Crystal Ovens

Many of widely used nonlinear crystals are susceptible to ambient humidity, for example KD*P, BBO, LBO. Protective coatings applied to the surface can reduce degradation to some extent only. To improve the protection of surfaces of the crystals from the degradation it is desirable to keep the crystals at higher than ambient temperature, which helps avoid condensation on the crystal surfaces.
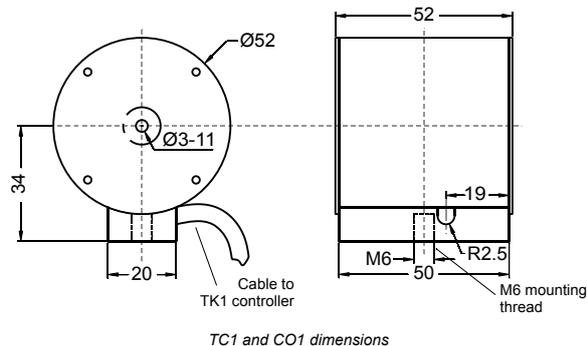
In addition, if the crystal is used for harmonics generation, the phase-matching angle depends on crystal temperature. For example, the output power of second harmonics generator based on KD*P crystal can decrease by 50 % if the crystal temperature changes just by one degree, hence for good laser stability precise crystal temperature stabilization is necessary. EKSMA OPTICS offers various solutions for precise crystal heating. CH series crystal ovens provide reliable, stable performance and can accommodate wide range of crystals.

TC1 · CO1 — TEMPERATURE CONTROLLER TC1 WITH OVEN CO1

TC1 and CO1 is high temperature set (up to 200 °C) consisting of thermocontroller TC1 and crystal oven CO1. TC1 has two independent outputs and can control two CO1 ovens simultaneously. Trough RS232 computer interface it can be controlled from PC. Actual crystal temperature is shown on LED display.

The nonlinear crystal is mounted into adapter before insertion into oven CO1. Such design facilitates handling and replacement of the crystal. The nonlinear crystal can be sealed with fused silica windows in order to provide extra protection. The standard adapters are 15, 30 and 50 mm length with apertures of 3×3, 4×4, 5×5, 6×6 mm size. Customized adapters for crystals up to 12×12 mm size are available. In addition, adapters for Brewster-cut and PPLN crystals are available too.

TC1 and CO1 dimensions

SPECIFICATIONS

Model	TC1+CO1-30	TC1+CO1-50
Quantity of ovens possible to connect to one controller TC1	2	1
Temperature tuning range	RT – 200 °C	
Maximum crystals dimensions	12×12×30 mm	12×12×50 mm
Sealing (optional)	FS windows	
Accuracy	± 0.5 °C	
Long-term stability	± 0.1 °C	
Resolution	0.1 °C	
Powering requirements	90–264 V, 47–66 Hz	
Power consumption	45 W	
Sensor type	PT1000	
Output connector	DB9	
Serial interface	RS232 (DB 9)	
Dimensions, Dia×D	Ø52×52 mm	Ø52×72 mm

Specifications are subject to changes without advance notice

Code **	Description, features
Thermocontroller TC1	
TC1	Thermocontroller, Fuzzy logic, RT-200 ºC, can control two CO1 ovens, long-term stability ±0.1 ºK, worldwide mains
Crystal Ovens for TC1	
For crystal length up to 30 mm	
CO1-30-y/y	Standard crystal sizes *
CO1-30-y/z	Custom crystal sizes
CO1-30S-y/y	Sealed, standard crystal sizes *

* Sizes 3×3, 4×4, 5×5, 6×6,12×12 are standard.   ** y/y, y/z – crystal size.

