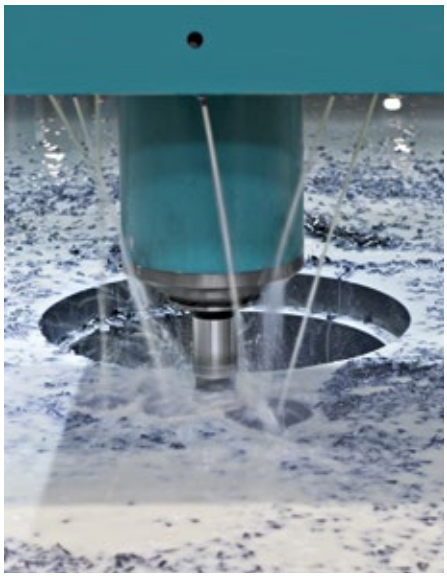
PAMA

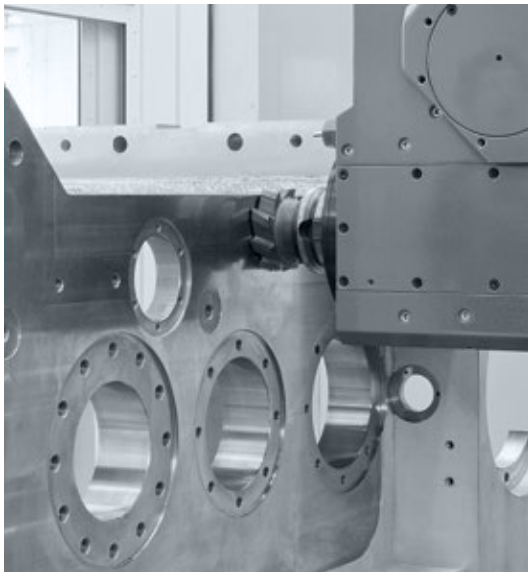


VERTIRAM

VERTICAL MACHINING CENTERS

TARGET AND APPLICATION

AEROSPACE
DIE & MOLD
EARTH MOVING
DIESEL ENGINES
ENERGY
GENERAL MACHINING



Vertiram is designed to be the perfect solution for large or heavy components whose machining is best performed in the vertical spindle plane. An unlimited number of boring, milling and turning operations can be performed in single set-up configuration.

The Vertiram range of portal machining centers is available in movable gantry type (GT) and movable table type (TT) models, both of which can be provided with fixed or movable crossrail and turning table options.

Wide range of clearance between the columns, from 2100 to 10100 mm. Clearance under spindle from 1700 to 5500 mm. Ram Z-axis stroke from 1300 to 2500 mm

GANTRY TYPE VERTICAL MACHINING CENTERS

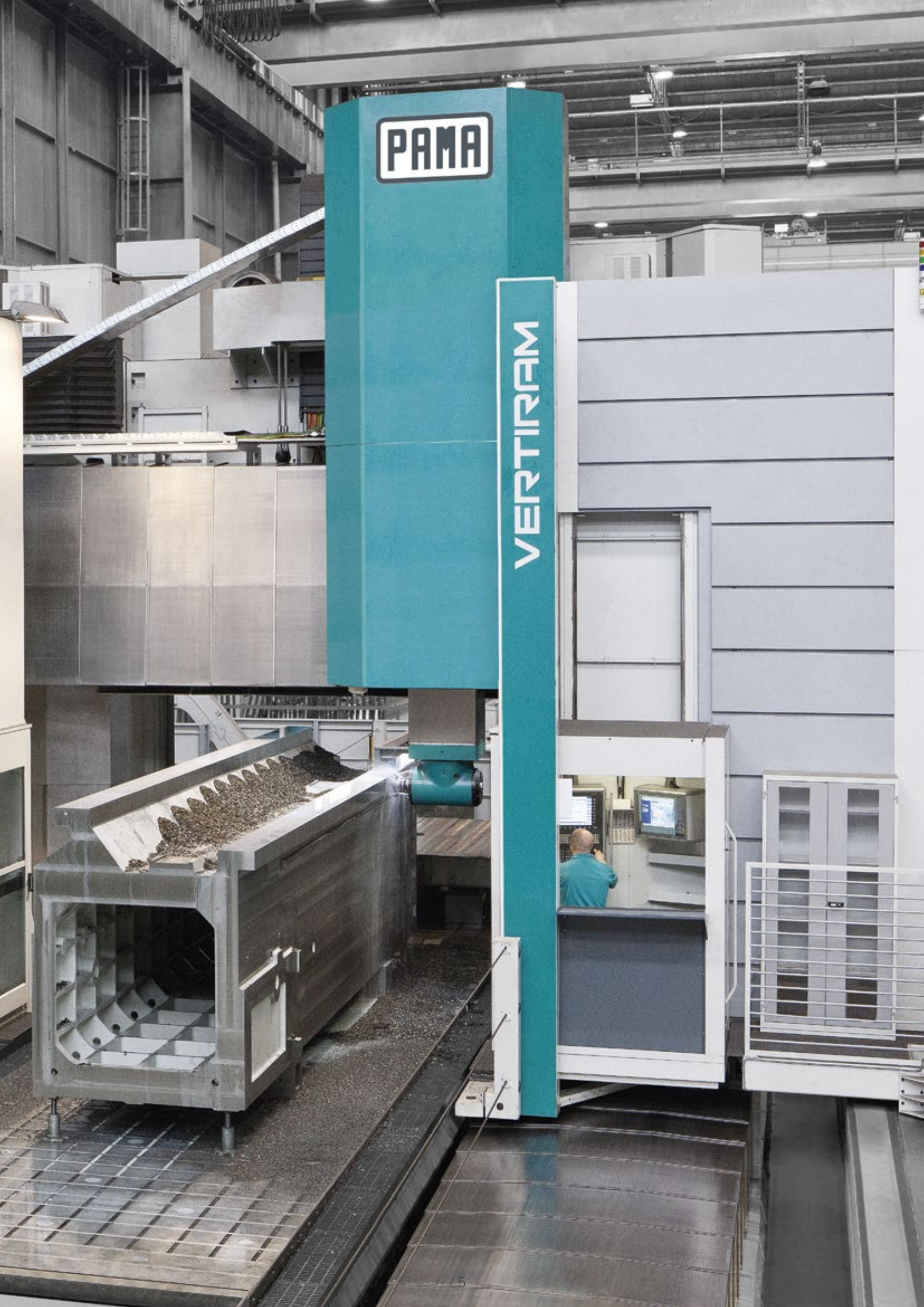
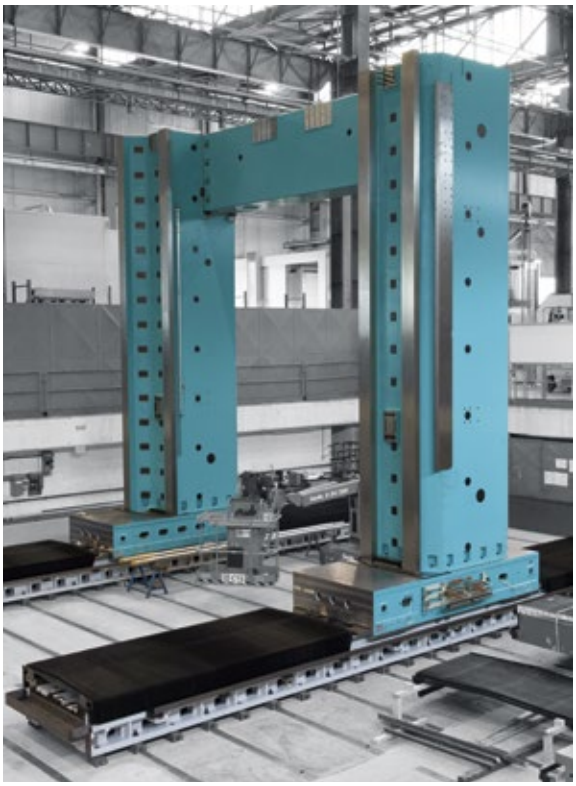

PAMA
VERTIRAM

TABLE TYPE VERTICAL MACHINING CENTERS

MACHINE FEATURES

Utilizing our vast, decades long experience in machine tool manufacturing, PAMA conceived the Vertiram. With its expansive models and options range, Vertiram can be tailored to meet the most demanding requirements whether that be speed, power or large workloads. Common feature on all models is the fully enclosed ram which, thanks to the hydrostatic support can satisfy the most difficult machining conditions.

