Safeguarding Cutting and Turning Machines

- Shields
- E-Stop Devices
- Disconnects
- Starters
- Safety Switches
- Danger Signs
- Auxiliary Equipment
Rockford Systems is one of the largest single-source suppliers of safety products for machinery. We offer a total solution for all machine guarding and control requirements for updating machinery in the metal-fabricating, metal-cutting, woodworking, and robotic industries. Other markets served include packaging, textiles, material handling, and assembly machines. Our complete line of products allows industry to meet or exceed the OSHA and ANSI standards for machine guarding.

Our goals are to supply superior safety equipment which complies with the safety standards and to educate individuals in positions of responsibility in these areas. To achieve these goals, we are always striving to find new and better ways of providing equipment to safeguard personnel who work on or around machinery. We offer a variety of services to help make your plant as safe as possible. These include:

**Machine Surveys**

Our sales personnel know machinery, know what is required to meet the OSHA and ANSI standards, and what it takes to update your machinery. Detailed survey forms are used to gather all the information required to bring your machinery up to the safety standards and beyond.

**Design Engineering**

Product development and engineering personnel are constantly developing new safeguarding products which are compatible with today's manufacturing environment.

**Installation of Equipment**

Highly skilled installation crews are available to provide complete integration and installation services of safeguarding systems in your plant or to instruct your personnel. These crews are highly qualified and have many hours of on-the-job experience on all types of cutting and turning equipment.

**Proposals**

After completing a machine survey, a detailed proposal is generated which covers the safety equipment required to meet or exceed OSHA and ANSI standards.

**Training Seminars**

We offer a series of monthly machine safeguarding seminars which educate the employer/user on safety standards. These seminars use visual aids, machine demonstrations and hands-on experience so the student can learn to interpret the performance language of the standards and regulations. Each person attending also receives CEUs (continuing education units) and a binder filled with information on machine safeguarding. Customized on-site seminars can also be provided at customer locations.
TABLE OF CONTENTS

INTRODUCTION ..........................................4-9

SAFEGUARDING ......................................10-37

Safety on Drills ............................................10-13
  Safety Chip Shields ..................................10
  Heavy-Duty Aluminum Drill Shields .............11
  Telescoping Drill Shields .........................12-13
  Spring-Loaded/Self-Ejecting Chuck Keys 
  for Drill Presses ..................................13

Safety on Lathes ..........................................14-22
  Sliding Lathe Shields ................................15
  Crossslide-Travel Lathe Shields ................16
  Small Steel Lathe Chuck Shields ...............17
  Large Steel Lathe Chuck Shields ...............18
  Transparent Lathe Chuck Shields ..............19
  Mounting Brackets ..................................20
  Lathe Chuck Wrenches .............................21-22

Safety on Mills ............................................23-27
  Chip Shields for Bridgeport Mills ............23-24
  Slide and Swing-Aside Shields ..............25-26
  Rear Shield Assemblies ............................26
  Electrical Interlock Assembly ................27
  Milling Machine Belt Covers ..................27

Safety on Grinders ........................................28-29
  Double-Wheel Grinder Shield ..................28
  Single-Wheel Grinder Shield ..................28
  Pivot-Mount Grinder Shield ...................29
  Standard-Mount Grinder Shields ..............29

Miscellaneous Shields ..................................30-37
  Universal Ball & Socket Shields .............30-32
  Magnetic-Base Shields ..........................33
  Flexible-Arm/Snake-Arm/Gooseneck 
  Shields .............................................34-36
  Free-Standing Shield Assembly ..............37

FLEXIBLE-ARM LAMPS ..................................38

DISCONNECTS, MOTOR STARTERS, CONTROLS, AND 
ACCESSORIES ........................................39-45
  Lockouts ............................................39
  Tagouts .............................................39
  Lockout Valves ....................................40
  Single-Phase Disconnect/Starter ..............40
  Enclosed Transformers ............................41
  IEC Fused Disconnect Switches, Magnetic 
  Motor Starters, and Combinations ............41
  Disconnect and Starter Part Numbering 
  System Chart ......................................42
  Remote Operator Station Part Numbering 
  System Chart ......................................43
  Remote Stations ....................................44
  Palm Buttons .......................................45

SAFETY INTERLOCK SWITCHES ....................46-56
  Standard Safety Switches .......................47
  Compact Safety Switches .......................48
  Locking Safety Switches .........................49-50
  Stopped-Motion Detector .......................51
  Timer ................................................52
  Safety Relay .......................................52
  Coded Magnetic Safety Switch and 
  Control Unit ..................................53
  Magnetic Safety Switch .........................54
  Cable and Push-Button E-Stop ................55-56

PRESSURE-SENSITIVE SAFETY MATS ............57-61

DANGER SIGNS............................................62

SURVEY FOR CUTTING AND TURNING 
MACHINES..............................................63-64

OSHA STANDARDS ........................................65

INDEX ......................................................66

TERMS & CONDITIONS OF SALE ......................67

WARRANTY, DISCLAIMER, LIMITATION OF LIABILITY..67

The applications described in this catalog are for instructional and informational purposes only; the photos in this 
catalog are for illustrative purposes only. They may not represent actual usage. This catalog has been carefully 
checked for accuracy and is thought to be fully consistent with the products described herein. However, Rockford 
Systems, Inc. does not assume liability for the contents of this publication or for the use of any products described 
herein. Rockford Systems, Inc. reserves the right to make changes to the products and documentation without fur-
ther notice.

This document contains proprietary information protected by copyright. No part of this catalog may be reproduced, 
transmitted, stored in a retrieval system, or translated into any language, in any form or by any means without prior 
written permission from Rockford Systems, Inc., P.O. Box 5525, Rockford, Illinois 61125-0525. Rockford Systems 
reserves the right to make changes or revisions to the material contained in this catalog and cannot be held liable 
for incidental or consequential damages resulting from the furnishing, performance or use of this material.
INTRODUCTION TO SAFEGUARDING CUTTING AND TURNING MACHINES

This catalog is arranged so you can make your safeguarding choices quickly and easily. We’ve listed the basic safety requirements for cutting and turning machines on this page and provided you with page references to help you easily find the products to meet these requirements throughout this catalog. The requirements for these areas are explained below.

BASIC SAFETY REQUIREMENTS FOR CUTTING AND TURNING MACHINES

<table>
<thead>
<tr>
<th>1. Safeguarding (Shields)</th>
<th>DRILLS</th>
<th>LATHES</th>
<th>MILLS</th>
<th>GRINDERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Controls (E-Stop)</td>
<td>40, 43, 45</td>
<td>40, 43, 45</td>
<td>40, 43, 45</td>
<td>40, 43, 45</td>
</tr>
<tr>
<td>3. Disconnects</td>
<td>40-44</td>
<td>40-43</td>
<td>40-44</td>
<td>40-43</td>
</tr>
<tr>
<td>4. Starters</td>
<td>40-44</td>
<td>40-43</td>
<td>40-44</td>
<td>40-43</td>
</tr>
<tr>
<td>5. Covers</td>
<td>Special Fabrication or OEM Supplied</td>
<td>Special Fabrication or OEM Supplied</td>
<td>27</td>
<td>Special Fabrication or OEM Supplied</td>
</tr>
<tr>
<td>6. Other Considerations</td>
<td>Various Pages</td>
<td>Various Pages</td>
<td>Various Pages</td>
<td>Various Pages</td>
</tr>
</tbody>
</table>

1. SAFEGUARDING: When safeguarding the point of operation on a cutting or turning machine, shields (barriers) can be installed between the hazard and the operator. These shields can also deflect chips, sparks, and coolant that are generated at the point of operation.

2. CONTROLS: Most cutting and turning machines are directly driven by a motor. When the motor is turned on, the tool or workpiece rotates causing a point-of-operation hazard. When the motor is turned off, the tool or workpiece coasts to a stop and the hazard is eliminated. The basic requirement, for controls, is that all cutting and turning machines must have an emergency-stop device located within reach of the operator. Some of the motor stop/start operator stations offered in this catalog are equipped with an emergency-stop push button to meet this requirement. These emergency-stop buttons can also be supplied separately.

3. DISCONNECTS: All cutting and turning machines must have a disconnecting means to shut off all electrical power coming to the machine. It must be capable of being locked only in the off position. Also under OSHA 29 CFR 1910.147 (lockout/tagout), this same disconnecting means can be used when repairing or maintaining the machine.

4. STARTERS: All cutting and turning machines must have a starter that will automatically drop out when the control voltage is lost to the machine. To restart the machine when power is restored, someone must start the motor with some type of overt action, for example, pressing the start push button. This prevents the machine from automatically restarting when the voltage is restored.

5. COVERS: All cutting and turning machines must have the mechanical power-transmission apparatuses covered (guarded) if below a 7’ level from the floor or working platform. This includes motor shafts, belts, pulleys, chains, sprockets, gears, etc. This catalog offers a pulley and belt cover for Bridgeport mills as shown on page 27. If special covers are required, ask for our Mechanical Motions Cover (CVR) catalog, or contact the OEM or a local fabricator to satisfy this requirement.

6. OTHER CONSIDERATIONS: Other auxiliary safeguarding equipment may be required to make cutting and turning machines as safe as possible. This equipment includes safety switches which can be used to interlock the shield or guard to the machine’s starter. Electronic motor brakes are available for machines that have a long coastdown time. These brakes are used to decrease the long coasting time after the motor is turned off. This increases productivity because the operator does not have to wait for the machine components to coast to a stop. Signs are used to warn of the hazards on a machine.
INTRODUCTION TO SAFEGUARDING CUTTING AND TURNING MACHINES

When safeguarding cutting and turning machines, the general requirements that apply to these types of machines are in OSHA (Occupational Safety and Health Administration) Title 29 of the Code of Federal Regulations. The following is a list:


2. OSHA 29 CFR sections that an employer (user) must comply with include:
   - 1910.211 Definitions
   - 1910.212 General requirements for all machines
   - 1910.213 Woodworking machinery requirements
   - 1910.215 Abrasive wheel machinery
   - 1910.219 Mechanical power-transmission apparatus

3. OSHA 29 CFR 1910.147 The control of hazardous energy (lockout/tagout).


These publications can be acquired by contacting:

U.S. Government Printing Office
P.O. Box 371954
Pittsburgh, PA 15250-7954

The basic OSHA standard, 29 CFR 1910.212, states that any machine that creates a hazard must be safeguarded to protect the operator and other employees. OSHA can also cite violations using other standards such as the ANSI (American National Standards Institute) B11 series. The following is a list of applicable and related ANSI standards available at the printing of this publication.

B11.1 Mechanical Power Presses
B11.2 Hydraulic Power Presses
B11.3 Power Press Brakes
B11.4 Shears
B11.5 Iron Workers
B11.6* Manual Turning Machines (Lathes)
B11.7 Cold Headers and Cold Formers
B11.8* Drilling, Milling, and Boring Machines
B11.9* Grinding Machines
B11.10* Metal Sawing Machines
B11.11* Gear and Spline Cutting Machines
B11.12 Roll Forming and Roll Bending Machines
B11.13 Automatic Screw/Bar and Chucking Machines
B11.14 Coil Slitting Machines/Systems
B11.15 Pipe, Tube, and Shape Bending Machines
B11.16 Metal Powder Compacting Presses
B11.17 Horizontal Hydraulic Extrusion Presses
B11.18 Coil Processing Systems
B11.19* Performance Criteria for Safeguarding
B11.20 Manufacturing Systems/Cells
B11.21 Lasers
B11.22* Turning Centers and CNC Turning Machines
B11.23* Machining Centers and CNC Milling, Drilling, and Boring Machines
B11.24 Transfer Machines
B11.TR1 Ergonomic Guidelines
B11.TR2 Mist Control Considerations
B11.TR3* Risk Assessment and Risk Reduction
R15.06 Robotic Safeguarding
01.1* Woodworking Machinery

* ANSI Standards for Cutting and Turning Machines

These standards can be purchased by contacting:

ANSI (American National Standards Institute, Inc.)
25 West 43rd Street, 4th Floor
New York, New York 10036
(212) 642-4900 • www.ansi.org

OR

AMT—The Association for Manufacturing Technology
7901 Westpark Drive
McLean, Virginia 22102
(703) 893-2900 • www.amtonline.org

Another good reference for safety on machine tools is the following publication from the National Safety Council:

Safeguarding Concepts Illustrated—7th Edition

This publication can be purchased by contacting:

National Safety Council
1121 Spring Lake Drive
Itasca, IL 60143-3201
1-800-621-7619, ext. 2199 • www.nsc.org

Other sources that can be used for reference include:

1. NFPA 79, Electrical Standard for Industrial Machinery

2. NEC (National Electrical Code) Handbook

   These can be purchased by contacting:
   National Fire Protection Association
   1 Batterymarch Park
   Quincy, MA 02169
   (617) 770-3000 • www.nfpa.org

3. NEMA (National Electrical Manufacturers Association)

   1300 North 17th Street, Suite 1752
   Rosslyn, VA 22209
   (703) 841-3200 • www.nema.org

For additional safety information and assistance in devising, implementing or revising your safety program, please contact the machine manufacturer, your state and local safety councils, insurance carriers, national trade associations, and your state’s occupational safety and health administration.
INTRODUCTION TO SAFEGUARDING CUTTING AND TURNING MACHINES

This catalog offers a variety of equipment including a complete line of shields (barriers), cord and plug lockouts, fused disconnect switches, magnetic motor starters, self-latching emergency stops, safety interlock switches, and accessories which are available to meet the electrical energy source portion of these standards.

The shields (barriers) offered in this catalog are usually installed on drilling machines, lathes, milling machines, and grinding machines. Many of the shields can be used on other types of equipment including woodworking machines. Most of these shields are intended to deflect chips (swarf), sparks, coolant, or lubricant away from the operator and other employees in the machine area. In addition to protection as a barrier, most shields provide visibility to the point of operation.

Although these shields provide some degree of guarding for the operator, they cannot be considered guards. When using these shields and before any of the shields illustrated in this catalog are moved from their normally applied position, power must always be turned off.

In some cases, more than one type of shield per machine may be necessary to provide protection. For example, on lathes, a chuck shield may be required along with a magnetic-base shield where the tool comes into contact with the workpiece.

This catalog offers several different types of shields. When considering shielding for your machines, be sure to choose the shield that fits your machining applications and still maintains current levels of productivity.

DRILLING MACHINES

As with other cutting machines, the operator must be protected from the rotating chuck and swarf that is produced by the drill bit. Specially designed shields can be attached to the quill and used to protect this area. A telescoping portion of the shield can retract as the drill bit comes down into the workpiece. On larger gang or radial drills, a more universal-type shield is usually applied.

The ANSI standard for drilling machines is ANSI B11.8.

LATHES

There are two main safety considerations for lathes (engine, turret, etc.). One is the rotating chuck that could catch the operator’s clothing, jewelry, hair, or hand and pull it into the machine. The other is the hazardous flying chips and coolant splash that are generated at the point of operation (where the tool contacts the workpiece being machined). To protect these areas, two shields can be applied—one around a portion of the chuck and the other at the point of operation. See the photo on page 15. Larger sliding shields can protect both areas, providing the workpiece is not too long.

On VTLs (vertical turret lathes), the safety concern is the rotating table and the point-of-operation swarf. Special barriers may have to be fabricated around the tables of these machines; shields can be provided at the point of operation. See page 35.

If railings are used to keep operators away from hazard areas, these railings must be 42” above the floor or platform.

The ANSI standard for lathes is ANSI B11.6.

MILLING MACHINES

The main safety consideration for milling machines is the swarf that is generated at the point of operation. Another safety concern is the tool cutter, which could catch operator’s clothing, jewelry, hair, or any other part of the body. Usually on smaller mills, the operator and other employees in the machine area are protected by shields. These shields can be applied around the perimeter of the table or bed area or close to the cutter, depending on the size of the workpiece and the application. On larger milling machines, operators are sometimes protected by location; however, when working close to a cutting tool, operators must be protected from swarf.

The ANSI standard for milling machines is ANSI B11.8.

GRINDING MACHINES

Shields are usually applied to grinding machines to protect the operator from chips (swarf), sparks, coolant, or lubricant.

Other safety concerns for grinders are the adjustment of the work rests and the adjustable tongues or ends of the peripheral members at the top of each wheel. Work rests shall be kept adjusted closely to the wheel with a maximum opening of ¼”. The distance between the wheel periphery and the adjustable tongue or the end of the peripheral member at the top shall never exceed ¼”.

Grinding machines are covered by OSHA in 29 CFR 1910.215. The ANSI standards for grinding machines are B11.9 and B7.1.
ELECTRICAL REQUIREMENTS

As stated in OSHA 29 CFR 1910.147 The control of hazardous energy (lockout/tagout): “(a)(1)(ii) This standard covers the servicing and maintenance of machines and equipment in which the unexpected energizing or start-up of the machines or equipment, or release of stored energy could cause injury to employees. This standard establishes minimum performance requirements for the control of such hazardous energy.”

To lockout electrical energy sources:
1. Unplug the machine and use an electrical plug lockout or use a disconnect switch with padlocks, lockouts, and tags.
2. Disconnect and ensure that all power sources are locked and tagged out.
3. Stored electrical energy must be bled to obtain zero energy state.
4. Use a volt meter to make sure all circuits are dead.

Electrical requirements for industrial machines are found in NFPA 79, Electrical Standard for Industrial Machinery.

Incoming Supply Circuit Conductor Terminations

Under 5.1.1, it states that “where practicable, the electrical equipment of a machine shall be connected to a single power supply circuit.”

Supply Circuit Disconnecting (Isolating) Means

In 5.3.1.1, it states that a supply circuit disconnecting means shall be provided for each incoming supply circuit to a machine. According to 5.3.1.1.1, each disconnecting means shall be legibly marked to indicate its purpose. Under 5.3.1.3, “The supply circuit disconnecting means other than attachment plugs and receptacles shall be mounted within the control enclosure or immediately adjacent thereto. Exception: Externally mounted supply circuit disconnecting means, whether interlocked or not interlocked with the control enclosure, supplying machines totaling 2 hp or less shall be permitted to be mounted up to 6 m (20 ft) away from the enclosure providing that the disconnecting means is in sight from and readily accessible to the operator.” Under 5.3.3, the disconnecting means shall be provided with permanent means for locking in the off position only (for other than attachment plugs). In accordance with 5.3.4.1, “The center of the grip of the operating handle of the disconnecting means, when in its highest position, shall not be more than 2.0 m (6 ft 7 in.) above the floor. A permanent operating platform, readily accessible by means of a permanent stair or ladder, shall be considered as the floor for the purpose of this requirement.” According to 5.3.2 (6), the supply circuit disconnecting means can be an attachment plug and receptacle (plug/socket combination) for cord connection to motor loads totaling 2 hp or less.

Control Circuit Supply, Voltage, and Protection

In 9.1.1.1, it states that “Control transformers shall be used for supplying the control circuits.” According to 9.1.1.3, “Transformers shall not be required if the supply voltage does not exceed 120 volts ac.”

In accordance with 9.1.2.1, “The ac voltage for control circuits shall not exceed 120 volts, ac single phase.”

According to 9.1.3, control circuits shall be provided with overcurrent protection.

Overload Protection of Motors

According to 7.3.1, “Overload devices shall be provided to protect each motor, motor controller, and branch-circuit conductor against excessive heating due to motor overloads or failure to start.”

