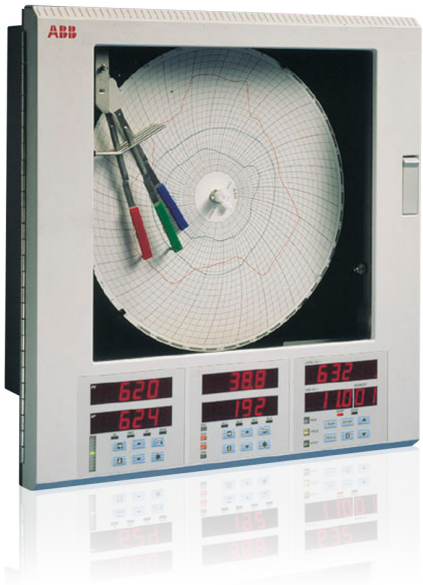
Data sheet DS/C1960–EN Rev. E

C1960
Multi-recipe profile recorder / controller

C1960 – for universal ramp / soak applications



Ideal for autoclave / retort control
— suitable for cooking many products

Designed for the control of tire presses and dyebeck process
— adjustment of the soak time is a fingertip operation

Easy selections of multi-segment profiles
— 99 segments and 10 profiles to suit the most complex process

Dedicated operator display of segment status
— clearly shows current segment running, cook temperature and time

Automatic operation with manual override
— dedicated switches, warning lights and status LEDs
— intelligent power failure recovery

Guaranteed ramp/soak with individual hysteresis
— two hysteresis (deadband) settings per program

Faster start up with self-seeking set point
— to save you process time

Easy-clean NEMA 4X/IP66 enclosure
— hosedown and harsh applications

C1960
Multi-recipe profile recorder / controller

Introduction

The C1960 multi-recipe profile recorder/controller has advanced ramp / soak profiling designed specifically for the food processing, canning, tire and dyebeck industries.

The range of products available gives you the ability to use the C1960 not only for control but to also record other process variables.

Specialized features include **guaranteed ramp/soak**, a **dedicated operator display** and time events to assign relays/outputs to individual or multiple segments.

The C1960 is a totally self-contained unit suitable for panel-, wall- or pipe-mounting with **NEMA4X/IP66** enclosure protection as standard.

The C1960 is available in four versions:

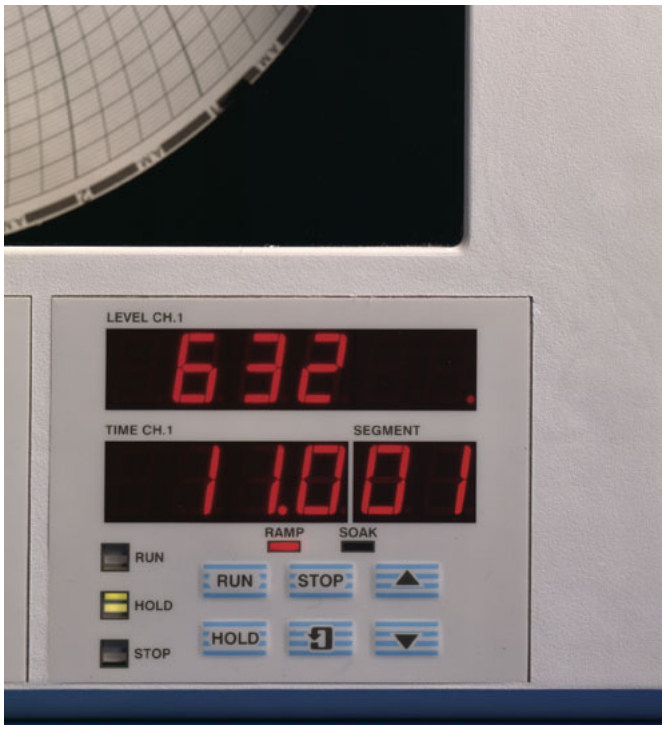
C1961	One controller and one recording pen with control and ramp/soak faceplates
C1962	One controller and two recording pens with control, record and ramp/soak faceplates
C1963	One controller and three recording pens with control, record and ramp/soak faceplates
C1964	Two controllers and two recording pens with two control and one ramp/soak faceplates for Channel 1

Other circular chart recorders also available from ABB include:

C1900	Recorder/Controllers
C1950	Pasteurizer Recorder/Controller

Application areas include:

- Autoclaves
- Retort control
- Pneumatic upgrades
- Tire presses
- Dyebeck
- Smokehouses
- Kilns