the portal configuration structure consists of two main columns connected by a crossrail available both in fixed and movable configuration



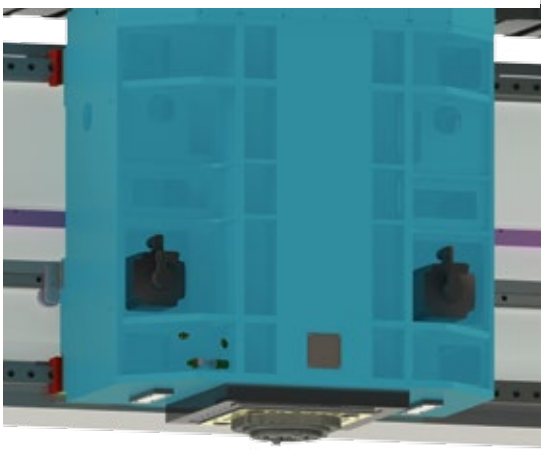
crossrail in movable configuration

AXES DRIVES

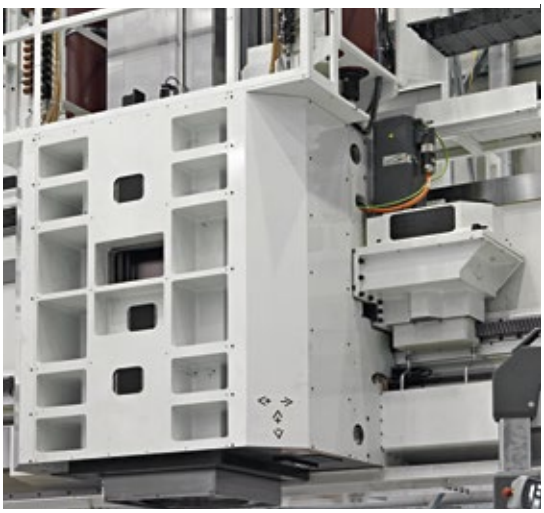
X and Y-axis movements via rack and double preloaded pinions or dual drive for backlash free operations

X axis with dual drive transmission (VR1000-VR2000 GT)

X Axis with double preloaded pinions (VR3000-VR4000 GT)

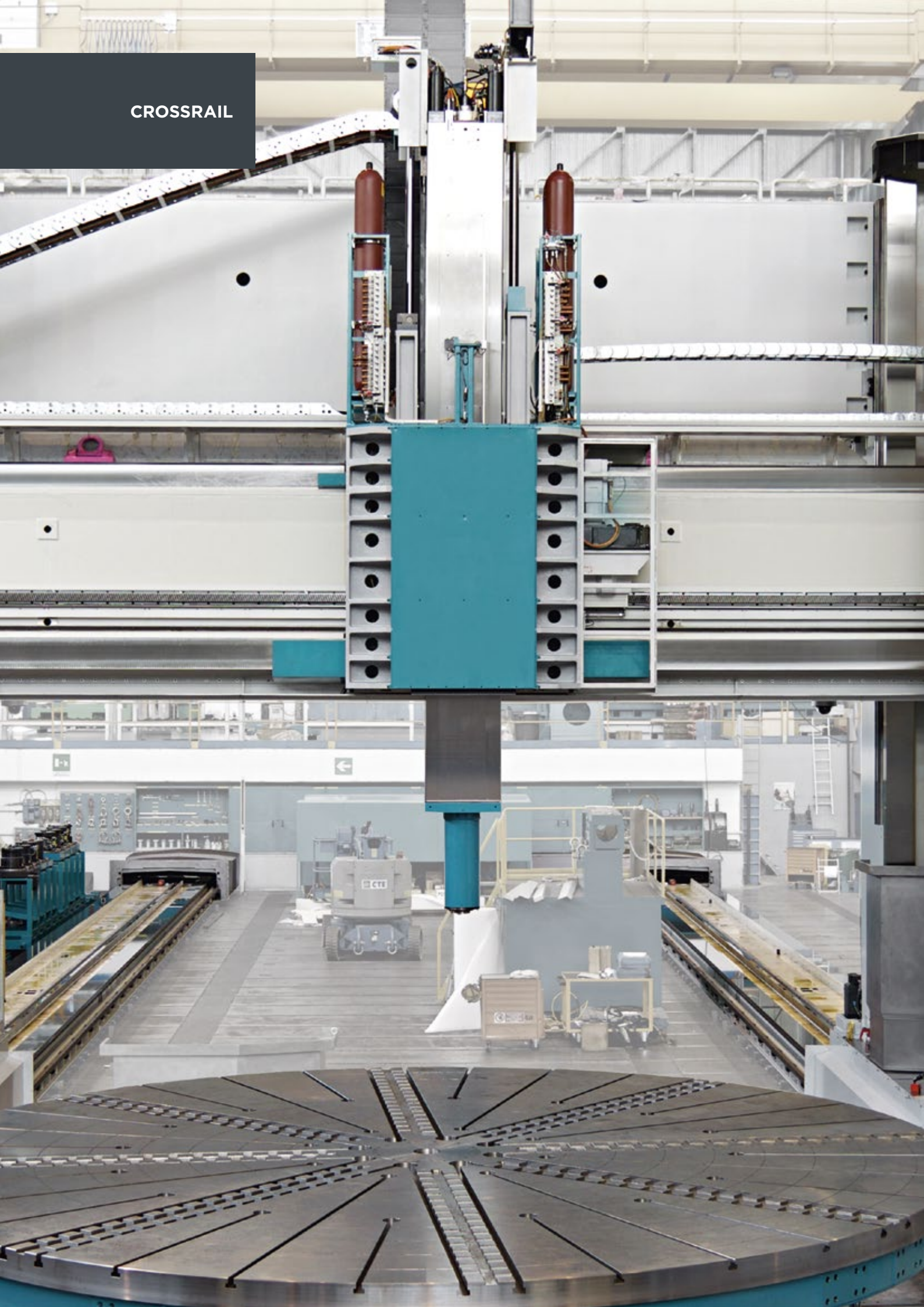


Y axis with dual drive transmission (VR1000-VR2000)



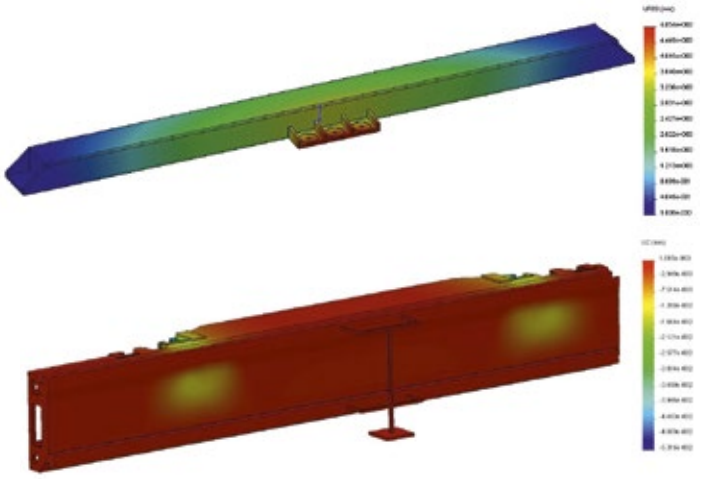
Y Axis with double preloaded pinions (VR3000-VR4000)

