PD CEN/TR 12098-8:2016

BSI Standards Publication

Controls for heating systems

Part 8: Accompanying TR prEN 12098-5:2015 — Modules M3-5,6,7,8

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National foreword

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European foreword

This document (CEN/TR 12098-8:2016) has been prepared by Technical Committee CEN/TC 247 “Building Automation, Controls and Building Management”, the secretariat of which is held by SNV.

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This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This document is currently divided into the following parts:

— Controls for heating systems — Part 1: Control equipment for hot water heating systems;

— Controls for heating systems — Part 3: Control equipment for electrical heating systems;

— Controls for heating systems — Part 5: Start-stop schedulers for heating systems;

— Controls for heating systems — Part 6: Accompanying TR prEN 12098-1:2015 Modules M3-5,6,7,8 [Technical Report; currently at Voting stage];

— Controls for heating systems — Part 7: Accompanying TR prEN 12098-3:2015 Modules M3-5,6,7,8 [Technical Report; currently at Voting stage];

— Controls for heating systems — Part 8: Accompanying TR prEN 12098-5:2015 Modules M3-5,6,7,8 [the present Technical Report; currently at Voting stage].

Introduction

The CENSE project, the discussion between CEN and the Concerted action highlighted the high page count of the entire package due to a lot of “textbook” information. This resulted in flooding and confusing the normative text.

A huge amount of informative contents shall indeed be recorded and available for users to properly understand, apply and nationally adapt the EPB standards.

The detailed technical rules CEN/TS 16629 ask for a clear separation between normative and informative contents:

— to avoid flooding and confusing the actual normative part with informative content;

— to reduce the page count of the actual standard;

— to facilitate understanding of the package.

Therefore each EPB standard shall be accompanied by an informative technical report, like this one, where all informative content is collected.

Table 1 shows the relative position of this TR within the EPB set of standards.

Table 1 — Relative positon of this TR within the EN EPB package of standards

	Over-arching	Building (as such)	Technical Building System									
Submodule	**Descriptions**	**Descriptions**	**Descriptions**	**Heating**	**Cooling**	**Ventilation**	**Humidification**	**Dehumidification**	**Domestic Hot waters**	**Lighting**	**Building automation and control**	**PV, wind, ..**
sub 1	**M1**	**M2**		**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**
1	General	General	General									
2	Common terms and definitions; symbols, units and subscripts	Building Energy Needs	Needs									
3	Application	(Free) Indoor Conditions without Systems	Maximum Load and Power									
4	Ways to Express Energy Performance	Ways to Express Energy Performance	Ways to Express Energy Performance									
5	Building Functions and Building Boundaries	Heat Transfer by Transmission	Emission and control	x								
6	Building Occupancy and Operating Conditions	Heat Transfer by Infiltration and Ventilation	Distribution and control	x								
7	Aggregation of Energy Services and Energy Carriers	Internal Heat Gains	Storage and control	x								
8	Building Partitioning	Solar Heat Gains	Generation and control	x								
9	Calculated	Building	Load									

	Over-arching	**Building (as such)**	**Technical Building System**									
Submodule	**Descriptions**	**Descriptions**	**Descriptions**	**Heating**	**Cooling**	**Ventilation**	**Humidification**	**Dehumidification**	**Domestic Hot waters**	**Lighting**	**Building automation and control**	**PV, wind, ..**
sub 1	**M1**	**M2**		**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**
	Energy Performance	Dynamics (thermal mass)	dispatching and operating conditions									
10	Measured Energy Performance	Measured Energy Performance	Measured Energy Performance									
11	Inspection	Inspection	Inspection									
12	Ways to Express Indoor Comfort		BMS									
13	External Environment Conditions											
14	Economic Calculation											

1 Scope

This Technical Report refers to prEN 12098-5:2015, *Controls for heating systems — Part 5: Start-stop schedulers for heating systems — Modules M3-5,6,7,8*.

It contains information to support the correct understanding, use and national adaption of prEN 12098-5:2015.

This Technical Report does not contain any normative provision.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

prEN 12098-1:2015, *Controls for heating systems — Part 1: Control equipment for hot water heating systems — Modules M3-5,6,7,8*

prEN 12098-5:2015, *Controls for heating systems — Part 5: Start-stop schedulers for heating systems — Modules M3-5,6,7,8*

EN 15316–2-3, *Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies - Part 2-3: Space heating distribution systems*

prEN 15500-1:2015, *Control for heating, ventilating and air-conditioning applications — Part 1: Electronic individual zone control equipment — Modules M3-5,M4-5,M5-5*

prEN ISO 52000-1:2015, *Energy performance of buildings — Overarching EPB assessment — Part 1: General framework and procedures*

EN ISO 7345:1995, *Thermal insulation - Physical quantities and definitions (ISO 7345:1987)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 7345:1995, prEN ISO 52000-1:2015 and prEN 12098-5:2015 (the accompanied EPB standard) apply.

4 Symbols and abbreviations

4.1 Symbols

For the purposes of this European Standard, the symbols given in prEN ISO 52000-1:2015 and prEN 12098-5:2015 (the accompanied EPB standard)apply.

