BATCH CONTROLLER

WITH MULTIPLE PRESET VALUES AND
FULL PROCESS MONITORING

FLUIDWELL
Accurate Liquid Management

Features

- Designed for batching / filling of liquids.
- Four or fourteen preset values
- Self learning overrun correction.
- Monitor functions for: flow rate, total quantity, number of batches, leakage, process-time, batch-size, power-down.
- Automatic restart function for repeatet batch control.
- Manual flush-control.
- Record of total quantity batched with alarm set-point.
- Record of number of batches executed with alarm set-point.
- Calibration procedure for the flowmeter.
- Alphanumeric display text in English, French, German or Dutch.
- Complete data back-up in the event of sudden power failure.
- User-friendly operation with clear menu structure.
- Two-stage control.
- Flameproof enclosure ATEX: II 2 G EEx d IIB T5.

Control and alarm output

- Three isolated electro-mechanical make-and-break relays or passive DC solid-state relays.
- One isolated 4 - 20mA output (option).

Signal input

Flow
- Reed-switch.
- NAMUR.
- NPN/PNP pulse.

Status Inputs
- Remote control: start / pause / stop / alarm.
- Remote control: preset selection 1-4 or 1-14.

Applications

- Batching of liquids where the batch size changes frequently. Basic models: F030, F130, F131, 310 or more advance model: 326.

General information

Introduction

The Batch Controller 320 offers comprehensive functionality to control and monitor your batching process perfectly. Four or fourteen different preset-values can be entered. These are easily selected with the arrow shaped keys or via the external inputs by a switch or PLC, allowing you to control the unit remotely. All functions are software controlled and offer broad application areas and user friendly control.

Screen display

A large LCD display of 4 lines x 20 positions is integrated in the control panel. During the process several parameters are shown at the same time; the process can be checked at a single glance. The clear display text is available in four languages.

Batch size

Four or fourteen different batch sizes can easily be pre-programmed. Consequently, presets can be changed by single button operation or even with remote control; program errors are eliminated.

Overrun correction

The Fluidwell 320 measures the overrun quantity at the end of every batch. With the automatic overrun correction procedure, the batch is corrected automatically; every run is executed with the highest accuracy.

Flow rate

During the process, the instantaneous flow rate is computed and can be read from the display.

Retained data

The total quantity of batched liquid and the number of batches are recorded. Under power failure conditions the actual process information is stored in the memory. This allows the process to be resumed from where it was interrupted.

Relays

Two relays are available for the controlling of valves and / or a pump. With the two-stage control, the batch can be undertaken in one or two stages. For flushing / deaerating, a function is available to flexibly control the relays.

The alarm relay is switched if an alarm is tripped. The LED's will flash and an audible alarm be initiated.

No-flow monitor

Following the START command, the flowmeter generates a signal. If this fails to come within the programmed time, an alarm is triggered and the batch interrupted.

Flow rate monitor

During process, the actual flow rate is monitored continuously. Capacity problems and heavy pollution are rapidly detected.

Leakage monitor

A signal generated by the flowmeter without a batch being started, is an indication of a leak. Therefore a defect within the valve or in the piping is detected.

Quantity / dispense monitor

The maximum quantity to be batched to prevent overfilling as well as the number of repeat batches that can be made can be limited.
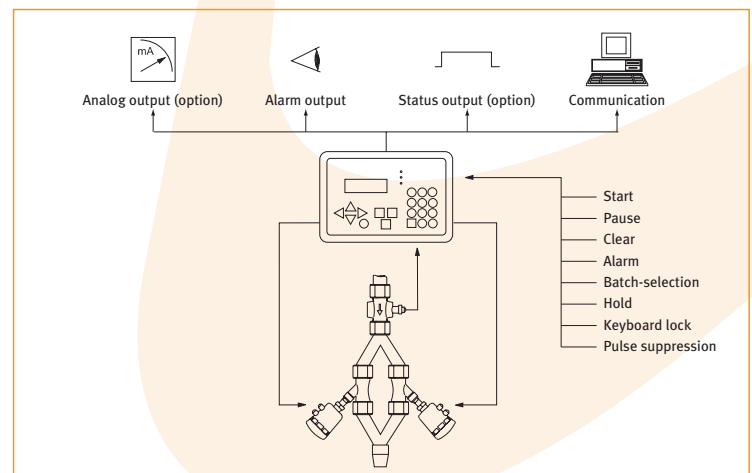
Communication

A serial interface (option) allows full computer control of the 320. The communication protocol used is Modbus ASCII/RTU.

