TX SERIES

KD*P Pockels Cell

PRODUCT DATASHEET

TX series KD*P Pockels cells are the most advanced large aperture optical isolators commercially available and are proven performers in high power applications.

G&H is the leading producer of Pockels cells for the development of laser induced nuclear fusion and sub-micron microlithography. Nearly 300 units are in use worldwide; more than twice the total from all other manufacturers combined.

We have incorporated state-of-the-art features, such as specially modified cylindrical-ring electrode geometries for optimum aperture extinction and transmission uniformity and minimum optical path length. TX Pockels cells also feature axially adjustable windows for sub-millimeter control of window/crystal spacing and 224 TPI differential screws for arc-second adjustment of windows parallelism or net wedge. These units typically have a lifetime of many years and can often be rebuilt for a fraction of the cost of a new unit. Each unit comes with detailed documentation for quality assurance.

We install premium 50 Ω GHV series electrical receptacles on TX cells because of their 20 kV DC and 1 GHz mil-spec ratings (used with RG-8 A/U or RG-213/U coaxial cable). We stock GHV bulkhead receptacles as well as cable-end plugs.



Key Features

- Axially adjustable windows for sub-millimeter control of window/crystal spacing
- 224 TPI differential screws for arc-second adjustment of input/output windows parallelism
- Double fill/drain ports
- Individually accessible crystal faces for convenient inspection or cleaning
- 50 Ω transmission line drive configuration is standard
- Precision milled and epoxy-free
- Ceramic aperture eliminating outgassing
- Range of aperture sizes available
- Expanded beam allowing for reduced intensity

Options

99% deuteration KD*P available for certain models

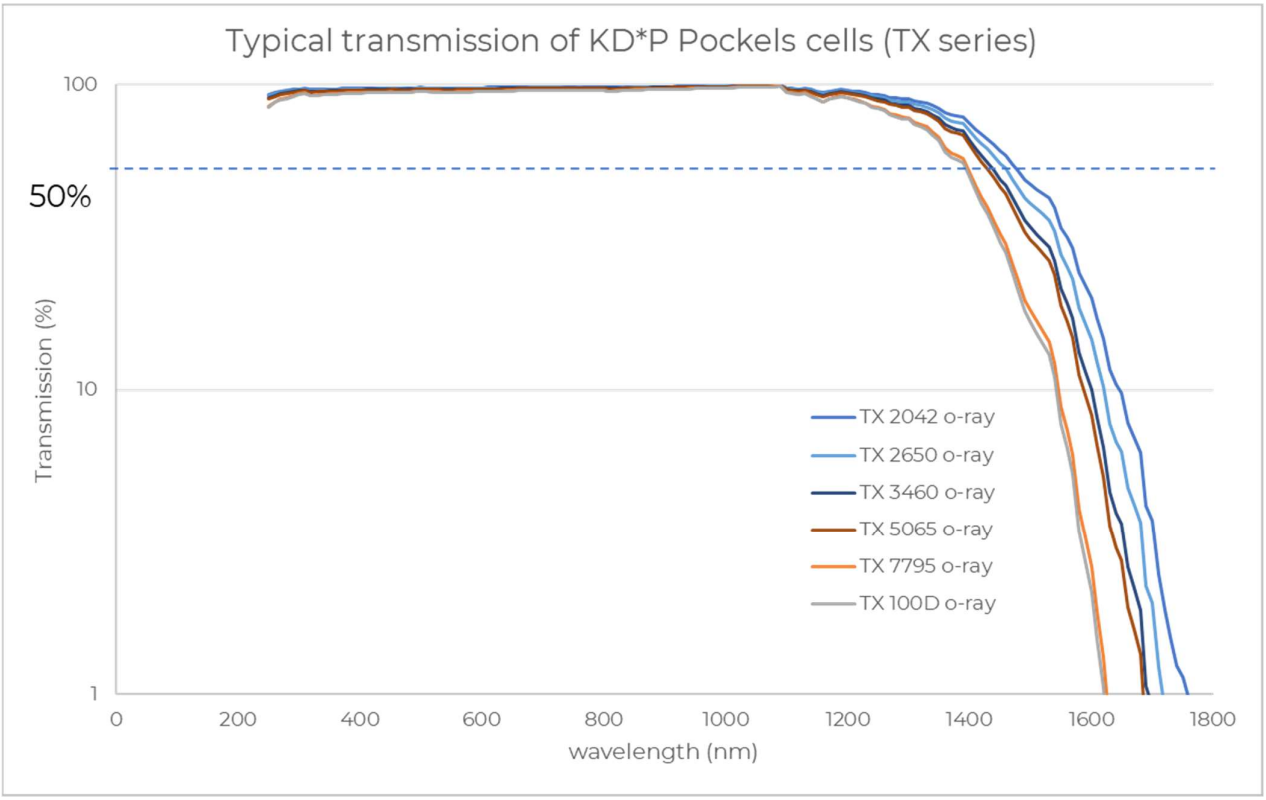
Applications

- Q-switching and optical isolators in petawatt/terawatt lasers
- Optical isolation and low frequency modulation of high power visible to NIR laser beams