4.2 Abbreviations

Abbreviation	Term
FSS	fixed start-stop scheduling

5 Control heating systems, main design rules

5.1 Start-stop scheduling of heating systems

Energy performance of heating systems involves suited BAC functions. Among them, switching on-off energy services related to predictable use of rooms, zones or buildings is the basic, simplest and more effectiveness function.

Clock scheduling intermittences is completed with derogation functions for override programmed periods and with timer function for single periods. These added functions started manually or automatically allow satisfying unexpected needs.

Properly energy managed buildings involve a large number of scheduled switching, punctuating running of each energy equipment, in all parts of heating systems and other technical services for satisfy comfort needs and minimize energy consumption. This lot of individually programmed clocks distributed in buildings imply to link schedulers on a BAC or management system by the way of a digital network.

For efficiently control heating:

— The heating system of the building shall be divided into spaces or zones with uniform conditions of use (see prEN ISO 52000-1:2015, D.2, D.3),

— BAC heating control system shall have multiple clock scheduling adapted to these conditions of use,

Special attention shall be done to keep watch for update schedulers to real conditions of use, during exploitation.

5.2 Partitioning control heating zones in buildings

For efficiently control heating, the flow temperature level of generation and distribution system shall satisfy heat demand. For this purpose, flow temperature is scheduled for intermittent heating in relation with conditions of use. For efficiency of control systems:

— The heating system distribution building shall be partitioned into zones or spaces with uniform conditions of use,

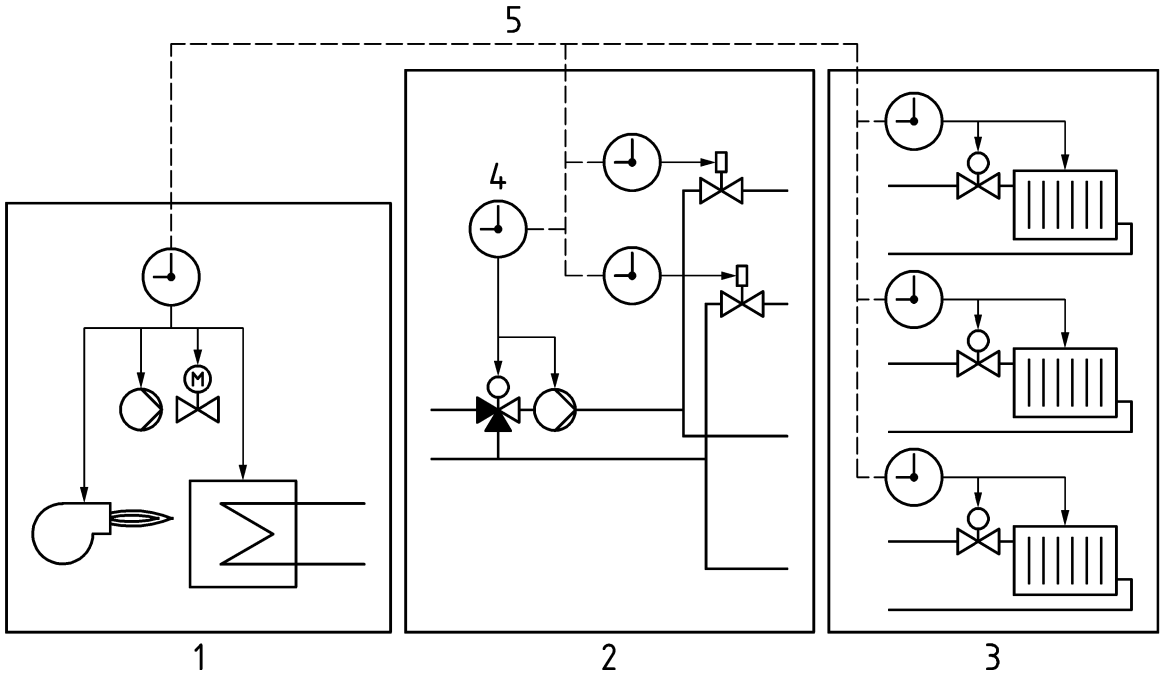
Partitioning of heating systems described on prEN ISO 52000-1:2015, Clause 9, D.2, D.3, may usefully be applied for the design of heating systems.

— The zone partitioning of the building shall take account thermal characteristics of emitters (all identical emitters) of a zone,

— BAC heating control system shall have multiple controls and intermittent scheduling adapted to zones or spaces conditions of use. Special attention shall be done to keep watch for update set points and schedulers to real conditions of use and needs, during exploitation.

For satisfy these indications; size of zones shall be limited.

NOTE An indication is given in EN 15316–2–3, A2: limit zones area to 1 000 m^2 (one pump for a maximum of 1 000 m^2).



Key

1 generation
2 distribution
3 emission
4 start-stop scheduler
5 digital network

Figure 1 — Example of scheduling parts of a heating systems. Network allow to synchronize and manage schedulers

6 Start-stop heating functions and they impact

6.1 General

Scheduling heating by standalone start-stop devices or functions integrated in controllers or BAC systems could be applied to all parts of heating systems (see Figure 1).

prEN 12098-1:2015 specifies functionalities and tests of FSS devices and function.