CROSSRAIL



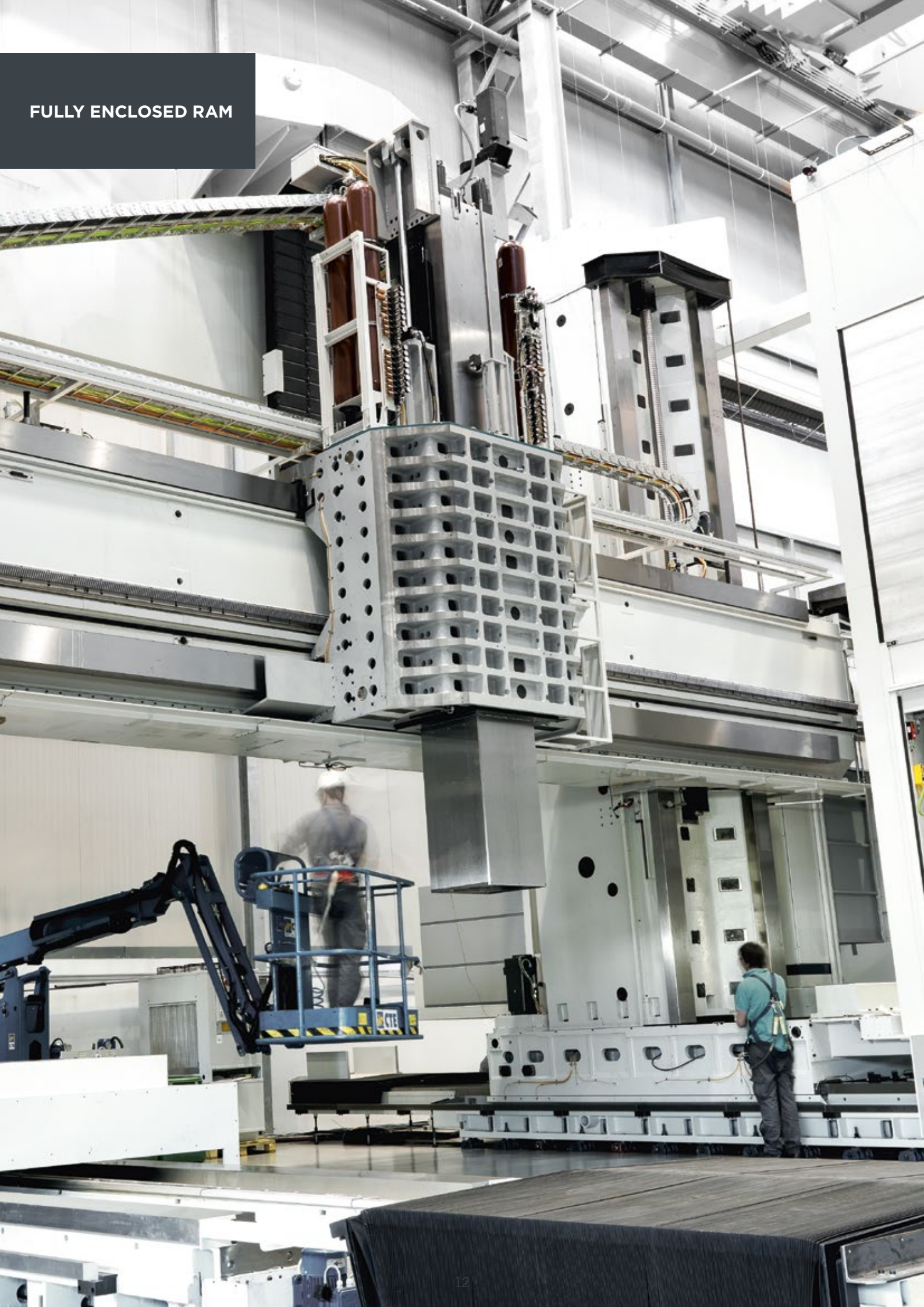
Crossrail, W-axis movement on pre-loaded hydrostatic guide ways. Crossrail vertical movement controlled by two independently driven, high load capacity rotating ball screws for well paired balancing

Torque and bending moment compensations are applied to the crossrail dependant upon ram headstock weight and position on Y-axis. Compensation controlled via hydraulic actuators driven by proportional valves.



HCC (Hydraulic Crossrail Compensation): real time CNC controlled compensation of bending and torsional crossrail deflections due to headstock weight and position

FULLY ENCLOSED RAM



All models boast monolithic headstock, fully enclosed with 16 hydrostatic pads supporting the vertical ram.

FULLY ENCLOSED RAM

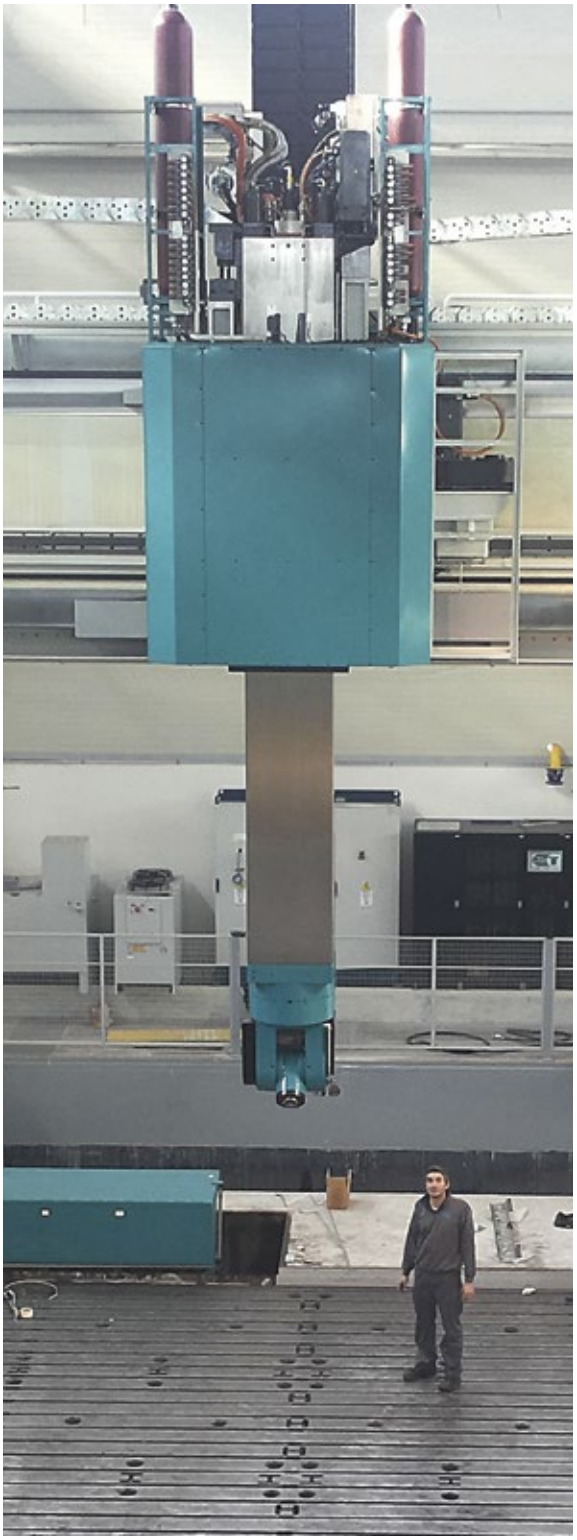


TABLE TYPE

single table

moving tables use large roller guideways for net loads up to 35 t and integral hydrostatic guideway for net load higher than 35 t

double table

hydrostatic guide way traversing table: Twin servo drive X axis, double pinion system with electronic preload for automatic backlash free operation: lowest inertia ratio high dynamic performance optimized for variable load