Casings

Several enclosures are available to mount the batch controller in the most suitable way: with a wall-assembly or panel-mount casing or a EExd enclosure with a large LCD and keyboard.

Overview application 320
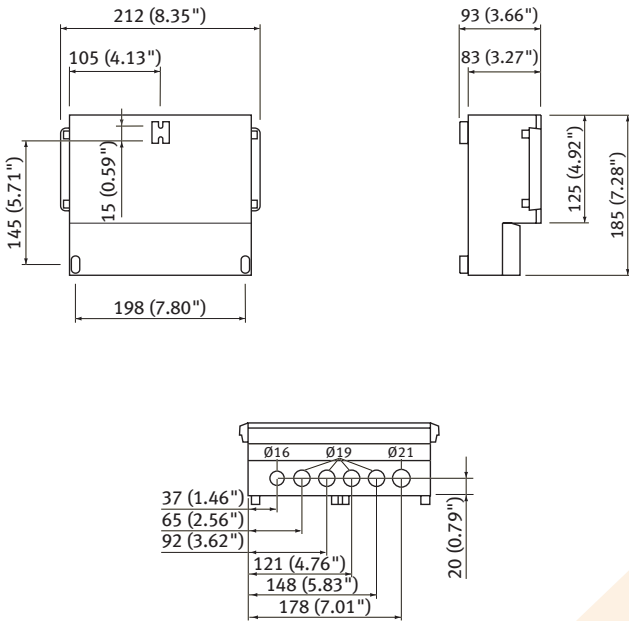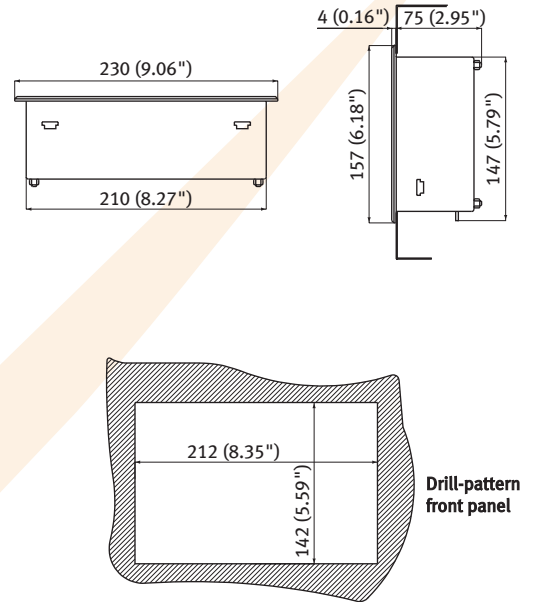
Dimensions enclosures

Enclosure HK (STANDARD)
Polystyrol wall mount casing IP50

dimensions: mm (inch)

Enclosure HM
Panel-mount casing IP65

dimensions: mm (inch)

Drill-pattern
front panel

Enclosure HL
Polystyrol wall mount casing IP65 (frontdoor)

dimensions: mm (inch)
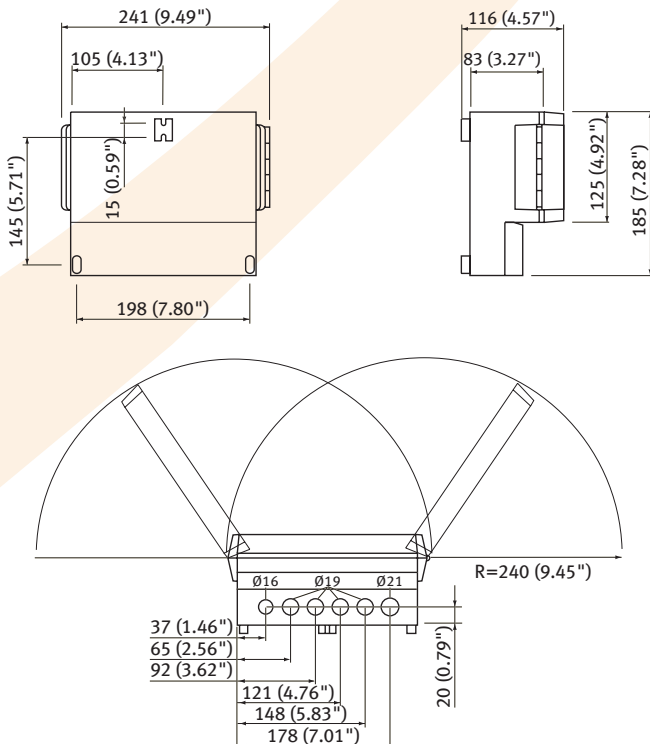
Enclosure HX
Compact explosion proof EExd casing IP54

