

**FRYER**<sup>®</sup>  
MACHINE SYSTEMS



**5 AXIS MACHINING**

## 5X SERIES

### 5 AXIS SIMULTANEOUS WITH ARTICULATING SPINDLE

The 5X Series features a tilting / rotary head providing 360° of rotation and 240° of spindle tilt. This flexible spindle solution is perfect for the aerospace, automotive and oil field industries where rotating the part is not practical.

#### THE BEST COMPONENTS MAKE THE BEST MACHINE

- ▲ 2 axis rotate/tilt spindle
- ▲ 18,000 RPM HSK63 spindle
- ▲ C3 grade double nut ball screws with class 7 bearings
- ▲ Box way construction with Turcite B liners
- ▲ High accuracy angular contact bearings
- ▲ Automatic metered lube systems
- ▲ Certified FC-40 Mehantie castings
- ▲ Spindle refrigeration unit
- ▲ 24 tool arm type ATC
- ▲ Digital servo motors and drives with absolute encoders
- ▲ ABEC 9 ultra precision spindle bearings
- ▲ Test part cut and shipped with each machine
- ▲ Hand built precision +/- .0002" entire travel
- ▲ Two year warranty



## 5X SERIES

### REDUCED SET-UP

Five-axis technology eliminates multiple setups required to re-position the workpiece at complex angles. This not only saves time, but greatly reduces errors. This saves on costly tooling and fixture expenses required to hold the workpiece in place. It also provides the ability to machine complex parts that are not otherwise possible—including angled holes, pockets, features and 5 axis contours.



#### 5 AXIS LARGE PART VERSATILITY

- ▲ 2 axis head spins 360° and tilts 240°
- ▲ 25 HP 18,000 RPM spindle
- ▲ HSK 63 rigid dual contact spindle
- ▲ Spindle refrigeration unit
- ▲ Heavy duty box way construction

#### 5 MODELS TO CHOOSE FROM

- ▲ 5X-45     **45" x 25" x 25"**
- ▲ 5X-60     **60" x 30" x 38"**
- ▲ 5X-100    **100" x 35" x 34"**
- ▲ 5X-120    **120" x 44" x 39"**
- ▲ 5X-160    **160" x 44" x 39"**

#### IDEAL FOR

- ▲ Large aerospace parts
- ▲ Multi-sided machining
- ▲ Trimming large dies
- ▲ Rapid prototyping large parts

## SX SERIES

### 5 AXIS SIMULTANEOUS WITH TILTING SPINDLE

The Fryer SX 5 axis machining centers feature a unique rotating spindle that moves 45° left or right ( $\pm 90^\circ$  optional). The spindle nose gageline is kept at the center of rotation for exceptional accuracy. This design offers better performance for many applications including cylinder heads, air foils, gear cutting and tire mold applications. Featuring a powerful 20 HP vibration free motorized spindle, this machine has both low speed torque and high speed precision.

#### VERSATILE 5 AXIS PERFORMANCE

- ▲ 15,000 RPM high torque 20 HP Weiss motorized spindle
- ▲ Unique rotating spindle axis
- ▲ Spindle can move up to  $\pm 90^\circ$
- ▲ 24 tool high speed twin arm ATC
- ▲ 8,500 BTU spindle refrigeration unit
- ▲ Chip auger system
- ▲ 'B' Axis rotary head features spindle gageline at rotary centerline
- ▲ 1,200 IPM rapid feedrate (except SX-100)
- ▲ Dual fluorescent work lamps
- ▲ Remote electronic handwheel
- ▲ Flood coolant system
- ▲ High pressure washdown system and hose



## SX SERIES

### FLEXIBLE SET-UP

Fryer's SX Series provides a flexible solution to multi-sided machining. The table mounted rotary table can be positioned in the vertical or horizontal plane allowing machining of up to 5 sides of a part.



