FOCUSSHIFTER-14

Automotive | E-Mobility | Electronics/IT | Solar/Photovoltaics | Integrators | Machine builders

Up to the top. Ready. Go.

Cleaning	Texturing	Cutting	Marking	Bonding
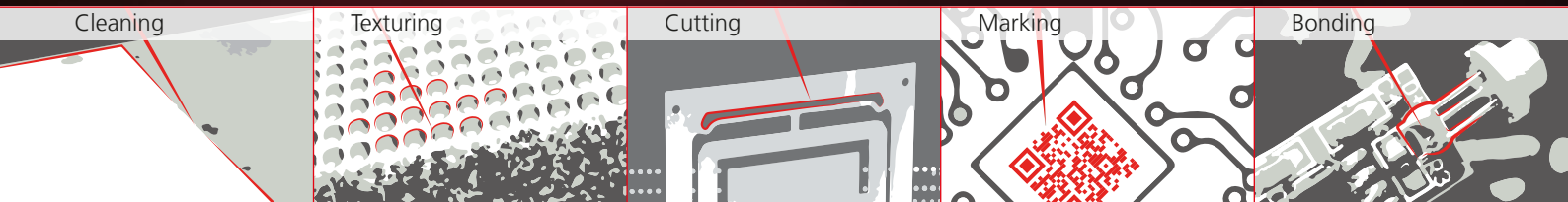
WHAT THE FOCUSSHIFTER-14 CAN DO FOR YOU:

The third dimension (3D) is not always the nonplus ultra. The FOCUSSHIFTER-14 deliberately takes a (half) step backwards to significantly **increase the range of applications** for you as a machine builder or integrator in the fields of e-mobility, solar/photovoltaics, and electronics/IT: With the FOCUS-SHIFTER-14, you can clean component contact surfaces of paint, oxide layers, oil or insulation, cut flexible PCBs, glass displays or polarisation foils, texturise or structure a wide variety of surfaces and connect components. Finally, the FOCUSSHIFTER-14 cuts an excellent figure in the resistance trimming of 5G antennas. The highlight: all this is done in two and a half dimensions – 2.5D.

This is achieved **automatically** by the FOCUSSHIFTER-14 shifting the focus – generated by the f-theta lens – either downwards or upwards. This combination forms the basis for you to be able to process **different height levels of the same workpiece** – qualitatively and quantitatively of high quality.

When things
have to go fast

Versatile use

What you can rely on with RAYLASE:

Usability, quality, and productivity are our core issues. That is why the development, production, and functional testing of our high-quality laser applications for almost all industries are carried out exclusively in our in-house laboratories and production facilities. Fast services and professional maintenance are ensured by our worldwide support network.

Flexibility you can see:

Removing oxides, lacquers, rust, or insulation is just as efficient and precise with the FOCUSSHIFTER-14 as texturing or joining **complex** and, of course, **simple component geometries.** The highly dynamic focusing axis with Moving coil drive ensures **maximum dynamics** and **speed** and thus guarantees the best results in demanding processes. Your benefit: a very good Overall Equipment Effectiveness (OEE) in your production.

And in case you want to machine three-dimensional, inclined, spherical, or curved planes, this can also be reliably realised by a combination of FOCUSSHIFTER-14 and suitable software.

How we define quality assurance:

For you as a machine builder or integrator, the high technical level of a laser beam deflection unit like the FOCUSSHIFTER-14 is not everything. A practicable technology for you – and all industries in which laser technology is used – is characterised above all by **uncomplicated implementation** in existing designs. To make this possible, the FOCUSSHIFTER-14 has many threaded and pin holes – on the side, at the bottom and even on the beam entry side.

Using the appropriate software, your **laser job can be set up on the camera image** of the workpiece and an **automatic position correction** can be carried out in production – together with an **archiving function,** features that speak for optimal quality assurance. It goes without saying that you can expect the best quality results from optional **image viewing and processing** software, regardless of whether it comes from us or a third-party supplier. Just like the fact that the FOCUSSHIFTER-14 is IP64 rated.

Two different control protocols on one connector and a separate power supply make the FOCUS-SHIFTER-14 quickly ready for use.

FOCUSSHIFTER-14 PROCESS DIFFERENT HEIGHT LEVELS EFFICIENTLY

GENERAL SPECIFICATIONS

Power Supply	**Voltage [V]**	+ 48
	Current (RMS) [A]	4
	Current (max.) [A]	8
	Riple / Noise @ 20 MHz bandwith [mV pp]	Max. 200
Ambient temperature [°C]		+15 to +35
Storage temperature [°C]		-10 to +60
Humidity non condensing [%]		≤ 80
IP Code		64
Interface signals	**Digital**	XY2-100 enhanced protocol 16 Bit SL2-100 protocol 20 Bit
Typical deflection (optical) [rad]		± 0.393
Resolution XY2-100 16 Bit [µrad]		12
Resolution RL3-100 / SL2-100 20-Bit [µrad]		0.76
Repeatability (RMS) [µrad]		< 2.0
Positioning noise (RMS) [µrad]		< 4.5
Temperature drift	**Max. Gaindrift [ppm/K]**	15
	Max. Offsetdrift [µrad/K] [1]	10
Long-term drift 8 h [µrad] [1]		< 60

[1] Angles optical. Drift per Axis, after 30 min. warm-up, at constant ambient temperature and process stress.