Stop Functions

According to 9.2.2, “The three categories of stop functions shall be as follows:
(1) Category 0 is an uncontrolled stop by immediately removing power to the machine actuators.
(2) Category 1 is a controlled stop with power to the machine actuators available to achieve the stop then remove power when the stop is achieved.
(3) Category 2 is a controlled stop with power left available to the machine actuators.”

In 9.2.5.3.1, it states that “Each machine shall be equipped with a Category 0 stop.” According to 9.2.5.3.2, “Category 0, Category 1, and/or Category 2 stops shall be provided where indicated by an analysis of the risk assessment and the functional requirements of the machine. Category 0 and Category 1 stops shall be operational regardless of operating modes, and Category 0 shall take priority. Stop function shall operate by de-energizing that relevant circuit and shall override related start functions.”
Emergency Stop Functions
In accordance with 9.2.5.4.1, emergency stop functions shall be designed to be initiated by a single human action. In addition to the requirements for stop, 9.2.5.4.1.1 states that “the emergency stop shall have the following requirements:
(1) It shall override all other functions and operations in all modes.
(2) Power to the machine actuators, which causes a hazardous condition(s), shall be removed as quickly as possible without creating other hazards (e.g., by the provision of mechanical means of stopping requiring no external power, by reverse current braking for a Category 1 stop).
(3) The reset of the command shall not restart the machinery but only permit restarting.”

In 9.2.5.4.1.2, it states that “Where required, provisions to connect additional emergency stop devices shall be provided.” According to 9.2.5.4.1.3, “The emergency stop shall function as either a Category 0 or a Category 1 stop. The choice of the category of the emergency stop shall be determined by the risk assessment of the machine.” In accordance with 9.2.5.4.1.4, “Where a Category 0 or Category 1 stop is used for the emergency stop function, it shall have a circuitry design (including sensors, logic, and actuators) according to the relevant risk as required by Section 4.1 and 9.4.1. Final removal of power to the machine actuators shall be ensured and shall be by means of electromechanical components. Where relays are used to accomplish a Category 0 emergency stop function, they shall be nonretentive relays. Exception: Drivers, or solid state output devices, designed for safety-related functions shall be allowed to be the final switching element, when designed according to relevant safety standards.”

Devices for Stop and Emergency Stop
In accordance with 10.7.1.1, “Stop and emergency stop pushbuttons shall be continuously operable and readily accessible.” According to 10.7.1.2, “Stop or emergency stop pushbuttons shall be located at each operator control station and at other locations where emergency stop is required.”

In 10.7.2.1, it states that “The types of devices for emergency stop shall include, but are not limited to, the following:
(1) Pushbutton-operated switches
(2) Pull-cord-operated switches
(3) Foot-operated switches without a mechanical guard
(4) Push-bar-operated switches
(5) Rod-operated switches”
Start Devices
According to 10.6, “Actuators used to initiate a start function or the movement of machine elements (e.g., slides, spindles, carriers) shall be constructed and mounted to minimize inadvertent operation.”

Protection Against Supply Interruption or Voltage Reduction and Subsequent Restoration
Under 7.5.1, “Where a supply interruption or a voltage reduction can cause a hazardous condition or damage to the machine or to the work in progress, undervoltage protection shall be provided (e.g., to switch off the machine) at a predetermined voltage level.” For restarting, 7.5.3 states that “Upon restoration of the voltage or upon switching on the incoming supply, automatic or unintentional restarting of the machine shall be prevented when such a restart can cause a hazardous condition.”

Protective Interlocks
In 9.3.6, it states that “Where doors or guards have interlocked switches used in circuits with safety related functions, the interlocking devices shall be listed, have either positive (direct) opening operation, or provide similar reliability and prevent the operation of the equipment when the doors or guards are open (difficult to defeat or bypass).” Under 9.3.1, “The reclosing or resetting of an interlocking safeguard shall not initiate machine motion or operation that results in a hazardous condition.”

OTHER SAFETY CONSIDERATIONS
Each machine should be surveyed as an individual system. This includes, but is not limited to, the proper shield(s), controls, drives, tooling, feeding methods, material handling methods, configuration and weight of workpiece, rotating and reciprocating parts, machine production requirements, and future machine needs. The proper disconnect switch, motor starter, lockout equipment and covers for machine rotating components must also be considered. See pages 63 and 64 for a survey report.

When operating the various machines to which shields can be applied, the operator must wear proper personal protective safety equipment and be properly trained. The operator must not wear loose clothing, have unrestrained long hair, and must not wear jewelry.

When operating any cutting or turning machine, the hands or any part of a person’s body must never be put into the point of operation or any other hazard area of the machine. Hand tools, fixtures, and other methods must be used so that operators are not exposed to hazards. If the hands or any part of a person’s body is put into the hazard, it could cause serious physical injury or death.
SAFETY ON DRILLS (Pages 10-13)

SAFETY CHIP SHIELDS

These sturdy safety chip shields provide protection from flying chips, coolant, and rotating parts. They are usually applied to small drill presses, mills, etc., and can be magnetically or permanently mounted.

The shield can be attached to any ferrous surface on the machine by an 80-lb pull, 3¼" diameter magnetic base. If a ferrous surface is not available, a 3¼" x 5¼" mounting plate is also furnished with each shield.

The impact-resistant, ⅜"-thick clear polycarbonate shield provides visibility to the point of operation. It adjusts and locks in any vertical position.

KYL-001 5" x 9" Shield With ¼" Diameter Black PVC Arm 14½" High
KYM-001 5" x 9" Replacement Shield Only
KYL-055 5" x 11" Shield With 1" Square Extruded Aluminum Arm 18" High
KYL-044 5" x 11" Replacement Shield Only

3⅜" x 5¼" Mounting Plate Furnished With Each Shield For Mounting to a Nonferrous Surface
HEAVY-DUTY ALUMINUM DRILL SHIELDS

These cast-aluminum drill shields are furnished with a standard 1¾" bore. The user can bore this shield to a size up to 3½" for attaching to the quill of a machine.

This shield is available in 2-tier or 3-tier models which provides 3” to 6” travel of the drill press.

The top of the holder attaches to the quill of the drill. The shields are open in the back. The bottom section has a clear panel for visibility.

For changing chucks or drill bits, the 2- or 3-tier section can be swung forward and upward out of the way. Also available are shields with a side hinge that swing to the left side.

1¾" diameter; User to Bore to Size up to 3½"

Top view of holder.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DZS-001</td>
<td>3-Tier Front Hinge 4½&quot; Min; 10½&quot; Max; 6&quot; Stroke; Max Chuck Diameter 2½&quot;</td>
</tr>
<tr>
<td>DZS-003</td>
<td>2-Tier Front Hinge 4¾&quot; Min; 7&quot; Max; 2¾&quot; Stroke; Max Chuck Diameter 2¼&quot;</td>
</tr>
<tr>
<td>DZS-004</td>
<td>2-Tier Front Hinge 6&quot; Min; 10½&quot; Max; 4½&quot; Stroke; Max Chuck Diameter 2¼&quot;</td>
</tr>
<tr>
<td>DZS-005</td>
<td>2-Tier Side Hinge 6&quot; Min; 10½&quot; Max; 4½&quot; Stroke; Max Chuck Diameter 2¼&quot;</td>
</tr>
<tr>
<td>DZS-006</td>
<td>3-Tier Side Hinge 4½&quot; Min; 10½&quot; Max; 6&quot; Stroke; Max Chuck Diameter 2¼&quot;</td>
</tr>
<tr>
<td>DZS-002</td>
<td>Replacement Polycarbonate Window</td>
</tr>
</tbody>
</table>

Dimensions of Part No. DZS-001

Dimensions of Part No. DZS-005

Front hinge shield shown open for tool change.

3-tier shield shown in machining position.
THE CONSTRUCTION

The shield consists of two or three chrome-plated steel sleeves. The inner sleeve is a ribbed cage which is held stationary in the shield holder. The outer sleeves are free to move up and down on the inner cage. The inner sleeve has a guide groove, which gives radial movement to the outer sleeves to prevent jamming as the drill descends.

The lower sleeve is fitted with an acrylic transparent window held in position by a locking screw. The window can be slid out and quickly replaced at regular intervals, giving maximum visibility at all times. This sleeve rests on the components to be drilled; as the drilling operation takes place, the cage moves down. This helps protect the window and break up the chips.

When changing a drill bit, the shield can be removed from the shield holder. This gives you access to fit the key into the chuck.

The basic drill shield (without bushing) is bored to fit a circular quill diameter between 2\(\frac{5}{8}\)" and 2\(\frac{3}{4}\)".

ORDERING INFORMATION

**Part No. DXS-500** Drill Shield With Standard Bore 2\(\frac{3}{4}\)", 2-Tier, 3” Stroke; Maximum Chuck Diameter Is 2\(\frac{5}{8}\)" Without Bushing

**Part No. DXS-100** Replacement Polycarbonate Window

**Part No. DXS-700** Drill Shield With Standard Bore 2\(\frac{3}{4}\)", 3-Tier, 3” or 6” Stroke; Maximum Chuck Diameter Is 2\(\frac{5}{8}\)" Without Bushing (Similar to 3-Tier Shown on Page 13.)

**Part No. DXS-100** Replacement Polycarbonate Window

BUSHINGS

The ten different bushings will cover a round quill diameter down to a minimum of 2". Determine your quill diameter at the time of order and select the appropriate drill shield and bushing. Please refer to the bushing chart below. Bushings are furnished separately.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Quill Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>DXS-010</td>
<td>2(\frac{1}{8})–2(\frac{1}{8}) to 2(\frac{1}{8})</td>
</tr>
<tr>
<td>DXS-015</td>
<td>2(\frac{5}{16})–2(\frac{5}{16}) to 2(\frac{3}{16})</td>
</tr>
<tr>
<td>DXS-020</td>
<td>2(\frac{7}{16})–2(\frac{3}{8}) to 2(\frac{1}{4})</td>
</tr>
<tr>
<td>DXS-025</td>
<td>2(\frac{1}{16})–2(\frac{5}{16}) to 2(\frac{1}{2})</td>
</tr>
<tr>
<td>DXS-030</td>
<td>2(\frac{3}{16})–2(\frac{5}{16}) to 2(\frac{3}{8})</td>
</tr>
<tr>
<td>DXS-035</td>
<td>2(\frac{7}{16})–2(\frac{1}{8}) to 2(\frac{1}{2})</td>
</tr>
<tr>
<td>DXS-040</td>
<td>2(\frac{3}{32})–2(\frac{1}{8}) to 2(\frac{1}{4})</td>
</tr>
<tr>
<td>DXS-045</td>
<td>2(\frac{1}{16})–2(\frac{5}{16}) to 2(\frac{1}{8})</td>
</tr>
<tr>
<td>DXS-050</td>
<td>2(\frac{1}{8})–2(\frac{3}{16}) to 2(\frac{1}{4})</td>
</tr>
<tr>
<td>DXS-055</td>
<td>2(\frac{3}{4})–2(\frac{5}{16}) to 2(\frac{1}{4})</td>
</tr>
</tbody>
</table>

(Continued on next page.)
TELESCOPING DRILL SHIELDS

2-TIER DRILL SHIELD FOR IRREGULAR-SHAPED QUILLS

When the quill of a drill press is not round, but an irregular shape (pear shape in some cases), the three-lug drill shield is ideal. The photo illustrates how the three-lug shield is applied.

If the drill shields offered in this catalog will not mount to your machine, please send us a photo and dimensions of the quill size. We would be pleased to send you a proposal on a special quill holder.

This drill shield is for drill presses that have 3” to 3⅜” quills. It has three-lug mounting and fits drill presses with a 3” stroke and a maximum chuck diameter of 2⅜”.

ORDERING INFORMATION
Part No. DXS-600 2-Tier Drill Shield, 3” Stroke
Part No. DXS-100 Replacement Polycarbonate Window

3-TIER DRILL SHIELD FOR IRREGULAR-SHAPED QUILLS

This drill shield has the same three-lug mounting as illustrated above. It has a 3” bore and will fit a maximum chuck diameter of 2⅜”. This shield allows 3” or 6” travel of the chuck and drill bit.

When the 3-tier drill shield is in the position shown here, it has an overall length of 11⅜”. When the thumbscrew is adjusted to the middle or top holes, the overall length is 10” and 8⅜” respectively. When the thumbscrew is in a retracted position (not in the bottom hole of top tier), the bottom two tiers will move up and down to provide 6” of travel. When the thumbscrew is engaged into one of the three holes, only the bottom tier will travel allowing a 3” stroke.

ORDERING INFORMATION
Part No. DXS-800 3-Tier Drill Shield, 3” or 6” Stroke
Part No. DXS-100 Replacement Polycarbonate Window

SPRING-LOADED/SELF-EJECTING CHUCK KEYS FOR DRILL PRESSES

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part No.</th>
<th>For LFA® Chuck Model No.</th>
<th>For Jacobs Chuck Model No.</th>
<th>Pilot Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLK-001</td>
<td>N/A</td>
<td>0, 0B</td>
<td>⅛”</td>
</tr>
<tr>
<td>SLK-002</td>
<td>81-1A, 81-1B</td>
<td>1A, 1B, 1BS, MC1</td>
<td>⅜”</td>
</tr>
<tr>
<td>SLK-003</td>
<td>81-4B</td>
<td>7, 7-1A, 7B</td>
<td>⅜”</td>
</tr>
<tr>
<td>SLK-004</td>
<td>81b-13A, 81b-13B, 42-13B, 81bS-13A</td>
<td>30, 30-1A, 30B, 31B, 31BA, 81b/2N, MC4</td>
<td>⅜”</td>
</tr>
<tr>
<td>SLK-005</td>
<td>82-2A, 82-2B</td>
<td>2A, 2B, MC5</td>
<td>⅛”</td>
</tr>
<tr>
<td>SLK-006</td>
<td>82a-5A, 43b-5A, 82a-5B, 43b-5B, 82as-5a, 43bs-5b</td>
<td>11N, 32, 32B, 33, 33B, 33BA, 33f, 33KD, 3326A, MC-10, MC33</td>
<td>⅛”</td>
</tr>
<tr>
<td>SLK-007</td>
<td>4200-B1, 412-B1, 420-B1</td>
<td>DC1G61, DC1G61AD, DC4G61, DC4G61AD, DC1G61, DC1G61, MC4G61, MC1G61, MC1G61, MC1G75, U4G61, U4G60, U4G61</td>
<td>⅛”</td>
</tr>
<tr>
<td>SLK-008</td>
<td>422-B13, 422-B13</td>
<td>DC8K33, DC8K61, DK8K64, DK8K64, HK8K61, HK8K64, MC4K01, MC4K41, MC4K61, MC4K62, MC8K64, MC8K64AD, U8K33, U8K33A, U8K64, U8K64A, U8K61</td>
<td>⅛”</td>
</tr>
<tr>
<td>SLK-011</td>
<td>N/A</td>
<td>20N</td>
<td>⅛”</td>
</tr>
</tbody>
</table>

Rockford Systems, Inc. ★ Shop Online at www.rockfordsystems.com ★ SFM 13
SAFETY ON LATHES (Pages 14-22)

UNGUARDED LATHE

Do Not Remove or Cover This Sign – See Back For Mounting Instructions

You are exposed to moving machine parts that can crush, dismember and cause death.

Do Not Operate this machine without shield(s) in place.

Never place your fingers, hands or any part of your body on or near the rotating parts of this machine.

Never operate this machine with loose clothing, jewelry, or unrestrained long hair.

Failure to obey will result in loss of fingers or limbs, or could cause death.

FLYING PARTS

You are exposed to moving machine parts that can cause eye or bodily injury due to hazardous flying chips, sparks, and coolant splash.

Never operate this machinery without proper eye and body protection.

Failure to obey will result in eye injury or severe personal injury.

Can cause serious injury or death if hand or any part of body is placed in this electrical enclosure.

Turn off main power and lock out the disconnect switch before opening this electrical enclosure.

Do Not Remove or Cover This Sign KST-152

SAFEGUARDED LATHE

Danger and Precautions Signs

Emergency-Stop Button

Chuck Shield

Crosslide-Travel Shield

Magnetic-Base Shield

Disconnect Switch and Motor Starter

Electronic Motor Brake
SLIDING LATHE SHIELDS

These heavy-duty sliding lathe shields are furnished in four different sizes. They are constructed of high quality, 12-gauge reinforced steel with a polycarbonate window. These shields are available for operator protection on large standard lathes, CNC machines, and OD grinders.

The shields are designed to fit lathes with chucks up to 48” in diameter. Four adjustable flanged mounting posts are provided for easy mounting. These posts are used to securely mount the shield’s ball-bearing carriage to the top of the headstock, as illustrated (mounting hardware not included). This means the posts can be attached without interfering with any part of the equipment housed within the headstock.

These sliding shields slide out-of-the-way over the headstock, allowing the operator access to the point of operation for loading and unloading workpieces, changing tooling, changing chucks, removing swarf, etc. Each shield has approximately 22” of travel.

When ordering these sliding shields, check lathe dimensions and reference drawings. Special sizes are available on request.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part No.</th>
<th>A</th>
<th>B</th>
<th>Chuck Diameter</th>
<th>Replacement Polycarbonate Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAJ-700</td>
<td>26&quot;</td>
<td>21&quot;</td>
<td>28&quot;</td>
<td>MAW-001</td>
</tr>
<tr>
<td>MAJ-800</td>
<td>27¼&quot;</td>
<td>23&quot;</td>
<td>32&quot;</td>
<td>MAW-002</td>
</tr>
<tr>
<td>MAJ-100</td>
<td>29¾&quot;</td>
<td>27&quot;</td>
<td>40&quot;</td>
<td>MAW-003</td>
</tr>
<tr>
<td>MAJ-120</td>
<td>33¾&quot;</td>
<td>30¼&quot;</td>
<td>48&quot;</td>
<td>MAW-004</td>
</tr>
</tbody>
</table>

Shield slid into position. Machine is ready for machining workpiece.
These lathe shields mount on and travel with the crosslide for protection when machining long workpieces. The 18-gauge reinforced steel structure provides protection from flying chips and coolant. The high-impact polycarbonate window permits visibility into the point of operation. The front portion of the shield hinges up for access. These shields are ideal for lathes with long beds. Special sizes are available on request.

**DIMENSIONS**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TXS-000</td>
<td>Replacement Polycarbonate Window</td>
</tr>
</tbody>
</table>

Mounting brackets are sold separately. See page 20 for mounting bracket choices.
These sturdily constructed steel chuck shields are fabricated of 18-gauge steel with reinforced sides and can be used on smaller lathes that have up to 18½” diameter chucks.

Each shield is furnished with a 1” x 13” mounting rod which can be cut to length if required. This mounting rod is fastened to the headstock of the lathe. The mounting rod is also used to hinge the entire shield. The shield can be lifted and swung up for quick and easy access to the chuck and the part being machined. This shield includes a high-impact polycarbonate window which permits visibility into the point of operation. Various types of mounting brackets are available and are sold separately. Please see page 20 for ordering information.

If shields for larger lathes are required, please see the next page.

**DIMENSIONS**

These sturdily constructed steel chuck shields are fabricated of 18-gauge steel with reinforced sides and can be used on smaller lathes that have up to 18½” diameter chucks.

