Briefing Paper

Leonardo ENERGY

Service Flats with Technology

Guy Kasier
E&D Systems
January 2008

Home of the Future

european COPPER institute

As national demographics see an ever increasing growth in the older age groups so there is a significant demand for homes that cater to this market and to people who, for whatever reason, require some form of assisted living in their home to enable them to stay there rather than being cared for away from home – privately or by the state.

This article reports on a guided tour around service flats, reviewing the modern technologies used in them to improve comfort, welfare, safety and energy efficiency. These service flats had been built in Flanders (Belgium) by a company called Serviceflats Invest, a fixed capital investment company that was set up in 1995. This company has to date completed 46 projects comprising a total of 1,063 service flats specifically designed for the elderly. As a further indication of the demand levels, there are currently 4 projects on the go with 99 flats under construction and 13 projects with 331 flats in the design stage.

Background

Serviceflats Invest aim to locate their projects close to or in the immediate vicinity of existing old people's residential or care homes. This company is generally involved in smaller development projects typically ranging from 10 to 40 flats each and averaging 23 flats per development.

Figure 1:
De Lijsterbes project in Destelbergen (Illustration source: E&D Systems)

The project (Destelbergen) shown here was visited and it consisted of 20 flats; it was opened in October 2006 and by the end of that year all the flats were occupied. There is currently a waiting list for this project alone of 180 people, further testimony that demand outstrips supply many times over due to our ageing population, a demand that demographic forecasts predict will only increase in the years to come.

All projects are variations of a standard layout of a living area of 54 m² comprising an entry hall, an almost rectangular living room with space for a sitting area and dining area, a semi-open kitchen, a small storage room, a bedroom, a bathroom and a terrace. This basic design can be adapted to include, for example, a second bedroom or a larger living room and/or terrace.

Serviceflats Invest currently find that the final end users tend to be single, elderly females.

