KSP SERVICE PROTECTOR
KSP-1200 thru KSP-4000

200,000-AMPERE INTERRUPTING RATING • 1200 TO 4000 CONTINUOUS AMPERES
240 AND 480 VOLTS AC • 2 OR 3 POLE CONSTRUCTION

SAFE-COORDINATED CURRENT-LIMITING FAULT PROTECTION for SERVICE ENTRANCE and HEAVY-DUTY FEEDER SWITCHING

GENERAL

The KSP Service Protectors are engineered protective devices employing a non-automatic low-voltage air circuit breaker and high interrupting capacity Amp-trap current-limiting fuses for application as service entrance or heavy-duty feeder protection. The Service Protector, utilizing basic circuit-breaker principles, permits frequent repetitive operation under normal and abnormal current conditions up to 12 times the device's continuous current rating. It is capable of closing and latching against fault currents up to 200,000-rms symmetrical amperes.

FEATURES:

Current-Limiting Fault Protection—
Reduces or eliminates thermal and mechanical damage, permits use of smaller related equipment.

Stored-Energy Operation—
Permits fast opening and closing independent of the operator—provides long contact life, minimum maintenance, no contact teasing.

Grounded Frame—
Provides safety to personnel.

Circuit-Breaker Design—
Permits safe repetitive loadbreak operations up to 12 times continuous current rating.

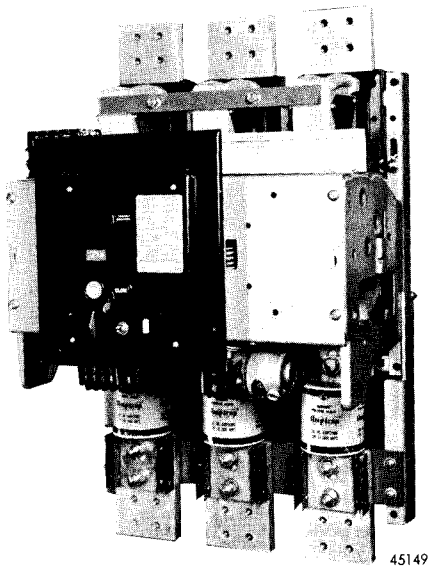
Enclosed Arc—
Provides increased safety to operating personnel during interruption.

Fuse Operation Noiseless, Smokeless and Flashless—
Provides increased safety to operating personnel.

Electrical Operation—
Permits close and trip control from remote location.
Manual closing lever on escutcheon for emergency closing.

Interlocks—
Provision for fuse door interlock—also provision for three padlocks to lock the device open.
Amp-trap mounting pad designed so that only fuse sizes up to the maximum current rating of the Protector can be installed.

Indication—
Contact-position indicator on escutcheon.
Fault current operation indicator on escutcheon.



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Type KSP-2000 service protector

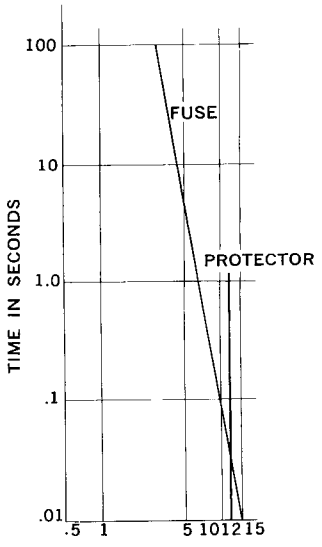

FIGURE 1

Figure 1 illustrates the coordination of the switching function to the protection afforded by the fuses. The selection of the crossover point at 12 times the rated current of the Protector produces a fuse operating time above 12 times of such short duration that it is practically impossible to switch the device under fault conditions, thus insuring the safety of the operator.

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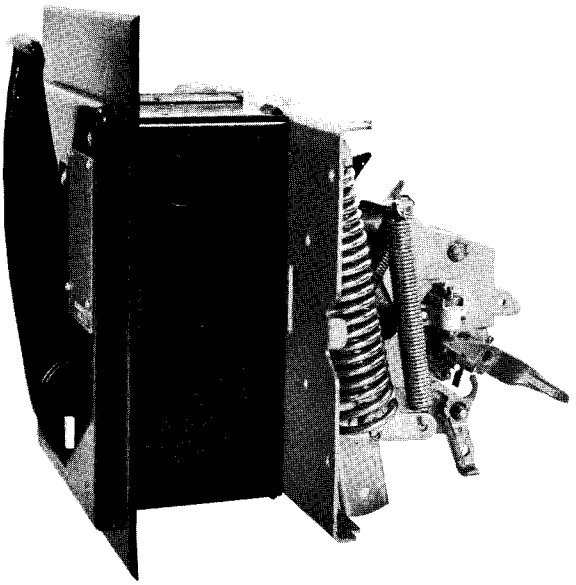
OPERATING MECHANISM—MANUAL