NONLINEAR CRYSTALS

LASER CRYSTALS

TERAHERTZ CRYSTALS

RAMAN CRYSTALS

POSITIONERS & HOLDERS

CRYSTAL OVENS

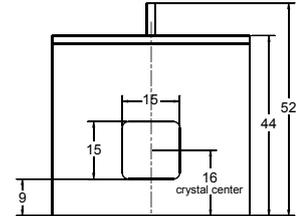| Code **	Description, features
Crystal Ovens for TC1	
For crystal length up to 50 mm	
CO1-50-y/y	Standard crystal sizes *
CO1-50-y/z	Custom crystal size
CO1-50S-y/y	Sealed, standard crystal sizes *
For Brewster-angle cut crystal	
CO1-30BA-y/y	For Brewster-angle cut crystal
CO1-30BAS-y/y	Sealed, for Brewster-angle cut crystal
For PPLN crystals	
CO1-30PP-y/y	For PPLN crystals
Mounting accessories	
Crystal holders	
AD1	Spare crystal holder for CO1-30 oven
AD2	Spare crystal holder for CO1-50 oven
Mounting stages for crystals ovens	
MS-4	Adapter for CO1 oven mounting on tilt stage. Tilt stage should be ordered separately

* Sizes 3×3, 4×4, 5×5, 6×6,12×12 are standard.   *** y/y, y/z – crystal size.*
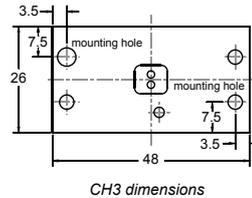
CH3   OVEN FOR NONLINEAR CRYSTALS

CH3-15 is compact oven with build-in thermocontroller for temperature up to 60 °C. It is ideal for larger aperture crystals like KD*P. The crystals with up to 15 × 15 mm dimensions can be mounted. CH3-30 model can fi crystals with up to 30 mm length.

Each oven is made exactly for specified crystal, so it cannot be used for different size crystals.

On request we can manufacture ovens for crystals with aperture up to 60×60 mm or even larger.

SPECIFICATIONS

Model	CH3-15	CH3-30
Temperature tuning range near preset	± 5 °C	
Maximum crystals dimensions	15×15×15 mm	15×15×30 mm
Preset temperature	30-60 (80) °C	
Long-term stability	± 0.2 °C	
Powering requirements	12-15 V DC	
Power consumption	6 W	
Sensor type	NTC Thermo resistor	
Output connector	Molex 2 pin	
Dimensions, W×H×D	48×44×26 mm	48×44×36 mm

Specifications are subject to changes without advance notice

CH3 dimensions

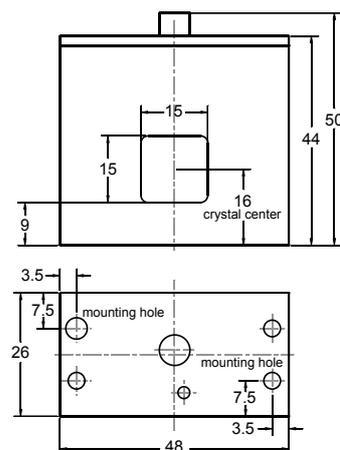| Code **	Description, features
CH3-15 – fixed temperature crystal ovens, temperature tuning range ±5 °K, crystal length up to 15 mm	
CH3-15-y/y-x	Standard crystal sizes *
CH3-15-y/z-x	Non-standard crystal size
CH3-15-y/y-80	For temperature up to 80 °C
CH3-30 – fixed temperature crystal ovens, temperature tuning range ±5 °K, crystal length up to 30 mm	
CH3-30-y/y-x	Standard crystal sizes *
CH3-30-y/z-x	Non-standard crystal size
CH3-30-y/y-80	Version for temperature up to 80 °C
Mounting accessories	
MS-1	Two axis tilt adjustment 5 degrees range, suitable for all types of CH3, CH4 or CH7 crystal ovens
MS-2	Two axis tilt stage, adjustment in 5 degree range, fits two pc. f CH3, CH4 or CH7 ovens
MS-3	Adapter for CH3, CH4 or CH7 mounting on rotary stage, 15 degrees fine tuning, angle read-out Rotary stage should be ordered separately
Power supply PS-12	
PS-12	Power supply for CH3, CH4 or CH7 crystal oven, 100-240 VAC mains, +12 VDC output