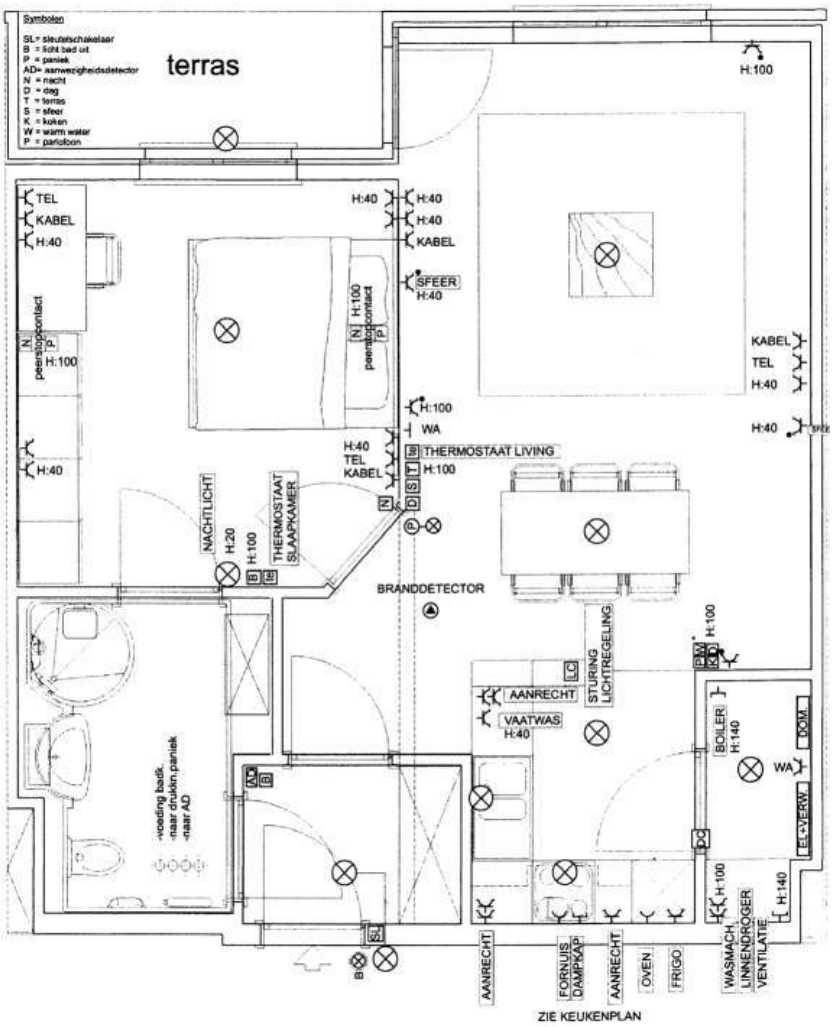

Figure 2:
Floor plan of a service flat. (Illustration source: De Maegd)

Technical facilities

Every flat is equipped with its own integrated home system as well as a mechanical ventilation unit with heat recovery, all of which will now be reviewed. Peha, a German switch producer distributing throughout Europe, manufacture the Peha House Control (PHC) system which was selected for review as a result of a detailed market study.

Starting with the ventilation unit, this has three settings – the lowest (Setting 1) is activated when the resident leaves the flat or goes to sleep; daytime ventilation (Setting 2) is for general living; when the resident is cooking or using the bathroom, the ventilation automatically goes to setting 3 to remove quickly and efficiently cooking smells or humidity from the bathroom.

Figure 3:
The ventilation unit with heat recovery (Illustration source: E&D Systems)

The integrated home system starts with the use of an entry phone, through which the resident can communicate with a visitor calling at the main entrance door. This is further supported by a video picture of that person and this is transmitted onto the flat's television. Specifically for the elderly who are deaf or hard of hearing, there is a loud doorbell and a light is activated when there is a caller.

Figure 4:
The Urmet bell with flashing light (Illustration source: E&D Systems)

Moving to climate and temperature control, electrical heating has been chosen for easy use with a storage heater in the living room and convection heaters (direct electrical heating) in the other rooms (bedroom, bathroom). Another good practical feature of this system is that, should visitors want to adjust thermostats when they are too hot or cold thereby changing the heating system's settings, they are prevented from doing so because the heating control thermostats are not found in the living areas but have been incorporated in the fuse box so storing and safeguarding the comfort and night temperature settings. However, the standard temperature settings can be readjusted in the living areas without changing the basic ones.

Personal safety being of uppermost importance, every room has an emergency call system whereby the resident can activate an alarm by pressing the unit's red emergency buttons. As well as several panic buttons being installed in various locations on the walls of the flat, the resident can also use a wireless wristband call button (a transponder).

An additional feature is the automatic alarm that can be activated when, for example, the motion detection alert of the integrated home system has not picked up any activity by the resident (eg pressing a call button or going past a motion detector) after a given period of time.

Figure 5:
The Caveo call system of the Swiss company TeleAlarm. This company has belonged to the Bosch group since 2006. (Illustration source: E&D Systems)

Figure 6:
Using the wristband transponder, the resident can activate an alarm when he (she) feels unwell. (Illustration source: E&D Systems)

The way this works is that when there is an alarm, a number of DECT telephones are activated in a neighbouring rest or care home. A two-way voice link is then established with the flat with an automatic volume control ensuring first that the resident can hear the staff throughout the entire flat (even in a closed bathroom) and second that the resident can also be heard by them. As a further safety precaution, in the event of an alarm, the integrated home system switches off all power points so shutting down the television and radio as the sound coming from them might well interfere with good communication between the resident and the staff.

Figure 7:
The resident can also activate an alarm by pressing the panic button (top button). At the bottom of this set, there is a connection for a call button that can be placed beside the bed when the resident is bedridden (Illustration source: E&D Systems)

There are various other safety and convenience features built into the standard design of these flats – for example each one is fitted with smoke detectors for fire protection and the electrical sockets, which are normally placed at a height of 15 to 20 cm from the floor, in these flats are positioned at least 50 cm from floor level. Consequently bending down is not an issue either for the elderly nor for the wheel chair bound. The switches are also positioned somewhat higher than normal, to make it even easier to read the symbols printed on each one.

