A row of blue SLENDUR M Fuse Protected Vacuum Contactor Units is shown in an industrial setting. The units are arranged in a long line, each with a black handle and a red indicator light. The background shows a complex electrical cabinet with various components and wiring.

SLENDUR M  
Fuse Protected  
Vacuum  
Contactor  
Units



**Laurence, Scott &  
Electromotors Ltd**





# SLENDUR M

Designed to provide compact, accessible, high certification vacuum contactor units for motor starting, transformer and capacitor feeder applications.

## **Certification**

- *In accordance with IEC 298 Appendix AA for internal arc fault containment.*
- *In accordance with IEC 632-1 Appendix B for type C co-ordination.*
- *In accordance with IEC 694 for busbar system fault capability.*
- *In accordance with CISPR and EN 55011 for Electromagnetic Compatibility and Radio Interference voltage.*

## **Standards**

- *Complies with IEC 298 and other relevant IEC Standards*

## **Declaration of Conformity**

- *SLENDUR contactor units, when properly applied, in accordance with the installation and operating instructions, meet the current European Directives (Low voltage and EMC) insofar as they are applicable to the contactor units themselves.*

## **Unit Construction**

- *Fully withdrawable design for safe and unrestricted access during maintenance testing.*
- *Available as single or multiple units in switchboard format.*
- *Standardised design for ease of extendibility with minimum shutdown time.*
- *Alternative starting methods available based upon standardised add-on modules including reversing, star-delta, auto-transformer, stator rotor.*

## **Segregation**

- *Between adjacent units.*
- *By provision of separate high and low voltage compartments.*
- *By provision of separate unit compartments for busbars, high voltage components, low voltage components, outgoing high voltage terminals, auxiliary low voltage terminals.*
- *At busbar system to provide full phase to phase segregation down to the live side of main HV fuses.*

## **Integral Earth Switch**

- *Circuit earth switch included as standard for safety during maintenance testing.*
- *Automatic closing of earth switch upon truck withdrawal.*

## **Qualification**

- *The SLENDUR product has successfully passed vibration and shock tests suitable for military, marine and offshore applications, together with full scale seismic qualification suitable for nuclear plant installation. The units were modified for these tests and many of the modifications are now incorporated into the standard design.*

## **Options**

- *Internal arc fault containment.*
- *Epoxy insulated busbar system.*
- *Automated shutters covering outgoing circuit terminals.*
- *Manually operated earth switch.*
- *Mechanical key interlocking of isolator and/or earth switch with remote devices.*
- *Striker pin type main HV fuses with front of panel fuse status indicator.*
- *Power factor correction equipment incorporated within starter housing.*
- *Contactors status indicator at front of panel.*
- *Surge suppression.*

# General information

The SLENDRAUR range of fuse protected vacuum contactor units is of the single tier withdrawable pattern suitable for connection to breakers or isolators for complete switchboard format.

The fixed housing incorporates phase segregated busbars, fast make earth switch and individual HV and LV outgoing cable chambers.

The truck withdraws on nylon wheels and incorporates fully segregated LV and HV components to allow safe and unrestricted access for testing and maintenance purposes.

## Safety Shutters

Automatic padlockable shutters cover the busbars when the truck is withdrawn. The shutters can be manually latched open, but are automatically reset by truck insertion.

Automatic padlockable outgoing circuit shutters are available as an option where backfeeds may cause the circuit terminals to remain energised when the truck is withdrawn.

## Safety Interlocking

A comprehensive system of mechanical interlocks is provided between truck, isolator, contactor, earth switch and LV compartment door.

## Testing

A test switch is located in the LV compartment and is mechanically interlocked with the padlockable compartment access door and main isolator to ensure safe testing is possible without energising the main outgoing circuit.

For full access, testing can be carried out with the truck withdrawn and a test lead is provided to reconnect the appropriate auxiliary circuits at the truck/housing plug and socket interface.

The test supply can either be connected from an external source to each unit or buswired along the switchboard.

