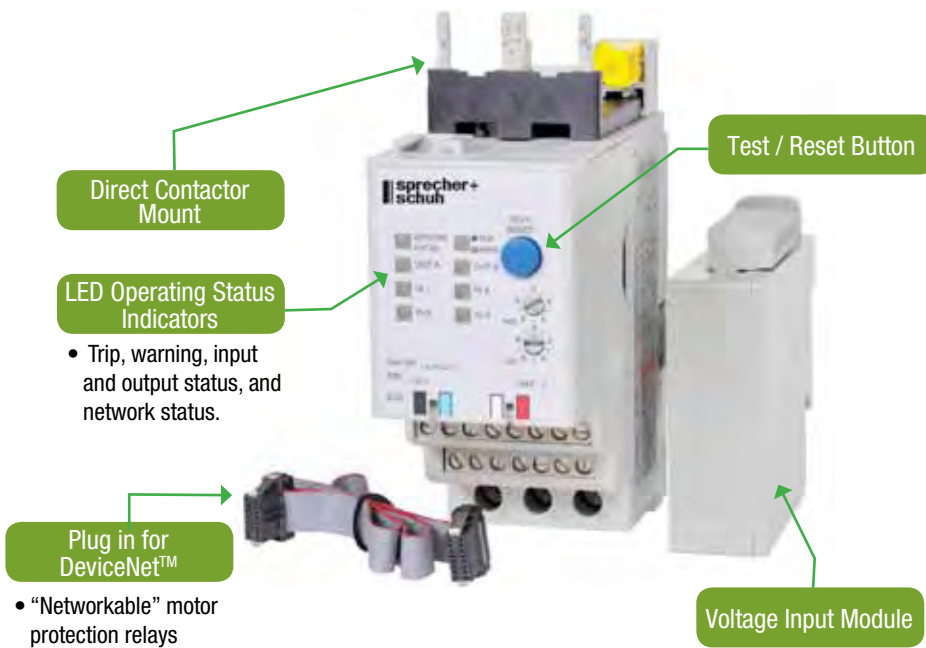


Type CEP7-C5 Enhanced Electronic Motor Protection

Available installed in a starter panel



The Sprecher + Schuh CEP7-C5 is a multi-functioning motor protection relay which combines enhanced motor protection functions with on-board DeviceNet™ communication.

The CEP7-C5 relay combines current and voltage protection with enhanced power monitoring and diagnostic capabilities. The addition of voltage protection helps you protect against under voltage, over voltage unbalance, phase loss, frequency, and phase rotation.



Advantages

- Voltage Protection
 - Under and over voltage
 - Voltage unbalance
 - Phase failure
 - Phase rotation
 - Frequency
- Power Protection
 - Real power (kW)
 - Reactive power (kVAR)
 - Apparant power (kVA)
 - Power factor (PF)
- Energy (kWh, kVARh, kVAh)
- Includes integrated I/O
 - 6 inputs
 - 2 outputs
- DeviceNet™ communications included as standard

A Full Featured Communicating Overload Relay

- Adjustable trip class overload with 5:1 ratio
- Motor Stall (during start)
- Motor Stall (jam) during run
- Underload (under current) detection
- Current asymmetry (imbalance)
- Adjustable fault warnings
- Variable frequency drive (VFD) directly compatible up to 90 Amps. Special external CT unit for larger HP.
- Direct contactor mount
- External ground fault protection (20mA...5A)

Design Features

- The CEP7-C5 uses current measurements provided by hall-effect transducers and a patented signal processing circuit for precise, true RMS measurement, accurate over a frequency range of 20...250 Hz (valid up to 45kW or 90 Amps).
- All terminals are easy to access (plug-in for DeviceNet) and LEDs provide a clear indication of operating status including trip (red), warning (flashing amber), input and output status (amber), and network status (green).
- A test/reset button is provided on the front panel. The reset mode (auto/manual) can also be selected together with the thermal capacity reset level.