hydrostatic guide way traversing table

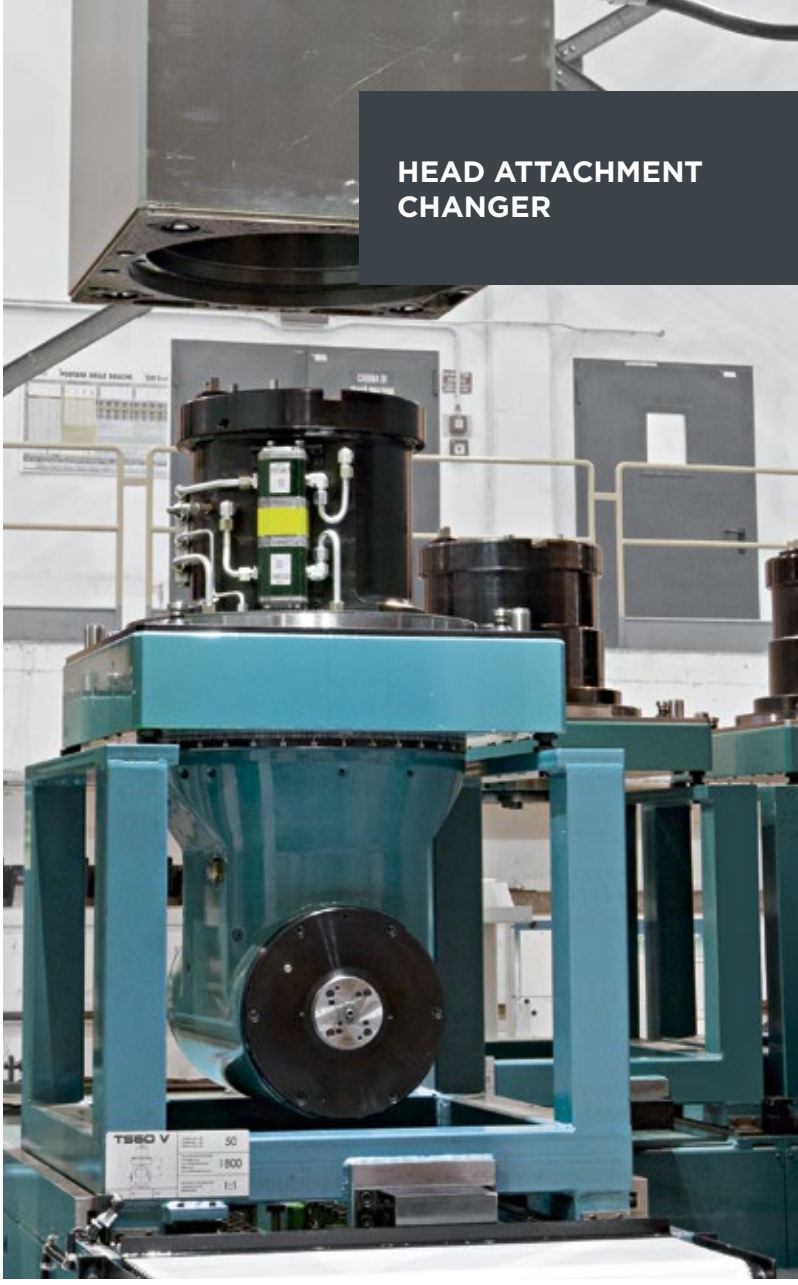
roller guide way traversing table

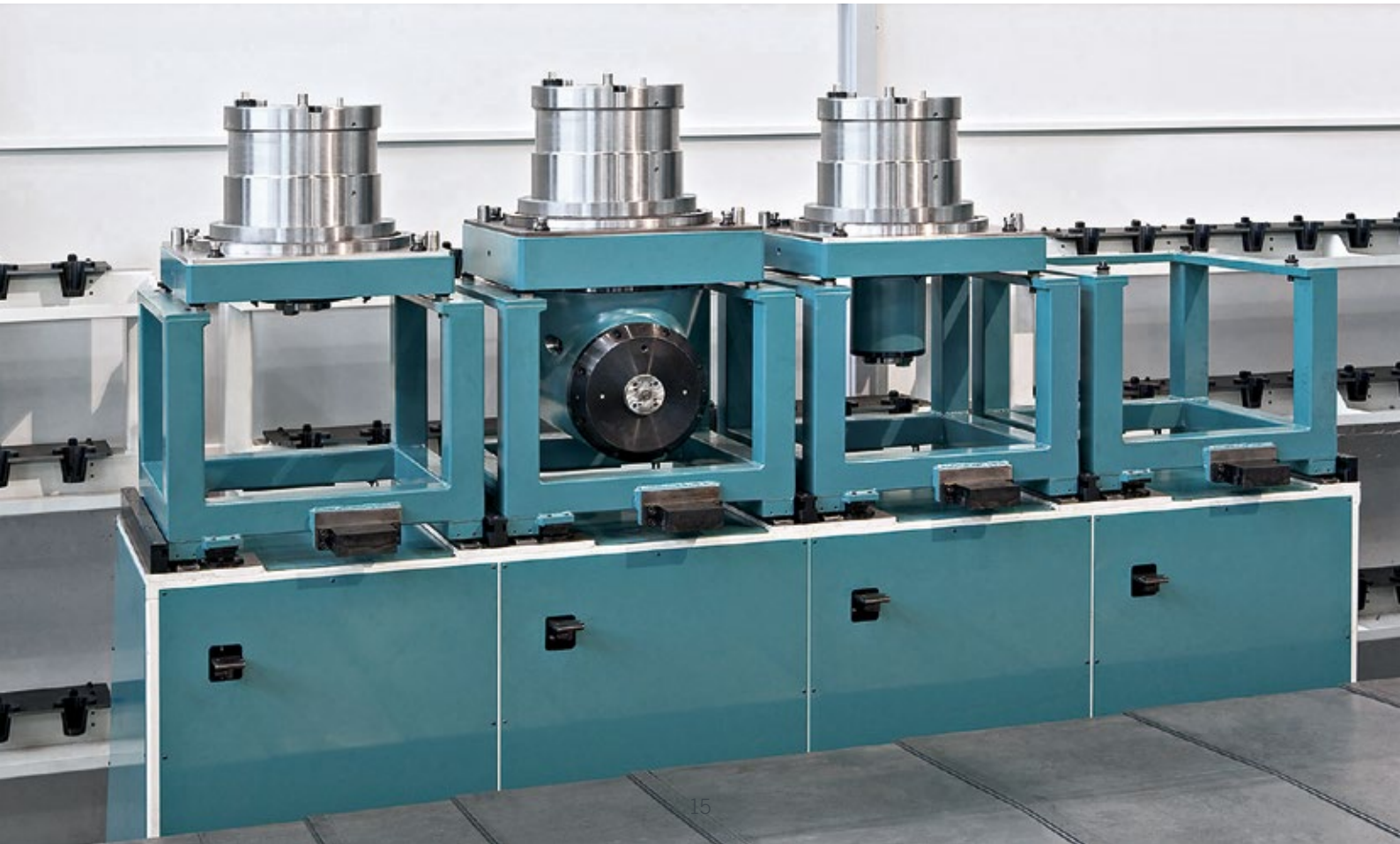
roller guide way traversing table: twin servo drive X axis

hydrostatic guide way traversing table

automatic head attachment changers are available in fixed, floor mounted or shuttle carrier configuration.
the Vertiram versatility can be further complemented with a wide range of head attachments which can be automatically loaded and unloaded onto the ram

HEAD ATTACHMENT CHANGER





AL
milling head

TS
right angle head

AL
boring and milling head

TTL
universal head with orthogonal axes

TW2
2 axes contouring head

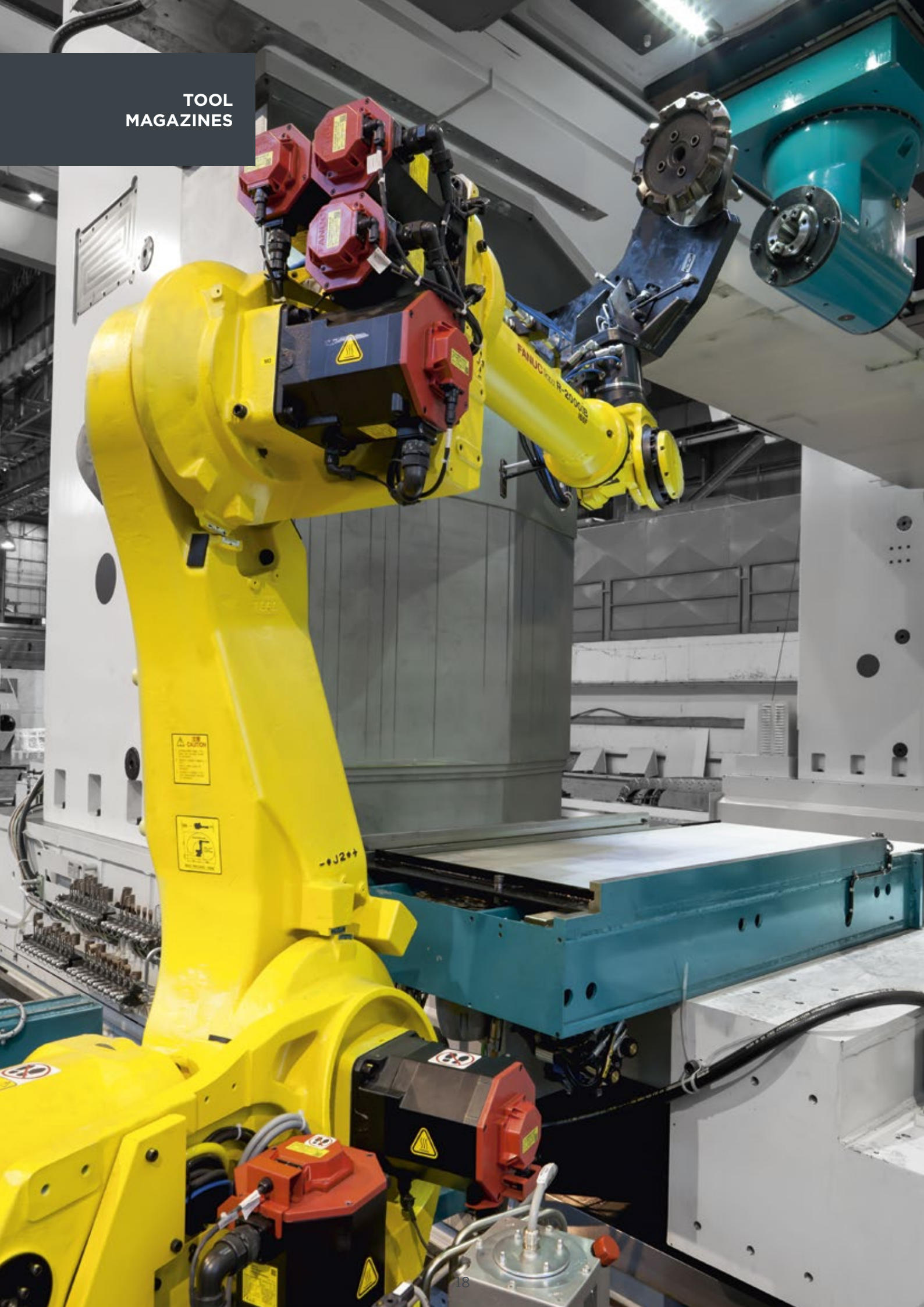
customized solutions
any special head required to solve specific technological problems