dimensions: mm (inch)

3
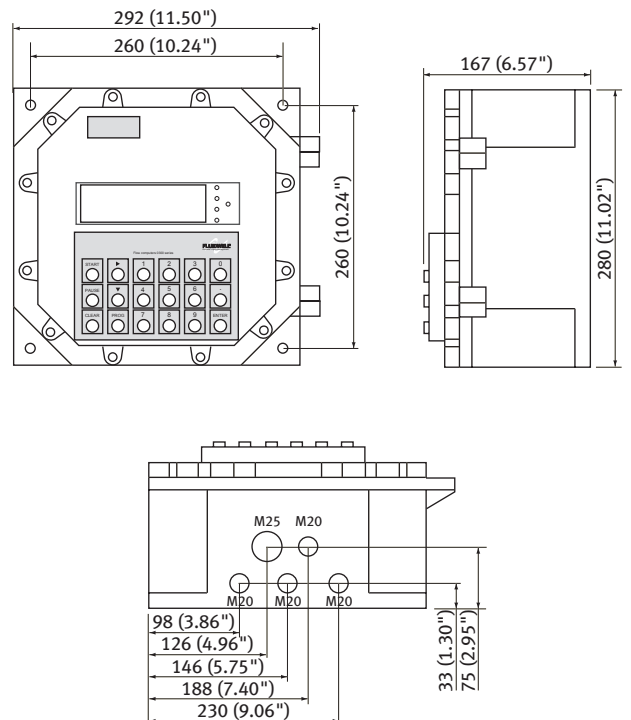
Terminal connections wall mount enclosures types: HK - HL - HX

	GND ⊓ +	GND ⊓ +	OPTION A	OPTION B	DC ↓↑		EXTERNAL CONTROL			O U T P U T S						⏚ ⚡ ⚡
	SENS. 1	SENS. 2														
	1 2 3	4 5 6	7 8 9	10 11 12	13	14	15 16 17	18 19 20 21	22 23 24 25	26 27 28 29 30						31 32 33
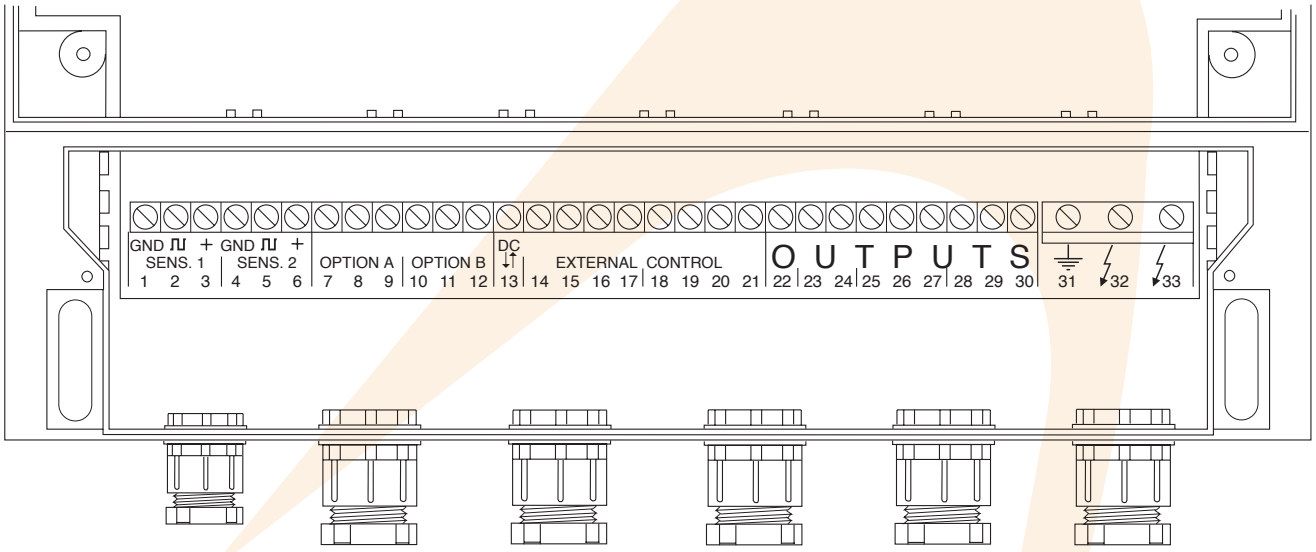
Terminal connections Panel mount enclosure type: HM