#### HIGH QUALITY CONSTRUCTION

- ▲ Nikken rotary tables with carbide worm gear
- ▲ Spindle refrigeration unit
- ▲ Box way construction with Turcite B liners
- ▲ Weiss vibration free motorized spindle
- ▲ C3 grade double nut ball screws with class 7 bearings
- ▲ ABEC 9 ultra precision spindle bearings
- ▲ Digital servo motors and drives with absolute encoders

#### 2 MODELS TO CHOOSE FROM

- ▲ SX-60     **60" x 30" x 28"**
- ▲ SX-100   **100" x 35" x 26"**

#### IDEAL FOR

- ▲ Cylinder head porting
- ▲ Turbine blade machining
- ▲ Multiple side machining

## TR SERIES

### 5 AXIS SIMULTANEOUS WITH TRUNNION TABLE

The Fryer TR Series 5 axis machining centers feature a trunnion rotary table for full 5 axis contouring. Built on the rugged box way Fryer MC series platform they feature exceptional performance. The trunnion rotary tables feature extra large bearings and a piston type disk brake for exceptional rigidity. Accuracy is maintained with a high performance dual worm gear design and a high accuracy ring gear assembly.

### FEATURES & OPTIONS

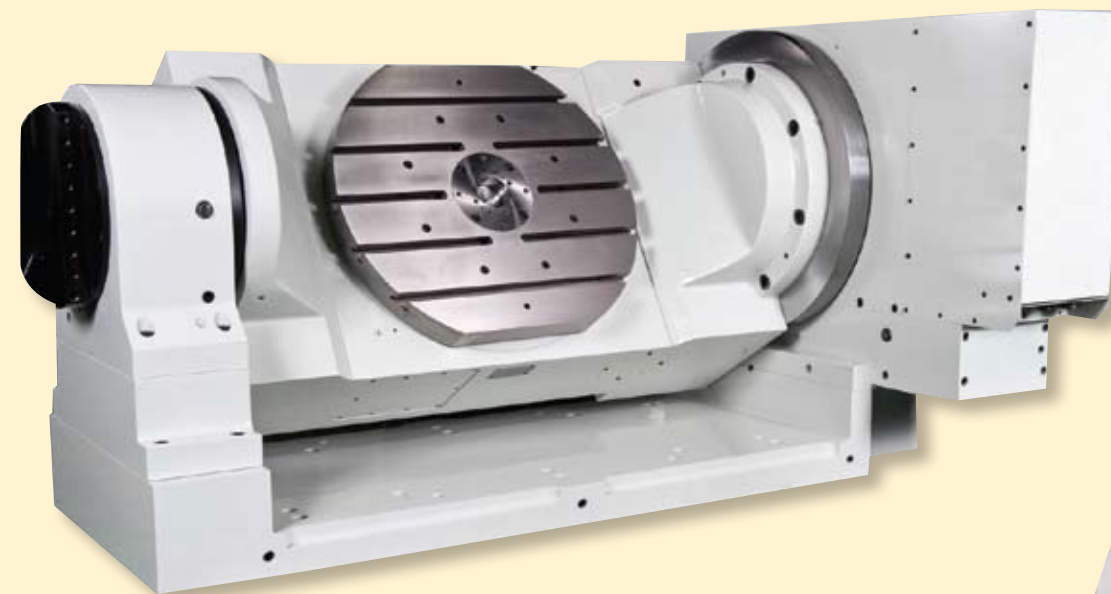
- ▲ 40 taper, 8,500 RPM spindle
- ▲ 24 Tool arm type ATC
- ▲ 2,500 RPM rigid tapping
- ▲ 1,200 IPM rapid feedrate
- ▲ Automatic lube system w/ low lube fault
- ▲ Remote electronic handwheel
- ▲ 5 Axis special function package
- ▲ 12,000 & 20,000 RPM spindles
- ▲ Automatic tool setter
- ▲ Wireless part probe
- ▲ Wireless ethernet networking
- ▲ High speed machining package



## TR SERIES

### 5 AXIS MADE EASY

The TR Series 5 axis machining centers allow complex contours to be machined easily and quickly. The robust machine construction features excellent cutting performance while the large trunnion table is ideal for multi-sided machining.