CSH (Clever Sensored Heads): equipped with temperature and acceleration sensors, allows for continuous head monitoring and predictive maintenance

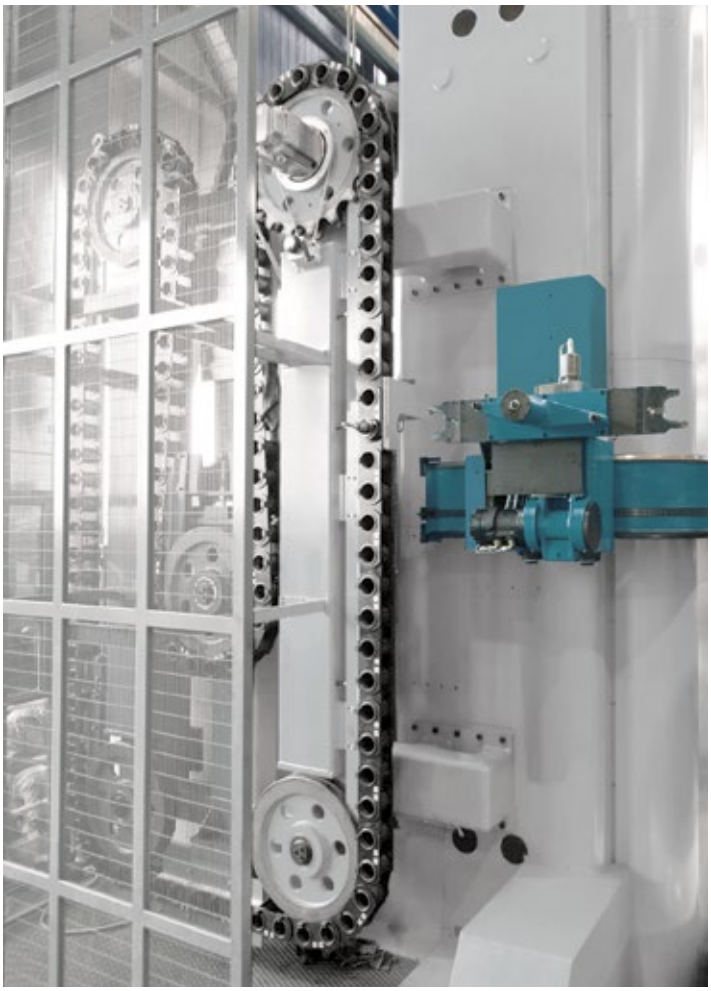
AHC (Automatic Head Calibration): automatic verification of head geometry and adjustment of offset parameters

PMP (PAMA Maintenance Program): software system reminds operators and maintenance personnel of scheduled PM activities

TOOL MAGAZINES



Vertiram may be customized to meet specific requirements for different application fields such as power generation, oil and gas, earthmoving, heavy mechanical engineering, shipbuilding, large diesel engines and aerospace

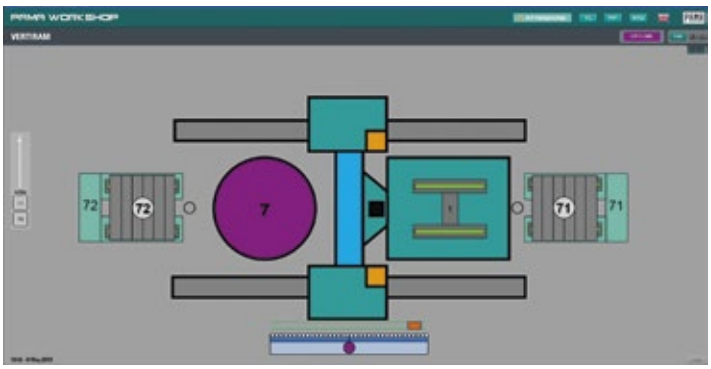


the productivity of Vertiram can be further enhanced by a comprehensive range of tool handling and tool storage solutions.

chain type magazines, mounted column side with 80 to 120 tool storage capacity

rack type tool magazines, floor mounted and modular, featuring large capacity with limited floor space

high level of automation is guaranteed by the availability of latest generation application software PR2 (Predictive Production Management) for the real time dynamic management of PAMA machining systems, even in unmanned production mode



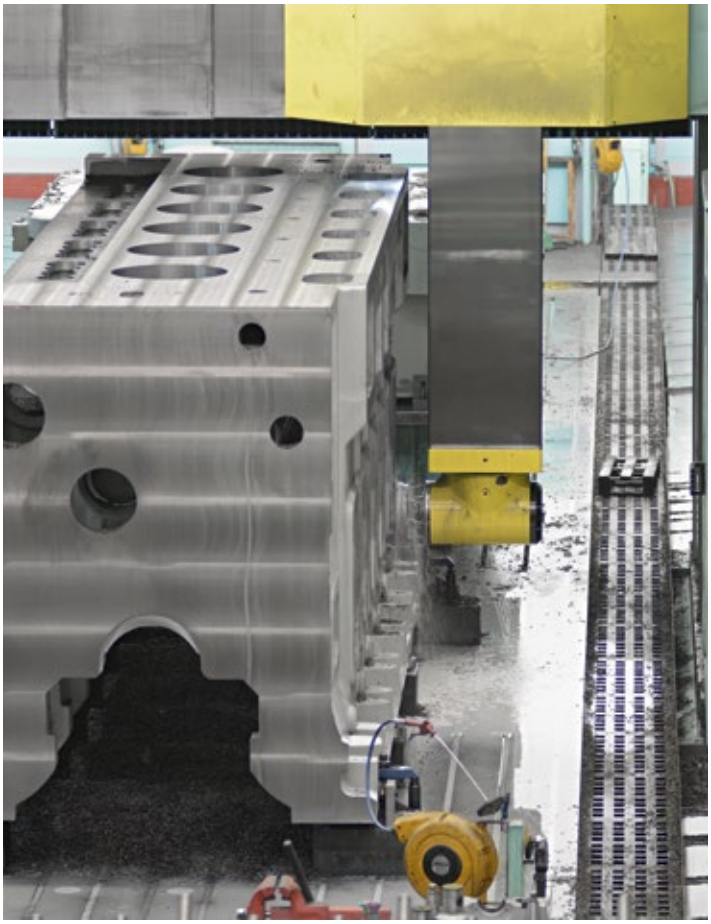
PR2 (Predictive Production Management): optimize the efficiency and the saturation of the production system

safety and ergonomics of the working environment are guaranteed by fully enclosed operator platforms with safety glass windows and user-friendly control panels

OPERATOR AND SAFETY

APPLICATIONS

power generation



diesel engines

APPLICATIONS

the outstanding performances of Vertiram are demonstrated by the following examples of real customer's applications, in optimized environment and tooling conditions

steel construction

Vertiram 3000 with AL200 head heavy feed milling:
material: forged steel 40CrNiMo8-6-1
milling cutter: 200 mm diameter
cutting: S318 rpm - 5500 mm/min feed
cutting: 2.5 mm depth, 160 mm width

Vertiram 3000 with AL200 head
heavy duty milling:
material: forged steel 40CrNiMo8-6-1
milling cutter: 200 mm diameter
cutting: S167 rpm - 603 mm/min feed
cutting: 12 mm depth, 200 mm width

Vertiram 3000 with TS80 angle head
heavy duty milling:
material: forged steel 40CrNiMo8-6-1
milling cutter: 200 mm diameter
cutting: S161 rpm - 707 mm/min feed
cutting: 11 mm depth, 200 mm width

MULTITASKING CONCEPT

the great versatility of Vertiram is further enhanced by availability of a new feature: turning capability. Together with the large number of available ram and headstock configurations and tailor made attachments, the new turning feature makes the Vertiram a real unbeatable multitasking system: less set-ups, better accuracy, less space, no idle time.