FUSE

33 32 31	O U T P U T S	EXTERNAL CONTROL	DC ↑↓	OPTION B	OPTION A	+ ⊓ GND	+ ⊓ GND
	30 29 28 27 26 25 24 23 22	21 20 19 18 17 16 15 14	13	12 11 10	9 8 7	SENS. 2	SENS. 1
						6 5 4	3 2 1

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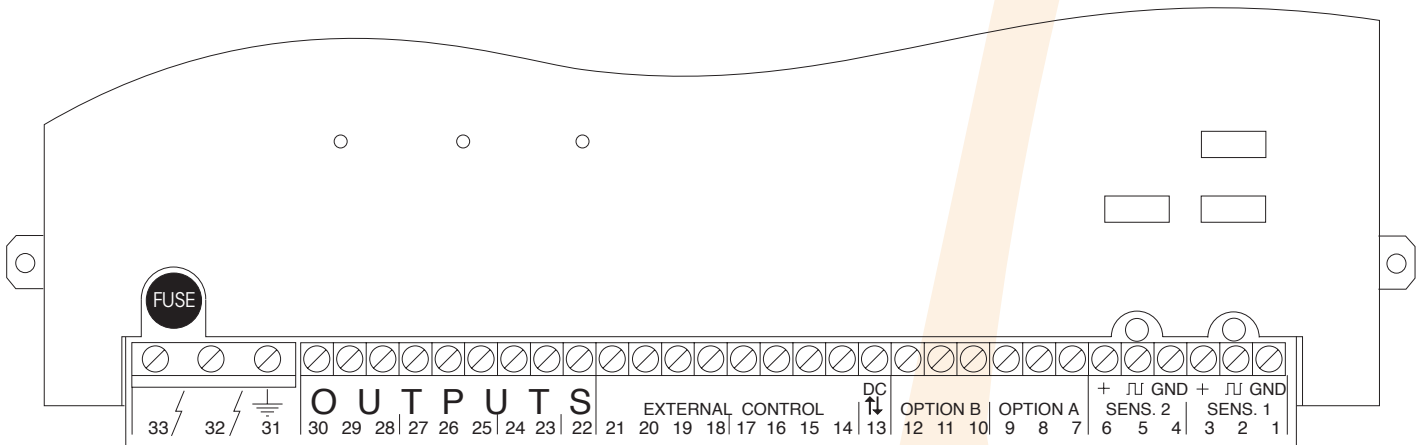
Explanation terminal connections