### CONSTRUCTION

- ▲ 2 axis trunnion rotary table spins 360° and tilts 240°
- ▲ Box way construction with Turcite B liners
- ▲ Digital servo motors and drives with absolute encoders
- ▲ All axes laser calibrated & ballbar verified
- ▲ Test part cut and shipped with each machine
- ▲ Two year warranty

### 3 MODELS TO CHOOSE FROM

- ▲ TR-10 **30" x 18" x 22"**
- ▲ TR-45 **45" x 25" x 25"**
- ▲ TR-60 **60" x 30" x 38"**

### IDEAL FOR

- ▲ Medical
- ▲ Automotive
- ▲ Aerospace

## CUSTOM CONFIGURATION

All Fryer 5 axis machining centers are custom configured to your needs. We offer a wide range of accessories designed to increase your productivity and profits.



### MACHINE CONSTRUCTION

- ▲ Heidenhain glass scales
- ▲ 12, 24, 40, & 60 tool ATC's
- ▲ Extended Z travel
- ▲ Rigid boxway construction



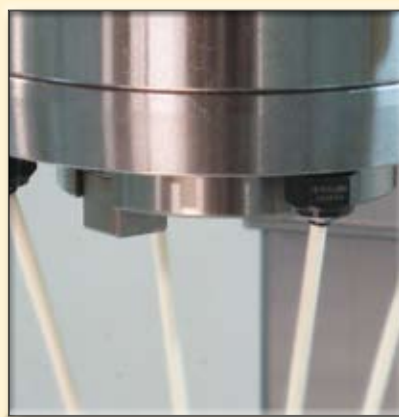
### COOLANT & CHIP REMOVAL

- ▲ High volume flood coolant
- ▲ 1,000 PSI coolant thru the spindle
- ▲ Chip wash down system
- ▲ Chip auger / conveyor



### AUTOMATIC SET-UP

- ▲ Automatic tool setter
- ▲ Wireless part probe
- ▲ One touch macros
- ▲ Electronic handwheel



### SPINDLE SYSTEMS

- ▲ High speed spindles to 40,000 RPM
- ▲ Spindle refrigeration unit
- ▲ HSK 63 rigid dual contact spindle
- ▲ 40 taper Big Plus dual contact spindle

## TOUCH 2100 5 AXIS CNC

The Siemens based Touch 2100 is the ultimate control for 5 axis machining. Built on the powerful 840D platform, it features high end 5 axis functions not available on any other control. Rotary tool center point compensation, 3D tool nose compensation and 5 axis spline interpolation make programming faster and easier than ever before. Large memory, advanced editor, Ethernet, USB port, high speed processing and high speed machining are just a few of the reasons why the Touch 2100 is the world most powerful 5 axis control.



### HARDWARE

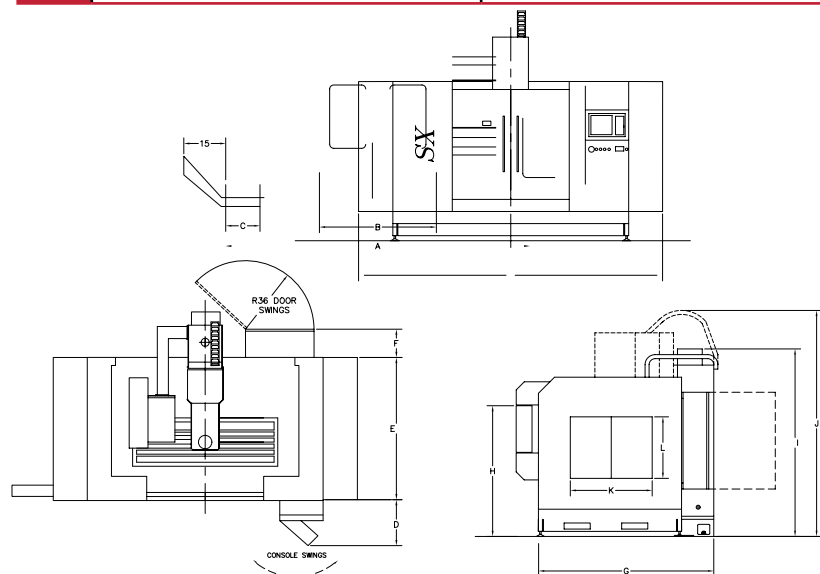
- ▲ High speed Intel CPU 1.7GHZ
- ▲ 31 axis, 10 channels
- ▲ 256 MB part program storage
- ▲ Front Panel USB Port
- ▲ 15" touch screen 1024 x 768 XGA
- ▲ 10/100 MB/sec Ethernet port
- ▲ Integrated keyboard with 14 direct keys
- ▲ Reliable CF card memory
- ▲ Digital Drives with Full Regen Capability for Energy Savings ( no brake resistors) 'Green'
- ▲ Coated Circuit Boards to Protect Against Contaminants
- ▲ Compact servomotor with Heidenhain absolute encoders
- ▲ Asynchronous spindle motor with full positioning capability
- ▲ Weiss Motorized Spindles for SX series