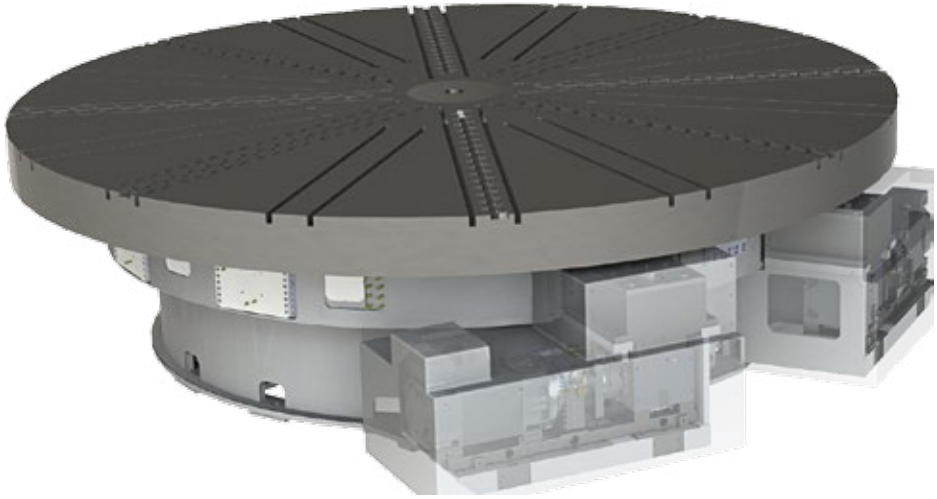
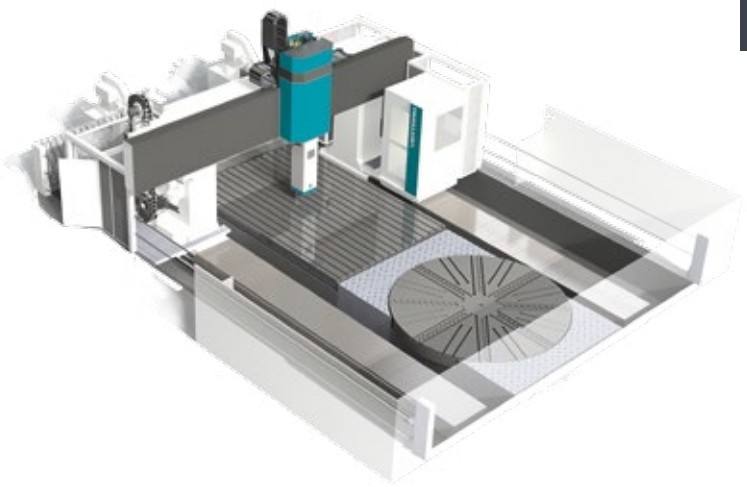


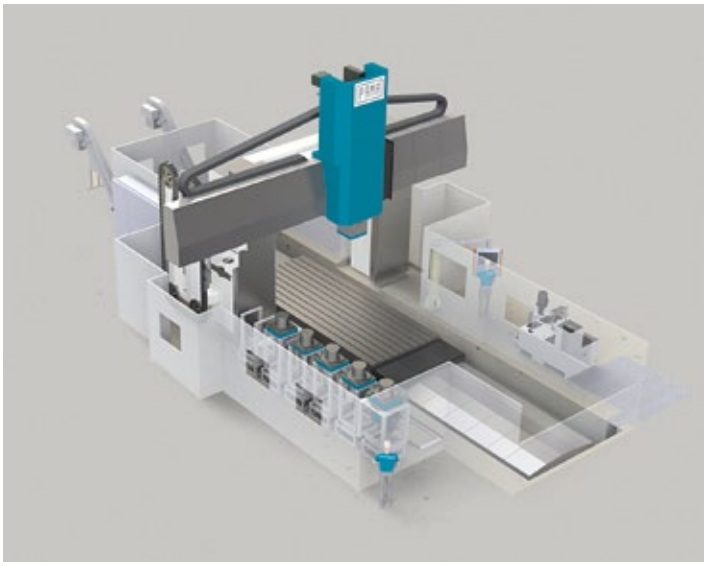
TABLE		TRT 3	TRT 6	TRT 10	TRT 15	TRT 30
Table diameter	mm	1250	1600	2000	2500	3200
Max loading capacity	t*	3	6	10	15	30
Turning power	kW	40	51	51	51	60/90
Max turning speed	rpm	320	250	200	160	120
Max turning torque	Nm	4000	10000	13000	16000	32000 / 62500

TABLE		TTH 60	TTH 100	TTH 150	TTH 200	TTH 300
Table diameter	mm	4000	5000-6000	5000-6000	8000	8000
Max loading capacity	t*	60	100	150	200	300
Turning power	kW	90/110	140/186	140 / 186	186-238	186-238
Max turning speed	rpm	100	75/55	75/55	45	45
Max turning torque	Nm	90000 / 126500	184000 / 300000	225000 / 300000	400000 / 500000	400000 / 500000

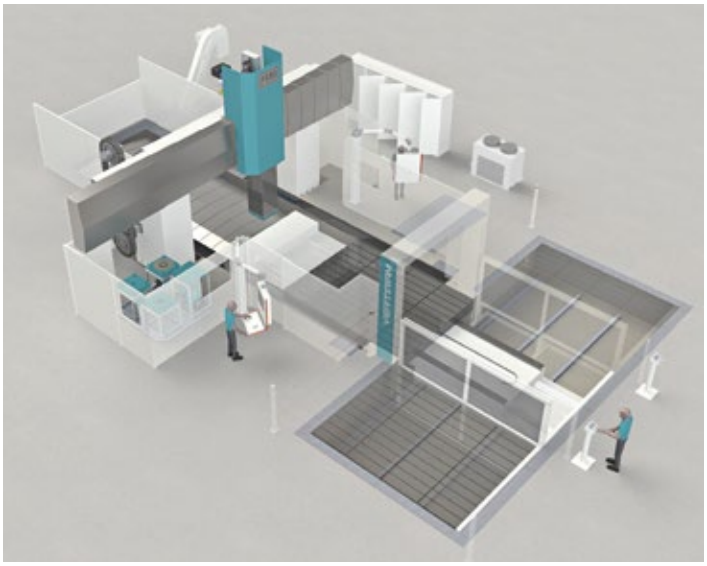
* t in metric ton



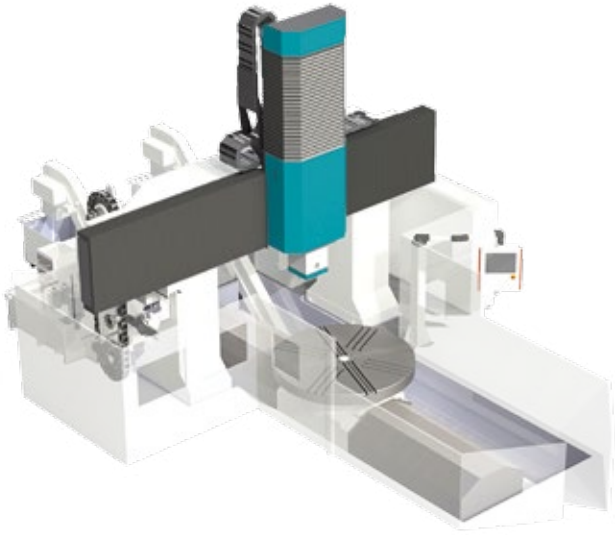
VERTIRAM GT with floor plates and turning table



