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UNISIG MODEL USK25 DEEP HOLE DRILLING MACHINE



Prepared for:

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OVERVIEW

Our model USK deep hole drilling machine series was designed for precision machining of complex workpieces in job shop or production environments. A single drilling spindle is used in conjunction with a CNC positioning table for flexible machining of simple and complex workpieces. The rigid construction and inherent accuracy of this machine makes it ideal for processing difficult-to-machine materials.

Workpiece position, drilling feed rate, spindle speed and positioning are programmable using conventional M and G codes. In addition, coolant flow and pressure are monitored by the machine control, allowing reliable, predictable drilling processes and unattended operation.

All of the machine components are designed and manufactured in our plant. Purchased components are selected based upon their wide availability and proven performance in high-volume production. Through our history dealing with the automotive, oil field, aerospace and defense markets, we have learned that machine reliability is as important as performance, and our machines are built and thoroughly tested with this in mind.

FUNCTIONAL SPECIFICATION

PROGRAMMABLE MACHINE FUNCTION

- Tool headstock position and feed rates
- Tool headstock spindle speed
- Cutting oil flow rate
- All of the above can be adjusted while drilling
- X and Y axis table position

PROCESS MONITORING AND AUTOMATIC INTERRUPTION

- Drilling thrust
- Tool headstock power
- Work headstock power
- Cutting oil maximum and minimum pressure
- All of the above interrupt values can be adjusted while drilling

TOOLING TYPES SUPPORTED

- Gundrilling

DRILLING PROCESSES

- Non-rotating workpiece, rotating tool
-

MACHINE COMPONENTS

MACHINE BED

- Heavy welded steel construction, internally ribbed to dampen vibration and sustain machining forces
- Thermally stress relieved and sand blasted before machining and finishing with two-part epoxy enamel
- Perimeter trough integral to machine base drains into sump to keep work area clean and dry

WORKPIECE TABLE

- Large cast iron (40,000 psi) table with precision T-slots
- Table is stress relieved after casting, rough machined, then stress relieved a second time before finish grinding and precision machining
- Steel covers on each end of table protect X-axis drive and provide an additional working surface for tooling and setup



DRILLING HEADSTOCK FEED (Z-AXIS)

- Hardened steel ways, bolted and keyed to machine base
- Cast iron saddle (40,000 psi) with low friction bearing material on all surfaces contacting ways
- Adjustable gibs to compensate for wear
- Precision ball screw and preloaded double nut, screw tensioned for rigidity
- Servo driven feed



VERTICAL TRAVEL (Y-AXIS)

- Preloaded re-circulating roller way system
- Precision ball screw and preloaded double nut
- Servo-driven feed with power off brake, low backlash high precision planetary gear reducer



HORIZONTAL TRAVEL (X-AXIS)

- Preloaded re-circulating roller way system
- Precision ball screw and preloaded double nut, screw tensioned for rigidity

USK25-1500 with 40 x 64 in 4,500 lb programmable workpiece table

DRILLING HEADSTOCK

- Cast iron housing (40,000 psi), thermally stress relieved before final bore, hand-scraped mounting surface
- Cartridge spindle, ABEC-7 spindle bearings in constant preload load-sharing arrangement, lifetime grease lubrication
- Rotary coolant inducer with ceramic seal faces
- Flanged and piloted nose for universal tool holder attachment
- Goodyear Eagle PD double helical synchronous belt final drive for quiet and low vibration power delivery
- High-performance AC spindle motor with motor encoder and closed loop velocity control for continuously reliable speed regardless of load

WHIP GUIDE CARRIAGES

- Cast iron saddle (40,000 psi) with low-friction bearing material on surfaces contacting ways and adjustable gibs to compensate for wear
- Mechanically coupled to drilling headstock for automatic release during headstock retract allowing unattended operation
- Adjustable position release dogs for various tool lengths
- Quickly removable when not needed
- Carriage is designed to hold industry standard dampener inserts
- See investment page for quantities

CHIP BOX

- Cast iron housing (40,000 psi) mounted at front of drilling axis
 - Hydraulically actuated, precision guided bushing carrier to hold industry standard GD, SF bushings
 - Clear sliding cover to verify chip flow and access tooling
 - Hinged discharge flume to carry fluid and chips to coolant system
-

GUARDING

- Standard safety shields over spindle nose and coolant inducer
- Optional enclosure guarding over drilling headstock with rolling doors and viewing windows