## Earth Switch

The fast make earth switch automatically closes when the truck is being withdrawn. The switch is provided with padlocking facilities as standard but with the option of a mechanical coded key lock.

As an option, the earth switch can be provided with manual closing only, by opening the isolator and gaining access to an additional closing handle fitted inside the LV compartment. Alternatively manual closing can be achieved from within the housing with the truck withdrawn.

The earth switch is mechanically driven open when the isolator is closed.

A front of panel flag gives indication of the earth switch status.

## Busbars

The phase segregated busbars are housed in chambers at the top of the housing, supported at panel intervals by moulded insulators which form barriers between adjacent panels.

## Isolation

A fully mechanically interlocked offload isolator on the truck provides the means to isolate all truck mounted components from the busbars without the need for truck withdrawal.

The isolator has external padlocking facilities as standard with the option of a mechanical coded key lock. The truck has padlocking facilities in the fully inserted position.

## Main Fuse Protection

Main fuse protection is provided by cartridges on the truck which are supported in moulded insulators providing full phase to phase segregation down to the live side of the cartridges.

Non indicating fuses are provided as standard but striker pin types are available as an option to trip the contactor and provide a front of panel flag indication.

## Contactors

The product has been developed using vacuum contactors of an inherently reliable and long lasting type, mechanically interlocked with the isolator. Contactors are available as electrically held, or mechanically latched pattern with external mechanical trip pushbutton and electrical trip coil.

## Protection Relays

Protection relays from most manufacturers and types can be included to suit customer's requirements. These are fitted either on the LV compartment door or inside the compartment as appropriate.

The devices range from the basic to the most sophisticated intelligent types.

## Controls, Indication and Metering

These devices are selected to suit individual customer requirements and will be located on the LV compartment door.

## External Cable Connections

Separate HV and LV cable termination chambers are located at the rear of the housing.

The LV chamber is suitable for both top and bottom entry.

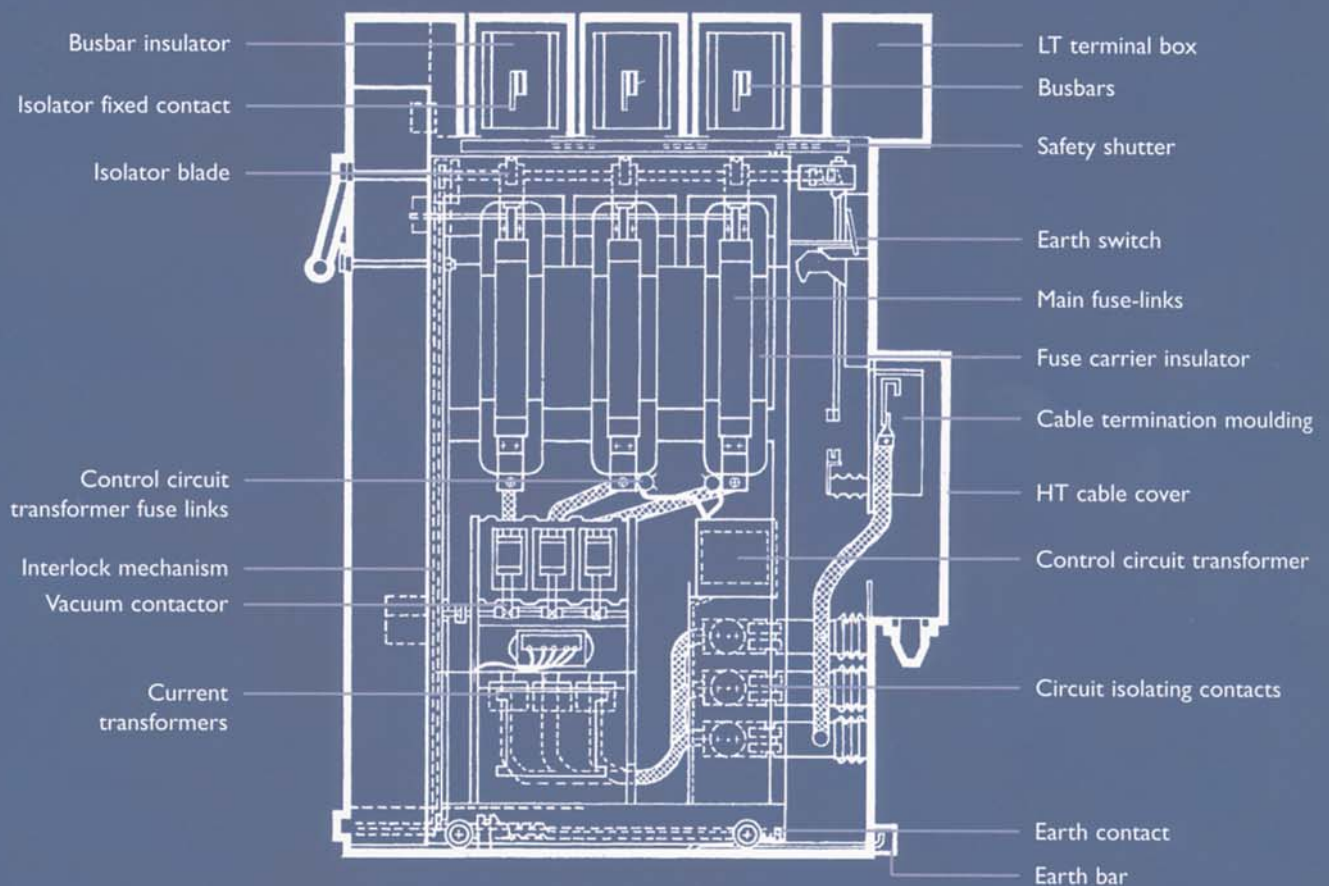
The reversible HV chamber will be arranged to suit the entry direction requirements for each application, and is provided with moulded terminal insulators to provide phase to phase and phase to earth segregation.