* Sizes 3×3, 4×4, ...,15×15 are standard.   *** y/y, y/z – crystal size, x – preset temperature in degrees of Celsius (30-60 °C range).*

NONLINEAR CRYSTALS

LASER CRYSTALS

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POSITIONERS & HOLDERS

CRYSTAL OVENS

CH4 — OVEN FOR NONLINEAR CRYSTALS

CH4 oven has identical mechanical design as CH3. The pre-set temperature can be adjusted in ±5 °C range by the help of potentiometer. The current temperature is not indicated. In addition, CH4 has "temperature ready" output signal, changing state when pre-set temperature is reached. CH4-50 model can fit crystals with up to 50 mm length.
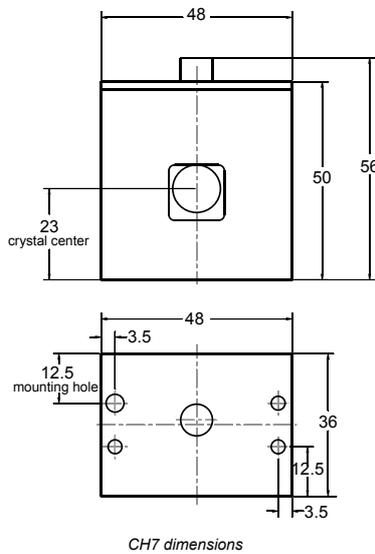
CH4 dimensions

SPECIFICATIONS

Model	CH4-15	CH4-30	CH4-50
Temperature tuning range near preset	± 5 °C		
Maximum crystals dimensions	15×15×15 mm	15×15×30 mm	15×15×50 mm
Preset temperature	30-60 (80) °C		
Long-term stability	± 0.2 °C		
Temperature OK output signal	Present		
Powering requirements	12-15 V DC		
Power consumption	6 W	6 W	9 W
Sensor type	NTC Thermo resistor		
Output connector	Binder 719, 3 pin		
Dimensions, W×H×D	48×44×26 mm	48×50×36 mm	48×50×56 mm

Specifications are subject to changes without advance notice

Code **	Description, features
CH4-15 – Provides READY signal, stability ±0.2 °K, crystal length up to 15 mm	
CH4-15-y/y-x	Standard crystal sizes *
CH4-15-y/z-x	Non-standard crystal sizes
CH4-15-y/y-80	Version for temperature up to 80 °C
CH4-30 – Provides READY signal, stability ±0.2 °K, crystal length up to 30 mm	
CH4-30-y/y-x	Standard crystal sizes *
CH4-30-y/z-x	Non-standard crystal sizes
CH4-30-y/y-80	Version for temperature up to 80 °C
CH4-50 – Provides READY signal, stability ±0.2 °K, crystal length up to 50 mm	
CH4-50-y/y-x	Standard crystal sizes *
CH4-50-y/z-x	Non-standard crystal sizes
CH4-50-y/y-80	Version for temperature up to 80 °C
Mounting accessories	
MS-1	Two axis tilt adjustment 5 degrees range, suitable for all types of CH3, CH4 or CH7 crystal ovens
MS-2	Two axis tilt stage, adjustment in 5 degrees range, fits two pc. of CH3, CH4 or CH7 oven
MS-3	Adapter for CH3, CH4 or CH7 mounting on rotary stage, 15 degrees fine tuning, angle read-out. Rotary stage should be ordered separately
Power supply PS-12	
PS-12	Power supply for CH3, CH4 or CH7 crystal oven, 100-240 VAC mains, +12 VDC output

* Sizes 3×3, 4×4, ...,15×15 are standard.
** y/y, y/z – crystal size, x – preset temperature in degrees of Celsius (30-60 °C range).