Ramp / soak profiles – easy to compile

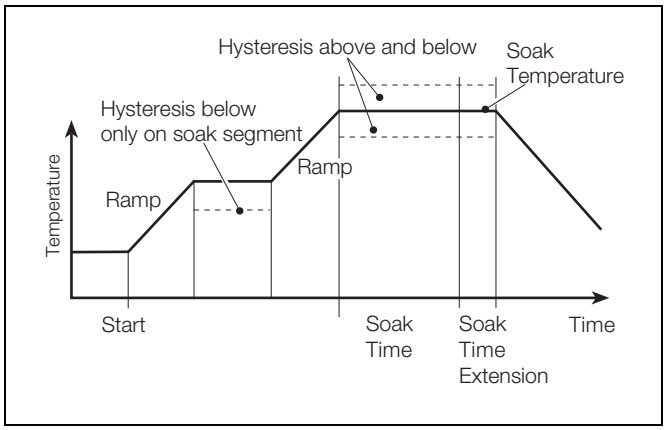
Profiles are programmed via the front panel. Time scales can be set in hours or minutes and ramp segments can be configured using segment time (hrs / min) or ramp rate (°F or °C, min or hrs)

The C1960 can store up to 20 programs, 10 per control channel, as standard

Guaranteed ramp / soak

This feature has been designed to make operation as flexible as possible. There are two hysteresis settings; one applicable to soak segments, the other to ramp segments.

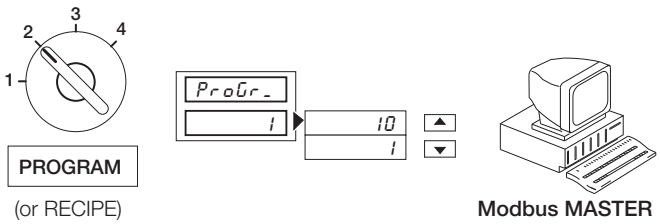
The guaranteed hysteresis value can be applied to individual segments above set point, below set point, both or none. This gives the user the option to HOLD a cycle only if it falls outside a preset value, i.e. where regulations state a minimum (but no maximum) temperature or where the ramping segment is allowed to reach temperature as quickly as possible, so saving process time and money.



Guaranteed ramp / soak

Product / profile selection

Recipes can be selected either via the front panel, multi-position selector switches connected to the C1960's digital inputs or by a MODBUS Master, allowing the selection of a profile for the product being processed in the most convenient format.

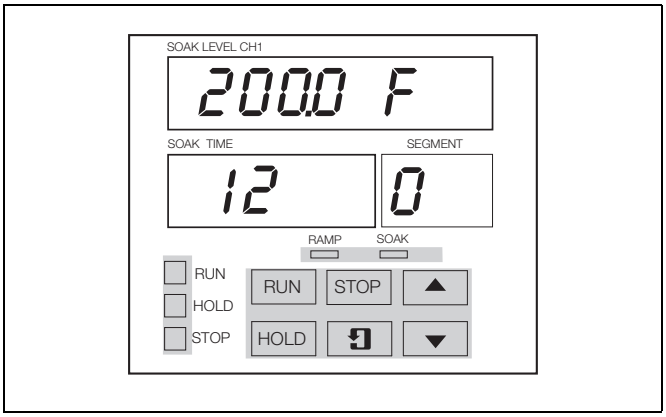


Dedicated ramp / soak display

Status LEDs give a clear indication of the current state of the profile, showing whether a ramp or soak is being performed. A dedicated display indicates the segment which is currently running, together with the standard controller display which shows the current set point and actual process value.

The highest cook temperature and time is also indicated on the dedicated display on the retort control version. The segment temperature and time is displayed on the advanced control version. Dependent upon the process, these values can be increased or decreased via the front switches or digital inputs.

The profile can be started, stopped or put on hold via the dedicated switches on the front face or by external digital input.