Terminal	Function	Explanation
01	sensor GND	Ground and shielding terminal.
02	sensor pulse	NPN or PNP pulse selected with a switch. Namur input has to be orderd.
03	sensor 12 / 24V DC	Votage selected with a switch. Namur sensor type supplies 8.2V DC.
04	not used (mass)	Pulse supression: by connecting terminal 5 with 6 the flow meter signal (terminal 2)
05	HOLD signal input	will be ignored, the monitor functions are disabled and the LED will not light up.
06	HOLD power supply	
07	not used.	
08	not used	Current sink: do connect a 8 - 24V DC power supply (terminal 6 or external) to the
09	analog output	plus (+) of the device and the minus (-) to terminal 9. Minimum load 100 Ohm.
10	RS485: GND	Communication option.
11	RS485: RXD/a	Modbus ASCII / RTU. Maximum comm. speed 9600 baud.
12	RS485: TXD/b	Cable length RS485 max. 1200 meters.
13	external GND	By shortly connecting terminal 14, 15, 16 or 17 with connector 13 (GND), the
14	external START	functions START, PAUSE and CLEAR can be operated by remote control,
15	external PAUSE	or an alarm can be triggered.
16	external CLEAR	
17	external alarm	
18	batch size 1	By shortening terminal 18-21 to terminal 13, the batchvolume can be seletced.
19	batch size 2	Minimum pulse duration 200ms. or continues signal (no other batch can be selected).
20	batch size 3	With 14 batch volumes (option ZB), the terminals are binairy coded to make selection
21	batch size 4	possible.
22	alarm relay NO	Mech. relay: potential free make-and-break contact; max. switch power 1A - 230V AC.
23	alarm relay C	excited in normal condition(C and NO are connected); fail-safe.
24	alarm relay NC	
25	relay 1 NO / s.s. +	Mech. relay: potential free make-and-break contact; max. switch power 1A - 230V AC.
26	relay 1 C / s.s. -	Solid state relay: passive DC output; max. switch power 1A - 50V DC.
27	relay 1 NC / not used	Continuously excited during process.
28	relay 2 NO / s.s. +	Mech. relay: potential free make-and-break contact; max. switch power 1A -230V AC.
29	relay 2 C / s.s. -	Solid state relay: passive DC output; max. switch power 1A - 50V DC.
30	relay 2 NC / not used	Continuously during process or used as preclose relay for two stage control.
31	power supply	Earthing.
32	power supply	230V AC or 24V AC / DC or 12V AC / DC.
33	power supply	230V AC or 24V AC / DC or 12V AC / DC.

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Technical specification
General

Display

Type	Bright transflective alpha-numeric LCD with LED backlight.
Digits	4 lines (20 characters per line). Standard 5mm (0.2") digits; EExd enclosure 9mm (0.35") digits.
Refresh rate	Ten times a second.
Languages	English, German, French, Dutch.

Casing

Type HK	Wall-mount IP50. Dimensions 212 x 185 x 93 mm (8.35" x 7.28" x 3.66") - LxWxH.
Type HL	Wall-mount with front-door IP65. Dimensions 241 x 185 x 116mm (9.49" x 7.28" x 4.57") - LxWxH.
Type HM	Panel-mount IP65. Aluminium/stainless steel enclosure. Dimensions 230 x 157 x 79 mm (9.06" x 6.18" x 3.11") - LxWxH. Panel cut-out: 212 x 142 mm (8.35" x 5.59") LxH.
Type HX	EExd enclosure IP54 – Die-cast aluminium. Cable entries: 1 x M25 – 4 x M20. Dimensions 292 x 280 x 167 mm (11.50" x 11.02" x 6.57")-LxWxH.
Control keys	Twenty industrial micro-switch keys with tactile feedback and embossed design. UV-resistant polyester keypad. EExd version: eighteen rugged metal keys.

Operating temperature

Operational	-10ºC to +55ºC (14ºF to +131ºF).

Power requirements

Type PP	12V AC/DC - 15VA.
Type PR / PS	22 - 28V AC/DC - 15VA.
Type PT / PU	105 - 130V AC / 50Hz - 15VA.
Type PV / PW	210 - 240V AC / 50Hz - 15VA.

Sensor excitation

Standard	Stabilized 12V DC or 24V DC - selection with voltage selection switch or 8.2 V DC when Namur input specified. Max. 100mA @ 24V DC.

Data protection

Type	NVRAM backup of all settings including process data figures prior to any sudden or unexpected power failures. Data retention 10 years.

Hazardous area (optional)

Explosion proof	Atex approved according to ⟨Ex⟩ II 2 G EEx d IIB T5. With 18 robust micro-switch keys. Compact case design.
Type XM	Operational temperature -20ºC to +60ºC (-4ºF to +140ºF). Includes automatic temperature compensated LCD contrast adjustment.

Environment

CE	EMC compliant ref: EN50081 and EN50082.

Signal inputs

Pulse inputs

Type P	NPN/PNP, open collector.
Type N	Namur type sensors.
Type S	Reed-switch.
Frequency	Minimum 0 Hz - maximum 10 KHz (18KHz).
K-factor	0.0001 - 9,999 with variable decimal position.