CH7 OVEN FOR NONLINEAR CRYSTALS

CH7 is compact oven with build-in thermo-controller for temperature up to 60 °C. CH7 oven provides more crystal mounting options in comparison to CH3 or CH4. Like in CO1, each crystal is mounted into adapter before insertion in oven. CH7 and CO1 crystal adapters are compatible. Maximum crystal size for this model is 12×12 mm and the length of the crystal – 30 mm.

The pre-set temperature can be adjusted in ±5 °C range by the help of potentiometer. The current temperature is not indicated. CH7 has "temperature ready" signal, changing state when pre-set temperature is reached. For additional protection of crystal surfaces from the dust or other contamination, we offer windowed version CH7-20.

SPECIFICATIONS

Model	CH7-15	CH7-30
Temperature tuning range near preset	± 5 °C	
Maximum crystals dimensions	12×12×15 mm	12×12×30 mm
Sealing (optional)	FS windows	
Preset temperature	30-60 (80) °C	
Long-term stability	± 0.2 °C	
Temperature OK output signal	Present	
Powering requirements	12-15 V DC	
Power consumption	6 W	
Sensor type	NTC Thermo resistor	
Output connector	Binder 719, 3 pin	
Dimensions, W×H×D	48×50×44 mm	48×50×56 mm

Specifications are subject to changes without advance notice

CH7 dimensions

Code **	Description, features
CH7-15 – Provides READY signal, stability ±0.2 °K, crystal length up to 15 mm	
CH7-15-y/y-x	Standard crystal sizes *
CH7-15-y/z-x	Non-standard crystal sizes
CH7-15-y/y-80	Version for temperature up to 80 °C
CH7-30 – Provides READY signal, stability ±0.2 °K, crystal length up to 30 mm	
CH7-30-y/y-x	Standard crystal sizes *
CH7-30-y/z-x	Non-standard crystal sizes
CH7-30-y/y-80	Version for temperature up to 80 °C
CH7-20 – Provides READY signal, with AR coated windows for crystal protection	
CH7-20-y/y-x	Fixed temperature in RT-60 °C range, crystal size limited to 10×10×20 mm
CH7-20-y/y-80	Version for temperature up to 80 °C
Power supply PS-12	
PS-12-CH7	Power supply for CH3, CH4 or CH7 crystal oven, 100-240 VAC mains, +12 VDC output
Mounting stages for crystal ovens	
MS-1	
MS-2	

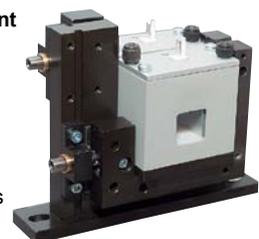* Sizes 3×3, 4×4, ...,12×12 are standard.
** y/y, y/z – crystal size, x – preset temperature in degrees of Celsius (30-60 °C range).

RELATED PRODUCTS

Mount MS-1 for fine tuning of CH3, CH4 or CH7 angle is available. The tuning range is ± 2.5°.

MS-2 type mount can fit two CH3, CH4 or CH7 type ovens and is ideal for holding second and third or fourth harmonics generators.