The KSP manually-charged stored-energy (quick-make) closing mechanism offers several advantages to the users of the service protector. Of primary importance is the added safety for operating personnel, since the contacts cannot be teased into the closed position. This quick-make mechanism also provides longer contact and protector life and increases the scope of application for manual service protectors.

On the KSP-1200 thru 2000, the operator simply pulls the handle downward through approximately 90 degrees. The first 80 degrees of travel charges the closing spring and the remaining 10 degrees releases the spring energy to automatically drive the contacts into the closed position.

On the KSP-3000 and 4000 the operator closes the protector by cranking the handle until the springs click into the charged position and the indicator shows "springs charged". The protector may then be closed by the close lever which releases a latch allowing the springs to discharge giving the necessary energy to close and latch the service protector.

A manual "Trip" button is located on the escutcheon where it is easily accessible. The button is flush mounted to minimize the possibility of accidental tripping.



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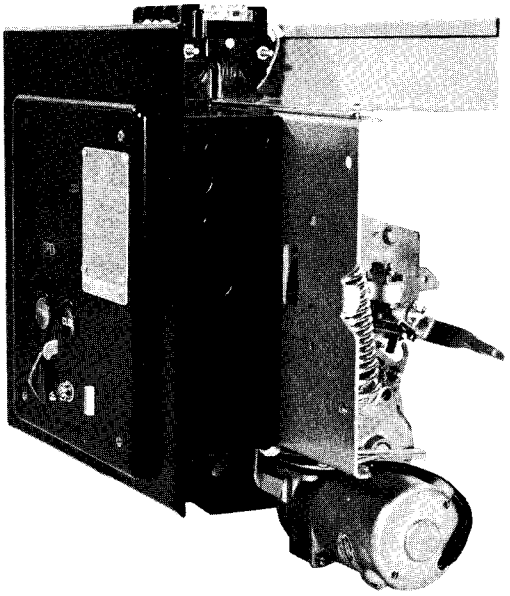
OPERATING MECHANISM—ELECTRICAL

The motor-charged stored-energy mechanism is desirable when remote or local electrical control is required. The stored energy principle insures positive close and latch operation under maximum fault conditions with greatly reduced control voltage. Its function is identical to that of the manually operated except that the springs are charged by a fractional horsepower electric motor with enclosed speed reduction gears which provide the mechanical closing energy. The powerful springs are easily charged and the closing operation is initiated through a relay operated latch or manual closing lever.

The standard control scheme automatically charges the mechanism immediately after a trip operation. An emergency charging handle is provided for manually charging when control power is not available. A manual closing lever on protector's escutcheon allows closed door operation under emergency conditions. The protector may be tripped by a mechanical "Trip" button on the escutcheon or by either a shunt trip controlled from a remote point or an undervoltage trip.



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ANTI-SINGLE-PHASE DEVICE

The Anti-Single-Phase Device supplied on all 3-pole KSP Service Protectors is integrally mounted and consists of Anti-Single-Phasing Coils which are in parallel with the current-limiting Amp-trap fuses. Spring loaded linkage operates the Service Protector trip bar if any of the coils are energized. There is no need for external electrical tripping power. The Protector remains trip free until all blown Amp-trap fuses are replaced and the device is reset by pushing the target on the Protector's left-side sub-panel.

Projection of the Anti-Single-Phase Device target on sub-panel and automatic trip indicator on escutcheon indicates fault current operation of the Protector.

KIRK KEY INTERLOCK

Kirk key interlocks have found major use as a safety device to provide safe working conditions, to prevent unauthorized equipment operation and to protect against damage to expensive industrial machinery.

Kirk lock type B2E is required for use with all KSP Service Protectors. Key interlock adapters must be supplied on all service protectors for use with customer furnished Kirk locks.