APERTURE DEPENDING SPECIFICATIONS – MECHANICAL DATA

Deflection Unit	FOCUSSHIFTER-14
Input Aperture [mm]	5.0
Beam displacement [mm]	17.0
Weight (without f-theta lens) without option MVC [kg] [1]	5.5
Weight (without f-theta lens) with option MVC [kg] [1]	6.0
Dimensions without electrical connectors (L x W x H) [mm]	330.0 x 105.0 x 134.0

[1] MVC = Machine Vision Control / camera observation

TYPE DEPENDENT SPECIFICATIONS – TUNINGS

Tuning	Description
Marking-Tuning (MA)	Optimized tuning for marking applications
Vector-Tuning (VC)	Optimized tuning with a wide range of applications with emphasis on processing speed
C-Tuning (C)	Optimized tuning for long vectors at highest speeds

FOCUSSHIFTER-14   PROCESS DIFFERENT HEIGHT LEVELS EFFICIENTLY

TYPE DEPENDENT SPECIFICATIONS – DYNAMIC DATA

Deflection unit	FOCUSSHIFTER-14 SI		FOCUSSHIFTER-14 QU	
Tuning	MA	VC	MA	C
Writing speed [cps] with high/good writing quality [1, 2]	650 / 800	-	600 / 750	-
Processing speed [rad/s] [3]	30	50	30	100
Positioning speed [rad/s] [3]	90	50	90	100
Tracking error [ms]	0.16 [4]	0.20 [5]	0.17 [4]	0.30 [6]
Step response time at 1% of full scale [ms]	0.36 [7]	0.68 [8]	0.39 [7]	0.69 [8]
Tracking error focusing unit [ms]	0.9			
Speed of moving lens [mm/s]	900			

[1] With f-theta Lens f = 163 mm / processing field size 120 mm x 120 mm [2] Single-stroke font height 1 mm, single line. [3] See "Calculation of speed".
[4] Calculation of acceleration time approx. 1.9 x tracking error [5] Calculation of acceleration time approx. 2.3 x tracking error [6] Calculation of acceleration time approx. 2.0 x tracking error [7] Setting to 1/1,000 of full scale [8] Setting to 1/5,000 of full scale

Calculation of speed:

Speed in processing field = focal length f-theta lens x processing speed
Example: FOCUSSHIFTER-14 with f-theta lens f = 163 mm, MA-Tuning, processing speed 30 rad/s,
v = 163 / 1,000 x 30 = 4.8 m/s

Mirrors and lenses:

Deflection mirrors and f-theta lenses with optimized mounts are available for many laser types, wavelengths, power densities, focal lengths and processing fields. Customized specific configurations are also possible.
For more information on possible combinations, please contact the RAYLASE support team at +49 8153 9999-699 or support@raylase.de.

Options:

The FOCUSSHIFTER-14 offers the possibility to connect a digital camera via a RAYLASE "On-Axis" camera lens and to use RAYLASE's special software components for image processing.

OPTICS SPECIFICATIONS

Wavelength and coatings	Mirror substrate	Maximum permissible laser power [W] [1]
355 nm	SI	100
532 nm	SI	200
1,070 nm	SI	300
1,070 nm	QU	1.000
10,600 nm	SI	300

[1] Valid for single-mode and multi-mode continuous wave (C) lasers

PROCESS-MONITORING

	FOCUSSHIFTER-14
Camera observation [nm]	640

The FOCUSSHIFTER-14 can be optionally equipped with a dust-tight output for camera observation and image processing.

CONFIGURATION EXAMPLES – FOCUSSHIFTER-14

Wavelength [nm]	355		532	
Effective focal length (EFL) [mm]	163	254	163	254
Spot diameter 1/e² [μm] [1]	8.7	13.6	13.0	20.3
Free focus range [mm]	-18.0 to +15.0	-47.0 to +36.0	-18.0 to +15.0	-47.0 to +36.0

Wavelength [nm]	1,070		10,600	
Effective focal length (EFL) [mm]	163	254	tbd	tbd
Spot diameter 1/e² [μm] [1]	26.1	40.7	tbd	tbd
Free focus range [mm]	-18.0 to +15.0	-47.0 to +36.0	tbd	tbd

[1] Beam quality $M^2 = 1$

The perfect companion:

RAYGUIDE

SIMPLE PROCESS SOFTWARE
Guarantees fast and easy interactions for customised programming. User-friendly set-up and calibration of the deflection unit and effortless automation.

SP-ICE 3

CONTROL CARD WITH FEEDBACK
Can be used universally as well as specifically for individual requirements. The laser system can thus be optimally controlled, optimised during development and monitored during operation.

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