VERTIRAM TT



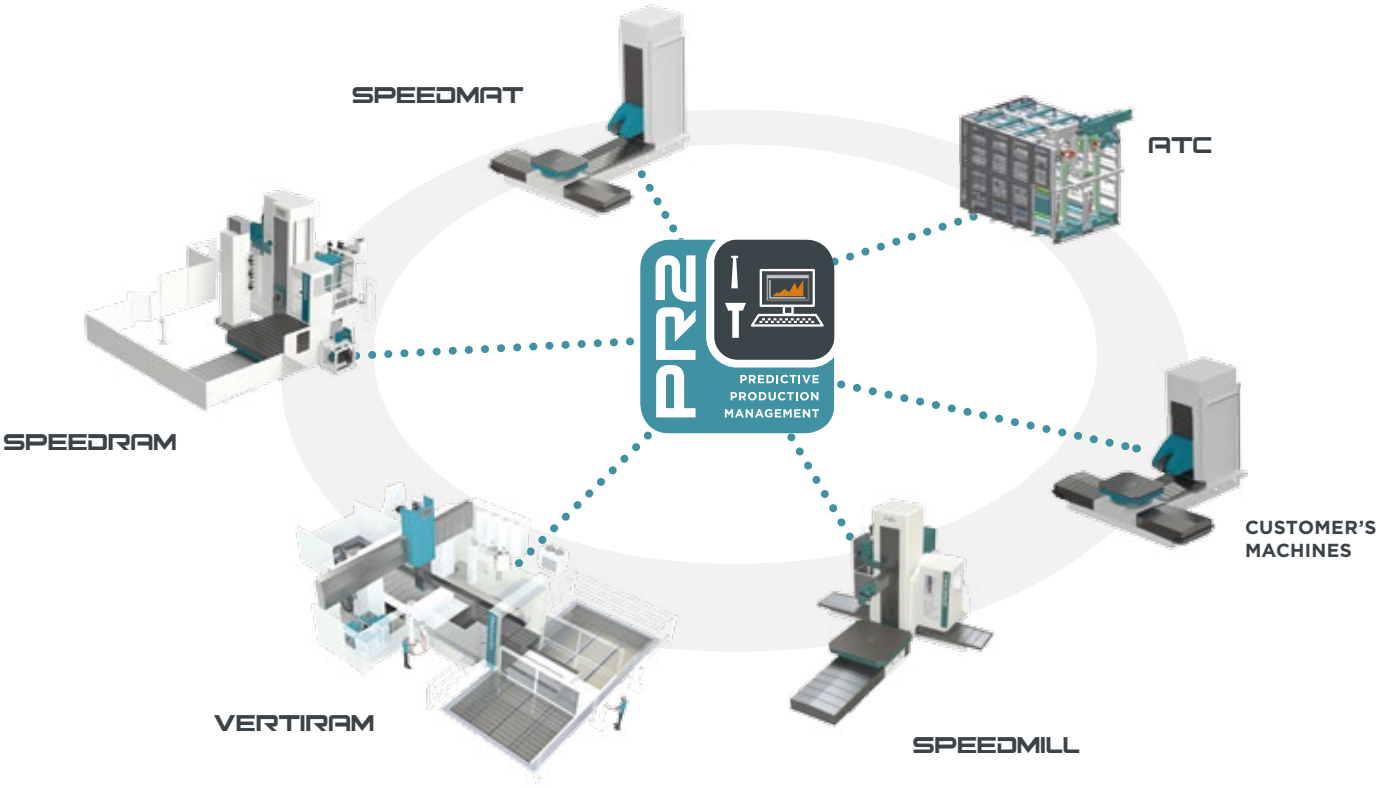
VERTIRAM TT with pallet changer



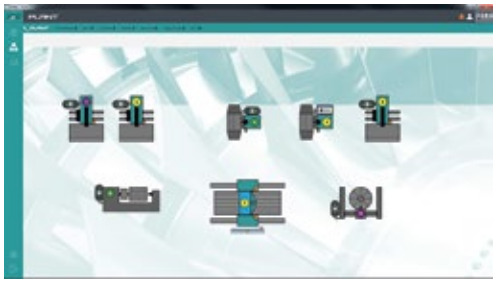
VERTIRAM TT with turning table

PR2 SUITE

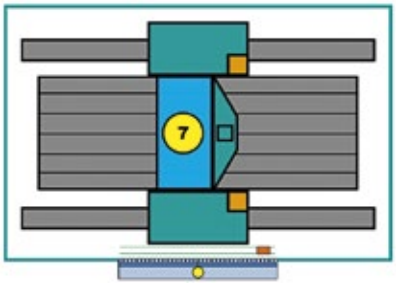
multi-level, applications integrated software developed by PAMA, designed to bring our clients to a higher level of efficiency and profit, thanks to our intuitive user interface, management of the production units in real time with predictive approach in both manned or unmanned conditions.



complete reporting of production unit activities



efficient managing of complex units (even with clients existing, compatible machines)

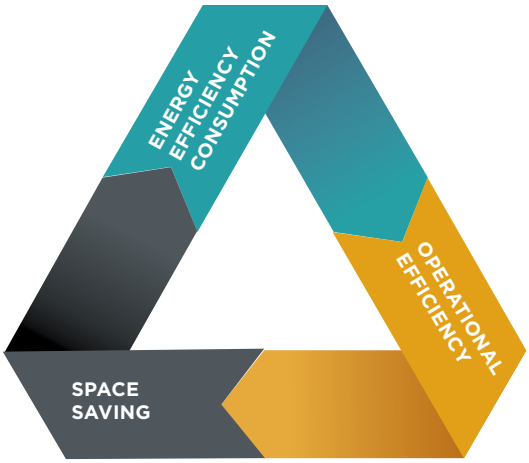


efficient managing of single production unit

PR2 (Predictive Production Management): optimize the efficiency and the saturation of the production system

PAMA GLOBAL EFFICIENCY

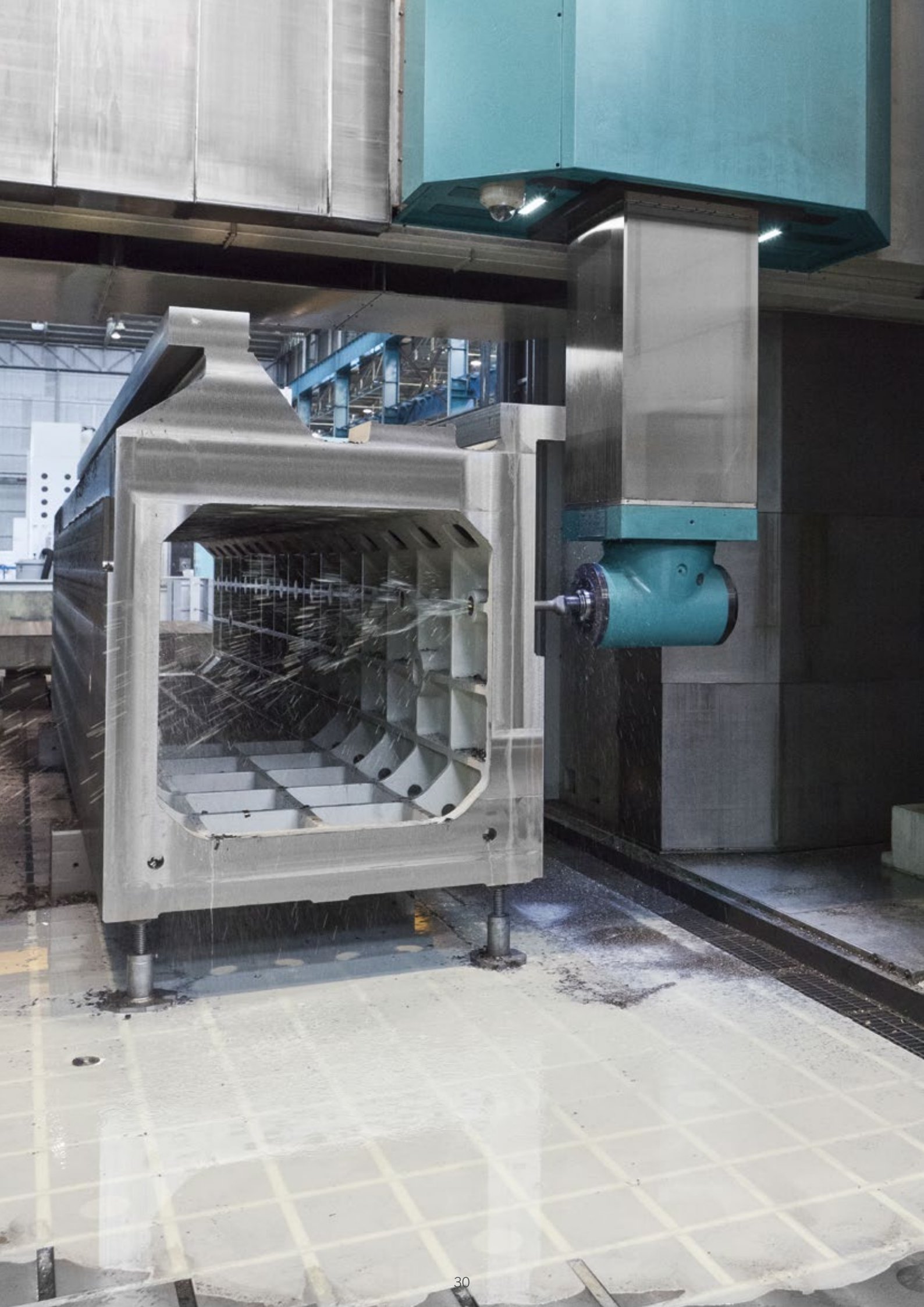
energy saving: low friction guides, use of direct drive technology, regenerating drives, intelligent use of all auxiliary units



