 units through the RS485 serial port.

The supervisor requires a RS232/485 converting device (LIBO-4-485 optoinsulated model).

The connection is effected by a polarised screened twisted pair.

MANUFACTURING CHARACTERISTICS

The NC7311 is composed of the actual Control Unit and of a plastic shock-proof case containing the terminal boards, which allows an easy rack or wall mounting.

The cables enter the case from the bottom through five cable sleeves closed by easily removable plastic plugs; it is possible to replace them with PG 13,5 cable glands.

The unit is equipped with an openable transparent front protection.

TECHNICAL CHARACTERISTICS

Power supply	24 V~ ±10%
Consumption	5VA
Terminal board	screw-type for 2.5 mm ² max wires
Cable sleeves	5 holes suitable for PG13,5 glands
Protection degree	IP 40
Working temp. limits	T50 °C
Storage temp. limits	-20 T70 °C
Weight	1.2 kg. max
Microprocessor	INTEL 80c32
Programme memory	64 Kbyte (EPROM)
Data memory	32 Kbyte (RAM with an integrated a booster battery)

Measuring inputs

Outdoor temperature	-20T40 °C
Digital inputs	SPST contacts

Communication with controllers

Interface type	RS485 (DLC)
Speed	1200 baud
Cable	Polarised twisted pair with 0.3 mm ² min. section

Connection to supervisor

Interface type	EIA RS232	RS485
Max. length	1500 m.	1000 m.

Product conforms to EMC 89/336 directive with reference to the below-mentioned standards:

- EN 50081-1 for emission
- EN50082-1 for immunity

POSSIBLE COMBINATIONS AND CONNECTIONS

Control unit can be used with all types of NR 7300 controllers, with SBE outdoor temperature sensor, with DG7ROUTX Bus signal repeaters and with supervision system.

As far as connection to supervision system and installation criteria are concerned, please contact our Technical Assistance for details.

INSTALLATION AND START-UP

Installation

The Control Unit is suitable for rack and wall mounting, using the fitted brackets.

Perform wiring connections in compliance with the diagram herewith illustrated and existing standards.

It is important to check that communication bus is correctly connected in order to ensure communication between the Control Unit and the controllers. In case of faulty connections, controllers will operate stand alone as if the Control Unit had not been installed.

WARNING:

For a right installation it is necessary to terminate the communication Bus at the two most distant devices (controller/unit).

For NR controllers it is necessary to remove the controller cover and close the JP1 jumper.

For the Unit it is necessary to insert in parallel a 121 Ohm 1/4 W resistance between the Bus terminals (RT1 and RT2).

In case of replacement of a NC7111 unit (conveyed waves bus) with a NC7311 (RS485 bus) it is necessary to insert the DG7ROUT3 repeater and to place the jumper 2 of SW1 in OFF position in order to configure it for old-type protocol management.

Start-up

The Control Unit allows to modify operation parameters and programmes according to the various plant management requirements.

In order to make start-up stage easier, the Control Unit is supplied with a series of preprogrammed data that can be activated by pressing the two suitable keys (see User's Manual). Set current day and time following the given instructions.

PREPROGRAMMED DATA AND RELEVANT MODIFICATION RANGES

Description	Range	Preprogrammed value
Nr. of controllers	0...160	100
Existing groups	0...4	1
Single controllers	0...160	0
Cooling enables in RC/RF	Yes/No	No
NM mode set point	11 T29°C	21°C
Dead Zone	0...6k	3K
Actuator stroke duct C	0...100%	34%
Actuator stroke duct F	0...100%	34%
Control type	P / P+I	P
Duct C prop. band	0,8...7,2	2.0 °C
Duct F prop. band	0,8...7,2	2.0 °C
Duct C integration time	1...30 m	5 m
Duct F integration time	1...30 m	5 m
Summer compensation start	20T35 °C	27 °C
Qualification compensation	0...99%	40%
Winter comp. start	T20°C	5 °C
Qualification compensation	0...99%	60%

4 different time schedules are preprogrammed:

1	2	3	4
hr mode	hr mode	hr mode	hr mode
7:30 NM	6:00 NM	6:00 RC	7:00 NM
12:30 RC	12:00 RC	7:30 NM	12:00 RC
14:00 NM	13:00 NM	12:00 RC	13:00 RF
17:00 RC	17:00 RC	13:30 NM	—
19:00 FA	21:00 RF	17:30 RC	—
—	—	19:00 FA	—

Weekly schedule

Minimum interval 10 minutes; resolution 10 minutes

MON	TUE	WED	THU	FRI	SAT	SUN
1	1	1	1	1	1	1

All controllers are set in Automatic Control

SELF TEST AND SYSTEM TEST

The Control Unit is able to carry out diagnostic functions to indicate the following internal faults:

- clock malfunction
- data memory malfunction
- external sensor malfunction

If any of such faults occurs, communication with controllers is interrupted and, after 10 minutes, the controllers passes to stand-alone operation with 20 °C set point.

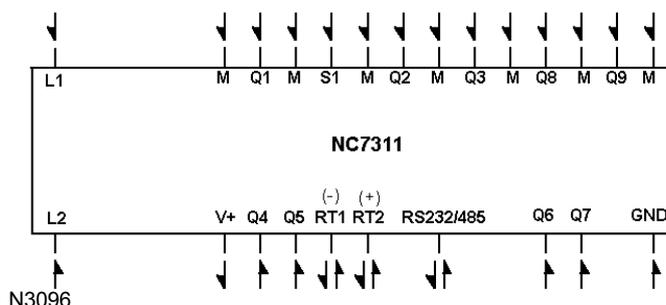
Moreover, the unit performs system test operations such as:

- malfunction of one or more controllers
- damaged communication BUS

Even when only one of the former conditions occurs, an blinking red signal appears on the Control Unit front. By pushing the TEST button it will be possible to find the specific cause of the warning signal.

It is, moreover, possible to display the status of the digital inputs (S/W enables and changeover) in order to check if the relevant connections are correct.

TERMINAL BOARD



N3096

L1		24 V- power supply
L2		
GND		Ground connection
M		
V+		V+ inputs common
S1		
Q1		Digital inputs
Q2		
Q3		
Q4		
Q5		
Q6		
Q7		
Q8		
Q9		
RT1		Polarized communication bus
RT2		
RS232/485		Serial connection for supervisor