Logic inputs

Function	Functionality and parity product dependent. Start / Pause / Clear / Alarm / Batch-selection 1 - 4 (1 - 14) / Pulse suppression.
Type	Nine status inputs.
Voltage	8 - 24V DC supplied - external voltage max. 24V DC.
Duration	Minimum pulse duration 200msec.

Signal outputs

Analog output (optional)

Function	Related to the flow rate
Type AJ	Isolated current-sink output 0 - 20mA, 4 - 20mA or 0 - 10V DC. Power supply available.
Accuracy	10-bit error < 0.05%.

Relay outputs

Function	Product dependent: batching relays and alarm condition
Type PP/PR/ PT/PV	Three mechanical relays with volt-free make and break contacts.
Maximum load	1A - 230V AC/DC - Two relays protected with RC.
Type PS/PU/PW	Solid-state relays: max. load 1A - 50V DC.
Type ZS	One control output and one scaled pulse output (two stage control not available).

Communication option (optional)

Function	Reading display information, reading / writing all settings, control a batch.
Type CH	RS485 (2-wire).
Protocol	Modbus ASCII / RTU.
Speed	1200 - 2400 - 4800 - 9600 baud.
Addressing	Maximum 255 addresses.

Operational

Operator functions

Displayed functions	• Preset value. • Actual batched quantity. • Flow rate. • Total (actual & alarm value). • Batch counter (actual & alarm value). • Actual batch volume.

Preset value / batched quantity / total

Digits	7.
Units	mL, hL, L, m³, cc, gl, bb, gr, kg, Tn, pt, p, _.
Decimals	0 - 6.

Flow rate

Units	mL, hL, L, m³, cc, gl, bb, gr, kg, Tn, pt, p, _.
Time	Minute / second.

Batch counter

Digits	7.
Note	Counter can be reset to zero.

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Enclosure HK (STANDARD)
Polystyrol wall mount casing IP50

Enclosure HM
Panel-mount casing IP65

Enclosure HL
Polystyrol wall mount casing IP65 (frontdoor)

Enclosure HX
Compact explosion proof EExd casing IP54

Display example

```
4A      BATCH SIZE:    4
ACTUAL         1483.92 L
PRESET         4250.00 L
FLOWR.    231.45 L/min
```

Ordering information

Example (standard configuration)

320-P-AX-CX-HK-PV-XX-ZX.

Explanation standard configuration:

P: input signal: NPN/PNP; **AX**: no analog output; **CX**: no communication; **HK**: polystyrol wall mount casing IP50; **PV**: 230V AC + mechanical relays; **XX**: Safe area; **ZX**: no options.

Ordering information:	320	-_	-A _	-C _	-H _	-P _	-X _	-Z _
Input signal								
N	Namur.							
P	**NPN / PNP.**							
S	Reed switch input.							
Analog output signal								
AJ	Isolated 4 - 20mA output for flow rate.							
AX	**No analog output signal.**							
Communication								
CH	Communication RS485 - 2-wire - Modbus ASCII / RTU.							
CX	**No communication.**							
Enclosure								
HK	**Polystyrol wall mount casing IP50.**							
HL	Polystyrol wall mount casing IP65 (frontdoor).							
HM	Panel-mount casing IP65.							
HX	Explosion proof casing IP54 (type XM).							
Power supply and relays								
PP	12V AC / DC + mechanical relays.							
PR	24V AC / DC + mechanical relays.							
PS	24V AC / DC + solid state relays.							
PT	115V AC + mechanical relays.							
PU	115V AC + solid state relays.							
PV	**230V AC + mechanical relays.**							
PW	230V AC + solid state relays.							
Hazardous area								
XM	⟨Ex⟩ II 2 G EEx d IIB T5; 18 keys; -20°C / +60°C; 3 x M20 - 1 x M25.							
XX	**Safe area only.**							
Other options / Specials								
ZB	14 batch-sizes.							
ZN	Remove RC-filter mechanical relays.							
ZS	Status output relay (for one-stage control only).							
ZX	**No options.**							

The bold marked text contains the standard configuration.

ISO 9001:2000
KEMA
DUTCH COUNCIL FOR ACCREDITATION

C E

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