Each shield is furnished with a 1” x 13” mounting rod which can be cut to length if required. This mounting rod is fastened to the headstock of the lathe. The mounting rod is also used to hinge the entire shield. The shield can be lifted and swung up for quick and easy access to the chuck and the part being machined. This shield includes a high-impact polycarbonate window which permits visibility into the point of operation. Various types of mounting brackets are available and are sold separately. Please see page 20 for ordering information.

If shields for larger lathes are required, please see the next page.

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Replacement Polycarbonate Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPS-300</td>
<td>12&quot;</td>
<td>7½&quot;</td>
<td>11&quot;</td>
<td>4½&quot;</td>
<td>TPW-003</td>
</tr>
<tr>
<td>TPS-400</td>
<td>15½&quot;</td>
<td>9¾&quot;</td>
<td>14¾&quot;</td>
<td>6¾&quot;</td>
<td>TPW-004</td>
</tr>
<tr>
<td>TPS-500</td>
<td>19¾&quot;</td>
<td>11¼&quot;</td>
<td>18¼&quot;</td>
<td>8&quot;</td>
<td>TPW-005</td>
</tr>
</tbody>
</table>

Mounting brackets are sold separately. See page 20 for mounting bracket choices.
These fabricated 18-gauge steel chuck shields with reinforced sides can be used on large lathes that have chucks up to 47" in diameter. They are double hinged for access to the chuck, workpiece, and tool. The front hinged portion can be swung up for workpiece changes, and the entire shield can be hinged back for changing chucks.

Each shield is furnished with a mounting rod, plate and support bar for mounting the shield to the face of the headstock. The rear mounting bracket hinges the entire shield, and the side mounting bracket supports the shield in its normal operating position.
These quality-constructed lathe chuck shields have a semicircular shape made from high-impact-resistant transparent polycarbonate. The shields themselves are attached to a 1” zinc-plated extension tube. This tube is inserted into one of the mounting brackets described on the next page. The shield assembly does not include the mounting bracket.

The semicircular shield covers half the circumference of the lathe chuck because it is mounted an equal distance from the chuck center.

Access to the chuck and workpiece is quick and easy. The shield is lifted up and out of the way for the operator.

The shield size depends on the center height of the lathe and the diameter of the chuck. On lathes with a center height up to 7”, there is a small variation in diameter between the 3- and 4-jaw chucks; therefore, one size shield will do the job.

On lathes with a center height in excess of 7”, there is a greater variation in diameter between the chucks; therefore, it is advisable to use two different size shields to provide adequate protection.

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>Replacement Shield</th>
</tr>
</thead>
<tbody>
<tr>
<td>LXS-300</td>
<td>10”</td>
<td>12”</td>
<td>7”</td>
<td>6½”</td>
<td>10”</td>
<td>LXS-301</td>
</tr>
<tr>
<td>LXS-400</td>
<td>14”</td>
<td>15½”</td>
<td>8½”</td>
<td>7¾”</td>
<td>13”</td>
<td>LXS-401</td>
</tr>
<tr>
<td>LXS-500</td>
<td>18”</td>
<td>19½”</td>
<td>10½”</td>
<td>7¼”</td>
<td>13”</td>
<td>LXS-501</td>
</tr>
<tr>
<td>LXS-600</td>
<td>23½”</td>
<td>24½”</td>
<td>12¼”</td>
<td>7¾”</td>
<td>13”</td>
<td>LXS-601</td>
</tr>
<tr>
<td>LXS-700</td>
<td>26”</td>
<td>28”</td>
<td>14¼”</td>
<td>7¾”</td>
<td>13”</td>
<td>LXS-701</td>
</tr>
</tbody>
</table>

Mounting brackets are sold separately. See page 20 for mounting bracket choices.
MOUNTING BRACKETS FOR SMALL STEEL AND TRANSPARENT LATHE CHUCK SHIELDS

The zinc-plated extension tube, to which the polycarbonate and steel shields are fastened, is mounted to the headstock of the lathe by a mounting bracket.

There are two principal types of mounting brackets available. Type A is used for mounting to the top or the side of the headstock. Type B is used for mounting to the inside face of the headstock.

Bracket Type A
Part No. LXS-650
For mounting to the top or side of the headstock.

Bracket Type B
Part No. LXS-652
For mounting to the face of the headstock.

Bracket Type A1
Part No. LXS-651
For extended mounting to top or side of the headstock.

Bracket Type B2
Part No. LXS-653
For mounting to the face of the headstock when two different sized shields are used.

Bracket Type B2 is a two-socket mounting. It can be fastened to the face of the headstock where shields with different diameters may be used. It accommodates 3-jaw and 4-jaw chucks. The inner socket is used for the 3-jaw chuck shield. When changing over to a 4-jaw chuck, the shield is removed from the inner socket and replaced by a larger diameter shield inserted into the outer socket. This accommodates the 4-jaw chuck.

Full dimensions, showing the transparent shield in relation to the chuck, are illustrated on page 19.

The small steel (page 17) and transparent (page 19) lathe chuck shields can be interlocked to the motor starter. When the chuck shield is lifted up, the contact on the switch is opened. This causes the machine to stop. The switch is attached to a heavy-duty mounting bracket.

Part number FKT-781 interlocking bracket assembly shown below includes mounting bracket LXS-652.

Interlock Switch Specifications
Contacts................................................2 NO and 2 NC
Actuating Directions..........................................................4
Switching Ability........................................3 A @ 230 V AC, 0.27 A @ 230 V DC
Conduit Adapter ................................................M20 to ½"
Operating Temperature ......................................-13° to 176°F
(-25° to 80°C)
STANDARD SIZE LATHE CHUCK WRENCHES

One of the most common accidents on lathes or other machines involves a chuck wrench or key which is thrown from the chuck. This happens when someone forgets to remove the wrench from the chuck before the machine is turned on.

The spring-loaded or self-ejecting chuck wrenches on pages 21 and 22 can be used on lathes or other machines equipped with manually adjusted chucks. The spring-loaded sleeve ejects the wrench from the chuck after each use. These wrenches are engineered and designed to provide proper loads for self-removal of the wrench weight.

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Nominal Size</th>
<th>Actual Size</th>
<th>Bar Diameter</th>
<th>Overall Diameter</th>
<th>Handle Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>KMC-011</td>
<td>9⁄32&quot; SQ</td>
<td>.271&quot;</td>
<td>3⁄4&quot;</td>
<td>1.050&quot;</td>
<td>5 1⁄2&quot;</td>
</tr>
<tr>
<td>KMC-001</td>
<td>5⁄16&quot; SQ</td>
<td>.303&quot;</td>
<td>3⁄4&quot;</td>
<td>1.050&quot;</td>
<td>5 1⁄2&quot;</td>
</tr>
<tr>
<td>KMC-002</td>
<td>3⁄8&quot; SQ</td>
<td>.365&quot;</td>
<td>3⁄4&quot;</td>
<td>1.050&quot;</td>
<td>5 1⁄2&quot;</td>
</tr>
<tr>
<td>KMC-003</td>
<td>7⁄16&quot; SQ</td>
<td>.427&quot;</td>
<td>3⁄4&quot;</td>
<td>1.050&quot;</td>
<td>5 1⁄2&quot;</td>
</tr>
<tr>
<td>KMC-004</td>
<td>1⁄2&quot; SQ</td>
<td>.490&quot;</td>
<td>3⁄4&quot;</td>
<td>1.050&quot;</td>
<td>5 1⁄2&quot;</td>
</tr>
<tr>
<td>KMC-005</td>
<td>9⁄16&quot; SQ</td>
<td>.552&quot;</td>
<td>15⁄16&quot;</td>
<td>1.315&quot;</td>
<td>9 1⁄2&quot;</td>
</tr>
<tr>
<td>KMC-006</td>
<td>5⁄8&quot; SQ</td>
<td>.615&quot;</td>
<td>15⁄16&quot;</td>
<td>1.315&quot;</td>
<td>9 1⁄2&quot;</td>
</tr>
<tr>
<td>KMC-007</td>
<td>11⁄16&quot; SQ</td>
<td>.678&quot;</td>
<td>15⁄16&quot;</td>
<td>1.315&quot;</td>
<td>9 1⁄2&quot;</td>
</tr>
<tr>
<td>KMC-008</td>
<td>3⁄4&quot; SQ</td>
<td>.740&quot;</td>
<td>15⁄16&quot;</td>
<td>1.315&quot;</td>
<td>9 1⁄2&quot;</td>
</tr>
<tr>
<td>KMC-500</td>
<td>1⁄2&quot; HEX</td>
<td>.490&quot;</td>
<td>3⁄4&quot;</td>
<td>1.050&quot;</td>
<td>5 1⁄2&quot;</td>
</tr>
<tr>
<td>KMC-501</td>
<td>5⁄8&quot; HEX</td>
<td>.615&quot;</td>
<td>3⁄4&quot;</td>
<td>1.050&quot;</td>
<td>9 1⁄2&quot;</td>
</tr>
<tr>
<td>KMC-502</td>
<td>3⁄4&quot; HEX</td>
<td>.740&quot;</td>
<td>3⁄4&quot;</td>
<td>1.315&quot;</td>
<td>9 1⁄2&quot;</td>
</tr>
</tbody>
</table>

2" Heat-Treated (Case-Hardened) Chamfered End for Strength and Wear

(Continued on next page.)
LONGER LATHE CHUCK WRENCHES

LONGER BODY, LONG SLIDING HANDLE!

The 18" handle can be slid into position and locked in place with the thumb screw.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Nominal Size</th>
<th>Actual Diameter</th>
<th>Bar Diameter</th>
<th>Overall Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>KMC-900</td>
<td>3⁄16&quot; SQ</td>
<td>.271&quot;</td>
<td>3⁄4&quot;</td>
<td>1.050&quot;</td>
</tr>
<tr>
<td>KMC-901</td>
<td>5⁄32&quot; SQ</td>
<td>.303&quot;</td>
<td>3⁄4&quot;</td>
<td>1.050&quot;</td>
</tr>
<tr>
<td>KMC-902</td>
<td>3⁄16&quot; SQ</td>
<td>.365&quot;</td>
<td>3⁄4&quot;</td>
<td>1.050&quot;</td>
</tr>
<tr>
<td>KMC-903</td>
<td>1⁄8&quot; SQ</td>
<td>.427&quot;</td>
<td>3⁄4&quot;</td>
<td>1.050&quot;</td>
</tr>
<tr>
<td>KMC-904</td>
<td>5⁄32&quot; SQ</td>
<td>.490&quot;</td>
<td>3⁄4&quot;</td>
<td>1.050&quot;</td>
</tr>
<tr>
<td>KMC-905</td>
<td>3⁄16&quot; SQ</td>
<td>.552&quot;</td>
<td>15⁄16&quot;</td>
<td>1.315&quot;</td>
</tr>
<tr>
<td>KMC-906</td>
<td>1⁄8&quot; SQ</td>
<td>.615&quot;</td>
<td>15⁄16&quot;</td>
<td>1.315&quot;</td>
</tr>
<tr>
<td>KMC-907</td>
<td>3⁄16&quot; SQ</td>
<td>.678&quot;</td>
<td>15⁄16&quot;</td>
<td>1.315&quot;</td>
</tr>
<tr>
<td>KMC-908</td>
<td>1⁄8&quot; SQ</td>
<td>.740&quot;</td>
<td>15⁄16&quot;</td>
<td>1.315&quot;</td>
</tr>
<tr>
<td>KMC-909</td>
<td>5⁄32&quot; HEX</td>
<td>.490&quot;</td>
<td>3⁄4&quot;</td>
<td>1.050&quot;</td>
</tr>
<tr>
<td>KMC-910</td>
<td>3⁄16&quot; HEX</td>
<td>.615&quot;</td>
<td>3⁄4&quot;</td>
<td>1.050&quot;</td>
</tr>
<tr>
<td>KMC-911</td>
<td>1⁄8&quot; HEX</td>
<td>.740&quot;</td>
<td>15⁄16&quot;</td>
<td>1.315&quot;</td>
</tr>
</tbody>
</table>
THE SHIELDS

These specially designed, quality-constructed shields are ideal for Bridgeport mills. They place a barrier between flying chips (swarf), sparks, coolant from the machine, and the operators or other employees in the area. They can be easily moved in or out of position to provide quick tool and part changes.

These shields are quick and easy to install. They attach directly to existing head machine bolts so no additional drilling or tapping is required.

THE SHIELD CONSTRUCTION

These shields are constructed of high-impact polycarbonate material. Attached at the bottom of each section of the shield is durable, flexible neoprene material to keep flying chips and swarf contained as the bed moves up and down. The front shield is mounted on a heavy-duty universal steel arm which is used to swing it back into the exact position it was in before tool or workpiece changes. The arm is 29” long and has an adjusting knob for raising and lowering the shield. The shield itself can also be used to hold a print.
REAR SHIELD

A rear shield is also available to protect the back area of the milling machine. This shield is easy to install and mounts directly onto the machine frame with a setscrew to hold it in place.

**CHIP SHIELDS FOR BRIDGEPORT MILLS**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KYL-019</td>
<td>9¼&quot; H x 19&quot; W Rear Shield With Two 45° Bends</td>
</tr>
<tr>
<td>KYL-065</td>
<td>9¼&quot; x 19&quot; Replacement Shield Only</td>
</tr>
<tr>
<td>KYL-059</td>
<td>9¼&quot; H x 15&quot; W Front Shield With One 45° Bend and One 90° Bend</td>
</tr>
<tr>
<td>KYL-020</td>
<td>7¼&quot; H x 18&quot; W Rear Shield With Two 45° Bends</td>
</tr>
</tbody>
</table>
SLIDE AND SWING-ASIDE SHIELDS

INTRODUCTION

These shields protect operators when machining either small workpieces or large castings that sometimes overhang the milling machine table. At the same time, they can provide immediate and complete access to the workpiece or casting being machined by sliding or swinging aside the door(s), as illustrated.

THE SHIELD

The transparent portion of the shield is constructed of impact-resistant polycarbonate. The frame of the shield is made of 1” x 2” extruded aluminum. The shield has front sliding panel(s) and two side fixed panels. The side panels are attached at both ends of the table.

These assemblies can be mounted or removed in a matter of minutes by using two locking T-bolts with nuts.

Each of the front panels can slide to the right or left and swing aside on their own axis out of the way (see drawings).

The advantage of the slide and swing-aside movement is that you can obtain immediate access to the whole length of the table for loading and unloading large workpieces. Although the panels slide aside, they will not take up any more room than the actual length of the table itself, because the sliding and swing-aside action takes place in one movement by simply lifting a latch.

THE SHIELD CONSTRUCTION

The parallel sliding bars enable the shield to be adjusted to the distance required from the front of the table to the shield. The adjustment on these bars caters to castings or large components which overhang the table. This adjustment is achieved by loosening the two socket cap screws at either end of the table. This permits the complete shield assembly to be moved backwards or forwards to the position required.

A safety latch is provided where the two front panels or the front and side panels come together which holds the panels in place. The latch has to be released manually prior to opening the panels.

The unique construction allows the front panels to slide and swing aside exposing the entire table.

(Continued on next page.)
SLIDE AND SWING-ASIDE SHIELDS

There are three sizes of shields available which cover table sizes up to a maximum length of 76”. On bed-type milling machines, where the table length is well in excess of 76”, it is still possible to use the SSA-300 shield. In many instances, only part of the maximum length of the table is used. If this is the case, the SSA-300 shield would be suitable as long as the longitudinal traverse used does not exceed the maximum length of the shield. For a table length of less than 36”, the SSA-000 shield may be used.

These shields have been generously designed to give protection to the operator; this will be noted in dimension H, which gives the height of the shields. Special height panels are available upon request. The standard shield does not provide protection on the back of the table. The rear shields (below) are used to minimize coolant splash and flying chips that may fly out of the back of the machine.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part Number</th>
<th>L–Length of Table Work Surface</th>
<th>H Height</th>
<th>D Depth</th>
<th>A Maximum Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSA-000*</td>
<td>24”-36”</td>
<td>20”</td>
<td>20”</td>
<td>13”</td>
</tr>
<tr>
<td>SSA-200**</td>
<td>36”-56”</td>
<td>20”</td>
<td>20”</td>
<td>13”</td>
</tr>
<tr>
<td>SSA-300**</td>
<td>56”-76”</td>
<td>20”</td>
<td>20”</td>
<td>13”</td>
</tr>
</tbody>
</table>

*Has one sliding and swing front door. **Has two sliding and swing front panels.

REAR SHIELD ASSEMBLIES

These shield assemblies can be used to protect personnel from swarf and chips at the rear of the table on both sides of the machine column. They can be used on milling machines or other equipment that require these types of shields. The two ¼” thick polycarbonate panels are mounted to the frame of the machine with mounts (see photo). Each panel has extruded aluminum framing to hold the polycarbonate in place. The mounts are also attached to this frame. The assembly is available in two sizes and includes two shields, one set of mounts, and connectors. Special sizes are available upon request.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSA-420</td>
<td>24” x 24” Rear Shields With Mounts (Set)</td>
</tr>
<tr>
<td>SSA-430</td>
<td>24” x 36” Rear Shields With Mounts (Set)</td>
</tr>
</tbody>
</table>

Rear Shield Assembly
MILLING MACHINE BELT COVERS

OSHA requires under 29 CFR 1910.219 that all mechanical power-transmission apparatuses on machinery that create a hazard be covered if below a 7-foot level from the floor or working platform. The sheaves and belts on milling machines must be covered to meet this requirement.

These unique patented belt covers are made of durable cast aluminum. The hinged covers are sold in pairs for the right and left sides and are permanently attached to the machine. Spindle speed changes are done quickly and efficiently by simply pulling down the belt cover.

This belt cover is made for Bridgeport model J.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description (Sold in Pairs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KYL-021J</td>
<td>Model J Belt Cover With Hinges</td>
</tr>
</tbody>
</table>
Grinder shields are designed to minimize the debris and hazards associated with bench grinders and buffers. Both double- and single-wheel grinder shields are available.

The double-wheel grinder shield provides protection for both wheels of the grinder with one continuous shield. The durable shield is made of clear, \( \frac{3}{4}'' \)-thick polycarbonate and measures 18" x 6". A special flat mounting-shield bracket adds stability to the top of the shield. Three different sized arms are available—12", 18", and 24".

The single-wheel grinder shield is made of clear, \( \frac{3}{4}'' \)-thick polycarbonate and measures 6" x 6". This sturdy, impact-resistant shield is designed for use when a single wheel needs safeguarding. Two different sized arms are available—18" and 24".

**MOUNTING OPTIONS**

For both double- and single-wheel grinder shields, there are two mounting options: direct or magnetic. The direct-mount base can be fastened directly to the grinder table or pedestal. The magnetic base has a 3"-diameter magnet with 100-lb holding force that can be secured to a flat ferrous mounting surface. If no ferrous mounting surface is available, an optional steel mounting plate is available—Part No. FKT-214.