CEP7-C5 Products

CEP7-C5 Selection ^①

Direct mounting onto contactor	Current setting range (A)	Catalog No. ^②
CA7-9...23	0.4...2.0	CEP7-C5-23-2
CA7-9...23	1.0...5.0	CEP7-C5-23-5
CA7-9...23	3.0...15	CEP7-C5-23-15
CA7-9...23	5.0...25	CEP7-C5-23-25
CA7-30...43	5.0...25	CEP7-C5-43-25
CA7-30...43	9.0...45	CEP7-C5-43-45
CA7-60...85	9.0...45	CEP7-C5-85-45
CA7-60...85	18...90	CEP7-C5-85-90

Direct mounting onto contactor	Current setting range (A)	Catalog No.
CA6-95...180	28...140	CEP7-C5-180-140
CA6-95...180	42...210	CEP7-C5-180-210
CA6-210...420	42...210	CEP7-C5-420-210
CA6-210...420	60...302	CEP7-C5-420-302
CA6-210...420	84...420	CEP7-C5-420-420
CA6-630...860	125...630	CEP7-C5-860-630
CA6-630...860	172...860	CEP7-C5-860-860



- ① Does not include terminal lugs or covers. See main catalog.
- ② CEP7-C5-23-2 thru CEP7-C5-85-90 accurate over a frequency range of 20...250hz. Therefore, for use with VFDs.
- ③ For use with VFDs on large HP motors.



Current range (A)	Catalog No.
9...5000 with external CTs by others.	CEP7-C5-CT5000K ^③

CEP7-C5 Accessories

DeviceNet™ Programmer HMI



Hand held programming terminal, includes 1m communication cable. Bezel sold separately.

DESCRIPTION	FOR USE WITH	CAT. NUMBER
Programmer HMI – hand held configuration terminal	CEP7-C5... or CEP7-EDN	CEP7-DNCT
Bezel – mountable terminal holder, IP20 (NEMA Type 1)	CEP7-DNCT	CEP7-DNCT-BZ1

AC Input Interface Module Accessory



The AC Input Interface Module conveniently allows the CEP7-C5 Overload Relay to be retrofitted or applied in new applications that require 110/120V AC control circuitry. This new accessory simply plugs into the CEP7-C5 Overload Relay's existing input terminals, optimizing panel space utilization. The module accepts termination of up to four external devices. Optical isolation is provided between the AC input wiring and the internal 24V circuitry.

FOR USE WITH	CAT. NUMBER
CEP7-C5...	CEP7-EIMD

CEP7 Core Balance Transformers ^④



- ④ Required for ground fault protection.

Approx. Current Rating	Inside Diameter	Max. Rec. Cable Size @600 V	For Use With Contactors...	CATALOG NUMBER
45A	19mm	10mm ²	CA7-9...CA7-43	CEP7-CBCT1
90A	40mm	35mm ²	CA7-9...CA7-85	CEP7-CBCT2
180A	65mm	120mm ²	CA6-180	CEP7-CBCT3
420A	85mm	185mm ²	CA6-420	CEP7-CBCT4

Separate Mounting Brackets

FOR USE WITH	CAT. NUMBER
CEP7-C5-23	CEP7-CPM1
CEP7-C5-43	CEP7-CPM2
CEP7-C5-85	CEP7-CPM3

Contact your Sprecher + Schuh representative for complete product information.

Thermal Warning

The CEP7-C5 Overload Relay provides the capability to alert in the event of an impending overload trip. A thermal warning bit is set in the Warning Status when the calculated percentage of thermal capacity utilization exceeds the programmed thermal warning level, which has a setting range of 0...100% TCU.

Phase Loss

The CEP7-C5 Overload Relay offers configurable phase loss protection in allowing the installer to enable or disable the function plus set a time delay setting, adjustable from 0.1...25.0 seconds. The trip level is factory-set at a current imbalance measurement of 100%.

Ground (Earth) Fault

The CEP7-C5 Overload Relay requires the external core balance current transformer (see Accessories). Trip and warning settings are adjustable from 20 mA...5.0 A. Class I protection is provided as defined by UL1053. Series B or later devices provide a trip-inhibit setting, offering flexibility to prevent tripping when the ground fault current magnitude exceeds 10 A. This can be useful to guard against the opening of the controller when the fault current could potentially exceed the controller's interrupting capacity rating.

Note: The CEP7-C5 Overload Relay is not a Ground Fault Circuit Interrupter for personnel protection as defined in article 100 of the U.S. National Electric Code.

Stall

Stall is defined as a condition where the motor is not able to reach full-speed operation in the appropriate amount of time required by the application. This can result in motor overheating as current draw is in excess of the motor's full load current rating. The CEP7-C5 Overload Relay provides user-adjustable stall protection. The trip setting has a range of 100...600% FLA, and the enable time is adjustable up to 250 seconds.

Jam (Overcurrent)

The CEP7-C5 Overload Relay can respond quickly to take a motor off-line in the event of a mechanical jam, thereby reducing the potential for damage to the motor and the power transmission components. Trip adjustments include a trip setting adjustable from 50...600% FLA and a trip delay time with a range of 0.1...25.0 seconds. A separate warning setting is adjustable from 50...600% FLA.