Looking at how that makes the residents' lives more convenient and more comfortable, these flats make provision for greater power accessibility. In the living room, there are both sufficient power points and two TV and radio sockets placed opposite one another on the two long walls meaning that the resident can choose which side he wants to position the television and sofa. In the bedroom, there also two TV connections and twice as many of the call buttons illustrated in figure 7. As the bed has no predetermined fixture in the bedroom, the resident can position it as they see fit ,without losing any of the room’s functionality in this regard.

User-friendliness

As has been implied by everything so far written, user friendliness is key to these flats and, to reinforce it, operating switches with easy to see symbols printed on them are used. The alarm symbol is evident throughout and in the kitchen, for example, the switch symbol is a cooking pot.

Some switches have a sun or moon symbol and these are used to alternate between the day and night settings. Finally, there is also a switch whose symbol is a pair of champagne glasses and this is the mood button for the living room, for example, when watching television.

In most cases, with these switches a glowing light indicates whether or not the particular function is active.

Figure 8:
The various switches are clearly marked and a light indicates they are working correctly (Illustration source: E&D Systems)

Common areas

As might be assumed there is a large lift in the common areas and the floor buttons are quite big which is an obvious benefit for people with poor eyesight. Although there are only three floors in this building, including the ground floor, this panel unnecessarily includes 10 floor buttons whereas buttons 0, 1 and 2 would have sufficed.

As these additional buttons could be confusing, it would have been better to replace the unused buttons with a blank plate, and to place the buttons 0, 1 and 2 above one another, with the 0 at the bottom and the 2 at the top so that they corresponded exactly with the layout of the building.

Figure 9:
Big buttons are a good idea, but only have as many as there are floors and let them correspond with the building layout (Illustration source: E&D Systems)

There are various other common area features such as the building's general light sensor that activates a light at the front door of every flat so that, as soon as darkness falls, it lights up ensuring that any resident leaving or entering the flat always does so with the common area to their own front door illuminated.

The common equipment room contains a separate energy meter for each flat as well as a general fire panel, to which the smoke detectors in the various common areas are connected.

Figure 10:
Every flat has its own energy meter (Illustration source: E&D Systems)

The PEHA integrated home system

The PHC (Peha House Control) integrated home system, manufactured by the German switch producer Peha, is distributed throughout Europe. It is based on a PLC (Programmable Logic Controller), but is programmed in a completely different way. The PHC system is a central system, which means that all intelligence is housed in the master control panel. A small bus is connected from the control panel to the input modules and output modules. The system is powered by a 24V DC supply and all modules can be clicked onto DIN rails.