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KYL-178</td>
<td>18&quot; Direct-Mount Arm With 6&quot; x 6&quot; Shield</td>
</tr>
<tr>
<td>KYL-179</td>
<td>24&quot; Direct-Mount Arm With 6&quot; x 6&quot; Shield</td>
</tr>
<tr>
<td>KYL-181</td>
<td>18&quot; Magnetic-Mount Arm With 6&quot; x 6&quot; Shield</td>
</tr>
<tr>
<td>KYL-182</td>
<td>24&quot; Magnetic-Mount Arm With 6&quot; x 6&quot; Shield</td>
</tr>
<tr>
<td>KYL-183</td>
<td>12&quot; Direct-Mount Arm With 18&quot; x 6&quot; Shield</td>
</tr>
<tr>
<td>KYL-184</td>
<td>18&quot; Direct-Mount Arm With 18&quot; x 6&quot; Shield</td>
</tr>
<tr>
<td>KYL-185</td>
<td>24&quot; Direct-Mount Arm With 18&quot; x 6&quot; Shield</td>
</tr>
<tr>
<td>KYL-186</td>
<td>12&quot; Magnetic-Mount Arm With 18&quot; x 6&quot; Shield</td>
</tr>
<tr>
<td>KYL-187</td>
<td>18&quot; Magnetic-Mount Arm With 18&quot; x 6&quot; Shield</td>
</tr>
<tr>
<td>KYL-188</td>
<td>24&quot; Magnetic-Mount Arm With 18&quot; x 6&quot; Shield</td>
</tr>
<tr>
<td>KYL-176</td>
<td>6&quot; x 6&quot; Flat Replacement Shield Only</td>
</tr>
<tr>
<td>KYL-177</td>
<td>18&quot; x 6&quot; Flat Replacement Shield Only</td>
</tr>
<tr>
<td>FKT-1072</td>
<td>Flat Mounting Bracket for 18&quot; x 6&quot; Shield Only</td>
</tr>
<tr>
<td>FKT-214</td>
<td>3¼&quot; x 4½&quot; Steel Mounting Plate for Magnetic Base</td>
</tr>
</tbody>
</table>
GRINDER SHIELDS

PIVOT-MOUNT GRINDER SHIELD

This grinding wheel shield bolts simply and quickly to the wheel guard of the grinder. It provides protection for grinders up to 8” in diameter.

The shield consists of a high-quality cast-aluminum frame measuring 6” H x 6¾” W with a thick replaceable high-impact polycarbonate window. A steel pivot connects the frame to the curved adjustable mounting pivot.

STANDARD-MOUNT GRINDER SHIELDS

These grinder shields are available in various sizes for protection from the swarf of bench or pedestal grinders. The frames are constructed of reinforced fiber nylon or heavy cast aluminum. Each shield is furnished with a threaded support rod. The transparent shield is high-impact polycarbonate to minimize scratching and provide durability.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Replacement Polycarbonate Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>GWG-100</td>
<td>Pivot-Mount Grinder Shield</td>
<td></td>
</tr>
<tr>
<td>GWW-000</td>
<td>Replacement Polycarbonate Window</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Replacement Polycarbonate Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>GWG-201</td>
<td>6⅛” H x 5¾” W Shield—Nylon Frame</td>
<td>GWW-001</td>
</tr>
<tr>
<td>GWG-202</td>
<td>8¾” H x 6” W Shield—Nylon Frame</td>
<td>GWW-002</td>
</tr>
<tr>
<td>GWG-203</td>
<td>12¼” H x 12” W Shield—Aluminum Frame</td>
<td>GWW-003</td>
</tr>
</tbody>
</table>
A variety of these quality-constructed, very versatile shields are available. They are ideal for mills, drills, grinders, band saws, or similar equipment including woodworking machines. The shield places a barrier between operators or other employees in the area and the flying chips (swarf), sparks, and coolant generated from the tool. These shields are furnished with heavy universal steel ball and socket arms to provide simple movement and adjustment. Large polypropylene plastic handles are used for positioning and locking. Arms mount easily to the frame or column of the machine and include standard mounting hardware.

The shields offered are made of high-impact-resistant 3/16" polycarbonate, selected for its toughness under impact to protect the operator. Each shield, except for the flat shield, has a hole in the left and right corners so the arm can be conveniently mounted on either side of the machine. Special size shields are available upon request.
### UNIVERSAL BALL & SOCKET SHIELDS

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KYL-104</td>
<td>6&quot; x 8&quot; Flat Shield With 21&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-105</td>
<td>6&quot; x 8&quot; Flat Shield With 31&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-106</td>
<td>6&quot; x 8&quot; Flat Shield With 44&quot; Universal Arm</td>
</tr>
<tr>
<td>CSAA-3</td>
<td>6&quot; x 8&quot; Flat Replacement Shield Only</td>
</tr>
<tr>
<td>CYF-016</td>
<td>Clamp Kit for Attaching to Table or Ledge</td>
</tr>
<tr>
<td>KYL-107</td>
<td>10&quot; x 12&quot; Flat Shield With 21&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-108</td>
<td>10&quot; x 12&quot; Flat Shield With 31&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-109</td>
<td>10&quot; x 12&quot; Flat Shield With 44&quot; Universal Arm</td>
</tr>
<tr>
<td>CSAA-5</td>
<td>10&quot; x 12&quot; Flat Replacement Shield Only</td>
</tr>
<tr>
<td>CYF-016</td>
<td>Clamp Kit for Attaching to Table or Ledge</td>
</tr>
<tr>
<td>KYL-110</td>
<td>30° Angle Shield (7&quot; Front) With 21&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-111</td>
<td>30° Angle Shield (7&quot; Front) With 31&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-112</td>
<td>30° Angle Shield (7&quot; Front) With 44&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-012</td>
<td>30° Angle (7&quot; Front) Replacement Shield Only</td>
</tr>
<tr>
<td>CYF-016</td>
<td>Clamp Kit for Attaching to Table or Ledge</td>
</tr>
<tr>
<td>KYL-013</td>
<td>30° Angle Shield (10¾&quot; Front) With 21&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-014</td>
<td>30° Angle Shield (10¾&quot; Front) With 31&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-015</td>
<td>30° Angle Shield (10¾&quot; Front) With 44&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-017</td>
<td>30° Angle Shield (10¾&quot; Front) Replacement Shield Only</td>
</tr>
<tr>
<td>CYF-016</td>
<td>Clamp Kit for Attaching to Table or Ledge</td>
</tr>
</tbody>
</table>

**All Steel Pivot Balls Are Hardened For Longevity**

(Continued on next page.)
**UNIVERSAL BALL & SOCKET SHIELDS**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KYL-127</td>
<td>30° &amp; 90° Angle Shield (10 3/8&quot; Front) With 21&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-128</td>
<td>30° &amp; 90° Angle Shield (10 3/8&quot; Front) With 31&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-129</td>
<td>30° &amp; 90° Angle Shield (10 3/8&quot; Front) With 44&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-126</td>
<td>30° &amp; 90° Angle Shield (10 3/8&quot; Front) Replacement Shield Only</td>
</tr>
<tr>
<td>CYF-016</td>
<td>Clamp Kit for Attaching to Table or Ledge</td>
</tr>
</tbody>
</table>

The 90° side prevents interference with a drill press handle!

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KYL-116</td>
<td>90° Angle Shield (11&quot; Front) With 21&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-117</td>
<td>90° Angle Shield (11&quot; Front) With 31&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-118</td>
<td>90° Angle Shield (11&quot; Front) With 44&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-018</td>
<td>90° Angle Shield (11&quot; Front) Replacement Shield Only</td>
</tr>
<tr>
<td>CYF-016</td>
<td>Clamp Kit for Attaching to Table or Ledge</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KYL-127</td>
<td>8&quot; x 10&quot; Concave Shield With 21&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-128</td>
<td>8&quot; x 10&quot; Concave Shield With 31&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-129</td>
<td>8&quot; x 10&quot; Concave Shield With 44&quot; Universal Arm</td>
</tr>
<tr>
<td>CSAD-2</td>
<td>8&quot; x 10&quot; Concave Replacement Shield Only</td>
</tr>
<tr>
<td>CYF-016</td>
<td>Clamp Kit for Attaching to Table or Ledge</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KYL-122</td>
<td>10&quot; x 12&quot; Concave Shield With 21&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-123</td>
<td>10&quot; x 12&quot; Concave Shield With 31&quot; Universal Arm</td>
</tr>
<tr>
<td>KYL-124</td>
<td>10&quot; x 12&quot; Concave Shield With 44&quot; Universal Arm</td>
</tr>
<tr>
<td>CSAD-3</td>
<td>10&quot; x 12&quot; Concave Replacement Shield Only</td>
</tr>
<tr>
<td>CYF-016</td>
<td>Clamp Kit for Attaching to Table or Ledge</td>
</tr>
</tbody>
</table>
MAGNETIC-BASE SHIELDS

These rugged magnetic-base shields can be used on lathes, small milling machines, drills, grinders, band saws, etc. These shields can be attached to any ferrous surface on the machine by an 80-lb pull magnetic base. If a ferrous surface is not available, a mounting plate (3¾” x 4¾”) is also furnished. Large polypropylene plastic handles are used for easy positioning and locking.

The transparent portion of the chip shield is constructed of high-impact-resistant, ¾”-thick clear polycarbonate material. It is furnished with a circular base which measures 3¼” in diameter. An 8” aluminum base extrusion is provided and attaches to the magnetic base. Also available is a 12” extruded-aluminum arm extension. This arm can be cut to a shorter length if required for your application.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Replacement Shield Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBS-1C1</td>
<td>Base With 6” x 8” Flat Shield</td>
<td>CSAA-3</td>
</tr>
<tr>
<td>CBS-2C1</td>
<td>Base With 10” x 12” Flat Shield</td>
<td>CSAA-5</td>
</tr>
<tr>
<td>CBS-3C1</td>
<td>Base With 14” x 16” Flat Shield</td>
<td>CSAA-7</td>
</tr>
<tr>
<td>CBS-1C1B</td>
<td>6” x 8” Flat Shield With 12” Arm Extension</td>
<td>CSAA-3</td>
</tr>
<tr>
<td>CBS-2C1B</td>
<td>10” x 12” Flat Shield With 12” Arm Extension</td>
<td>CSAA-5</td>
</tr>
<tr>
<td>CBS-3C1B</td>
<td>14” x 16” Flat Shield With 12” Arm Extension</td>
<td>CSAA-7</td>
</tr>
<tr>
<td>CBS-6C1</td>
<td>Base With 8” x 10” Concave Shield</td>
<td>CSAD-2</td>
</tr>
<tr>
<td>CBS-7C1</td>
<td>Base With 10” x 12” Concave Shield</td>
<td>CSAD-3</td>
</tr>
<tr>
<td>CBS-6C1B</td>
<td>8” x 10” Concave Shield With 12” Arm Extension</td>
<td>CSAD-2</td>
</tr>
<tr>
<td>CBS-7C1B</td>
<td>10” x 12” Concave Shield With 12” Arm Extension</td>
<td>CSAD-3</td>
</tr>
</tbody>
</table>
These high-quality flexible-arm shields can be used on lathes, drills, small mills, grinders, band saws, or similar equipment including woodworking machines. The heavy-duty, flexible arms are made of spring steel and are covered with vinyl to protect them from grease, oil, and contaminants that would weaken their holding ability. They offer virtually unlimited adjustment possibilities and long-term holding ability.

The transparent portion of these shields is constructed of high-impact-resistant \( \frac{3}{16} \)-thick clear polycarbonate. The shield places a barrier between an operator and the flying chips (swarf), sparks, and coolant generated at the point of operation. Special shield sizes are available up to 12” x 12”; please contact the factory.

The flexible-arm shields have two mounting options: direct or magnetic. The direct-mount base can be fastened directly to a machine with two \( \frac{1}{4} \)“ fasteners (included). The magnetic base consists of a 3”-diameter magnet with 100-lb holding force. If an adequate flat, ferrous mounting surface is not available, an optional steel mounting plate can be permanently attached to the machine to hold the magnetic base.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KYL-096</td>
<td>6&quot; x 8&quot; Flat Shield and 12&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-097</td>
<td>6&quot; x 8&quot; Flat Shield and 18&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-132</td>
<td>6&quot; x 8&quot; Flat Shield and 24&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>CSAA-3</td>
<td>6&quot; x 8&quot; Flat Replacement Shield Only</td>
</tr>
<tr>
<td>KYL-100</td>
<td>6&quot; x 8&quot; Flat Shield and 12&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-101</td>
<td>6&quot; x 8&quot; Flat Shield and 18&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-133</td>
<td>6&quot; x 8&quot; Flat Shield and 24&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>CSAA-3</td>
<td>6&quot; x 8&quot; Flat Replacement Shield Only</td>
</tr>
<tr>
<td>FKT-214</td>
<td>Optional 3½” x 4¾” Steel Mounting Plate (Fasteners Not Included)</td>
</tr>
<tr>
<td>KYL-098</td>
<td>10&quot; x 12&quot; Flat Shield and 12&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-099</td>
<td>10&quot; x 12&quot; Flat Shield and 18&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-134</td>
<td>10&quot; x 12&quot; Flat Shield and 24&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>CSAA-5</td>
<td>10&quot; x 12&quot; Flat Replacement Shield Only</td>
</tr>
<tr>
<td>KYL-102</td>
<td>10&quot; x 12&quot; Flat Shield and 12&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-103</td>
<td>10&quot; x 12&quot; Flat Shield and 18&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-135</td>
<td>10&quot; x 12&quot; Flat Shield and 24&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>CSAA-5</td>
<td>10&quot; x 12&quot; Flat Replacement Shield Only</td>
</tr>
<tr>
<td>FKT-214</td>
<td>Optional 3½” x 4¾” Steel Mounting Plate (Fasteners Not Included)</td>
</tr>
</tbody>
</table>

(Continued on next page.)
# FLEXIBLE-ARM/SNAKE-ARM/GOOSENECK SHIELDS

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KYL-136</td>
<td>30° Angle Shield (7&quot; Front) and 12&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-137</td>
<td>30° Angle Shield (7&quot; Front) and 18&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-138</td>
<td>30° Angle Shield (7&quot; Front) and 24&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-012</td>
<td>30° Angle (7&quot; Front) Replacement Shield Only</td>
</tr>
<tr>
<td>KYL-139</td>
<td>30° Angle Shield (7&quot; Front) and 12&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-140</td>
<td>30° Angle Shield (7&quot; Front) and 18&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-141</td>
<td>30° Angle Shield (7&quot; Front) and 24&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-012</td>
<td>30° Angle (7&quot; Front) Replacement Shield Only</td>
</tr>
<tr>
<td>FKT-214</td>
<td>Optional 3½&quot; x 4¾&quot; Steel Mounting Plate (Fasteners Not Included)</td>
</tr>
<tr>
<td>KYL-142</td>
<td>30° Angle Shield (10½&quot; Front) and 12&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-143</td>
<td>30° Angle Shield (10½&quot; Front) and 18&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-144</td>
<td>30° Angle Shield (10½&quot; Front) and 24&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-017</td>
<td>30° Angle (10½&quot; Front) Replacement Shield Only</td>
</tr>
<tr>
<td>FKT-214</td>
<td>Optional 3½&quot; x 4¾&quot; Steel Mounting Plate (Fasteners Not Included)</td>
</tr>
<tr>
<td>KYL-145</td>
<td>30° Angle Shield (10½&quot; Front) and 12&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-146</td>
<td>30° Angle Shield (10½&quot; Front) and 18&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-147</td>
<td>30° Angle Shield (10½&quot; Front) and 24&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-017</td>
<td>30° Angle (10½&quot; Front) Replacement Shield Only</td>
</tr>
<tr>
<td>FKT-214</td>
<td>Optional 3½&quot; x 4¾&quot; Steel Mounting Plate (Fasteners Not Included)</td>
</tr>
<tr>
<td>KYL-148</td>
<td>30° &amp; 90° Angle Shield (10½&quot; Front) and 12&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-149</td>
<td>30° &amp; 90° Angle Shield (10½&quot; Front) and 18&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-150</td>
<td>30° &amp; 90° Angle Shield (10½&quot; Front) and 24&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-126</td>
<td>30° &amp; 90° Angle Shield (10½&quot; Front) Replacement Shield Only</td>
</tr>
<tr>
<td>KYL-151</td>
<td>30° &amp; 90° Angle Shield (10½&quot; Front) and 12&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-152</td>
<td>30° &amp; 90° Angle Shield (10½&quot; Front) and 18&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-153</td>
<td>30° &amp; 90° Angle Shield (10½&quot; Front) and 24&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-126</td>
<td>30° &amp; 90° Angle Shield (10½&quot; Front) Replacement Shield Only</td>
</tr>
<tr>
<td>FKT-214</td>
<td>Optional 3½&quot; x 4¾&quot; Steel Mounting Plate (Fasteners Not Included)</td>
</tr>
</tbody>
</table>

(Continued on next page.)
## FLEXIBLE-ARM/SNAKE-ARM/GOOSENECK SHIELDS

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KYL-154</td>
<td>90° Angle Shield (11&quot; Front) and 12&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-155</td>
<td>90° Angle Shield (11&quot; Front) and 18&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-156</td>
<td>90° Angle Shield (11&quot; Front) and 24&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-018</td>
<td>90° Angle (11&quot; Front) Replacement Shield Only</td>
</tr>
<tr>
<td>KYL-157</td>
<td>90° Angle Shield (11&quot; Front) and 12&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-158</td>
<td>90° Angle Shield (11&quot; Front) and 18&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-159</td>
<td>90° Angle Shield (11&quot; Front) and 24&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-018</td>
<td>90° Angle (11&quot; Front) Replacement Shield Only</td>
</tr>
<tr>
<td>FKT-214</td>
<td>Optional 3½&quot; x 4¾&quot; Steel Mounting Plate (Fasteners Not Included)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KYL-160</td>
<td>8&quot; x 10&quot; Concave Shield and 12&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-161</td>
<td>8&quot; x 10&quot; Concave Shield and 18&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-162</td>
<td>8&quot; x 10&quot; Concave Shield and 24&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>CSAD-2</td>
<td>8&quot; x 10&quot; Concave Replacement Shield Only</td>
</tr>
<tr>
<td>KYL-163</td>
<td>8&quot; x 10&quot; Concave Shield and 12&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-164</td>
<td>8&quot; x 10&quot; Concave Shield and 18&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-165</td>
<td>8&quot; x 10&quot; Concave Shield and 24&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>CSAD-2</td>
<td>8&quot; x 10&quot; Concave Replacement Shield Only</td>
</tr>
<tr>
<td>FKT-214</td>
<td>Optional 3½&quot; x 4¾&quot; Steel Mounting Plate (Fasteners Not Included)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KYL-166</td>
<td>10&quot; x 12&quot; Concave Shield and 12&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-167</td>
<td>10&quot; x 12&quot; Concave Shield and 18&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>KYL-168</td>
<td>10&quot; x 12&quot; Concave Shield and 24&quot; Arm With Direct-Mount Base</td>
</tr>
<tr>
<td>CSAD-3</td>
<td>10&quot; x 12&quot; Concave Replacement Shield Only</td>
</tr>
<tr>
<td>KYL-169</td>
<td>10&quot; x 12&quot; Concave Shield and 12&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-170</td>
<td>10&quot; x 12&quot; Concave Shield and 18&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>KYL-171</td>
<td>10&quot; x 12&quot; Concave Shield and 24&quot; Arm With Magnetic Base</td>
</tr>
<tr>
<td>CSAD-3</td>
<td>10&quot; x 12&quot; Concave Replacement Shield Only</td>
</tr>
<tr>
<td>FKT-214</td>
<td>Optional 3½&quot; x 4¾&quot; Steel Mounting Plate (Fasteners Not Included)</td>
</tr>
</tbody>
</table>
These shields can be used to protect the area between machines, the backside of machines, along aisles, etc.