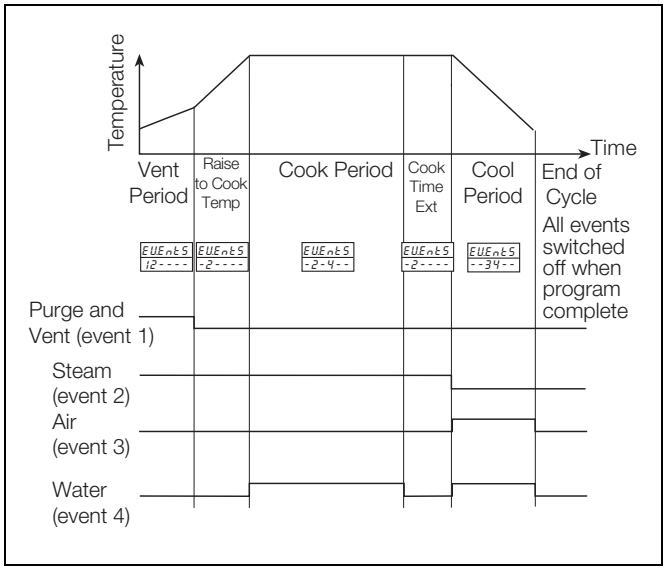
Programmable power failure recovery

The power failure recovery function allows pre-selection of the restart position within the profile. If the power is restored within the programmable power down time, the C1960 **resumes** from the point in the profile that the power failed. If, however, the power down time has expired, the C1960 holds the program and can **restart** in three different ways:

1. the current program from the beginning;
2. the current segment;
3. or the segment from the position at the time of failure.

Event states

The C1960 has 6 common events that can be allocated to relay or digital outputs and each segment can be configured to enable any event. This enables an event to be triggered from multiple segments, or for one segment to trigger multiple events, providing a flexible and powerful control strategy.



Event States

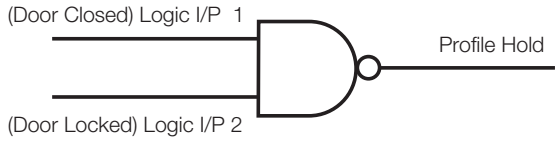
Self-seeking set point

To reduce process time the C1960 has a self-seeking set point setting which enables a profile to start from the current process temperature. This eliminates the wasted time normally taken to drive the process temperature down to the actual start temperature for the profile.

Sequencing and logic control

The C1960 offers comprehensive sequencing to complement its advanced analog control features with eight logic equations and up to seven elements per equation. These eight logic equations, when combined with real-time alarms, program and segment events make the C1960 a powerful sequence recorder/controller.

For safety purposes, logic equations can be included as part of the profile control, disabling the ability to run unless all safety interlocks are in place.



Process alarms

The C1960 has four internal process alarm inputs per channel. These can be soft-wired to control strategies, logic equations and output relays.

Each alarm can have a separate hysteresis value, programmable in engineering units and/or time. Alarms can also be enabled or disabled via digital inputs.

Ideal replacement for pneumatic products

Profile cycle can be controlled automatically or, at the touch of a button, switched to manual control. Dedicated switches to increase or decrease cook/soak times give manual control of the process when required.

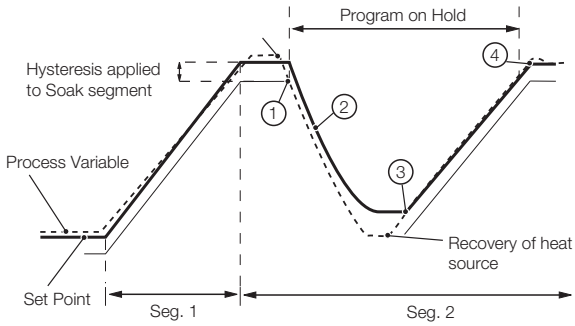
All front panel switches can be replicated on an external panel using digital signals.

Retort function

The Retort function ensures safe operation of retort vessels under fault conditions. If the heat source fails during a soak segment, the process variable inevitably falls. When the process variable falls below the holdback hysteresis value the program is put on HOLD (as for normal operation). The set point then follows the process variable as it continues to fall (retort hold).

Set point = Process Variable + Hysteresis Value

Upon recovery of the heat source, the process is controlled at the new set point value. When the process variable reaches the set point it is then ramped back to the initial soak value at the rate of the previous ramp (retort ramp). When the soak level is reached the program is released from its hold state and the segment is either completed or repeated from the beginning, depending on the retort mode selected.



1. The program is put on HOLD when the process variable falls below the holdback hysteresis
2. The set point follows the process variable as it continues to fall. (SP = PV + hysteresis)
   The set point tracks the lowest value of the process variable
3. When the process variable reaches the set point, the set point is ramped back to the soak level at the rate of the previous ramp
4. Upon reaching the soak level, 'HOLD' is released and the segment is completed or repeated