LUBRICATION

- Automatic lubrication system supplies oil to all way surfaces and ballscrews, electronically interlocked to machine control
 - If a lube fault occurs, the next machining cycle will be stopped
-

MACHINE CONTROL

STANDARDS FOR CONTROL SYSTEM

- USA** - Compliance with NFPA 79 standards of construction for machine tools and industrial equipment and National Electric Code (460 VAC, 3-phase, 60 Hz)
- Canada** - Compliance with CSA standards of construction relevant to machine tools and industrial equipment (460 VAC, 3-phase, 60 Hz)
- Mexico** - USA standards with regional adaptation to meet NOM requirements (460 VAC, 3-phase, 60 Hz)
- European Union** - Control systems design to comply with applicable CE directives, risk-assessment and self certification against technical file prepared by third party (400 VAC, 3-phase 50 Hz)
- Other** - Regulations by regional authority relevant to machine tools and industrial equipment will be followed (may require third party certification at additional cost)

CNC – FANUC

- Fanuc 0-MB control
- Electrical devices enclosed in NEMA 12 cabinet, following applicable National Electric Code and NFPA standards of construction for machine tools and industrial equipment
- The machine is wired for 460 volts AC, 3-phase power



COOLANT SYSTEM

CHIP AND FLUID RETURN

- Coolant and chips flow through chip box and exit machine through discharge flume
- A fine mesh basket separates chips from fluid
- A hinged belt chip conveyor (optional)

UNFILTERED COOLANT RESERVOIR

- Closed top steel reservoir adjacent to chip removal system
- Multiple baffles to allow entrained air to escape
- Convenient cleanout access to all chambers

FILTER AND LOW PRESSURE PUMPS

- Multiple bag filter system using redundant inexpensive media to reduce operating costs
- Differential pressure switch across filter bank to alert operator when filters need changing, interlocked with machine control

FILTERED COOLANT RESERVOIR

- Closed top steel reservoir with overflow weir into unfiltered reservoir
- Multiple chambers to reduce turbulence in fluid
- Plumbing connections for temperature control system with diffuser on return port
- Low and High fluid level sensor
- Access covers on top for maintenance

HIGH PRESSURE PUMPING SYSTEM

- Clean coolant is pumped by a positive displacement coolant pump, flow and pressure are fully programmable through CNC, controlled by part program
 - Flow and pressure are displayed at operator's console and monitored by the CNC providing a true closed-loop control of coolant system, automatically compensating for process changes
-

MACHINE ACCESSORIES

FULL ENCLOSURE SHEET METAL GUARDING

- Rolling steel doors over drilling axis
- Lexan viewing windows
- Guarding safety switch to inhibit door opening during machine operation

LARGE PROGRAMMABLE WORKPIECE TABLES

- 40 x 64 in, 4,500 lb dual ballscrew
- 64 x 50 in, 4,500 lb dual ballscrew

EXTENDED STATIONARY WORKPIECE TABLE

- Table heavy welded steel construction, internally ribbed to dampen vibration and sustain machining forces
- Thermally stress relieved and sand blasted before machining and finishing with two-part epoxy enamel
- Precision T-slots for clamping and alignment
- Perimeter trough integral to table drains into machine sump to keep work area clean and dry
- Provides additional support for long work-pieces and mounting for external fixtures and accessories

COUNTER ROTATING WORKPIECE HEADSTOCK

- Increases hole straightness and reduces ID to OD run-out for on-center drilling of precise holes
- 5hp headstock, cartridge spindle
- 3-Jaw manual chuck
- Slide assembly with manual lead screw drive for workpiece length adjustment

AUTOMATIC HOLE BREAKTHROUGH SEAL

- Hydraulically seals end of part at breakthrough, actuated manually or automatically via CNC
- Adjustable the full stated drilling length of the machine
- Complete set of seal holders for all drilling diameters

HYDRAULIC POWER UNIT

- Horizontal pump over JIC reservoir with drip pan, heat exchanger for temperature control
- Modular valves for fixture clamping and accessories



64 x 64 in 7,500 lb table, 120 in extended stationary workpiece table with counter rotating workpiece headstock



64 x 50 in 4,500 lb table, 48 in extended stationary workpiece table



V-BLOCK TABLE CLAMPS

- Set of two
- Built to align with T-slot in workpiece table
- Adjustable for workpieces from 2" to 10 "