### SOFTWARE

- ▲ Multi Axis Interpolation
- ▲ Inverse Time Feed with G93
- ▲ Spline Interpolation for 5 axis
- ▲ Rotary Tool Center Point Compensation
- ▲ 3D Tool Nose Compensation
- ▲ Handwheel Run Feature
- ▲ Programmable Feed Forward
- ▲ Helical Interpolation
- ▲ High Speed Look Ahead
- ▲ Measuring Functions with Touch Probe
- ▲ Protection Zones
- ▲ Repos (Repositioning)
- ▲ 3D solid model Simulation
- ▲ Friction compensation

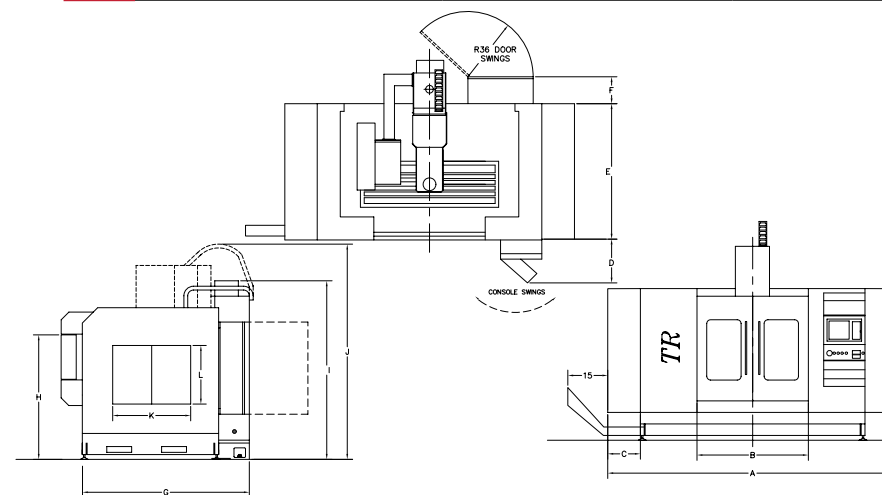
SPECIFICATIONS		SX-60	SX-100
MACHINE CAPACITY	X Travel	60"	100"
	Y Travel	30"	35"
	Z Travel	28"	26"
	A Travel	+/- 360°	
	B Travel	+/- 95°	
	Table Load (Evenly Distributor)	4,500 lbs.	5,500 lbs.
	Table Size	24" x 67"	30" x 112"
	T-Slots (No. / Width)	5 / .709"	
	Table Top to Floor	32"	35"
	Motor HP (Peak)	20.0 HP	
	Spindle Speed (RPM)	500 – 15,000 Refrigerated	
	Spindle Torque	110 ft/lbs @ 500 RPM	
	Tool Type/Taper	HSK-63A	
	ATC	Spindle Nose to Table (Max-Min)	32" – 4"
Spindle Center to Column (Throat)		30"	36"
Tool Storage Capacity		24 Station Arm Type	
Tool Change Time		2 Seconds	
Max. Adjacent Tool Diameter		3.0"	
Max. Tool Weight		10.0 LBS	
PERFORMANCE	Max. Tool Length	12"	
	Positioning Accuracy	+/-0.0002"	
	Position Repeatability	+/-0.0001"	
	Axis Rapid Traverse	1,200 IPM X,Y 900 IPM Z	500 IPM X, 800 IPM Y, 600 IPM Z
	Rotary Rapid Traverse	66 deg/sec - 22 RPM (133deg/sec - 44 RPM)	
	Cutting Feed Rate	.001 – 900 IPM	
GENERAL INFO	Servo Type	AC Digital Brushless	
	Axis Thrust (Peak)	4,955 lbs. X,Y – 6,193 lbs. Z	
	Air Pressure Requirements	90 PSI 5 CFM	
	Coolant Capacity	90 Gallons	
	Coolant Flow	9 GPM	
	Power Requirements	80 AMP 430–500 VAC 3 Phase (200–250 VAC Optional)	
Operating Dimensions (WxDxH)	161" x 112" x 112"	211" x 122" x 114"	
Machine Weight	19,500 lbs.	25,500 lbs.	