Retort function

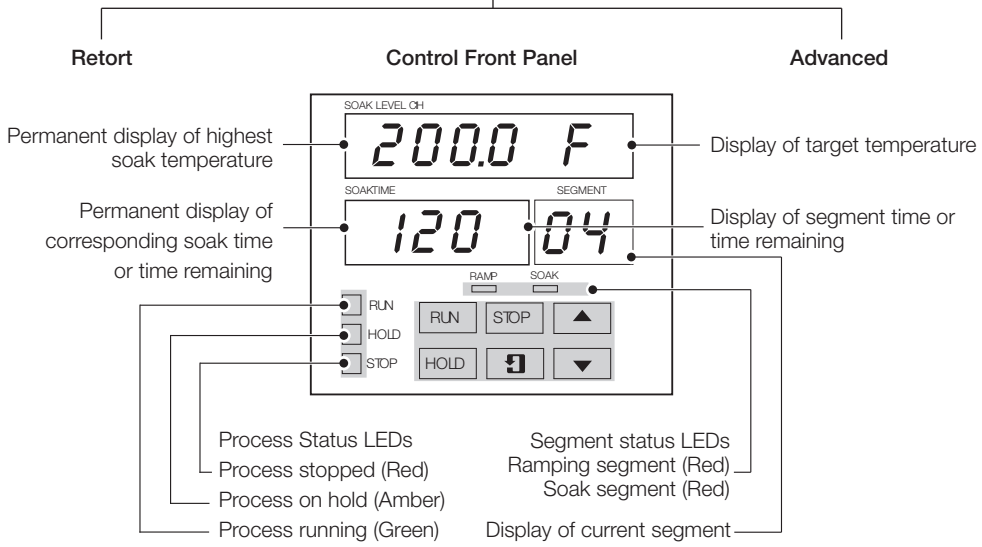
Retort control 'K' software

Operation

The retort control software has been designed for control of basic cooking functions. The dedicated display on the custom face indicates the 'Cook' time and temperature. This is assumed to be the highest 'Soak' level in the profile. These are normally simple profiles, having only a 'Ramp' and 'Soak' segment, then 'Off'.

The retort control software, through dedicated front panel keys, enables continuous adjustment of the 'Cook' temperature and time at any point during the profile, to suit the product being processed.

Advanced control 'L' software



Dedicated key to start profile	RUN	Dedicated key to start profile
Dedicated key to set operator hold	HOLD	Dedicated key to set operator hold
Dedicated key to stop/reset profile	STOP	Dedicated key to stop/reset profile
Scroll key selects between adjustment of soak time and soak level		Inactive with this software
Increment soak time/soak level	▲	Increment soak time
Decrement soak time/soak level	▼	Decrement soak time

Ordering information

PART 1 – General details

C1960 multi-recipe profile recorder / controller	19XX	X	X	X	X	X	X	X	X	X	X	X	XXX
Pens/Controllers *													
1 control unit, 1 pen (red)	61												
1 control unit, 2 pens (red & green)	62												
1 control unit, 3 pens (red, green, blue)	63												
2 control units, 2 pens (red & green)	64												
Chart type													
Taylor (ER/C) charts		R											
KPC 105, Kent PX and Kent PXR type charts		S											
Chessell brand charts		D											
Electrical code													
Standard			A										
CSA approved			B										
Option module													
None				0									
Additional I/O modules				A									
Software options													
Retort control					K								
Advanced control					L								
Door lock													
No lock						1							
Lock fitted						2							
Power supply													
115V AC							1						
230V AC							2						
115V AC with on/off switch							4						
230V AC with on/off switch							5						
PART 2 ** Additional I/O modules					**Module Type**								
Module position 2 / channel 2 input* (selection for C1961 only)					0 1 2								
Module position 3 / channel 3 input* (selection for C1961, C1962 and C1964)					0 1 2								
Module position 4 / channel 4 input*					0 1 2 3 4 5 6								
Module position 5					0 3 4 5								
Module position 6					0 4 5 8								
Programming / special features **													
Configured to factory standard													STD
Configured to customer requirements (customer to complete and supply C1960 custom configuration sheet – INF08/031)													CUS
Special features													SXX
Engineered configuration (customer to supply configuration details required)													ENG

* Each pen fitted has an associated standard input/output module comprising analog input, analog output, relay, transmitter power supply and 2 digital inputs.

** Additional input/output modules may be fitted in the unused module positions as required.
These additional modules must be specified in **PART 2** of the ordering information.

Key to module types

* 0	No module fitted / pen input channel
1	Standard input / output
2	Analog input + relay
3	4 relays
4	8 digital inputs
5	8 digital outputs
6	True-time event pen – violet (event pen is additional to standard pens)
8	Modbus RS485 communications

For full technical specifications refer to Data Sheets DS/C1900R–EN & DS/C1900RC–EN.

Acknowledgements and trademarks