DOCUMENTATION

- Operations manual in English, containing detailed instructions for general operation, fault clearing and descriptions of their causes
- Mechanical, electrical, pneumatic and hydraulic assembly drawings with part identification lists
- Recommended spare parts list
- Preventative maintenance schedule

TRAINING

- A machine runoff with customer supplied tooling, cutting fluid and workpieces in the machine price
- Operation and maintenance training at our facility is included in the machine price
- Additional training is available after machine startup at the Customer's facility

TECHNICAL SUPPORT

- Telephone engineering support and remote diagnostic services using customer provided VPN

SERVICE DISPATCH

- North American service is based from our facility
- Europe and Asia service needs are provided by our trained local service providers, supported by UNISIG engineering staff
- UNISIG technical staff and engineers are dispatched worldwide for advanced training or machine repair requirements



SHIPMENT

- UNISIG will load equipment on to customer contracted trucks
- Transportation contractors must have proper pads, tarps, chains and straps suitable for transporting precision machinery without damage
- Machines for export will be packaged for international shipment

INSTALLATION

- Foundation design service and drawings are provided with detailed dimensional requirements and general construction guidelines considering unique customer facility
 - Professional Engineering service familiar with local conditions must review and approve design prior to build.
 - Leveling wedges and anchors are provided with the machine
 - Rigging, grouting and rough placement of the machine at the customer's facility are not included in this proposal
 - North America Installation assistance, precision alignment, power up and machine testing are performed by UNISIG technicians
 - Installation outside of North America is available at service rates
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SPECIFICATIONS

Description		
Machine control	GE Fanuc 0-MB CNC	
Servo and spindle technology	Digital, brushless AC	
Performance		
Gundrilling diameter capacity (all alloys)	1.00 in	25.4 mm
Gundrill tool holding capacity	1.50 in	38 mm
Drill depth maximum	See Investment Page	
Tool feed force	847 lbs	363 kgf
Standard Headstock		
Spindle power (continuous)	10 Hp	7.5 kW
Spindle speed range (infinitely variable)	0 – 6,000 rpm	
Spindle base speed (maximum torque)	1,125 rpm	
Spindle maximum torque	47 ft-lbs	64 Nm
Coolant System		
Coolant volume	22 gal/min	83 L/min
Coolant pressure (standard)	2,000 psi	138 bar
Coolant pressure pump power (standard)	10 hp	7.5 kW
Reservoir capacity	220 gal	833 L
Standard Workpiece Table		
Table size (Z)	40.0 in	1,000 mm
Table size (X)	40.0 in	1,000 mm
Table capacity	2,200 lbs	1,000 kg
X-axis (horizontal) travel	20.0 in	500 mm
Y-axis (vertical) travel	12.5 in	318 mm
Optional large 40 x 64 inch workpiece table		

INVESTMENT

Machine Accessories	Qty	Price Each	Price Total
MACHINE AND OPTIONS			
Whip guide carriages	3	\$3,610.00	\$10,830.00
USK75-1000 CNC knee-type deep hole gundrilling machine	1	\$338,100.00	\$338,100.00
Stationary Work Table 1,000 mm (40.0 in) nominal drill depth			
Standard Features		\$13,730.00	\$0.00
Extended stationary work support table, 1,219 mm (48.0 in)			
Flange adapter, gundrill driver		\$20,880.00	\$20,880.00
Extended stationary work support table, 1,829 mm (72.0 in)	1		
Training at UNISIG's facility (5 days total)			
Workholding			
Automatic hole breakthrough seal, floor mounted, USK750/USK1000 at end-users facility in North America (5 days total)		\$7,650.00 Included	
Automatic hole breakthrough seal, floor mounted, USK1500		\$13,100.00	
Machine Options			
Hydraulic power unit	1	\$6,030.00	\$6,030.00
Counter rotation headstock, 380 mm (15.0 in) OD workpiece		\$62,610.00	
		\$5,230.00	\$5,230.00
Gundrill Tooling			
	Qty	Price Each	Price Total
Work Table		\$760.00	\$760.00
Gundrill driver, 19.05 mm (0.75 in) diameter	1		
Large work table, 1,000 x 1,650 mm (40.0 x 64.0 in), 3,045 lbs (1,500 kg) capacity	1	\$36,430.00 \$760.00	\$36,430.00 \$760.00
Gundrill driver, 25.4 mm (1.00 in) diameter	1		
Extended length work table, 1,650 x 1,275 mm (64.0 x 50.0 in), 3,045 lbs (1,500 kg) capacity		\$93,500.00 \$760.00	\$760.00
Gundrill driver, 31.7 mm (1.25 in) diameter	1		
Snap guide adapter holder, 30 mm (one per carriage, one for chip box)	4	\$290.00	\$1,160.00