SPECIFICATIONS		TR-10	TR-45	TR-60	
MACHINE CAPACITY	X Travel	30"	45"	60"	
	Y Travel	18"	25"	30"	
	Z Travel	22"	25"	38"	
	A Travel	+110° / - 110°	+20° / - 110°	+110° / - 110°	
	C Travel	+/- 360°			
	Table Size	16.5" X 31.5"	24" x 51"	24" x 67"	
	Table Load (Evenly Distributed)	2,500 LBS	4,500 lbs.	5,500 lbs.	
	SPINDLE	Motor HP (Peak)	25.0 HP (40.0 HP Optional)		
		Spindle Speed (RPM)	60-8,500 RPM (10,000 and 12,000 RPM Refrigerated Optional)		
		Spindle Torque	155 Ft/Lbs @ 350 RPM		
		Tool Type/Taper	CAT - 40		
		Spindle Nose to Machine Table	29" - 7"	38" - 10"	42" - 4"
		Spindle Nose to Platter	18.4" - 0"	26.8" - 1.8"	27.5" - 0"
		Spindle Center to Column (Throat)	18"	25"	30"
TRUNNION		Platter Diameter	8"	10"	12.6"
		Max Part Swing (Reduced at 90°)	8.65"	16.5"	24.0"
		Max Weight on Platter	260 lbs.	320 lbs.	500 lbs
		Through Hole Diameter	1.2"	2.8"	4.3"
		Rotating Speed on Tilting	16 RPM	16 RPM	16 RPM
		Rotating Speed on Rotating	33 RPM	33 RPM	16 RPM
ATC		Tool Storage Capacity	20 Station Arm Type	24 Station Arm Type	
	Tool Change Time	2 Seconds			
	Max. Adjacent Tool Diameter	3.70"	3.20"		
	Max. Tool Weight	15.5 lbs.			
	Max. Tool Length	11"	13"		
	PERFORMANCE	Positioning Accuracy	+/-0.0002"		
Position Repeatability		+/-0.0001"			
Rapid Traverse		1,200 IPM X,Y 900 IPM Z			
Cutting Feed Rate		.001 -900 IPM			
Axis Thrust (Peak)		3,500 lbs.	4,955 lbs. X, Y - 6,193 lbs. Z		
GENERAL INFO		Air Pressure Requirements	90 PSI 5 CFM		
	Coolant Capacity	70 Gallons	90 Gallons		
	Coolant Flow	5 GPM	9 GPM		
	Power Requirements	40 AMP 430-500 VAC 3 PHASE (200-250 VAC Optional)			
	Operating Dimensions (WxDxH)	93" x 77" x 89"	127" x 104" x 110"	161" x 112" x 112"	
	Machine Weight	9,900 LBS	14,500 lbs.	20,000 lbs.	



**MACHINE SPECIFICATIONS** DIMENSIONS ARE IN INCH

REF	SX-60	SX-100
A	116	275
B	52.5	70
C	21.75	68
D	22	22
E	68	84
F	20	20
G	88	124
H	70	70
I	95	126
J	116	331
K	45	98.5
L	30	30



**MACHINE SPECIFICATIONS** DIMENSIONS ARE IN INCH

REF	TR-10	TR-45	TR-60
A	93	129	129
B	31	27	27
C	9	164	204
D	22	82	102
E	57	60	80
F	20	129	129
G	77	105	105
H	70	115	115
I	88	126	126
J	95	291	331
K	29.5	98.5	98.5
L	37.5	30	30