These free-standing adjustable shield assemblies are available in a wide range of sizes. They are constructed of 3⁄16” thick polycarbonate material surrounded by aluminum framing. The shield can easily be adjusted up or down on the stands. The stands are constructed of 2” square extruded aluminum. Each base includes four holes for permanent mounting to the floor. Four standard sizes are available. Special size shield assemblies are available upon request.

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KYL-026</td>
<td>48” H x 48” L Shield Size</td>
</tr>
<tr>
<td>KYL-027</td>
<td>48” H x 60” L Shield Size</td>
</tr>
<tr>
<td>KYL-028</td>
<td>48” H x 72” L Shield Size</td>
</tr>
<tr>
<td>KYL-029</td>
<td>48” H x 96” L Shield Size</td>
</tr>
</tbody>
</table>
These flexible-arm lamps can be used to light the point of operation of machines or most any work area where additional light is needed. The heavy-duty, flexible arms are made of spring steel and are covered with vinyl to protect them from grease, oil, and contaminants that would weaken their holding ability. They offer virtually unlimited adjustment possibilities and long-term durability.

All lamps are UL-listed with the C-UL US listing mark, which indicates compliance with both United States and Canadian requirements. The lamps have 6’ cords with grounded plugs (120 V). The lamp shade is made of high-impact polycarbonate that is resistant to denting, chipping, and cracking. It has a double wall that keeps the outer wall from getting too hot, allowing adjustment of the lamp while in use. A bright conical reflector directs the light to where it is needed. Each lamp uses a 100-watt-maximum regular incandescent bulb (not included). An innovative, finned aluminum heat sink keeps the toggle switch cool for a long switch life. Optional accessories for the lamp include a wire guard that can be snapped onto the front rim of the shade to protect the bulb, and a magnifier attachment that can mount directly to the shade with a 2" x 4", 2-power glass lens. Please note that the wire guard and the magnifier attachment cannot be used together.

The flexible-arm lamps have three mounting options: direct, C-clamp, or magnetic. The direct-mount base can be fastened directly to any flat surface with two ¼” fasteners (included). The C-clamp base can be mounted to a table or ledge up to 1¼” thick. The magnetic base consists of a 3”-diameter magnet with 100-lb holding force. If an adequate flat, ferrous mounting surface is not available, an optional steel mounting plate can be permanently attached to any flat surface to hold the magnetic base. (Fasteners not included.)

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAL-504</td>
<td>Lamp With 18&quot; Flexible Arm and Direct-Mount Base</td>
</tr>
<tr>
<td>RAL-505</td>
<td>Lamp With 24&quot; Flexible Arm and Direct-Mount Base</td>
</tr>
<tr>
<td>RAL-506</td>
<td>Lamp With 18&quot; Flexible Arm and C-Clamp Base</td>
</tr>
<tr>
<td>RAL-507</td>
<td>Lamp With 24&quot; Flexible Arm and C-Clamp Base</td>
</tr>
<tr>
<td>RAL-508</td>
<td>Lamp With 18&quot; Flexible Arm and Magnetic Base</td>
</tr>
<tr>
<td>RAL-509</td>
<td>Lamp With 24&quot; Flexible Arm and Magnetic Base</td>
</tr>
</tbody>
</table>

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAL-510</td>
<td>Wire Guard That Snaps Onto Shade to Protect the Bulb</td>
</tr>
<tr>
<td>RAL-511</td>
<td>Magnifier Attachment With 2&quot; x 4&quot;, 2-Power Glass Lens</td>
</tr>
<tr>
<td>FKT-214</td>
<td>3¼&quot; x 4¼&quot; Steel Mounting Plate for Magnetic Base</td>
</tr>
</tbody>
</table>
**LOCKOUTS**

**Electrical Plug Lockout**

Part No. KYM-088

This lockout container can lockout plugs up to 3” wide and 5½” long with a maximum cord diameter of 1¼”.

The lockout consists of a round container and two cover plates made of a durable and chemically resistant thermoplastic. The cover plates, when used singularly or combined, are locked to produce a universally fitting electrical plug lockout device.

This lockout is bright yellow so it can also serve as a visual warning to other plant personnel.

**Plug Hugger—Part No. KYM-199**

This device is ideal for frequently locked-out cords. It slides over the plug’s blades and locks with a key. It can only be used on standard 125-V, 15-A plugs (polarized or nonpolarized) with a hole on both blades.

**Lockout Hasps**

These lockout hasps are made from 12-gauge steel that is epoxy-coated for superior rust resistance and added dielectric strength. The yellow plastic coating on the lock area is for visibility. These devices accept up to six padlocks with ½” maximum shackle diameter.

Part No. KYM-988 1” Diameter Lockout Hasp

Part No. KYM-989 1½” Diameter Lockout Hasp

**Electrical Power Cutoff System (Interlock)**

This interlock assembly can be interfaced into the control system so when the plug is pulled, the machine or equipment becomes inoperable. It includes a two-prong plug, a 12” or 24” chain, a receptacle, and an electrical mounting box. The receptacle and plug are yellow and are made of molded rubber.

Part No. KTS-503 Assembly With 12” Chain

Part No. KTS-518 Assembly With 24” Chain

**Lock-a-Plugs**

These lockout devices accommodate a large variety of electrical plugs. The large device (KYM-987) also locks out necked-down pneumatic male fittings commonly attached to compressed air hoses. These devices accommodate up to four padlocks with ¾” maximum shackle diameter.

Part No. KYM-984 For plugs up to 1½” wide, 1½” high, and 3” long with a maximum cord diameter of ¼”

Part No. KYM-987 For plugs up to 3½” wide, 3½” high, and 6” long with a maximum cord diameter of ¾”

**Plugout**

Part No. KYM-983

This lockout container accepts lockout plugs up to 2½” wide and 4½” long with a maximum cord diameter of 2¼”. It is constructed of high-impact, yellow UV-stabilized polymer. It has an easy to use two-step close and slide assembly. It allows the use of four individual padlocks (up to ¾” shackle diameter). A lockout hasp can be used if more locks are required. An advantage to this plug lockout is that it can be stored on the cord when not in use. This device is 4½” wide and 7¼” long.

**Plug Hugger—Part No. KYM-199**

This device is ideal for frequently locked-out cords. It slides over the plug’s blades and locks with a key. It can only be used on standard 125-V, 15-A plugs (polarized or nonpolarized) with a hole on both blades.

**Lockout Hasps**

These lockout hasps are made from 12-gauge steel that is epoxy-coated for superior rust resistance and added dielectric strength. The yellow plastic coating on the lock area is for visibility. These devices accept up to six padlocks with ½” maximum shackle diameter.

Part No. KYM-988 1” Diameter Lockout Hasp

Part No. KYM-989 1½” Diameter Lockout Hasp

**Electrical Power Cutoff System (Interlock)**

This interlock assembly can be interfaced into the control system so when the plug is pulled, the machine or equipment becomes inoperable. It includes a two-prong plug, a 12” or 24” chain, a receptacle, and an electrical mounting box. The receptacle and plug are yellow and are made of molded rubber.

Part No. KTS-503 Assembly With 12” Chain

Part No. KTS-518 Assembly With 24” Chain

**TAGOUTS**

These tagouts are 2¾” x 5½” x .055” thick, and made of a polyethylene material. They meet the requirements of OSHA 29 CFR 1910.147 for lockout/tagout. The reverse side of each tagout is the same.
LOCKOUT VALVES

SLIDE-OPERATED VALVE
This three-way valve is operated with the manual movement of a slide that opens and closes the valve. This valve shuts off air at the press and then bleeds off downstream air. It can be locked only in the off position.

EEZ-ON VALVE
This valve shuts off air supply to the machine and bleeds downstream air when the valve is closed. When the valve is open, it gradually allows air into the air system to prevent damage to air components. It can be locked only in the off position. This valve is furnished with a muffler.

SINGLE-PHASE DISCONNECT SWITCH WITH MAGNETIC MOTOR STARTER AND SELF-LATCHING EMERGENCY-STOP BUTTON

This single-phase unit is designed for motors that have built-in overloads. Typical applications for these combinations include smaller crimping machines, grinders, drill presses, and all types of saws.

Part No. CSS-055 (115 V, 1/2 HP max.)
The 115-V, 15-A disconnect switch and nonreversing magnetic motor starter are housed in a NEMA 12 enclosure. Enclosure size is 8” x 6” x 3¼”. It includes a self-latching red emergency-stop palm button and a green motor control start push button. It can be used on machines with 115-V power and is rated up to ½ HP maximum.

The disconnect switch has a rotary operating handle which is lockable in the off position only. This meets OSHA regulations and ANSI standards.

For machines with 230-V AC single-phase motors, a transformer is required to reduce the control circuit voltage to 115-V AC in order to comply with NFPA 79. See the RSD series disconnect switches, motor starters, and combinations on pages 41-42.

Part No. CSF-082 (115 V, 1/2 HP max.)
The 115-V, 15-A nonreversing magnetic motor starter, self-latching red emergency-stop palm button, and green motor control start push button are housed in a NEMA 4 polycarbonate enclosure. Enclosure size is 4½” x 4½” x 3½”. It can be used for machines with 115-V power and is rated up to ½ HP maximum.

For machines with 230-V AC single-phase motors, a transformer is required to reduce the control circuit voltage to 115-V AC in order to comply with NFPA 79. See the RSD series disconnect switches, motor starters, and combinations on pages 41-42.

Part No. CSF-301 (115 V, 2 HP max.)
The 115-V, 30-A nonreversing magnetic motor starter, self-latching red emergency-stop palm button, and green motor control start push button are housed in a NEMA 12 enclosure. Enclosure size is 8” x 6” x 6”. It can be used for machines with 115-V power and is rated up to 2 HP maximum.

For machines with 230-V AC single-phase motors, a transformer is required to reduce the control circuit voltage to 115-V AC in order to comply with NFPA 79. See the RSD series disconnect switches, motor starters, and combinations on pages 41-42.
ENCLOSED TRANSFORMERS

These transformers comply with OSHA regulations and ANSI standards and are available for use when the motor start/stop station is remotely located from the starter enclosure, and voltage to these buttons must be 115 V or less. These transformers mount directly to the frame of the machine. If the existing motor starter operating coils are a higher voltage (208, 230, 460, 575 V), they must be replaced with a 115-V coil when furnishing these transformers. A replaceable fuse is accessible from the outside of the transformer housing.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSF-021</td>
<td>100-VA, 230/460-V primary and 115-V fused secondary with a 1 A, 230-V fuse</td>
</tr>
<tr>
<td>RSF-030</td>
<td>150-VA, 230/460-V primary and 115-V fused secondary with a 1.5 A, 230-V fuse</td>
</tr>
</tbody>
</table>

IEC FUSED DISCONNECT SWITCHES, MAGNETIC MOTOR STARTERS, AND COMBINATIONS

These three-phase disconnect/starters are housed in a NEMA 12 metal enclosure. The enclosure size will vary depending on the motor starter required. These units can be used on machines with 208, 230, 460, or 575 V. They are furnished with an overload relay and have operating coils of 115 V, 60 Hz. The disconnect operating handle is lockable in the off position only. These combination units meet OSHA regulations, ANSI standards, and NFPA 79.

To obtain the part number of the motor starter required, please refer to the part numbering chart on the next page.

A remote station is required when using any plain-door starter. To obtain the part number of the remote operator station required, please refer to the part numbering chart on the page 43.

Please furnish the exact motor horsepower, voltage, and full-load amps when ordering any of the disconnects or starters on page 42. This information is usually on the motor nameplate. Voltage can be 208, 230, 460, or 575 V. If other sizes are required, please consult the factory.
**SELECTING A DISCONNECT, STARTER, OR COMBINATION DISCONNECT/STARTER(S)**

To determine the 9-digit configured part number for a disconnect, starter, or combination disconnect/starter(s) required, follow directions 1-7 below and use the information in the **PART NUMBERING SYSTEM CHART** below.

1. The first 3 digits for all disconnects, starters, or combination disconnect/starter(s) are RSD.
2. The 4th digit determines the size of the disconnect switch, if required. Zero (0) indicates no disconnect switch provided.
3. The 5th digit determines the type of the main motor starter and/or 2nd motor starter. Zero (0) indicates no starters.
4. The 6th digit determines the size of the main motor starter. Zero (0) indicates no main motor starter.
5. The 7th digit determines the size of the 2nd motor starter. Zero (0) indicates no 2nd motor starter.
6. The 8th digit (if required) determines the configuration and location of the operator controls.
7. The 9th digit determines if a transformer and/or wiring is required.

---

**DISCONNECT AND STARTER(S) PART NUMBERING SYSTEM CHART**

<table>
<thead>
<tr>
<th>DISCONNECT AND STARTER(S)</th>
<th>R S D - X X X - X - X</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISCONNECT SWITCH SIZE (IEC)</td>
<td>PLUS MAXIMUM MAIN MOTOR FLA</td>
</tr>
<tr>
<td>0 — No Disconnect Switch</td>
<td></td>
</tr>
<tr>
<td>1 — 30-A CC Disconnect—1- to 17-FLA Total Motor Current</td>
<td></td>
</tr>
<tr>
<td>2 — 30-A J Disconnect—1- to 17-FLA Total Motor Current</td>
<td></td>
</tr>
<tr>
<td>3 — 60-A J Disconnect—18- to 34-FLA Total Motor Current</td>
<td></td>
</tr>
<tr>
<td>4 — 100-A J Disconnect—35- to 57-FLA Total Motor Current</td>
<td></td>
</tr>
<tr>
<td>5 — 200-A J Disconnect—58- to 114-FLA Total Motor Current</td>
<td></td>
</tr>
<tr>
<td>6 — 400-A J Disconnect—115- to 228-FLA Total Motor Current</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MODIFIER</th>
<th>-- — Blank — No Specific Configuration, Terminals, Transformer, or Wiring</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>— Generically Numbered and Wired to Terminals—Includes Transformer</td>
</tr>
<tr>
<td>2</td>
<td>— Generically Numbered and Wired to Terminals—Without Transformer</td>
</tr>
</tbody>
</table>

**REVERSING/NONREVERSING MOTOR STARTER**

| 0 — No Starters |  |
| 1 — Nonreversing Main Motor Starter |  |
| 2 — Reversing Main Motor Starter |  |
| 3 — Nonreversing Main Motor Starter & Nonreversing 2nd Motor |  |
| 4 — Nonreversing Main Motor Starter & Reversing 2nd Motor |  |
| 5 — Reversing Main Motor Starter & Nonreversing 2nd Motor |  |
| 6 — Reversing Main Motor Starter & Reversing 2nd Motor |  |
| 7 — Nonreversing 2-Speed Main Motor Starter |  |
| 8 — Reversing 2-Speed Main Motor Starter |  |
| 9 — Nonreversing 2-Speed Main Motor Starter & Nonrev. 2nd Motor |  |
| A — Nonreversing 2-Speed Main Motor Starter & Reversing 2nd Motor |  |
| B — Reversing 2-Speed Main Motor Starter & Nonreversing 2nd Motor |  |
| C — Reversing 2-Speed Main Motor Starter & Reversing 2nd Motor |  |

**MAIN MOTOR STARTER SIZE**

| 0 — No Main Motor Starter |  |
| IEC | 1-Phase | 3-Phase |
| 115 V | 230 V | 208 V | 230 V | 460 V | 575 V |
| 1 — 12-A 1⁄2 | 1 | 2 | 3 | 5 | 7.5 |
| 2 — 17-A 3⁄4 | 2 | 3 | 3 | 10 | 10 |
| 3 — 25 A | 3 | 3 | 5 | 10 | 15 |
| 4 — 32 A | 2 | 3 | 7.5 | 10 | 15 |
| 5 — 40 A | 3 | 3 | 10 | 10 | 25 |
| 6 — 50 A | 3 | 7.5 | 10 | 15 | 30 |
| 7 — 65 A | 5 | 10 | 15 | 20 | 40 |
| 8 — 80 A | 5 | 10 | 20 | 25 | 50 |
| 9 — 95 A | 7.5 | 15 | 25 | 30 | 60 |
| A — 115 A | – | – | 30 | 30 | 75 |
| B — 185 A | – | – | 50 | 60 | 125 |
| C — 265 A | – | – | 75 | 75 | 200 |

Please see page 43 for an example of a disconnect and starter(s) part number.
SELECTING A REMOTE OPERATOR STATION

To determine the 8-digit configured part number for a remote operator station required, follow directions 1-3 below and use the information in the PART NUMBERING SYSTEM CHART below.

1. The first 3 digits determine the orientation of the remote operator station.
2. Digits 4 through 7 determine motor operators. Zero (0) indicates no operator(s).
3. The 8th digit (if required) determines the 2nd motor operators.

REMOTE OPERATOR STATION PART NUMBERING SYSTEM CHART

<table>
<thead>
<tr>
<th>X X X - X</th>
<th>X X X - X</th>
</tr>
</thead>
<tbody>
<tr>
<td>REMOTE OPERATOR STATION ORIENTATION</td>
<td>2nd MOTOR OPERATORS</td>
</tr>
<tr>
<td>HOS—Horizontal Operator Station</td>
<td>--- —Blank—No 2nd Motor</td>
</tr>
<tr>
<td>VOS—Vertical Operator Station</td>
<td>1—Start/Stop Push Buttons</td>
</tr>
<tr>
<td>MAIN MOTOR START/STOP/E-STOP OPERATORS</td>
<td>2—Start/Stop Push Buttons</td>
</tr>
<tr>
<td>1—Start/Stop Push Buttons</td>
<td>3—Start/Stop/E-Stop Buttons</td>
</tr>
<tr>
<td>2—Start/E-Stop Push Buttons</td>
<td>4—E-Stop Button Only</td>
</tr>
<tr>
<td>3—Start/Stop/E-Stop Buttons</td>
<td>MAIN MOTOR FORWARD/REVERSE OPERATORS</td>
</tr>
<tr>
<td>4—E-Stop Button Only</td>
<td>0—No Forward/Reverse Operators</td>
</tr>
<tr>
<td>MAIN MOTOR FORWARD/REVERSE OPERATORS</td>
<td>1—Forward/Reverse Selector Switch</td>
</tr>
<tr>
<td>0—No Forward/Reverse Operators</td>
<td>2—Forward/Reverse Push Buttons</td>
</tr>
<tr>
<td>1—Forward/Reverse Selector Switch</td>
<td>MAIN MOTOR SPEED CHANGE</td>
</tr>
<tr>
<td>2—Forward/Reverse Push Buttons</td>
<td>0—No Speed Change</td>
</tr>
<tr>
<td>3—Forward/Reverse Push Buttons</td>
<td>1—Fast/Slow Selector Switch</td>
</tr>
<tr>
<td>4—E-Stop Button Only</td>
<td>2—Fast/Slow Push Buttons</td>
</tr>
</tbody>
</table>

Disconnect and starters part number example

1 2 3 4 5 6 7
R S D - 3 5 2 1 - P - 1

The example shown above, RSD-3521-P-1, indicates that the enclosure containing the combination disconnect/starter(s) has a 60-A disconnect switch, a 17-A reversing main motor starter, and a 12-A non-reversing 2nd motor starter. All motor controls will be in a remote station. This disconnect/starter(s) will be generically numbered and wired to terminals and will include a transformer.