INVESTMENT SUMMARY

STANDARD PAYMENT TERMS

Investment Summary - Standard payment terms			Price
Total Machine and Options			\$387,340.00
Total Machine Accessories			\$58,030.00
Total Durable Tooling			\$4,600.00
Project Total			\$449,970.00
Configuration discount			\$19,435.73
Project total after configuration discount			\$430,534.27

Payment Terms			Price
Down payment with order	30%		\$129,160.28
Payment upon acceptance at UNISIG prior to shipment	60%		\$258,320.56
Payment upon acceptance at customer's facility	10%		\$43,053.43
Total			\$430,534.27

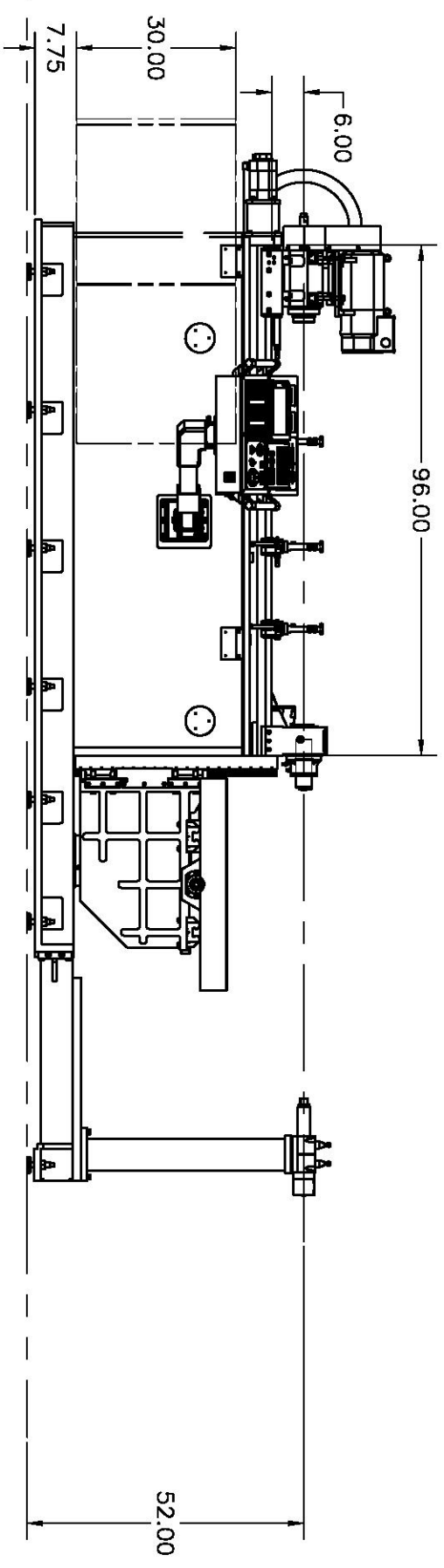
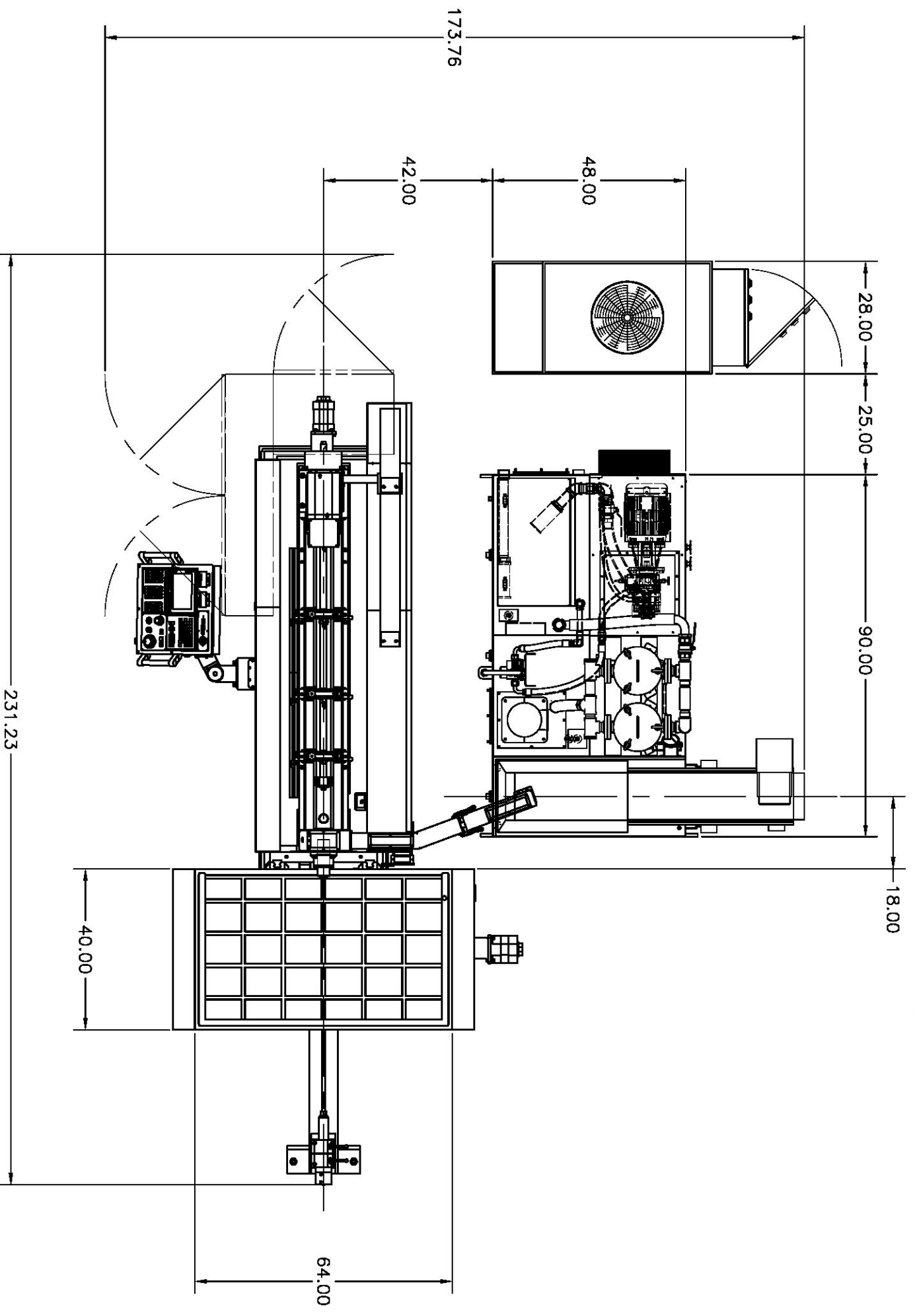
EXPRESS PAYMENT TERMS