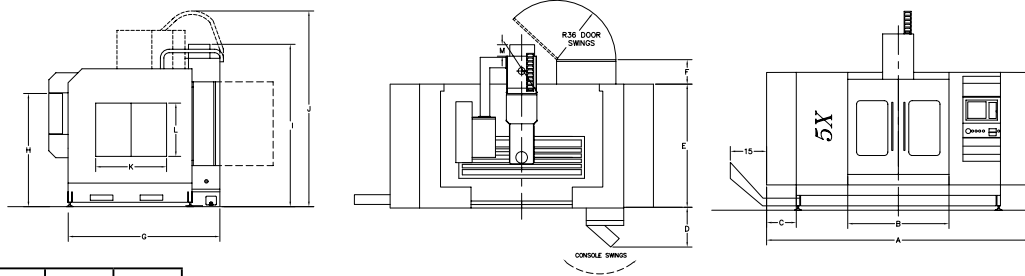
### MACHINE CAPACITY

### ATC

### PERFORMANCE

### GENERAL INFO

SPECIFICATIONS	5X-45	5X-60	5X-100	5X-120	5X-160
X Travel	45"	60"	100"	120"	160"
Y Travel	25"	30"	35"	44"	44"
Z Travel	25"	38"	34"	39"	39"
B Travel	+/- 120°				
C Travel	+/- 220° (360° continuous optional)				
Table Load (Evenly Distributed)	3,500 lbs	4,000 lbs	5,000 lbs	6,500 lbs	6,500 lbs
Table Size	24" x 51"	24" x 73"	30" x 112"	40" x 126"	40" x 165"
T-Slots (No./Width)	5 / .709"				
Table Top to Floor	35"	32"	35"	35"	35"
Motor Horse Power (Peak)	25.0 HP (50 HP high torque)				
Spindle Speed (RPM)	200 - 18,000 RPM Refrigerated (10,000 RPM high torque)				
Spindle Torque (max)	50 ft/lbs @ 3000 RPM (100 ft/lbs @ 1,000 RPM)				
Rotation Range	A axis +/- 120° C axis +/- 220° (360° continuous optional)				
Tool Type/Taper	HSK 63F (HSK-63A)				
Spindle Nose to Table - Vertical	0 - 21.5"	0 - 28"	0 - 26"	0 - 32.5"	0 - 32.5"
Spindle Nose to Table - Horizontal	7" - 32"	5" - 38"	5" - 36"	4" - 43"	4" - 43"
Spindle Center to Column (Throat)	26"	30.5"	36"	45"	45"
Tool Storage Capacity	24 Station Arm Type				
Tool Change Time	2 seconds				
Max. Adjacent Tool Diameter	3.0"				
Max. Tool Weight	10.0 lbs.				
Max. Tool Length	12"				
Positioning Accuracy	+/-0.0002"				
Position Repeatability	+/-0.0001"				
Rapid Traverse	1,200 IPM X,Y 900 IPM Z		500 IPM X, Y, Z		
Cutting Feed Rate	.001-500 IPM				
Axis Thrust (Peak)	3,174 lbs. X,Y 5,395 lbs. Z				
Air Pressure Requirements	90 PSI 5 CFM				
Coolant Capacity	60 Gallons				
Coolant Flow	3 GPM				
Power Requirements	80 AMP 430-500 VAC 3 PHASE (200-250 VAC Optional)				
Operating Dimensions (WxDxH)	127"x104"x110"	161"x112"x112"	240"x110"x110"	260"x120"x115"	300"x120"x115"
Machine Weight	14,500 lbs.	15,000 lbs.	20,500 lbs	34,000 lbs.	37,000 lbs



REF	5X-45	5X-60
A	126	161
B	31	53
C	22	22
D	22	22
E	68	68
F	20	20
G	88	88
H	70	70
I	90	95
J	111	116
K	45	45
L	30	30
M	10	8

REF	5X-100	5X-120	5X-160
A	101	129	129
B	27	27	27
C	120	164	204
D	85	82	102
E	51	60	80
F	120	129	129
G	95	105	105
H	101	115	115
I	116	126	126
J	271	291	331
K	95	99	99

### MACHINE SPECIFICATIONS

DIMENSIONS ARE IN INCH