Performance Data

TX Series: Typical performance 95% KD*P (see Figure 1)	TX 2024	TX 2650	TX 3460	TX 5065	TX 7595	TX 100D
PHYSICAL						
Hard aperture diameter	19.5 mm	25.5 mm	33.5 mm	49.5 mm	73.5 mm	99.0 mm
Single pass insertion loss @ 1064 nm	< 3.5%	< 4%	< 5%	< 5%	< 6.5%	< 7%
Intrinsic contrast ratio (ICR) @ 1064 nm	8000:1; see Figure 2					
Voltage contrast ratio (VCR) @ 1064 nm (parallel polarizers): see Figure 3	3000:1	2500:1	1500:1	500:1	300:1	100:1
Single pass distortion @ 1064 nm	λ/20					
ELECTRICAL						
Capacitance (DC)	23 pF	27 pF	32 pF	56 pF	86 pF	115 pF
DC quarter wave voltage @ 1064 nm	3.2 kV	3.2 kV	3.4 kV	3.5 kV	3.7kV	3.9 kV
10-90% rise time (theoretical) into 50 Ω line	1 ns	2 ns	2 ns	3 ns	5 ns	7 ns
Modulation frequency	<1 kHz					
Duty cycle (recommended)	<5%					
LASER DAMAGE THRESHOLD (LIDT)						
1064 nm, 10 ns, 10 Hz, 1 mm beam	>10 J/cm^2					
ENVIRONMENTAL CONDITIONS						
Operating conditions						
Temperature range	+15 C to +35 C					
Humidity	<85% RH (non-condensing)					
Storage conditions						
Temperature range	-50 C to +85 C					
Humidity	Non-condensing					