Investment Summary - Express Payment			Price
Total Machine and Options			\$387,340.00
Total Machine Accessories			\$58,030.00
Total Durable Tooling			\$4,600.00
Project Total			\$449,970.00
Configuration and express payment discount			\$22,585.52
Project total after configuration & express payment discount			\$427,384.48

Payment Terms			Price
Down payment with payment received before 12-31-2012	60%		\$256,430.69
Payment upon acceptance at UNISIG prior to shipment	30%		\$128,215.34
Payment upon acceptance at customer's facility	10%		\$42,738.45

TERMS AND CONDITIONS

Shipment	26	weeks (confirmed at order placement)
FOB Point - Domestic		Our facility, Menomonee Falls, Wisconsin
FOB Point - International		Packaging point, or CIF upon request
Terms of Payment - All prices in U.S.A. Dollars	30%	Down payment
	60%	Upon acceptance at our facility, prior to shipment
	10%	Upon acceptance at customer's facility
Price and Delivery Validity	30	Days from date of this proposal
Warranty	1	Year, three shift operation
Conditions		Entrust terms apply, see attached sheet



SERIAL NUMBER- 1762		BUILD NUMBER- M1182	
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES			
UNMARKED TOLERANCES ON DIMENSIONS			
ON ANGLES		ON SURFACE	
X ± .1		± .010	
XX ± .05		± .005	
XXX ± .005		± .002	
BREAK ALL SHARP EDGES			
DO NOT SCALE DRAWING			
DESIGNED BY	DESIGNED BY	DATE	DATE
R. LEWINSKI	A. FETTING	3-26-08	07-23-07
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