Dwg. 708700—Rev. 0

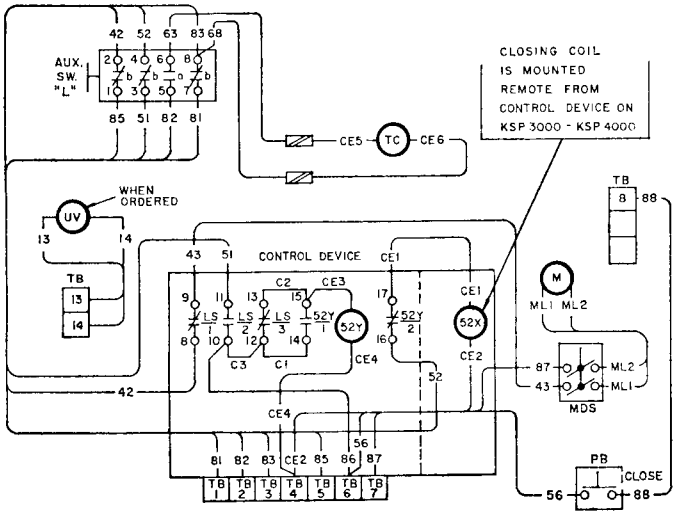
ELECTRICAL DIAGRAM

FOR KSP™ SERVICE PROTECTORS

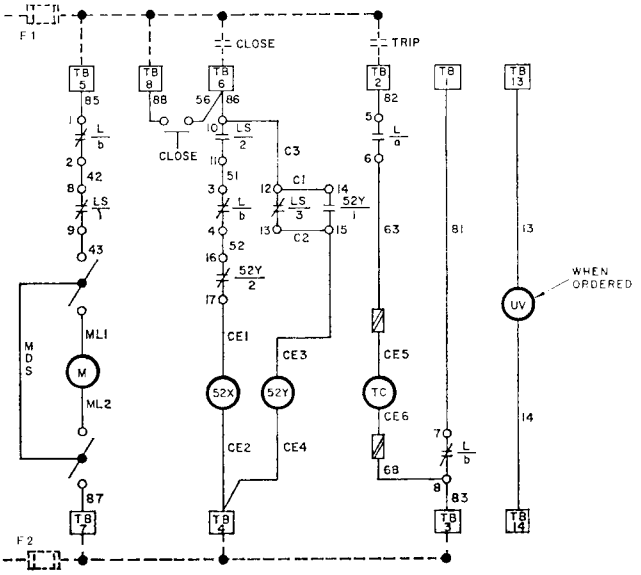
ELECTRICALLY OPERATED WITH SHUNT TRIP AND 4-CONTACT AUXILIARY SWITCH

KSP-1200, KSP-1600, KSP-2000, KSP-3000 AND KSP-4000

FRONT OF BOARD - CONNECTION DIAGRAM



SCHEMATIC DIAGRAM



Legend:

LS/1, LS/3	Limit-switch contacts closed when springs are discharged, open when springs are charged.
LS/2	Limit-switch contacts open when springs are discharged, closed when springs are charged.
52X	Latch release coil.
52Y	Control coil.
52Y/1	Lockout-relay contact, normally open.
52Y/2	Lockout-relay contact, normally closed.
MDS	Motor disconnect switch.

List of Abbreviations:

a	Contact open when protector is open.
b	Contact closed when protector is open.
CE	Coil Ends.
ML	Motor Leads—with plug connections.
TB	Terminal Block points.
TC	Shunt Trip.
UV	Undervoltage.

Notes:

1. Dotted lines indicate customers equipment and wiring.
2. Protector wired with No. 14-19 stranded wire.

SEQUENCE OF OPERATION

Charging

The closing springs must be fully charged before an electrical closing operation can be performed. The springs are automatically charged when the following conditions exist:

1. MDS closed and control power available.
2. Charging springs discharged.
3. Protector main contacts open.

LS/1 and a "b" contact energize the motor which charges the springs until they reach the fully charged position when LS/1 de-energizes the motor and the closing latch arrests the closing springs.

Closing

The protector is electrically closed by the operation of 52X which releases the closing latch and allows the fully charged springs to close the protector. 52X is energized by remote or local close switch, 52Y/2, LS/2 and a "b" contact.