All chambers are fitted with removable undrilled gland plates.

# SLEND AUR M design parameters

Rated Operational Voltage	kV rms	3.3	6.6
Rated Insulation Voltage	kV rms	3.6	7.2
Rated Frequency	Hz	50/60	50/60
Power Frequency Rating (1 min)	kV rms	20	20
Impulse Rating	kV pk	40/60	40/60
Rated Circuit Operational Current	A rms	400	400
Contactors AC4 Rating	A rms	400	400
Contactors Rated Thermal Current	A rms	400	400
Contactors Rated Breaking Current	kA rms	4	4
Contactors Rated Making Current	kA pk	4	4
Contactors Short Time Withstand (2 sec)	kA rms	4	4
Enclosure Protection	Code	IP4X	IP4X
Nominal Motor Maximum Rating	kW	1500	3000
Nominal Transformer Maximum Rating	kVA	2000	4000
Nominal Capacitor Maximum Rating	kVAr	2000	4000

Busbar Thermal Ratings	A rms	800	1250	2000	4000
Busbar Short Time Withstand (1 sec) (3 sec)	A rms	50	—	—	—
		—	50	50	50
Busbar Peak Withstand	kA pk	125	125	125	125



# Company Profile

Since 1883, Laurence, Scott & Electromotors has been a leading designer and manufacturer of rotating electrical machines and control gear.

The company is a major supplier to the Offshore, Petrochemical and Power Industries, together with countless Industrial and Marine users worldwide.

## Capabilities

As part of the FKI Group of Companies, Laurence, Scott & Electromotors can offer combined equipment packages to suit most customer requirements.

## Customer Service and Site Support

The Company recognises that Customers' needs extend beyond the delivery of equipment. To provide the all important confidence in the field, a comprehensive after sales service capability exists to support Customers worldwide for installation commissioning, spare parts, repairs, maintenance, modifications, consultancy and training.

## Quality Assurance

Quality assurance is considered paramount to activities at all stages of a Customer/supplier relationship, from enquiry receipt through to site support.

Because of this commitment a Quality Management System is employed which has been independently certified by EAQA as complying with BS EN ISO 9001:1994.



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