Remote operator part number example

1 2 3 4 5 6 7
V O S - 3 1 0 0 - 1

The example shown above, VOS-3100-1, indicates that it is a vertical-oriented remote operator station which includes main motor start/stop/E-stop buttons, main motor forward/reverse selector switch, and start/stop push buttons for the 2nd motor starter.
**REMOTE STATIONS**

**Part No. HOS-4000**

This 4½" x 3½" x 3" station has a self-latching red emergency-stop palm button in a NEMA 12 metal enclosure. To reset this button, turn it to the right.

**Part No. VOS-2000** *(For Use With Nonreversing Motor Starters)*

This 6¼" x 3¼" x 3" station has a motor start push button and a self-latching red emergency-stop palm button in a NEMA 12 metal enclosure.

**Part No. HOS-4201** *(For Use With Reversing Motor Starters)*

This 3½" x 10½" x 3" station has a motor jog/run selector switch, forward and reverse push buttons, and a self-latching emergency-stop palm button in a NEMA 12 metal enclosure.

**Part No. VOS-1000** *(For Use With Nonreversing Motor Starters)*

This 6¾" x 3½" x 3" station has motor start and stop push buttons in a NEMA 12 metal enclosure.

**Part No. HOS-4200** *(For Use With Reversing Motor Starters)*

This 3¼" x 8½" x 3" station has motor forward and reverse push buttons and a self-latching emergency-stop palm button in a NEMA 12 metal enclosure.

**Part No. VOS-1100** *(For Use With Reversing Motor Starters)*

This 8¾" x 3½" x 3" station has motor start and stop push buttons and a motor forward/reverse selector switch in a NEMA 12 metal enclosure.

**Part No. VOS-2100** *(For Use With Reversing Motor Starters)*

This 8¾" x 3½" x 3" station has a motor forward/reverse selector switch, a motor start push button, and a self-latching red emergency-stop palm button in a NEMA 12 metal enclosure.

**PARTS**

**Part No. PB5R00-01** — Self-Latching Emergency-Stop Mushroom-Head Push Button

**Part No. CTM-506** — Yellow Emergency-Stop Nameplate (22.5 mm hole)

**Part No. CTC-550** — Push/Pull to Release Emergency-Stop Push Button

**Part No. CTM-548** — Yellow Emergency-Stop Nameplate (30 mm hole)
**Palm Buttons**

Part No. CTC-737—This heavy-duty, light-push single plunger run palm button provides 1 NO and 1 NC contact arrangement. This 2 1/4" palm button is constructed from zinc die cast and has a flat plunger. The palm button cover plate has a solid neoprene gasket which provides an oil-tight seal upon installation. This palm button can replace the black palm button described previously. The force required to operate this button is 2.5 lb.

**Chrome Palm Button**

Part No. CTC-737—This heavy-duty, light-push single plunger run palm button provides 1 NO and 1 NC contact arrangement. This 2 1/4" palm button is constructed from zinc die cast and has a flat plunger. The palm button cover plate has a solid neoprene gasket which provides an oil-tight seal upon installation. This palm button can replace the black palm button described previously. The force required to operate this button is 2.5 lb.

**Universal Palm Button Ring Guard**

Part No. CTK-006—This palm button ring guard is used to protect new and existing run palm buttons from accidental operation. This high-impact PVC plastic ring guard can be used with most palm button brands. Four 1 1/4" screws are furnished with each ring guard.

**Black Palm Button**

Part No. CTC-726—This standard heavy-duty, single plunger run palm button provides 1 NO and 1 NC contact arrangement. This 2 1/4" button is mushroom-shaped. The palm button cover plate has a solid neoprene gasket which provides an oil-tight seal upon installation. When applying two-hand control as a safeguard to any machine, fixture, device, etc., the palm buttons must be installed at the proper safety distance. The force required to operate this button is 4.3 lb.

**Emergency-Stop Palm Button W/Lockout**

Part No. CTC-736—This heavy-duty, single plunger red emergency-stop palm button with yellow cover plate provides 1 NO and 1 NC contact arrangement. This 2 1/4" button has a mushroom-shaped plunger with a spring latch that keeps the button latched down when pushed. A side release plunger is incorporated. The palm button cover plate has a solid neoprene gasket which provides an oil-tight seal upon installation.

**Touchdown!™ Palm Button**

Part No. CTL-555—Standard Voltage (115 V AC, 45-60 Hz, 40 mA)  
Part No. CTL-553—Low Voltage (24 V DC, 100 mA)

This ergonomic run/inch palm button can replace the black or chrome palm buttons described previously. The palm button has a solid neoprene gasket which provides an oil-tight seal upon installation. The contact arrangement is 1 NO and 1 NC.

**Mounting Boxes (With 1/4" NPT Threaded Hubs)**

Part No. CTK-004

A single-hub mounting box is supplied with all palm button assemblies. It is used when wire terminates at this box. It can also be used when remote mounting electrical cut-off systems or duplex power outlets.

Part No. CTK-003

A double-hub mounting box is supplied with all palm button assemblies. It is used when wires are required to go through the box and on to another mounting box.

**Mounting Boxes for Touchdown!™ Palm Buttons Only**

Part No. CTK-038—Deep single-hub mounting box  
Part No. CTK-039—Deep double-hub mounting box
SAFETY INTERLOCK SWITCHES

The safety switches, monitoring systems, and safety relay described in this section are designed to interlock safeguarding systems such as barrier guards, gates, covers, and shields. They can be used on exposed machinery, conveyors and handling equipment, as well as textile, packaging, and processing machines, robots and other types of machinery. They are designed to be used in various types of industrial environments.

Some of the safety switches have tamper-resistant enclosures, actuators and fasteners. They are not easily defeated because two independent components are required to actuate the switch. This minimizes accidental or deliberate operation of the switch by anything other than the correct actuator. These switches are designed for simple installation and maintenance by authorized personnel only. This increases the integrity of the system and helps provide a safer work environment for all employees.

Proper installation of these safety interlock switches is as important as the accurate design and manufacturing of the switches. It is critical that a safety interlock switch, monitoring system, or safety relay is installed as part of a suitable safety control circuit. All devices are shipped with complete installation instructions. The instructions are simple, but all installation work should be performed by qualified personnel.

The purpose of interlock switches is two-fold. First, when the interlock is open, the machine should not be able to start any hazardous motion. Second, if the interlock is opened during a machine cycle, the hazardous motion must stop quickly. The type of stop command, either emergency stop or top stop (machine stops in open or end-of-cycle position), can be critical, depending on the guard’s location or the machine’s ability to stop quickly.

Using the new ANSI, UL, NFPA 79, and Harmonized European standards for reference, interlocks must be designed, installed, and maintained in a control-reliable configuration. The interface between the switch and the machine control system is very important to maintain reliability. If there is a high degree of risk associated with the machine, the interlock must have control reliability which means it uses redundant contacts and cross-checking (monitoring). The safety relays and monitoring systems found on pages 52 and 53 can be used to accomplish this.

When deciding what type of interlock switch is required on a machine, determine where the interlock will be most effective in the control circuit of the machine. To do this, a risk assessment/hazard analysis should be done first. This assessment should include the following:

1. **frequency** of exposure to the hazard: seldom, occasional, or frequent
2. **probability** of injury: unlikely, possible, probable, or certain
3. **severity** of injury: minor, serious, major, or fatal

Each of these must be considered separately. Each of these categories must also be considered for all stages of machine operation including installation, normal operation, maintenance, inspection, and removal from service. Remember, when interlocking guards, there are many factors that must be considered, including safety, reliability, convenience, production, and maintenance.

*Note: This section of the catalog (pages 46-56) uses NO for normally open contacts and NC for normally closed contacts in the specifications and descriptions. All safety contacts are specified as normally open when the actuator is not inserted in the switch.*
SAFETY INTERLOCK SWITCHES

STANDARD SAFETY SWITCHES

Either tamper-resistant safety switch can be used to interlock hinged, sliding, or lift-off guards. Closure of the guard or latch causes the actuator to enter the switch and release the dual antitamper locking cams. The actuator allows the main center cam to rotate and make the switch contacts. When opening the guard or latch, the actuator positively forces the contacts open due to the cam action built into the switch.

These versatile switches have multiple actuation entry positions. Actuators and conduit adapter are sold separately.

TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Feature</th>
<th>Standard Safety Switch</th>
<th>Standard Safety Switch With Zinc Housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Contacts</td>
<td>2 NO</td>
<td>3 NO</td>
</tr>
<tr>
<td>Auxiliary Contact</td>
<td>1 NC</td>
<td>1 NC</td>
</tr>
<tr>
<td>Actuator Entry Positions</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Switching Ability</td>
<td>2 A @ 250 V AC, 2 A @ 24 V DC</td>
<td>3 A @ 240 V AC, 3 A @ 24 V DC</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-4° to 176°F (-20° to 80°C)</td>
<td>-4° to 176°F (-20° to 80°C)</td>
</tr>
<tr>
<td>Switch Dimensions</td>
<td>3.7&quot; H x 2&quot; W x 1.2&quot; D</td>
<td>4.5&quot; H x 1.5&quot; W x 1.6&quot; D (95 H x 52 W x 32 D mm)</td>
</tr>
</tbody>
</table>

Part No. 6025067 Standard Safety Switch (Actuator and Conduit Adapter Sold Separately)

Part No. 6025073 Standard Safety Switch With Zinc Housing (Actuator and Conduit Adapter Sold Separately)

ACTUATORS

- Part No. 5311130 Straight Actuator
- Part No. 5311129 Fully Flexible Actuator 15° Adjustability All Directions
- Part No. 5311278 Semi-Flexible Actuator 15° Lateral Adjustability

CONDUIT ADAPTER

- Part No. 5312998 M20 to ¼" Conduit Adapter
- Part No. 5312998 M20 to ¼" Conduit Adapter

Safety contacts are normally open (NO) when the switch is in the position shown, without the actuator inserted.
SAFETY INTERLOCK SWITCHES

COMPACT SAFETY SWITCH

This compact switch is designed for tight spaces. The switch body is 1.2” (31 mm) wide. It works on the same principles as the standard switches described on the previous page.

The head of this switch can rotate every 90° which allows the actuator to enter the switch from five (5) different positions. It provides both side and end actuator entry.

Actuators and conduit adapter are sold separately.

TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Contacts</td>
<td>2 NO</td>
</tr>
<tr>
<td>Auxiliary Contact</td>
<td>1 NC</td>
</tr>
<tr>
<td>Actuator Entry Positions</td>
<td>5</td>
</tr>
<tr>
<td>Switching Ability</td>
<td>3 A @ 240 V AC</td>
</tr>
<tr>
<td></td>
<td>3 A @ 24 V DC</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-4° to 176°F</td>
</tr>
<tr>
<td></td>
<td>(-20° to 80°C)</td>
</tr>
<tr>
<td>Case</td>
<td>Glass-Fiber Reinforced Thermoplastic</td>
</tr>
<tr>
<td>Operating Head</td>
<td>Rotates Every 90°</td>
</tr>
<tr>
<td>Switch Dimensions</td>
<td>3.5” H x 1.2” W x 1.1” D</td>
</tr>
<tr>
<td></td>
<td>(90.5 H x 31 W x 30 D mm)</td>
</tr>
</tbody>
</table>

Part No. 6025059 Compact Safety Switch (Actuator and Conduit Adapter Sold Separately)

ACTUATORS

- Part No. 5311131 Straight Actuator
- Part No. 5311132 Angled Actuator
- Part No. 5308842 Semi Flexible Actuator 15° Lateral Adjustability

CONDUIT ADAPTER

- Part No. 5311531 M16 to ½” Conduit Adapter

Safety contacts are normally open (NO) when the switch is in the position shown, without the actuator inserted.
SAFETY INTERLOCK SWITCHES

LOCKING SAFETY SWITCHES

These switches are designed to prevent accidental or deliberate access while the machine is in motion. The mechanical locking feature is ideal for machines that have to finish a sequence, a program, or coast to a stop before the interlocked guard can be opened. The switches allow the guard to be mounted closer to the hazard than nonlocking switches.

The operating principle of these switches is simple. When the actuator enters the switch, it engages with and operates a tamper-resistant locking mechanism, closing the contacts in a similar way to the standard switches on page 47. This locks the actuator in and holds the guard closed. When the contacts are closed and the mechanism is locked in, the machine is allowed to start.

To open the guard, a separate signal is required to energize the solenoid which releases the locking mechanism after the machine has stopped or the cycle has finished. A timer or stopped-motion detector can be used for this signal (see pages 51-52). The timer can be used on machines with a consistent coastdown time. The stopped-motion detector is available for machines that have a variable or inconsistent coastdown time. If power is lost, a supervised override mechanical release, built into the switch, can be used.

Actuators and conduit adapter are sold separately.

LIGHT-DUTY LOCKING SAFETY SWITCH

TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Contacts</td>
<td>2 NO</td>
</tr>
<tr>
<td>Auxiliary Contact</td>
<td>1 NC</td>
</tr>
<tr>
<td>Door Monitoring Contact</td>
<td>1 NO</td>
</tr>
<tr>
<td>Actuator Entry Positions</td>
<td>5</td>
</tr>
<tr>
<td>Locking Force</td>
<td>1200 N</td>
</tr>
<tr>
<td>Switching Ability</td>
<td>4 A @ 230 V AC</td>
</tr>
<tr>
<td></td>
<td>4 A @ 24 V DC</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-4°F to 131°F (-20° to 55°C)</td>
</tr>
<tr>
<td>Case</td>
<td>Glass-Fiber Reinforced Thermoplastic</td>
</tr>
<tr>
<td>Operating Head</td>
<td>Rotates Every 90°</td>
</tr>
<tr>
<td>Switch Dimensions</td>
<td>7.5&quot; H x 1.5&quot; W x 1.6&quot; D (192 H x 40 W x 42 D mm)</td>
</tr>
</tbody>
</table>

Part No. 6022580 Light Duty Safety Switch (Actuator and Conduit Adapter Sold Separately)

ACTUATORS

- Part No. 5306527 Straight Actuator
- Part No. 5306530 Rubber-Mounted Straight Actuator
- Part No. 5306535 Angled Acuator
- Part No. 5306528 Semi-Flexible Actuator 15° Lateral Adjustability

CONDUIT ADAPTER

Part No. 5312998 M20 to ½" Conduit Adapter

Safety contacts are normally open (NO) when the switch is in the position shown, without the actuator inserted.

Rockford Systems, Inc. ★ Shop Online at www.rockfordsystems.com ★ SFM 49
SAFETY INTERLOCK SWITCHES

MEDIUM-DUTY LOCKING SAFETY SWITCH

Part No. 6025060 Medium-Duty Safety Switch (Actuator and Conduit Adapter Sold Separately)

HEAVY-DUTY LOCKING SAFETY SWITCH

Part No. 6025115 Heavy-Duty Safety Switch (Actuator and Conduit Adapter Sold Separately)

TECHNICAL SPECIFICATIONS

Medium-Duty Safety Switch

- Safety Contacts: 2 NO
- Auxiliary Contact: 1 NC
- Actuator Entry Positions: 3
- Locking Force: 1200 N
- Switching Ability: 2 A @ 250 V AC, 2 A @ 24 V DC
- Operating Temperature: 14° to 140°F (-10° to 60°C)
- Case: Glass-Fiber Reinforced Thermoplastic
- Switch Dimensions: 4.7" H x 2.2" W x 1.4" D (120 H x 58 W x 37 D mm)

Heavy-Duty Safety Switch

- Safety Contacts: 2 NO
- Door Monitoring Safety Contacts: 2 NO
- Door Monitoring Auxiliary Contact: 1 NC
- Actuator Entry Positions: 3
- Locking Force: 2000 N
- Switching Ability: 2 A @ 250 V AC, 2 A @ 24 V DC
- Operating Temperature: -4° to 140°F (-20° to 60°C)
- Case: Glass-Fiber Reinforced Polyester
- Switch Dimensions: 5.1" H x 3.6" W x 1.4" D (130 H x 93 W x 37 D mm)

ACTUATOR

Part No. 5311133 Straight Actuator

CONDUIT ADAPTER

Part No. 5312998 M20 to 1/2" Conduit Adapter

CONDUIT ADAPTER

Part No. 5312998 M20 to 1/2" Conduit Adapter

Safety contacts are normally open (NO) when the switch is in the position shown, without the actuator inserted.

Safety Interlock Switches and Actuators by Rockford Systems, Inc.

Part No. 5308758 Straight Actuator

Part No. 5308759 Fully Flexible Actuator

15° Adjustability all Directions

Part No. 5312998 M20 to 1/2" Conduit Adapter

50 SFM ★ Rockford Systems, Inc. ★ Call Toll-Free 1-800-922-7533 ★ Fax 815-874-6144
SAFETY INTERLOCK SWITCHES

STOPPED-MOTION DETECTOR

The stopped-motion detector is designed to be used with locking safety switches (see pages 49-50) that are applied to machines or robots with an inconsistent or variable coastdown time.

The stopped-motion detector has an on-delay that can be adjusted between 0.1 second and 40 minutes through a series of four time ranges. It also uses two independent proximity sensors and monitors two moving metal parts of the machine or robot. This means it can detect when hazardous motion has stopped. Should either sensor detect motion, the machine guard will remain locked. This capability is essential on machines which do not have a consistent coastdown time.

SENSOR SPECIFICATIONS

Sensor Type ................................................................. Shielded, Inductive
Operating Voltage .......................................................... 10-30 V DC
Outputs ................................................................. 1 NO NPN Sensor and 1 NO PNP Sensor
Operating Temperature ............................................. -13°F to 158°F (-25°C to 70°C)
Cable ............ 6.7' (2 m) of Prewired 3-Conductor Flexible Cable (14 AWG)
Sensor Dimensions ........... 0.71" Diameter (M18 x 1 Thread Size) x 2" Long (50.8 mm)

TECHNICAL SPECIFICATIONS

Power Supply ......................................................... 24 V AC/DC or 115/230 V AC
Relay Outputs .......................................................... 2 NO and 1 NC
Maximum Switching Ability ........................................... 4 A @ 250 V AC
2 A @ 30 V DC
Replaceable Fuse ........................................................ 500 mA
Mounting ................................................................. 35-mm DIN Rail
Operating Temperature .............................................. 14° to 131°F (-10° to 55°C)

Part No. CMC-086 Stopped-Motion Detector Assembly (24 V AC/DC)
Part No. CMC-079 Stopped-Motion Detector Assembly (115/230 V AC)
SAFETY INTERLOCK SWITCHES

TIMER

The timer is designed to be used with locking safety switches (see pages 49-50) that are applied to machines or robots with a consistent coastdown time. The timer is a compact unit designed to energize and unlock guard interlocking devices. It is housed in a 1.8” (45 mm) wide, DIN-rail-mounted enclosure. The cover can be removed to access the DIP switches and the potentiometer which control the timing. The on-delay can be adjusted between 0.1 second and 40 minutes through a series of four time ranges.