NONLINEAR CRYSTALS

LASER CRYSTALS

TERAHERTZ CRYSTALS
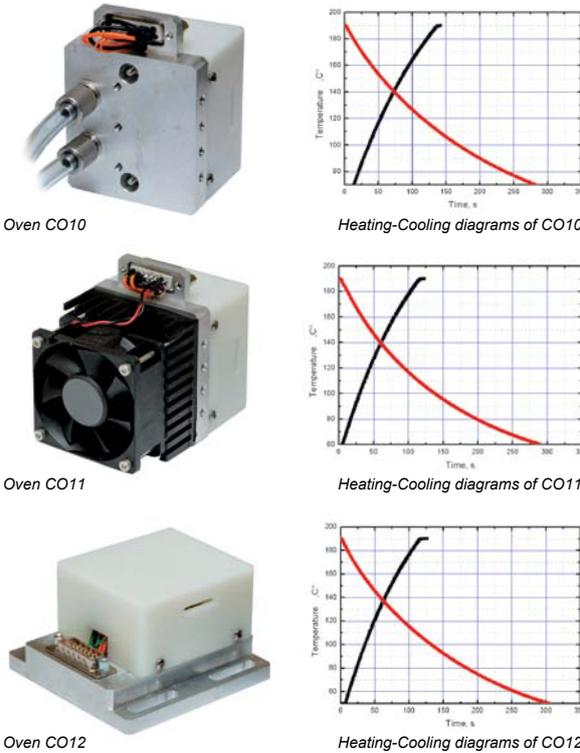
RAMAN CRYSTALS

POSITIONERS & HOLDERS

CRYSTAL OVENS

TC2 • CO10 • CO11 • CO12

PRECISION RESISTIVE HEATER KIT TC2 AND CO10 SERIES OVENS

With combination of temperature controller, CO10 series ovens are designed specifically for tuning and conditioning the periodically poled bulk devices (PPSLT, PPLN & PP-MgO:LN) and other nonlinear crystals. The oven is designed to hold the crystal with dimensions of 30×16×1 mm. Custom made oven is also available. The crystal heater provides temperature stabilization for crystals with an accuracy of 0.1°C. The crystal temperature can be changed from 50°C to 200 °C.

Crystal's temperature stabilization

Fast temperature control using active cooling

External temperature is kept low by insulation – no need for gloves

No alignment is required when crystal is removed and replaced

4 screws to remove to exchange crystals

Crystals can be replaced without removing the oven from the experiment

LabVIEW based software included

APPLICATIONS

Fast temperature tuning of generated wavelengths in periodically oriented and noncritical phase-matching nonlinear crystals

Temperature tuning of Bragg grating wavelengths

Thermostat of tuning temperature

Oven CO10

Heating-Cooling diagrams of CO10

Oven CO11

Heating-Cooling diagrams of CO11

Oven CO12

Heating-Cooling diagrams of CO12

Code	Description, features
Thermocontroller TC2	Thermocontroller for CO10, CO11, CO12 fast temperature tuning PPLN crystall ovens
CO10	Water cooled fast temperature control oven for PPLN crystals
CO11	Air cooled fast temperature control oven for PPLN crystals
CO12	Cooled by mounting on heat transfering body fast temperature control oven for PPLN crystals

SPECIFICATIONS

Model	CO10	CO11	CO12
Resolution, °C		0.1	
Long term stability, °C		±0.1	
Basic accuracy, °C		±0.5	
Temperature sensor type		PT1000	
General specifications			
controllability		manual or via RS232 port	
mains		90-264 VAC; 50/60 Hz	
max power consumption, W		45	
TC2 controller dimensions (H×W×D), mm		67×155×160	
weight, kg		1.5	
operating temperature		-15 °C to +35 °C	
storage temperature		-40 °C to +70 °C	
connectors		15-pin D-sub receptacle or 9-pin D-sub plug	
Temperature control range, °C	50-200	60-200	70-200
Cooling type	Water	Air	Heatsink
Heating time, s	130 (50-190 °C)	120 (60-190 °C)	110 (70-190 °C)
Cooling time (190 °C -50/60 °C), s	305	290	290
Cooling temperature change velocity, °C/s *	1.1-0.25	1.0-0.1	1 -0.1
Heating temperature change velocity, °C/s *	1.5-0.7	1.5-0.7	1.5-0.7
Set heater temperature, °C	50	60	70
Dimensions (H×W×D), mm	85×71×65	95×71×65	91×90.5×56

* Depends on temperature.

NONLINEAR CRYSTALS

LASER CRYSTALS

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POSITIONERS & HOLDERS

CRYSTAL OVENS