

REFRIGERATION / FREEZER APPLICATIONS WITH ESM-3712CN SERIES



ESM-3711CN and ESM-3712CN series are designed and manufactured for cooling and refrigeration control industry. They can be used in many applications with ON/OFF control form, defrost feature, simple and easy programming, and user friendly display. The RS-485 communication module provides 7/24 monitoring and remote control option. They can be easily programmed with Prokey modules.

The application fields consists of refrigerations, freezing, cold storage, air conditioning. ESM-3711CN and ESM-3712CN series cooling controllers offer ideal cooling solutions for food manufacturers, supermarkets, restaurants.

ESM-3712CN is ideal for freezers and refrigerators that are used storage below 0°C/32°F. This type of cooling / freezing systems require short defrost processes and can not afford to let the cabinet temperature deviate from set value for a prolonged time. ESM-3712CN, with electrical or hot gas defrost options, enables the system go through speedy defrost cycles without damaging the stored products.

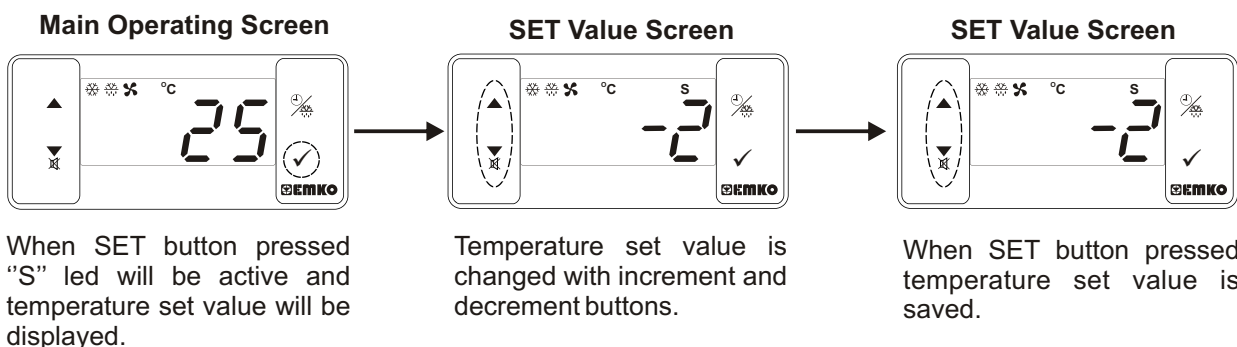
Application Example: Refrigeration / freezer control with electric defrost and adjusting defrost time.

A refrigerator that store fresh red meats needs to be controlled.

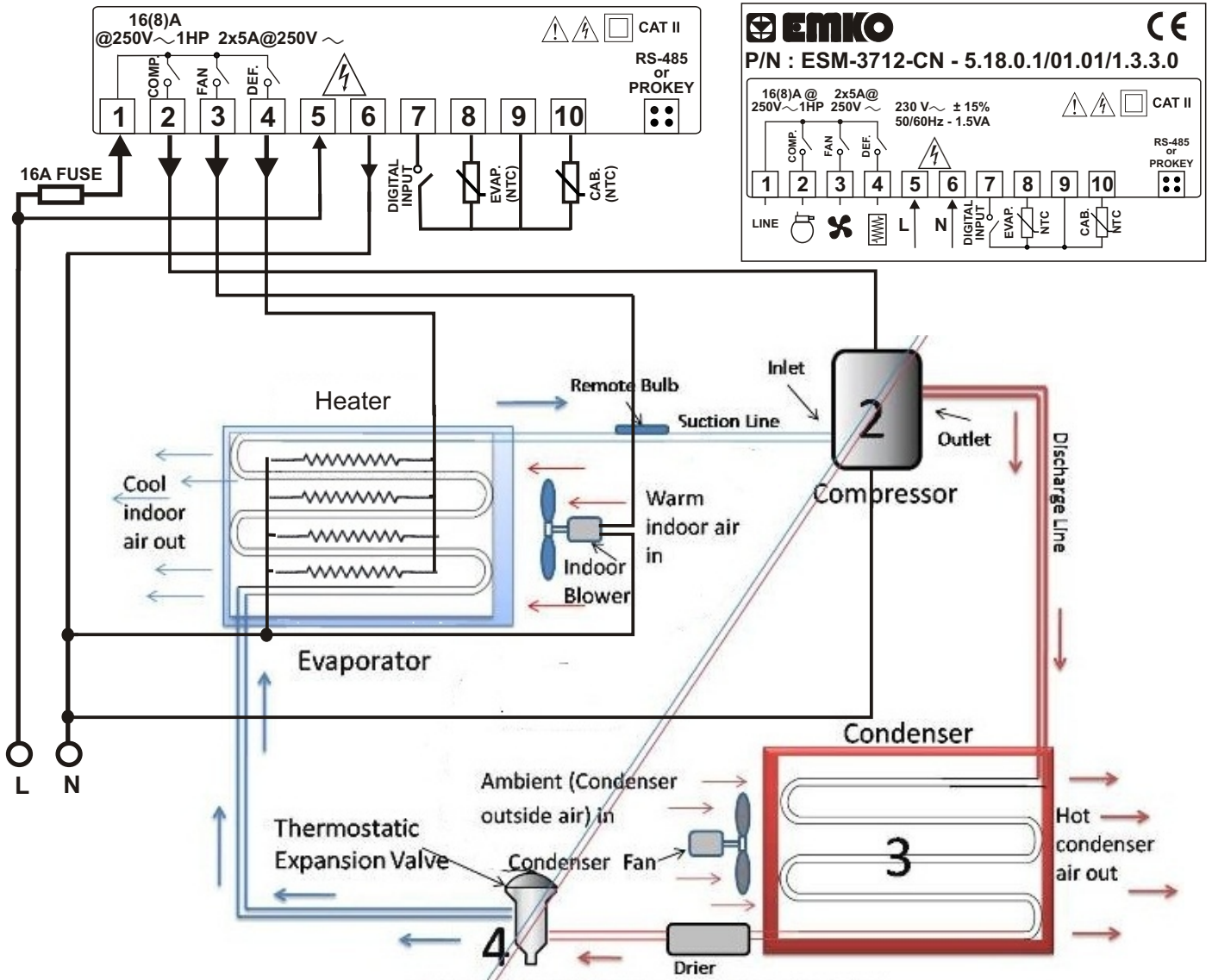
Note: Red meat begins to change color when exposed to more than 4°C/40°F for longer than 1,5 hour.