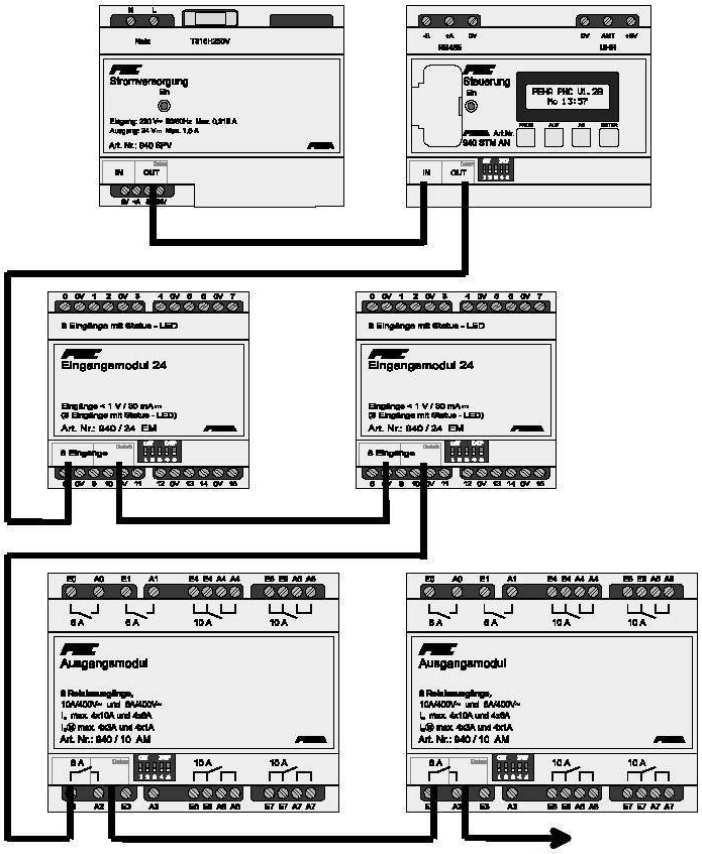

Figure 11:
Structure of the PHC system. Top left: the 24V supply. Top right: the control panel. In the middle are 2 input modules and below are 2 output modules. (Illustration source: De Maegd)

Up to sixteen contacts can be connected to the input modules. They pass on their signals to the control panel which, according to how it has been programmed, places a data telegram on the bus targetting the output of an output module. All cabling from these contacts to the input modules is in star topology, which is also the case for the consumer connections to the output of an output module.

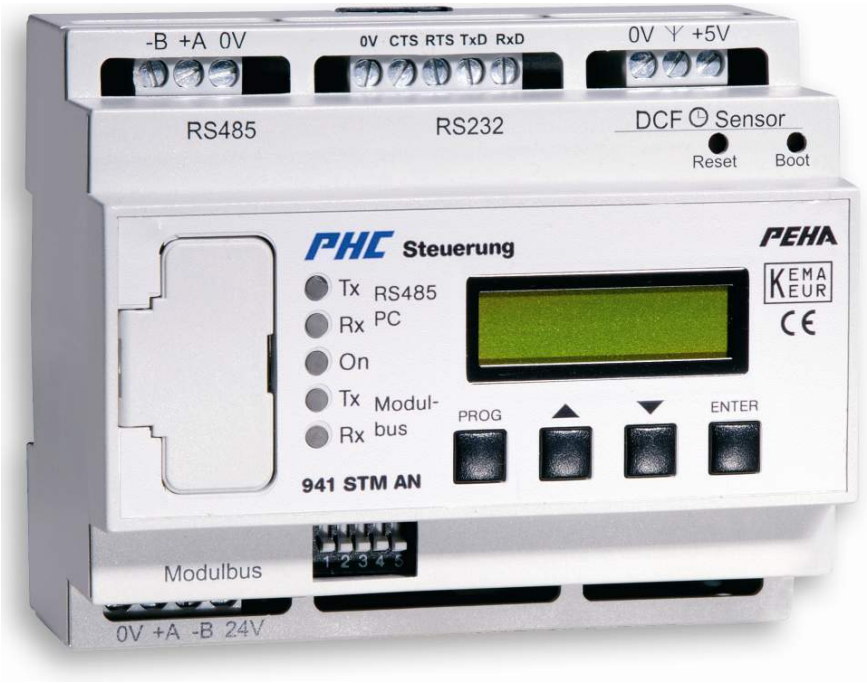

Figure 12:
The PHC control panel monitors all events. (Illustration source: Peha Belgium)

There is a USB connection on the control panel for connection to a computer and this can be programmed off-line. This connection is only needed when downloading data from the PC to the control panel is required. Built into the control panel are also 128 clocks, RS485 and RS232 connections and a connection for a DCF receiver, so that the control panel internal clock is always set to the right time.

Figure 13:
One input module and three output modules (3 x 8 x 4A) are used in the service flats. (Illustration source: Peha Belgium)

Of the many different types of output modules, the ones used in the service flats have 8 relays divided internally into two groups of 4 relays each. In this case, every relay is suitable for a maximum current of 4A. The PHC range also includes output modules that have zero-voltage contacts of 6A and 10A.