TECHNICAL SPECIFICATIONS

- Power Supply: 24 V AC/DC and 115/230 V AC
- Relay Outputs: 2 NO and 1 NC
- Maximum Switching Ability: 4 A @ 250 V AC, 2 A @ 30 V DC
- Replaceable Fuse: 500 mA
- Mounting: 35-mm DIN Rail
- Operating Temperature: 14° to 131°F (-10° to 55°C)

Part No. CMC-080 Adjustable Timer

SAFETY RELAY

TYPICAL APPLICATIONS
- Interlocked Guards
- Machine Input/Output Signals

A safety relay is designed to connect safety devices, such as interlock switches, to the machine control circuit. It provides a switching action from the safety interlock switch, and can act as an intermediate relay to distribute a signal to multiple devices. The relay compares input and output signals, and provides failure to a safe condition if there is a failure in the interlocking interface control circuit.

Without a safety relay, faults and short circuits in a safety interlock switch can go undetected and can create a hazardous situation. The potential for faults exists in the power supply, relays, and switches as well as their associated wiring.

When using a safety relay, the wiring is monitored and compared. If a failure occurs in one area, it will be detected and a stop signal will be sent to the safeguarded machine.

This dual-channel safety relay has 1 NC or 2 NC dual-channel safety inputs. It is designed for use with guard interlock switches or a light curtain.

This safety relay has 3 NO safety outputs and 1 NC auxiliary output. The safety outputs have independent and redundant internal contacts to help the safety function. The auxiliary contact is a nonsafety output intended to provide an external signal about the status of the safety outputs.

TECHNICAL SPECIFICATIONS

- Supply Voltage: 24 V DC
- Safety Outputs: 3 NO
- Auxiliary Output: 1 NC
- Safety Input Contact Arrangement: 1 NC or 2 NC
- Maximum Switching Ability: 6 A @ 230 V AC, 2 A @ 24 V DC
- Mounting: 35-mm DIN Rail
- Operating Temperature: -13° to 131°F (-25° to 55°C)

Part No. 6024918 Safety Relay (24 V DC)
SAFETY INTERLOCK SWITCHES

CODED MAGNETIC SAFETY SWITCH AND CONTROL UNIT

This high-integrity system consists of an electromagnetically coded magnetic safety switch, actuator, and control unit. The switch and actuator can be used as a stand-alone system for low-power, low-risk machines or with the control unit for applications requiring a higher level of integrity. The control unit should be used when monitoring and checking of the circuit is required. The 115/230-V AC unit monitors and checks up to six coded magnetic safety switches (wired in series); the 24-V AC/DC unit monitors up to fifteen coded magnetic safety switches (wired in series). If a failure is detected in any switch or in the control unit at a machine off/on cycle, a stop signal will be sent to the guarded machine. The control unit also provides monitoring of the machine’s control contactor.

TECHNICAL SPECIFICATIONS

Sensor and Actuator
Supply Voltage .................................................. 24 V DC
Safety Contacts .................................................. 2 NC
Maximum Switching Ability .......................... 30 mA @ 30 V DC
Safety Contact Operating Distance ................. Make 0.28” (5 mm), Break 0.35” (15 mm)
Case .......................................................... Molded ABS Plastic
Operating Temp ......................... 14° to 131°F (-10° to 55°C)
Cable ..................................................... Prewired, 10’ (3 m), 6-Conductor

Part No. 6025080 Sensor and Actuator

Control Unit
Supply Voltage ............... 24 V AC/DC or 110/230 V AC
Safety Inputs ...................... 1 NO and 1 NC
Relay Outputs ..................... 2 NO
Maximum Switching Ability ............... 4 A @ 250 V AC
.......................................................... 2 A @ 30 V DC
Mounting ......................... 35-mm DIN Rail
Operating Temp ................ 14° to 131°F (-10° to 55°C)

Part No. 6025082 Control Unit

Safety contacts are normally open (NO) when the actuator is not actuating the switch.
SAFETY INTERLOCK SWITCHES

MAGNETIC SAFETY SWITCH

These reed-type switches are magnetically actuated and offer noncontact reliability along with tolerance for misalignment. They are totally submersible, which makes them ideal for environments where hygiene is important. Each switch is supplied with a prewired 13-foot cable.

On presenting the magnetic actuator to the switch, the high intensity field, from the actuator, causes the internal reed-switch safety contact(s) to close. On removing the actuator, the safety contact(s) open.

Applications

TECHNICAL SPECIFICATIONS

Rated Current ..........2 A, fuse externally 1.6 A quick acting
Rated Voltage ..................................................250 V AC
Safety Contact Operating Distance
..............................Make 0.47" (12 mm), Break 0.91" (23 mm)
Operating Temp.....................14° to 149°F (-10° to 65°C)
Cable ..........13 Feet of Prewired 2-Conductor Flexible Cable (CMC-097)
Cable ...............13 Feet of Prewired 6-Conductor Flexible Cable (CMC-098)

CMC-097 ....................................3.3" H x .75" W x .6" D
(84 H x 19 W x 16 D mm)
CMC-098 ......................................3" H x 1.2" W x .6" D
(76 H x 30 W x 15 D mm)

Part No. CMC-097 Magnetic Safety Switch With Actuator
(1 NO Safety Contact)
Part No. CMC-098 Magnetic Safety Switch With Actuator
(2 NO Safety Contacts and 1 NC Auxiliary Contact)

SPARE PARTS

Part No. CMK-096 Spare Actuator for CMC-098
Part No. CMK-075 Spare Actuator for CMC-097

Safety contacts are normally open (NO) when the actuator is not actuating the switch.
SAFETY INTERLOCK SWITCHES

CABLE AND PUSH-BUTTON E-STOP

This switch is a cable and push-button emergency-stop device. At the same time it is used to provide an awareness barrier on exposed machinery, such as conveyors.

This device enables this system to accommodate cable spans up to 248 feet (75 m).

The switch has a unique cam operation of the contact mechanism to give rapid, positive operation of the contacts. This mechanism also provides a failure to the safe condition if the cable goes slack or is cut, but is immune to nuisance tripping due to machine vibration. Should the cable be pulled, the contacts are opened, isolating machine power, and the latch engages. The machine cannot restart until the hazard has been corrected and the switch is reset. The switch is reset by turning the blue reset dial from the off position to the run position. This switch also incorporates a cable-tension indicator. This indicator assists in installation and maintenance of the switch. A red mushroom-head emergency-stop button is provided on each switch. Optionally available is an indicator light as shown. A cable tension kit, which includes thimbles, cable clamps and a turnbuckle, must be used with this switch (see next page). This kit includes the components to properly tension the cable. When installing this switch on cable runs over 12 feet, one switch should be installed at both ends of the cable. The cables should be supported by eye bolts every 6½ to 10 feet (2 to 3 m) along its length. They should also be used about one foot from each switch to ensure that all emergency-pull movement is transmitted to both units in a linear fashion. If this assembly is to go around a corner, a free-moving pulley should be used. Please consult the factory if this is required.

TECHNICAL SPECIFICATIONS

Safety Contacts ....................................................2 NO
Auxiliary Contact ................................................2 NC
Switching Ability ......2 A @ 250 V AC, 2 A @ 24 V DC
Case ................................................Heavy-Duty Die-Cast Zinc
Operating Temperature............................-13° to 176°F (-25° to 80°C)

Part No. 6024884 Cable and Push-Button E-Stop Device Only

OPTIONAL ACCESSORIES

Part No. CMK-064 Indicator Light Without Bulb
Part No. CTT-335 Bulb for Above Indicator (24 V AC/DC)
Part No. CTT-336 Bulb for Above Indicator (115 V AC)
Part No. FSL-024 Red PVC-Covered Steel Cable
Part No. CMK-039 Tension Kit (See page 56)

The safety contacts are normally open (NO) when the E-stop button is pushed, or if the cable is slack or pulled as shown in the illustration above.
SAFETY INTERLOCK SWITCHES

CABLE AND PUSH-BUTTON E-STOP ASSEMBLY

Operators and other employees are exposed to point-of-operation hazards if they enter the backside area of press brakes, shears or other machines. A cable and push-button e-stop assembly can be used to warn them of the exposure.

This cable and push-button e-stop assembly can be used with the cable-operated switch described on the previous page. It stops the machine if someone pulls or loosens the cable. The sign warns them of danger.

The switch that interlocks the cable is arranged so that if someone either pulls on the cable or removes the cable from the hook, the machine becomes inoperable. The switch must be electrically interfaced with the cycle control of the machine.

ORDERING INFORMATION

Part No. CML-510 Cable and Push-Button E-Stop Switch Assembly Includes:
- Part No. 6024884 Cable and Push-Button E-Stop
- Part No. CMK-064 Indicator Light
- Part No. CTT-336 Bulb for Above Indicator (115 V AC)
- Part No. 5312998 M20 to ⅛" Conduit Adapter
- Part No. FSL-024 7 Yards of Red PVC-Covered Steel Cable
- Part No. CMK-039 Assembly Consisting of:
  - 1 Turnbuckle
  - 1 Hook Bolt
  - 4 Cable Thimbles
  - 4 Cable Clamps
- Part No. FSL-026 Mounting Tabs for Sign (2)

OPTIONAL ACCESSORIES

Part No. FSL-028 Pulley
Part No. KSC-056 10" x 12" x .055" thick Danger Sign for Miscellaneous Machines
Part No. KSC-064 10" x 12" x .055" Danger Sign for Down-Acting Machines

Danger Sign
Part No. KSC-056 for Miscellaneous Machines
Part No. KSC-064 for Down-Acting Machines
PRESSURE-SENSITIVE SAFETY MATS

Safety mats are intended to be used as auxiliary or additional safeguarding equipment to protect operators and other employees in the machine area. They must not be used as the primary method of safeguarding except when all other means are not applicable.

These mats can safeguard many types of machines. Consider the following when choosing mats:

1) How is the mat to be interfaced to the existing motor control or equipment? Does a new control or starter need to be added?

2) Can the motion of the machine that is creating the point-of-operation hazard be stopped quickly? If it can, what kind of clutch and brake arrangement does it have? Is the machine hydraulically or pneumatically operated? Is it operated by any other means?

Before applying a safety mat to any machine, make sure it will be interfaced correctly with the machine control and make sure it does not interfere with productivity. The whole machine system must be considered, including safeguarding, machine control, disconnects, starters, covers for rotating parts, auxiliary parts, feeding and retrieving of workpieces, etc.

The pressure-sensitive, heavy-duty safety mats described on these pages are highly resistant to wear, oils, grease, acids and most common chemicals.

These mats function in two different ways. One way is that the machine will not start if someone or some object is on the mat. Another way is that if the machine is already operating or cycling, it will stop if someone steps onto the mat. In this case, the machine needs to be restarted once the mat has been cleared.

The mat(s) must be located so an operator or other employee, when stepping onto the mat, cannot reach into the point-of-operation hazard prior to the machine’s hazardous motion coming to a stop. See ANSI/RIA R15.06 robot safety standard for detailed guidelines on mat safety distance. Also see the ANSI B11.19 for guidelines on mat control system reliability.

Mats can be applied to many different machines and auxiliary equipment for protection. Here are just a few examples.
PRESSURE-SENSITIVE SAFETY MATS

The single-piece molded construction of these safety mats means these mats will not delaminate. The mats encase conductive plates which provide stop/restart signals when pressure is applied or released. Each mat top surface has a rib pattern running parallel with the mat length which helps prevent slipping, yet is easy to clean.

All mats are supplied with a 20' single-jacketed, four-wire cord exiting from the width end of the mat. The outside edge of each mat has a lip to attach either an aluminum ramp or a blunt edge. The lip can also be removed when joining two mats with a mat connector. The mat dimensions provided are for the active area of the mat.

These mats can be supplied individually or in multiple configurations. They are available in various sizes and can be tied together (electrically) in series.

The part numbers listed in the chart on page 59 do not include any ramps, blunt edges, or connectors. Follow the instructions below the chart to add ramp edging.

Note: A mat control box Part No. RKR-062, or Zone Monitor Part No. RKR-103 or RKR-107 must be used with the mats. See pages 60-61.

The heavy-duty pressure-sensitive safety mats offered have been successfully used to provide auxiliary safeguarding for the hazard areas that exist in many industrial environments. Some of these include:

- Robotic welding
- Laser welding/cutting
- Water jet machines
- Pick-and-place robots
- Plastics molding machines
- Assembly machines
- Automated material handling
- Packaging machinery
- Textile machinery
- Conveyors
- Paper converting machinery
- CNC punches and tube benders

**MAT SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature</td>
<td>-35° to 120°F (-37° to 49°C)</td>
</tr>
<tr>
<td>Individual Mat Sizes</td>
<td>12&quot; x 12&quot; to 48&quot; x 72&quot;</td>
</tr>
<tr>
<td>Activation Force</td>
<td>3 to 5 ft/lb (normal foot traffic)</td>
</tr>
<tr>
<td>Mat Cover Material</td>
<td>Molded vinyl</td>
</tr>
<tr>
<td>Shore A Hardness</td>
<td>72 ± 2</td>
</tr>
<tr>
<td>Mat Cable Length</td>
<td>20 ft</td>
</tr>
<tr>
<td>Load Capacity</td>
<td>3,000 psi</td>
</tr>
<tr>
<td>Applicable Standards</td>
<td>Designed to meet or exceed ANSI B11.19, OSHA 1910.212, and ANSI/RIA R15.06</td>
</tr>
<tr>
<td>Electrode Assembly</td>
<td>Normally open switch</td>
</tr>
<tr>
<td></td>
<td>High-durability 24-gauge steel</td>
</tr>
<tr>
<td></td>
<td>18-gauge, 4-wire, single-jacketed lead wires and optional application-specific wiring options</td>
</tr>
<tr>
<td></td>
<td>Hermetically encapsulated switch and lead wires</td>
</tr>
<tr>
<td></td>
<td>Designed to meet IP67 and NEMA 6</td>
</tr>
<tr>
<td></td>
<td>Water-tight and totally submersible</td>
</tr>
</tbody>
</table>

For a complete chemical resistance chart, contact the factory.
SAFETY MATS AND RAMP EDGING

These heavy-duty pressure-sensitive safety mats are constructed of molded vinyl material. The molding encases two separated parallel steel plates. These plates make contact when the mat is stepped on. They have a black, ribbed pattern top surface to help prevent slipping and are easy to clean.

The mats are active over the entire surface, except the narrow border. They are designed for low-voltage (24-V DC) control circuits.

All standard size safety mats can be modified, i.e., with notches, cutouts, angles, or holes. Various configured layouts of any dimension can be supplied. Various colors, sizes, and shapes of mats are available along with different wiring options to meet your requirements. To obtain a proposal to meet your needs, submit a layout drawing complete with all dimensions and a list of your specific requirements.

### STANDARD MAT SIZES

<table>
<thead>
<tr>
<th>PRESSURE-SENSITIVE MATS CHART</th>
<th>PRESSURE-SENSITIVE MATS CHART (continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Part No.</strong></td>
<td><strong>Width</strong></td>
</tr>
<tr>
<td>PSM-1212</td>
<td>12&quot;</td>
</tr>
<tr>
<td>PSM-1224</td>
<td>12&quot;</td>
</tr>
<tr>
<td>PSM-1236</td>
<td>12&quot;</td>
</tr>
<tr>
<td>PSM-1248</td>
<td>12&quot;</td>
</tr>
<tr>
<td>PSM-1260</td>
<td>12&quot;</td>
</tr>
<tr>
<td>PSM-1272</td>
<td>12&quot;</td>
</tr>
<tr>
<td>PSM-1636</td>
<td>16&quot;</td>
</tr>
<tr>
<td>PSM-1824</td>
<td>18&quot;</td>
</tr>
<tr>
<td>PSM-1836</td>
<td>18&quot;</td>
</tr>
<tr>
<td>PSM-1848</td>
<td>18&quot;</td>
</tr>
<tr>
<td>PSM-1860</td>
<td>18&quot;</td>
</tr>
<tr>
<td>PSM-1872</td>
<td>18&quot;</td>
</tr>
<tr>
<td>PSM-2420</td>
<td>24&quot;</td>
</tr>
<tr>
<td>PSM-2424</td>
<td>24&quot;</td>
</tr>
<tr>
<td>PSM-2430</td>
<td>24&quot;</td>
</tr>
<tr>
<td>PSM-2436</td>
<td>24&quot;</td>
</tr>
<tr>
<td>PSM-2442</td>
<td>24&quot;</td>
</tr>
<tr>
<td>PSM-2448</td>
<td>24&quot;</td>
</tr>
<tr>
<td>PSM-2456</td>
<td>24&quot;</td>
</tr>
<tr>
<td>PSM-2460</td>
<td>24&quot;</td>
</tr>
<tr>
<td>PSM-2472</td>
<td>24&quot;</td>
</tr>
<tr>
<td>PSM-2828</td>
<td>27(\frac{3}{4})&quot;</td>
</tr>
<tr>
<td>PSM-2833</td>
<td>27(\frac{3}{8})&quot;</td>
</tr>
<tr>
<td>PSM-2843</td>
<td>27(\frac{3}{2})&quot;</td>
</tr>
<tr>
<td>PSM-2856</td>
<td>27(\frac{3}{2})&quot;</td>
</tr>
</tbody>
</table>

The pressure-sensitive safety mat information in the chart is for mats **without** EDG-1000 Series ramp edging. To include mitered ramp edging on all four sides of the mat, add a -1 to the part number and add 4" to both the width and length provided in the chart.

All mats are furnished with a 20’ four-wire cord that exits the mat at the width end.
PRESSURE-SENSITIVE SAFETY MATS

RAMP EDGING, BLUNT EDGING, AND MAT CONNECTORS

An aluminum ramp-edged mat system can be customized to fit any shape or size area. Custom-made mats can fit most areas and even provide cutouts for machine legs, posts, or other obstructions. Send us a layout drawing with complete dimensions of the area the mats need to cover, and we will provide a proposal for the required mats and accessories.

BLUNT EDGING—EDG-2000 SERIES
Recessed installations: for flush edges against thresholds, walls, and machines.
Part No. EDG-2052-N (¾" W x 52" L)
Part No. EDG-2096-N (¾" W x 96" L)

MAT CONNECTORS—CON-1000 SERIES
Joins mats together: permits add-on mats for large-area installations.
Part No. CON-1052-N (52" L)
Part No. CON-1096-N (96" L)

THE MAT EDGE STYLE & MAT MEASUREMENT
The lip edge is the most common and widely used edge style for mats for single mat applications. The lip can be removed to create the square edge for use with the CON-1000 series mat connector.

*This dimension is not included in the mat widths and lengths. Do not include this in your measurements.

MAT CONTROLS

MAT CONTROL BOX—PART NO. RKR-062
This mat control box provides an interface for the safety mats to the existing machine control. If someone steps on the mat while the machine is operating or cycling, the control is designed to provide a stop signal; or, if someone is on the mat(s), the stop signal will not allow the machine to start a cycle. If special applications of this control are required, please consult the factory.

This mat control is furnished in a dust- and oil-tight NEMA 12 enclosure and includes a selectable latch-out feature. When the latch-out feature is turned on, the machine will not automatically be able to restart until the latch-out has been cleared. This is accomplished with the use of the key-operated selector switch. When the latch-out feature is turned off, the machine can be restarted when the mat is cleared.