- Cabinet temperature needs to be -2°C/28°F.
- Defrost time should be adjusted and evaporator temperature should not exceed 4°C/40°F.
- Electric defrost needs to be performed.
- Freezing / refrigeration control with ESM-3712CN
- 2 Input (cabinet , evaporator) sensors NTC (-50°C..100°C)
- 3 Relay Outputs for compressor, fan, and electric/hot gas defrost
- Adjusting defrost time and evaporator temperature control

1.Setting Cabinet Temperature



2. Electrical Connections



3. Programming Mode Parameter List

dt 4 Defrost Type Selection Parameter (Default =0) MODBUS ADDRESS:40010

Electric defrost is selected.

dt 1 Defrost Time Parameter (Default =10) MODBUS ADDRESS:40009

It can be adjusted from 0 to 999 minutes. If it is selected 0 automatic or manual defrost is not performed.

dt1 is set to 18 (minutes).

Defrost process should be completed in a short period of time in an electric defrost method depending on the power of the heater. Approximate defrost time can be taken 15-22 minutes 3 times a day for this particular example.

dr 8 Defrost Repeat Cycle Parameter (Default = 1) MODBUS ADDRESS:40010

It can be adjusted from 1 to 99 hours.

drC is set to 8 (hours).

Electric defrost needs to be repeated approximately every 8 hours with systems operating at -2°C/28 °F. The frequency of defrost cycle varies for each system and has to be calculated considering the occupancy of the system.

525

Evaporator Sensor Selection Parameter (Default =1) MODBUS ADDRESS:40008

1

Evaporator sensor is enabled.

d5t

Defrost Stopping Temperature Parameter (Default = 2°C) MODBUS ADDRESS:40013

Evaporator sensor must be enabled for this option to be utilized.

dSt is set to 4°C/40°F.

During defrost operation, if the evaporator temperature reaches to the defined temperature here, then the defrost process gets terminated regardless of defrost period time entered to

dEt parameter.

4. Using Prokey for Quick Programming

To use prokey, value of the prc parameter must be '0'.

If prc=1 and ▼ button is pressed **Err** message will be observed. After 10s the device turns back to the main operation screen or you can press set button to turn back to main operation screen.

PROKEY Programming Module



Uploading from device to Prokey:

-Power on the device then put in PROKEY and press ▼ button. **uPL** message will be seen on the display. **End** Message will appear on the display upon completing the upload.

-Press any button to turn back to main operation screen.

-Remove the Prokey.

Downloading from Prokey to device:

-Turn off the device.

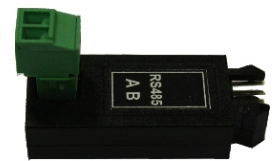
-Put in the prokey then energize the device.

-When the device is on, the parameter values in the Prokey begins downloading to the device automatically. Initially, **dDL** message will appear on the display, when downloading finishes **End** message will be observed.

5. Remote Monitoring and Data Logging with RS-485 Communication Module

Remote monitoring and data logging is required or requested by customers to ensure food safety at all time. In some countries it is required by law to ensure that the stored food never exceeds the defined lower and upper limits.

RS-485 Module



RS-485 Communication Interface

We can monitor and log data 7/24 through RS-485 communication module and with our free data logging software Protakal (downloadable from www.emkoelektronik.com.tr).

We can also use the RS-485 communication module to control the device remotely (changing cabinet and evaporator temperatures, alarm set values, manual defrost etc..)

Prc

Communication Mode Selection Parameter(Default = 0) MODBUS ADDRESS:40042

1

RS485 communication is selected.

A sample of data log recording cabinet and temperature values is given on the next page.

6. A snapshot from Protakal