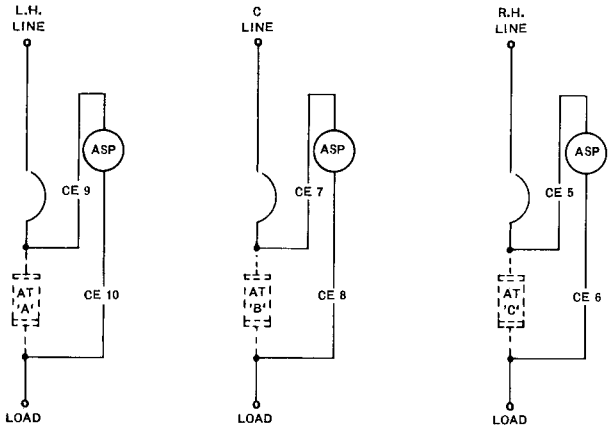
52Y limits 52X to a single operation each time remote or local close switches are operated on both momentary and maintained control schemes.

Tripping

The protector may be electrically tripped by either the TC, UV or Anti-Single-Phase Device. Shunt tripping occurs when the TC is energized by the remote trip switch and an "a" contact. Undervoltage tripping occurs when the voltage applied to the UV is reduced to a predetermined value. Anti-Single-Phase Device tripping occurs when an anti-single-phasing coil is energized (see Auxiliary Wiring Diagram on page 100).

AUXILIARY WIRING DIAGRAM

KSP-1200, KSP-1600, KSP-2000, KSP-3000 AND KSP-4000 ANTI-SINGLE-PHASE DEVICE



Notes:

1. Anti-Single-Phasing Device wired with #14-3000 volt insulation wire.
2. For two-pole assembly, wire as shown, except omit Anti-Single-Phasing Device and C pole.

List of Abbreviations:

AT Amp-Trap† fuses.

ASP Anti-Single-Phasing Device. When Amp-trap is blown, Anti-Single-Phasing Device trips Service Protector which remains trip free until all blown fuses are replaced and target is pushed to reset.

ELECTRICAL CHARACTERISTICS OF CONTROL DEVICES

TABLE 1—CLOSING AND TRIPPING CURRENTS, VOLTAGES AND RANGES

Service Protector	Nominal Control Voltage	Average Closing Motor Current Amperes	Shunt Trip Current Amperes	Closing Relay Current Amperes		Closing Circuit Voltage Range	Shunt Trip Circuit Voltage Range	Recommended Control Fuse Size (F 1 & F 2)
				Anti-Pump	Release			
KSP-1200 KSP-1600 KSP-2000	115 V ac 60 cycle	10.	6.5	.15	1.5	95–125	50–125	10A
	230 V ac 60 cycle	5.	1.15	.075	.75	190–250	190–250	10A
	48 V dc	25.	3.14	.11	1.33	35–50	28–60	15A
	125 V dc	10.	1.3	.06	.7	90–130	70–140	10A
	250 V dc	5.	.65	.03	.3	180–260	140–280	10A
KSP-3000 KSP-4000	115 V ac 60 cycle	10.	10.0	.15	4.0	95–125	50–125	10A
	230 V ac 60 cycle	5.	1.84	.075	1.84	190–250	190–250	10A
	48 V dc	25.	5.0	.11	5.0	35–50	28–60	15A
	125 V dc	10.	2.0	.06	2.0	90–130	70–140	10A
	250 V dc	5.	1.0	.03	1.0	180–260	140–280	10A

CONTROL-POWER TRANSFORMERS

The KSP-1200, KSP-1600, KSP-2000, KSP-3000 and KSP-4000 motor-operated Service Protectors are furnished for use with only two a-c control voltage ratings—115 and 230 volts, single phase. If any other control voltage such as 380, 460 or 550 volts is to be used, then a control transformer is required.

TABLE 2—RECOMMENDED CONTROL TRANSFORMER SIZE

Type Circuit Breaker	KVA of Transformer	Preferred Secondary Voltage
KSP-1200	0.25	115 V
KSP-1600	0.25	115 V
KSP-2000	0.25	115 V
KSP-3000	0.50	115 V
KSP-4000	0.50	115 V

The transformer ratings given in Table 2 are based upon the requirements of charging one Service Protector at one time. If more than one protector is to be charged at the same time from one control transformer then consideration must be given to the use of a larger transformer.

It is recommended that the primary circuit of the control transformer be fused. The fusing must be adequate to interrupt the maximum available power of the supply source. If the supply source is taken from the main primary bus, then current-limiting fuses are recommended.

The secondary of the transformer is connected to the closing and tripping circuit of the Service Protector.

If control transformers are required, they must be mounted remote from the protector since no space is available for mounting on the Service Protector.

† Reg. TM—The Chase-Shawmut Co.