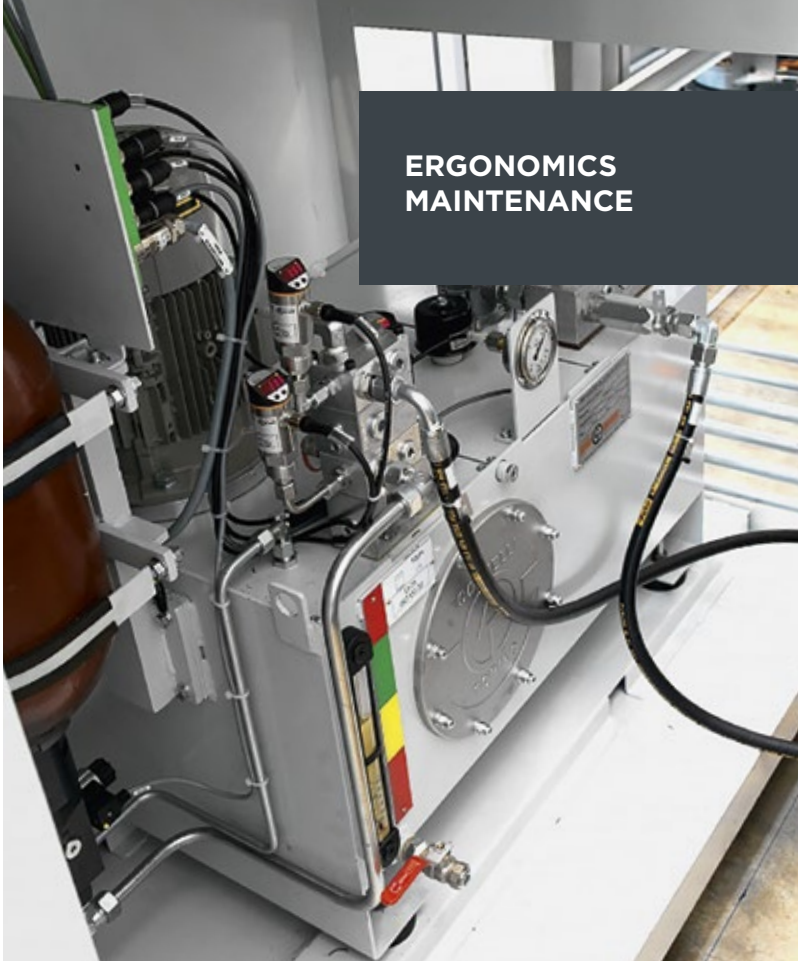
space saving: compact design, wide choice of tool changer, pallet changer and chip conveyors

operational efficiency: multitasking configuration, machine reliability, PMP preventive maintenance software, MSM machine sensor monitoring and predictive maintenance, PR2 suite to optimize the efficiency and the saturation of the production system

PGE (PAMA Global Efficiency): energy saving, space saving, operational efficiency



easy maintenance, combined with predictive maintenance, is a must for an efficient workshop management



ERGONOMICS MAINTENANCE

PMP (PAMA Maintenance Program): reminds operators and maintenance personnel of scheduled preventive maintenance activities via messages, alarm and/or icons permanently displayed on the CNC screen

required operations are illustrated by the visualization of the corresponding part of the operator maintenance manuals

PMP (PAMA Maintenance Program): software system reminds operators and maintenance personnel of scheduled PM activities

MSM (Machine Sensor Monitoring): temperature and acceleration sensors for continuous machine monitoring and predictive maintenance


puppinato


Tonn.30
VERTIRAM

VERTIRAM

		1000 - TT	2000 - TT	3000 - TT
WORKING AREA				
Clearance between columns	mm	2100 - 3100	3100 - 4100	3100 - 4600
Clearance under spindle (AL200)	mm	2000 - 2500	2500 - 3000	2500 - 4000
X axis (gantry)	mm	-	-	-
	mm	-	-	-
X axis (table)	mm	5000 - 6000	5000 - 11000	5000 - 11000
Y axis (headstock)	mm	2500 - 3500	4100 - 5100	4600 - 6100
Z axis (ram)	mm	1300 (1600)	1600 (2000)	1500 (2000)
W axis (cross-rail - option)	mm	1100	1100	1100 - 2600
TABLE (FLOOR PLATES)				
Table (floor plates) width	mm	1500 - 2500	2000 - 3000	2000 - 3500
Table length	mm	4000 - 5000	4000 - 10000	4000 - 10000
Loading capacity	t*	15 / 30	15 / 30 / 50	30 / 50 / 120
HEADSTOCK				
Ram section	mm	500 x 500	500 x 500	590 x 590
Max. spindle speed	rpm	5000 (7000)	6000 (4000)	3000 / 4000
Spindle gear ranges		Direct Drive	Direct Drive	Direct Drive
Max spindle power (S1)	kW	45 (73)	73 (90)	90
Max spindle torque (S1)	Nm	800 (1210)	1210 (2200)	3000 / 4000
V axis (boring bar option)	mm	-	800	-
Boring bar diameter	mm	-	160	-
C axis positions		-	-	720 x 0,5°
C axis continous (*)		± 400°	± 400°	-
C axis speed	rpm	30	30	-
C axis continous torque	Nm	4500	4500	-
C axis clamping force	Nm	10000	10000	-
AXES FEED RATES				
X,Y,Z,V rapid traverse/feed rate	mm/min	up to 40000	up to 40000	up to 25000
W axis rapid traverse/feed rate	mm/min	4000	4000	3000
GUIDEWAYS				
Configuration		roller/hydrostatic	roller/hydrostatic	full hydrostatic

* t in metric ton

(*) Only 73kW available
(*) Boring bar not available

4000 - TT	10000 - GT	20000 - GT	30000 - GT	40000 - GT
3600 - 5100	3100 - 4600	3100 - 5600	3100 - 5600	5100 - 10100
2500 - 5500	1700	2500 - 3000	2500 - 4000	2500 - 5500
-	4000	4000	4000	6000
-	+N x 1000	+N x 1000	+N x 1000	+N x 1000
5000 - 13000	-	-	-	-
4600 - 6600	3100 - 4600	4100 - 6600	4600 - 7100	6600 - 11600
2000 (2500)	1300 (1600)	1600 (2000)	1500 (2000)	2000 (2500)
2600 - 3600	NO	1100	1100 - 2600	2600 - 3600
2500 - 4000	2000 - 3500	2000 - 4500	2000 - 4500	4000 - 9000
4000 - 12000	-	-	-	-
50 / 120 / 200	-	-	-	-
590 x 590	500 x 500	500 x 500	590 x 590	590 x 590
4000	5000 (7000)	6000 (4000)	3000 / 4000	4000
4	Direct Drive	Direct Drive	Direct Drive	4
103	45 (73)	73 (90)	90	103
10730	800 (1210)	1210 (2200)	3000 / 4000	10730
-	-	800	-	-
-	-	160	-	-
720 x 0,5°	-	-	720 x 0,5°	720 x 0,5°
-	± 400°	± 400°	-	-
-	30	30	-	-
-	4500	4500	-	-
-	10000	10000	-	-
up to 25000	up to 30000	up to 30000	up to 25000	up to 25000
3000	-	-	3000	3000
full hydrostatic	roller/hydrostatic	roller/hydrostatic	full hydrostatic	full hydrostatic

09/15 Grafiche Antiga spa

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PAMA has a policy of continuous improvement of its products and reserves the right to change materials and specifications without notice.

COMPANY WITH QUALITY MANAGEMENT SYSTEM CERTIFIED BY DNV
= ISO 9001:2008 =