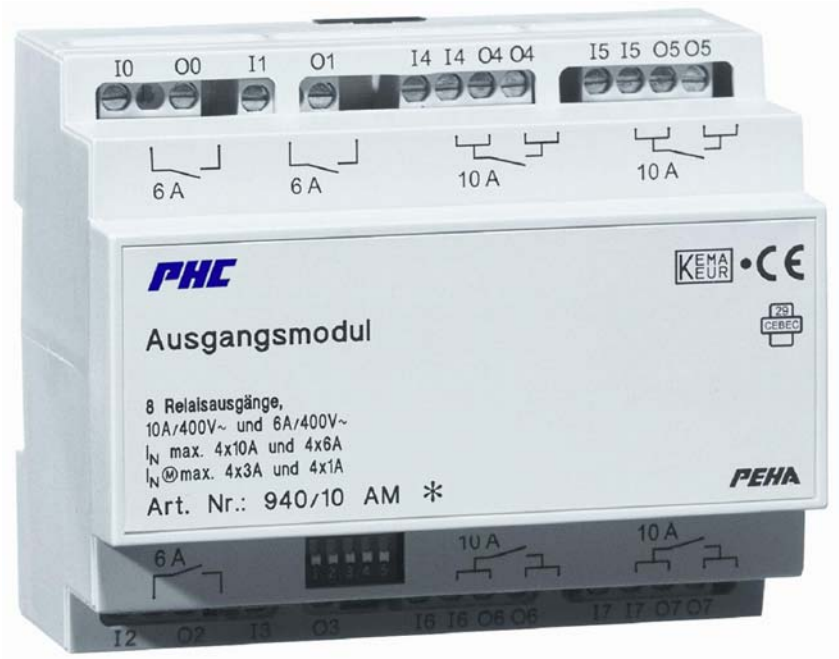

Figure 14:
PHC output module with 4 contacts of 6A and 4 contacts of 10A (Illustration source: Peha Belgium)

The address of a module is set by DIP-switches and programming is user-friendly because of specifically developed software. Different functions can be allocated to a button either depending on whether the button is pressed for a long or short time or when the button is pressed once or twice. This can be useful in certain circumstances, as long as it does not overcomplicate the system's use.

Comfort buttons

Comfort buttons are mainly used in the service flats. They all have a symbol (cooking pot, moon, sun, champagne glasses, etc). To illustrate how this works, when the 'watch TV' atmosphere is activated, it will not only create a dimmed lighting atmosphere in the living room, but the lighting in the bedroom and kitchen will also be switched off. The kitchen equipment will also be disconnected from the mains.

Pressing the "cooking pot" button once turns on the lights for the kitchen work surfaces and the appliances will also be reconnected to the mains. A second short press on the "cooking pot" button turns on the central kitchen lighting. By pressing it longer (> 1 sec) all the kitchen equipment (lighting and appliances) is switched off.

The "moon" button is forest for going to sleep, the "sun" button for normal daytime settings and the "in/out" button is situated by the front door. All these buttons relate to what the resident wishes to do giving them easy control of their home and so their lives.

Conclusion

In this article the systems relating to the individual service flats constructed by Serviceflats Invest have been discussed. Add to these legionella prevention installed in the hot water system, the flats' high insulation value and the optimum acoustic insulation between the flats, then their design can certainly be called a well thought out concept. As the demand is many times greater than the current supply, it can also be termed a desirable concept for the elderly who want to maintain their independent living with losing the reassurance that help and support is close at hand were it to be needed.

Links

Peha Germany: http://www.peha.de/
Peha Netherlands: http://www.peha-elektro.nl/
Peha Belgium: http://www.peha.be
PHC software manual German: http://www.peha.de/DBFiles/PHC-Handbuch D.pdf
PHC software manual French: http://www.peha.be/nl/download.htm
PHC software manual Dutch: http://www.peha.be/nl/download.htm
PHC software German: http://www.peha.de/PhcDownloads.aspx
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