Typical transmission spectra of KD*P crystal (99% deuteration) used in TX series



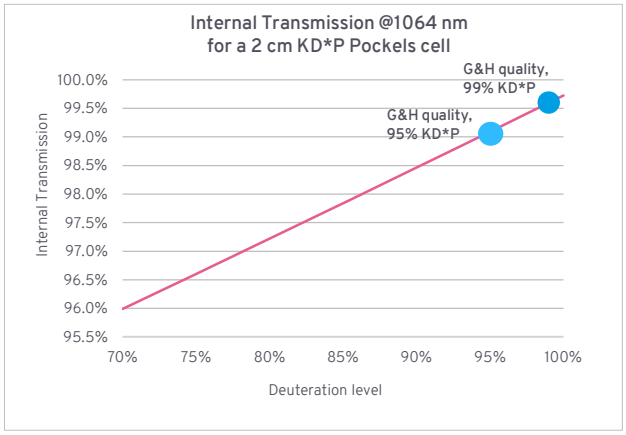


Figure 1 Internal KD*P transmission

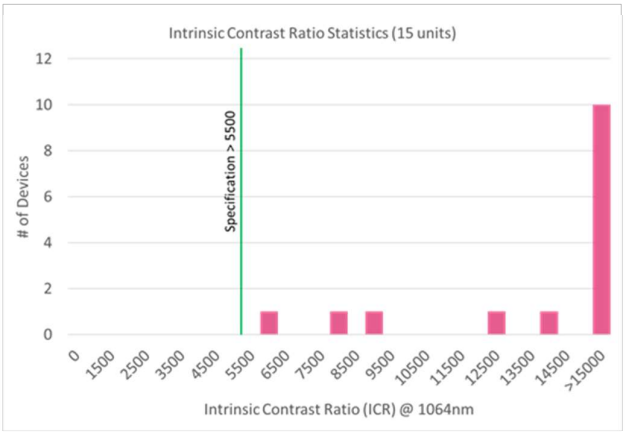


Figure 2 Intrinsic contrast ratio

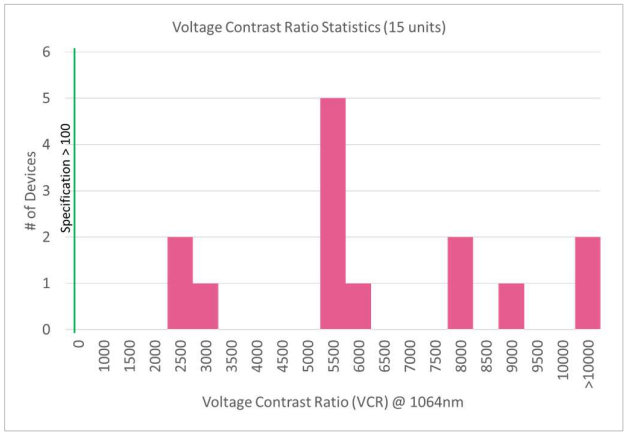
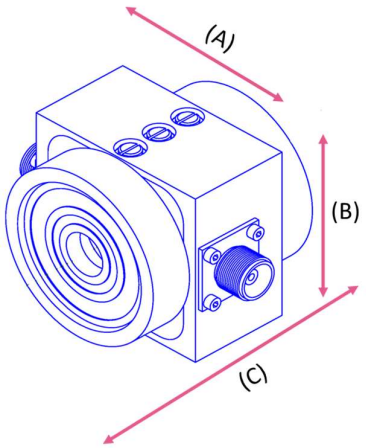
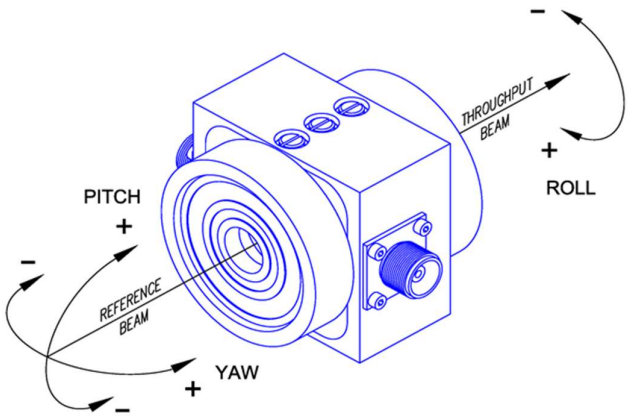


Figure 3 Voltage contrast ratio



TX: DIMENSIONS (inches [mm])			
MODEL	DIM 'A' L	DIM 'B' H	DIM 'C' W
TX 2024	3.346 [85.0]	3.150 [80.0]	3.346 [85]
TX 2650	3.819 [97.0]	3.425 [87.0]	3.622 [92.0]
TX 3460	4.016 [102]	3.740 [95.0]	4.055 [103]
TX 5065	4.528 [115]	4.370 [111]	4.685 [119]
TX 7595	5.945 [151]	5.354 [136]	5.669 [144]
TX 100D	6.181 [157]	6.339 [161]	6.654 [169]

Example of test data provided with each device



NOTES

1)INSPECTION BEAM IS HeNe, VERTICALLY POLARIZED
2)POCKELS CELL DEPICTED IN INSPECTION ORIENTATION
3)TYPICAL INPUT POLARIZATION SHOWN (PARALLEL OR PERPENDICULAR TO ELECTRODES
4)SHOWN WITH STANDARD GHV CONNECTORS: ACTUAL CONNECTOR CONFIGURATION MAY DIFFER DEPENDING ON SPECIFIC ORDER REQUIREMENTS
5)SCRATCH/DIG SPECIFICATION IS 20/10 MEASURED AGAINST FIXED STANDARDS
6)PER AMPLITUDE TECH SPEC# PO16-0957-B
7)TRANSMISSION VERSION SHOWN: MOUNT HOLES NOT AVAILABLE ON DIFFERENTIAL ("D") VERSIONS

PRECAUTIONARY NOTES

1)POCKELS CELL HAS SENSITIVE OPTICAL SURFACES: REMOVE FROM PACKAGE AND HANDLE ONLY IN CLEAN ROOM ENVIRONMENT
2)DO NOT ATTEMPT TO CLEAN OPTICAL SURFACES: DOING SO WILL VOID THE WARRANTY AND /OR SHORTEN THE LIFETIME OF THE CELL
3)DO NOT ATTEMPT SOLDERING OPERATIONS ON OR NEAR THE CELL
4)REFER TO "POCKELS CELL ALIGNMENT" DATA SHEET FOR ADDITIONAL INFORMATION AND PRECAUTIONS

TX PRODUCT / PERFORMANCE INFORMATION	
CUSTOMER:	XXXXXX
MODEL:	TX 7595
WORK ORDER #:	XXXXXX
SHIP DATE:	1/31/2023
SERIAL NUMBER:	XXXXXX
CRYSTAL:	KD*P 95% 94.73 MM
AR COATING - CRYSTAL (nm):	700-900
AR COATING - WINDOWS (nm):	700-900
CLEAR APERTURE Ø (mm):	74
ELECTRICAL CONNECTION:	M4 THREADED TERMINALS
TEST WAVELENGTH (nm):	633 Beam Ø: 30mm
INTRINSIC CONTRAST (ICR):	8000:1 @ 633 nm
VOLTAGE CONTRAST (VCR):	3725:1 @ 633 nm
DC λ/2 VOLTAGE (kV):	4.10 @ 633 nm
PULSED λ/2 VOLTAGE (kV):	4.59 @ 633 nm
INSERTION LOSS (%)	0.04 @ 810 nm
WEDGE ANGLE (μRadians): 6	Note 6 @ 633 nm
TRANSMITTED WFE:	< λ/6 @ 633 nm
CAPACITANCE (pF), ± 10:	56 (Including Connectors)
NOTES / SPECIAL MODIFICATIONS:	Center chamber filled for arc-over resistance during half wave operation. 30' wedge windows timed for <2' total wedge.

For further information

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gandh.com