CONTROL BOX SPECIFICATIONS
Voltage ........................................................................................115 V AC, 60 Hz
Output-Relay Contacts Rating........................................10 A, 115 V AC Resistive
PRESSURE-SENSITIVE SAFETY MATS

MAT CONTROLS (continued)

If the MAT CONTROL BOX PART NO. RKR-062 is not required, a DIN-rail mounted control module is available. Each control module has 4 NO safety contacts and 1 NC auxiliary contact. The control module allows operation in either automatic or manual reset modes.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RKR-104</td>
<td>120-V AC, 24-V DC control module</td>
</tr>
<tr>
<td>RKR-105</td>
<td>240-V AC, 24-V DC control module</td>
</tr>
</tbody>
</table>

MAT JUNCTION BOXES

If multiple mats are grouped together to provide auxiliary or perimeter (work-envelope) safeguarding, junction boxes may be required to facilitate the installation.

Use either of the above mat junction boxes with either the mat control box RKR-062 or a DIN-rail mount control module from above. Each mat junction box includes 20’ of four-wire cord.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RKR-020</td>
<td>Mat junction box to accommodate from 2-5 safety mats</td>
</tr>
<tr>
<td>RKR-021</td>
<td>Mat junction box to accommodate from 2-10 safety mats</td>
</tr>
</tbody>
</table>

ZONE MONITOR

For applications where multiple safety mats are needed, a zone monitor can be used. It acts as a control box, while eliminating the need for a junction box for multiple safety mat installations. Additionally, it has a diagnostic feature to determine which mat or mats have been tripped. The zone monitor is available in two models: one which monitors 1-4 safety mats, and another which monitors 1-8 safety mats.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RKR-103</td>
<td>Zone monitor for 1-4 safety mats</td>
</tr>
<tr>
<td>RKR-107</td>
<td>Zone monitor for 1-8 safety mats</td>
</tr>
</tbody>
</table>

If the diagnostics of an entire perimeter safeguarding system are required, a latch-out/reset zone-control unit may be required. Please consult the factory.
DANGER SIGNS

The signs offered in this catalog are .055" thick linear polyethylene. They are semi-rigid plastic and are capable of withstanding a temperature range of -60° to 130°F. They are resistant to tears and may be mounted with nails, rivets, screws, bolts, nylon lock-strap, double-face adhesive tape, etc. Each sign is protected from fading, chipping, scratching, weather extremes, physical abuse, grease, oil, moisture, chemicals and acids. These signs do not rust, dent, or corrode. They do not curl up or rip and are lightweight and easy to handle.

Operator Safety Precautions For Metal-Cutting Machinery—8½" x 11" x .055" thick

Part No. KSC-048—English
Part No. KSC-048S—Spanish
Part No. KSC-048F—French

Shield Sign—5" x 6" x .055" thick

Part No. KSC-046—English
Part No. KSC-046S—Spanish
Part No. KSC-046F—French

Saw Blade Sign—5" x 6" x .055" thick

Part No. KSC-058—English
Part No. KSC-058S—Spanish
Part No. KSC-058F—French

General Machine Sign—10" x 12" x .055" thick

Part No. KSC-056—English
Part No. KSC-056S—Spanish
Part No. KSC-056F—French

Reverse Side of Signs
# SURVEY FOR CUTTING AND TURNING MACHINES

**Company**

**Address**

**City, State, Zip**

**Attention**

**Telephone No.**

**Date**

**Representative**

**Fax No.**

**Surveyed By**

When filling out this form, be sure the information is filled in for satisfying the basic areas of safety.

## Basic Areas—

1. Safeguarding
2. Control
3. Disconnect
4. Starter
5. Cover
6. Other Considerations

For identification and reference, please fill in this area first.

<table>
<thead>
<tr>
<th>Machine No.</th>
<th>Dept.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model No.</th>
<th>Serial No.</th>
</tr>
</thead>
</table>

## INSTALLATION

<table>
<thead>
<tr>
<th>N</th>
<th>Y</th>
</tr>
</thead>
</table>

**Is machine presently out of service?**

<table>
<thead>
<tr>
<th>Y</th>
</tr>
</thead>
</table>

## 1. Safeguarding:

<table>
<thead>
<tr>
<th>N</th>
<th>Y</th>
</tr>
</thead>
</table>

### Drill:

- Has
- Provide
- Contact Manufacturer

#### Is a drill shield required?

- If Y, what style? (circle one) Aluminum–Telescoping–Chip: Sm. or Lg.–Universal–Flexible
- If aluminum: Is front hinge required? N Y If Y, 2-Tier: Sm or Lg 3-Tier
- Is side hinge required? N Y If Y, 2-Tier 3-Tier
- If telescoping: (check one) 2-Tier 3-Tier Quill Dia., Lug Type
- If universal: What is the arm length? (circle one) 21" 31" 44"
- What style is required? (circle one)
- Sm. 30° Lg. 90° 30°/90° Sm. Concave Lg. Concave
- If flexible: What is the arm length? (circle one) 12" 18" 24" What style? DM MB
- What size shield? (circle one) 6" x 8" 10" x 12"

### Lathe:

- Engine
- Turret
- VTL
- Other

#### Is a lathe chuck shield required?

- If Y, what is the chuck diameter when jaws are extended? **"**
- Style: (circle one) Transparent Steel: Sm or Lg. Sliding
- Is a mounting bracket required? (required with transparent and small steel) N Y
- If Y, what type? (circle one) A A1 B B2

#### Is an electrical interlocking bracket assembly required?

- Y

#### Is a spring-loaded chuck wrench required?

- N Y
- If Y, what size? **"**
- What style? Standard Longer What shape? Square Hex
- Is a crossslide-travel shield required? N Y
- If Y, what model? (circle one)
- Small Large
- Are supplemental shields required? N Y
- If Y, what style(s)?

### Mill:

- Vertical
- Horizontal
- Jig
- Bridge

#### Size:

- S Small
- M Med.
- L Large

#### Is a milling machine shield required?

- Y

#### If Y, what style?(circle one) Slide/Swing Aside–Bridgeport–Chip: Sm. or Lg.–Universal–Flexible

- If slide and swing aside: What is the length of the bed? **"** Are rear shields required? N Y
- Is an electrical interlocking bracket assembly required? N Y
- If Bridgeport: (circle one) Front Shield Rear Shield

#### If universal or flexible: See drill section above.

#### If chip: See drill section above.

#### Are supplemental shields required? N Y

#### If Y, what style(s)?

### Bridgeport belt covers required? N Y (Model J)

### Grinder:

- Bench/Pedestal
- Surface
- OD
- ID
- Other

#### Is a grinder shield required? N Y

- If Y, what style?
  - Double-Wheel Shield (6" x 18")
  - Single-Wheel Shield (6" x 6")
  - Pivot Mount (6" x 6")

#### Quantity

- Standard Mount: 6½" x 5½" 8½" x 6" 12½" x 12"

- (circle size)
### SURVEY FOR CUTTING AND TURNING MACHINES

#### 1. Saw:
- Table
- Cutoff
- Radial Arm
- Band
- Other __________

Is a shield for a saw required? [ ] N [ ] Y If Y, use other machine specs for furnishing shield.

#### 2. Other:
- Borer
- Broach
- Planer
- Machining Center
- Other __________

Is a free-standing shield required? [ ] N [ ] Y
If Y, what size? [ ] 48" x 48" [ ] 48" x 60" [ ] 48" x 72" [ ] 48" x 96"

Is a magnetic-base shield required? [ ] N [ ] Y
If Y, what size? [ ] Small Flat [ ] Medium Flat [ ] Large Flat [ ] Small Concave [ ] Large Concave [ ] With Arm Extension

Is a special shield or guard required? [ ] N [ ] Y If Y, what style? __________

#### 2. Control:

**A.** Is a transformer for 115-V power supply required? [ ] N/A [ ] N [ ] Y

**B.** Is a red emergency-stop button or cable required? [ ] N [ ] Y
If Y, check one: [ ] Small Button W/Twist Reset [ ] Large Button With Latch & Mntg. Box [ ] Cable & Switch Assembly PLUS [ ] KSC-056 Sign

#### 3. Disconnect:

**A.** Is an electrical disconnect switch required? [ ] N [ ] Y If Y, furnish HP, FLA and Voltage in 4A.

**B.** How is the disconnect to be furnished (if required)? [ ] Separate [ ] Combo W/Disconnect

**C.** Plug lockout? [ ] N/A [ ] N [ ] Y

**D.** Air lockout valve? [ ] N/A [ ] N [ ] Y If Y: (circle one) ½" ¾" 1¼"

#### 4. Starter:

**A.** Is a magnetic motor starter required? [ ] N [ ] Y
If Y provide: _______ Horsepower _______ RPM _______ Full-Load Amps _______ Voltage _______ Hz [ ] 1 Phase [ ] 3 Phase

**B.** How is starter to be furnished (if required)? [ ] Separate [ ] Combo W/Disconnect

**C.** What type of main drive starter is required? Nonreversing [ ] N [ ] Y Reversing [ ] N [ ] Y

**D.** Is a remote push-button station required? [ ] N [ ] Y

**E.** Is the motor two-speed? [ ] N [ ] Y If Y, provide motor nameplate data.

**F.** Is the motor jogged or reversed frequently? [ ] N [ ] Y

#### 5. Cover:

Do any mechanical power-transmission apparatuses need to be covered up to 7 feet above floor or platform? [ ] N [ ] Y If Y, what needs to be covered?

- Gears [ ] N [ ] Y
- Leadscrew [ ] N [ ] Y
- Pulley and Belts [ ] N [ ] Y
- Sprockets and Chain [ ] N [ ] Y
- Horizontal Shaft [ ] N [ ] Y
- Other _______

- Shaft End [ ] N [ ] Y
- Vertical Shaft [ ] N [ ] Y

#### 6. Other Considerations:

**A.** Does the shield require an electrical interlock switch? [ ] N/A [ ] N [ ] Y
Is a mounting bracket required? [ ] N [ ] Y

**B.** Does the interlock require a timer or stop-motion detector? [ ] N/A [ ] N [ ] Y
If Y: [ ] Timer [ ] Stop-Motion Detector PLUS [ ] Proximity Switch Set

**C.** Is a safety relay required? [ ] N [ ] Y If Y: [ ] 24 V DC [ ] 115 V AC

**D.** Is an electrical power cutoff system w/chain required? [ ] N/A [ ] N [ ] Y

**E.** Is an electronic motor brake required? [ ] N [ ] Y
If Y, be sure that all of 4A is completed.

- Start-Up Time _______ sec
- Coastdown Time _______ sec
- No. of Braking Stops/Hr _______

Does the electronic motor brake require:
- [ ] Zero-Speed Sensing [ ] Extended Braking Time [ ] Mechanical Brake Release
- [ ] High Brake Torque [ ] Other _______

Does the machine have:
- [ ] Manual Brake [ ] Variable-Speed Drive [ ] Forward/Reversing Starter
- [ ] Single-Speed Motor [ ] High-Inertia Loads [ ] Mechanical-Holding Brake

**F.** Are danger signs required? [ ] N [ ] Y
OSHA STANDARDS FOR CUTTING AND TURNING MACHINES

OSHA 29 CFR 1910.212 and a portion of 1910.219 are included in this catalog for use as a reference when determining safety requirements for bringing cutting and turning machines into compliance. Please note that 29 CFR 1910.147 (lockout/tagout) is not included here but it is an OSHA standard an employer must comply with for all machines and equipment.

29 CFR 1910.212 GENERAL REQUIREMENTS FOR ALL MACHINES.

(a) Machine guarding — (1) Types of guarding. One or more methods of machine guarding shall be provided to protect the operator and other employees in the machine area from hazards such as those created by point of operation, ingoing nip points, rotating parts, flying chips and sparks. Examples of guarding methods are - barrier guards, two-hand tripping devices, electronic safety devices, etc.

(2) General requirements for machine guards. Guards shall be affixed to the machine where possible and secured elsewhere if for any reason attachment to the machine is not possible. The guard shall be such that it does not offer an accident hazard in itself.

(3) Point of operation guarding. (i) Point of operation is the area on the machine where work is actually performed upon the material being processed.

(ii) The point of operation of machines whose operation exposes an employee to injury, shall be guarded. The guarding device shall be in conformity with any applicable standards therefor; or, in the absence of applicable specific standards, shall be so designed and constructed as to prevent the operator from having any part of his body in the danger zone during the operating cycle.

(iii) Special hand tools for placing and removing material shall be such as to permit easy handling of material without the operator placing a hand in the danger zone. Such tools shall not be in lieu of other guarding required by this section, but can only be used to supplement protection provided.

(iv) The following are some of the machines which usually require point-of-operation guarding:

(a) Guillotine cutters.
(b) Shears.
(c) Alligator shears.
(d) Power presses.
(e) Milling machines.
(f) Power saws.
(g) Jointers.
(h) Portable power tools.
(i) Forming rolls and calenders.

(4) Barrels, containers, and drums. Revolving drums, barrels and containers shall be guarded by an enclosure which is interlocked with the drive mechanism, so that the barrel, drum or container cannot revolve unless the guard enclosure is in place.

(5) Exposure of blades. When the periphery of the blades of a fan is less than seven (7) feet above the floor or working level, the blades shall be guarded. The guard shall have openings no larger then one-half (½) inch.

(b) Anchoring fixed machinery. Machines designed for a fixed location shall be securely anchored to prevent walking or moving.

29 CFR 1910.219 MECHANICAL POWER-TRANSMISSION APPARATUS.

(b) Prime-mover guards—(1) Flywheels. Flywheels located so that any part is seven (7) feet or less above floor or platform shall be guarded in accordance with the requirements of this subparagraph:

(i) With an enclosure of sheet, perforated, or expanded metal, or woven wire:

(ii) With guard rails placed not less than fifteen (15) inches nor more than twenty (20) inches from rim. When flywheel extends into pit or is within 12 inches of floor, a standard toeboard shall also be provided;

(iii) When the upper rim of flywheel protrudes through a working floor, it shall be entirely enclosed or surrounded by a guardrail and toeboard.

(iv) For flywheels with smooth rims five (5) feet or less in diameter, where the preceding methods cannot be applied, the following may be used: a disk attached to the flywheel in such manner as to cover the spokes of the wheel on the exposed side and present a smooth surface and edge, at the same time providing means for periodic inspection. An open space, not exceeding four (4) inches in width, may be left between the outside edge of the disk and the rim of the wheel if desired, to facilitate turning the wheel over. Where a disk is used, the keys or other dangerous projections not covered by disk shall be cut off or covered. This subdivision does not apply to flywheels with solid web centers.

(v) Adjustable guard to be used for starting engine or for running adjustment may be provided at the flywheel of gas or oil engines. A slot opening for jack bar will be permitted.

(vi) Wherever flywheels are above working areas, guards shall be installed having sufficient strength to hold the weight of the flywheel in the event of a shaft or wheel mounting failure.

Note: This is not the entire content of 29 CFR 1910.219. This catalog does not cover all aspects of a safety program. There are many publications on the subject of safety. Please see page 5 for a listing of safety sources.
TERMS & CONDITIONS OF SALE

PRICES
A. Prices are subject to change without notice and will be invoiced at the price in effect at the time of shipment. Unless otherwise stated, all prices are in U.S. dollars.
B. Prices specified include no federal, state, local, use, occupational, foreign, or other tax. Taxes, if applicable, will be added to the invoice.
C. The prices specified include our regular packaging only. Any special packaging requested by the customer, including special protection for export shipment, will be at the customer's expense, and the cost of such special packaging shall be in addition to the prices quoted.

PAYMENT TERMS
Net in 30 days for equipment and net in 10 days for installation, service, and machine surveys (with approved credit). Machine safeguarding seminar fees are due at the time of service. A 1.5% monthly service charge (18% a year) will be added to past-due accounts.

CREDIT POLICY
Customers with established credit may purchase for immediate processing of orders. Customers not previously established with us or suitably rated by D&B must apply for open-account status. Orders received without suitable credit information must be prepaid in full before shipment. MasterCard, Visa, and American Express credit cards are accepted.

MINIMUM ORDER
Our minimum order is $25.00. Orders received for less than $25.00 will be subject to a service charge to bring the total to $25.00.

CANCELLATION FEE
Orders that are canceled prior to shipment may be subject to a cancellation fee if the products are nonstock, custom, special, or built to order.

SHIPPING AND HANDLING
Parcels are normally shipped prepaid via our carrier of choice with the charges added to the invoice, but they can also be sent collect or via consignee billing against the customer's account. Truck shipments are normally shipped collect, but they can also be shipped prepaid with the charges added to the invoice via our carrier of choice. A handling charge will be added to all invoices except for customer-pickup orders.

INSURANCE
All shipments are insured for the standard amount provided by the carrier. Additional insurance may be purchased at the customer's expense.

RISK OF LOSS
Unless otherwise agreed upon, all equipment will be shipped FOB shipping point. Title and risk of loss will pass to the customer upon delivery to the carrier at the point of shipment. Transportation will be at the customer's risk and expense, and any claim for loss or damage in transit must be made directly against the carrier.

RETURNED MERCHANDISE
Returned merchandise must be authorized by Rockford Systems in advance, at which time an RMA (return materials authorization) number will be issued. No returned merchandise will be accepted unless accompanied by an RMA number and this RMA number plainly identified on the outside of the shipping container. Material returned without this RMA number will be refused by our receiving department. All returned shipments must be prepaid. The minimum restocking charge will be 25% for any material not found to be defective. Such merchandise must be in original condition and unused in order to qualify for credit. Custom, special, or built-to-order items may not qualify for any credit; however, they may be returned for modification, if needed, which may be at an additional cost. No returns for credit will be considered more than 30 days from the date of shipment.

WARRANTY
Rockford Systems, Inc., warrants that this product will be free from defects in material and workmanship for a period of 12 months from the date of shipment thereof. ROCKFORD SYSTEMS INC.'S OBLIGATION UNDER THIS WARRANTY IS EXPRESSLY AND EXCLUSIVELY LIMITED to repairing or replacing such products which are returned to it within the warranty period with shipping charges prepaid and which will be disclosed as defective upon examination by Rockford Systems, Inc. This warranty will not apply to any product which will have been subject to misuse, negligence, accident, restriction, and use not in accordance with Rockford Systems, Inc.'s instructions or which will have been altered or repaired by persons other than the authorized agent or employees of Rockford Systems, Inc. Rockford Systems, Inc.'s warranties as to any component part is expressly limited to that of the manufacturer of the component part.

DISCLAIMER
The foregoing warranty is made in lieu of all other warranties, expressed or implied, and of all other liabilities and obligations on the part of Rockford Systems, Inc., including any liability for negligence, strict liability, or otherwise, and any implied warranty of merchantability or fitness for a particular purpose is expressly disclaimed.

LIMITATION OF LIABILITY
Under no circumstances, including any claim of negligence, strict liability or otherwise, will Rockford Systems, Inc., be liable for any incidental or consequential damages, or any loss or damage resulting from a defect in the product of Rockford Systems, Inc.
Catalog FAB
Features products and services for updating fabricating machines.

Catalog SEM
Provides details on our monthly machine safeguarding seminar.

Catalog DSB
Features a complete line of die safety blocks and accessories for use whenever dies are being adjusted or repaired.

Catalog CVR
Features products for covering gears, sprockets and chains, conveyors, pulleys and belts, shaft ends, and more!

Shop online at www.rockfordsystems.com