6.2 FSS generation impact

Daily or weekly switch heat generation control to normal - frost protection (or reduced) mode, in relation with heating needs. Yearly switch off heating over heating season.

Switching off heating generation consist to switch off generators pumps, close tree ways valve and/or partioning valves on the distribution.

NOTE Fixed start-stop scheduler applied to outside temperature control (OTC), schedules these 3 modes: normal – reduced - boost during 3 fixed programmed periods, for 3 expected temperature levels. Better energy efficiency of heating control system is provided by optimum start-stop scheduler (OSS). Action of OSS consist to adapt automatically start time and duration of the boost period, in relation with outside temperature and/or room temperature. Room temperature measurement allows to automatically anticipating switching off before programmed reducing.

Table 2 — Identifiers for generation start-stop (intermittent) control

Start-stop heat generator for combustion and district heating	HEAT_GEN_FSS
	The goal consists to adapt closely heating operation to occupancy
0	Manual control (no programming)
1	Programmed switching of generators, pumps and other auxiliaries

6.3 Distribution

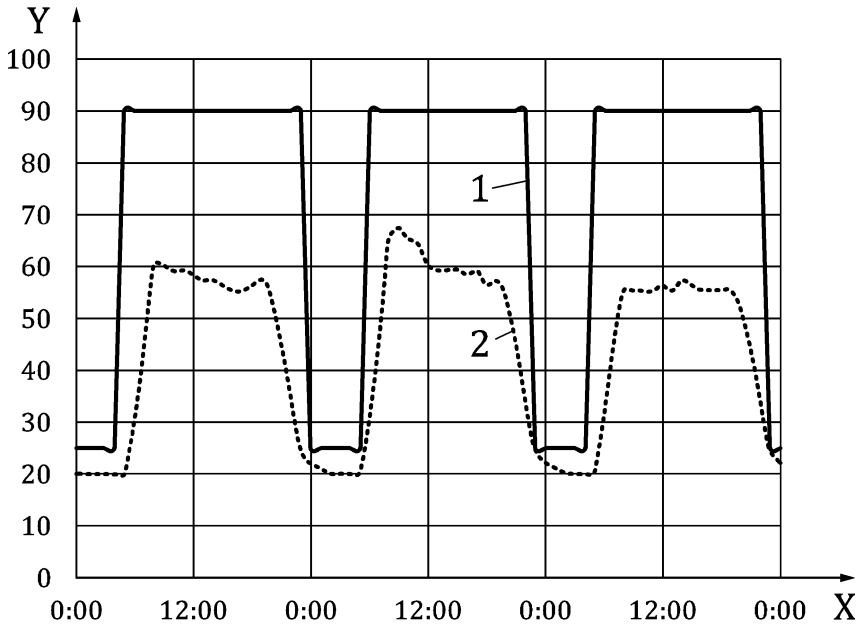
Daily, weekly or yearly switch flow of each zone will be switch from normal to off mode in relation with his condition of use. Switching off heating zone consist to switch off pump, close tree ways valve and/or partitioning valves on the distribution.

Start-stop functions applied to the distribution parts or zones are identical to generation.

Switch on zones distribution periods are reduced with respect to switch on generation periods (Figure 2).

Table 3 — Identifiers for distribution start-stop (intermittent) control

Start-stop distribution network hot water temperature	HEAT_DISTR_FSS
	The goal consists to adapt closely heating operation to occupancy
0	Manual control (no programming)
1	Programmed switching of pumps, valves and other auxiliaries



Key

Y temperature

X time of day

1 generation flow temperature

2 distribution flow temperature

Figure 2 — Scheduling the distribution temperature is on the frame of the generation temperature

6.4 Emission

Individual electronic controllers of heated spaces or emitters are normally equipped with programmable clock (see prEN 15500-1:2015).

Scheduling programs of heating system parts (Figure 2) may be automatically cascaded in relation with energy demand:

— Switch heating of a zone taking account scheduling of spaces or emitters of the zone,

— Switch the generators taking account demand of zones.

Such functions imply a data communication network linking multipart schedulers.

NOTE prEN 12098–5:2015 specifies tariff compensation function for adapt heating switching to variable tariff energy price, like electricity (see prEN 12098–5:2015, 6.3.5).

Bibliography

[1] prEN 15316-1:2015, *Energy performance of buildings - Method for calculation of system energy requirements and system efficiencies - Part 1: General and Energy performance expression, Module M3-1, M3-4, M3-9, M8-1, M8-4*

[2] prEN 15316-3:2015, *Energy performance of buildings - Method for calculation of system energy requirements and system efficiencies - Part 3: Space distribution systems (DHW, heating and cooling), Module M3-6, M4-6, M8-6*

[3] prEN 12098-3:2015, *Energy Performance of Buildings - Controls for heating systems - Part 3: Control equipment for electrical heating systems - Modules M3-5,6,7,8*

[4] CEN/TS 16629, *Energy Performance of Buildings - Detailed Technical Rules for the set of EPB-standards*

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