Underload (Undercurrent)

A sudden drop in motor current can signal conditions such as:

- Pump cavitation
- Tool breakage
- Belt breakage

For these instances, rapid fault detection can help minimize damage and aid in reducing production downtime.

Additionally, monitoring for an underload event can provide enhanced protection for motors that are coded by the medium handled (e.g., submersible pumps that pump water). Such motors can become overheated despite being underloaded. This can result from an absence or an insufficient amount of the medium (due to clogged filters, closed valves, etc.).

The CEP7-C5 Overload Relay offers underload trip and warning settings adjustable from 10...100% FLA. The trip function also includes a trip delay time with a range of 0.1...25.0 seconds.

Current Imbalance (Asymmetry)

The CEP7-C5 Overload Relay offers current imbalance trip and warning settings adjustable from 10...100%. The trip function also includes a trip delay time with a range of 0.1...25.0 seconds.

Remote Trip

The remote trip function allows an external device such as a vibration sensor to induce the CEP7-C5 Overload Relay to trip. External device relay contacts are wired to the CEP7-C5 Overload Relay discrete inputs. The discrete inputs are configurable with an option for assigning the remote trip function.

Current Monitoring Functions

The CEP7-C5 Overload Relay allows the user to monitor the following operational data over the DeviceNet™ network:

- Individual phase currents (in amperes)
- Individual phase currents (as a percentage of motor full load current)
- Average current (in amperes)
- Average current (as a percentage of motor full load current)
- Percentage of thermal capacity utilized
- Current imbalance percentage
- Ground fault current

Test/Reset Button

The Test/Reset button, located on the front of the CEP7-C5 Overload Relay, allows the user to perform the following:

- **Test** — The trip relay contact will open if the CEP7-C5 Overload Relay is in an untripped condition and the Test/Reset button is pressed for 2 seconds or longer.
- **Reset** — The trip relay contact will close if the CEP7-C5 Overload Relay is in a tripped condition, supply voltage is present, and the Test/Reset button is pressed.

Single/Three-Phase Operation

The CEP7-C5 Overload Relay can be applied to three-phase as well as single-phase applications. A programming parameter is provided for selection between single- and three-phase operation. Straight through wiring is afforded in both cases.

Voltage Protection

The CEP7-C5 will provide the user with enhanced current based motor protection with the addition of voltage protection. With this product, users can protect against voltage issues e.g., undervoltage, voltage unbalance, phase loss, frequency, and phase rotation before the contactor coil is energized.

Power Protection

While the motor is powering a load, the CEP7-C5 will also protect the motor based on power. This product will monitor and protect for excessive real power (kW), reactive power (kVAR), apparent power (kVA), and power factor for a specific application (e.g., pump applications).

Motor Energy Consumption

The CEP7-C5 model can be included in a company's energy management system. This product will provide voltage, current, power (kW, kVAR, and kVA), energy (kWh, kVARh, kVAh, kW Demand, kVAR Demand, and kVA Demand), and power quality (power factor, frequency, and phase rotation) information down at the motor level.

Access via DeviceNet™ or HMI Programmer

The following data is accessible via the DeviceNet™ network and configuration is via DeviceNet™ software:

Motor current and voltage monitoring

- Phase currents (amps)
- Phase currents (percent of FLC)
- Average current (amps)
- Average current (percent of FLC)
- Thermal capacity (percent)
- Current imbalance (percent)
- Earth fault (amps)
- Phase voltage (volts)
- Real, reactive and apparent power (kW, kVAR, kVA)
- Power factor

Motor diagnostics

- Device status
- Trip status
- Warning status (see “Warning functions” listed)
- Time to trip (if overloaded)
- Time to reset (if trip on overload)
- History of last 5 trips

Warning functions

- Thermal overload (1 to 100%)
- Ground fault (1 to 5 A)
- Underload
- Stall (mechanical jam)
- Current asymmetry
- Under and over voltage
- Phase rotation

DeviceNet™ Communications

The CEP7-C5 Overload Relay is a Group 2 “slave only” device and supports the following:

- Unconnected Message Manager (UCMM) messages
- Polled I/O messaging
- Change-of-state/cyclic messaging
- Explicit messaging
- Group 4 — Off-line node recovery messaging
- Full parameter object support
- Auto-baud network rate identification
- Configuration consistency value

DeviceLogix™

The CEP7-C5 offers increased control flexibility with DeviceLogix™ capabilities. Using RNetWorx for DeviceNet™ (version 3.0 or later), function block programs can be configured and saved to an CEP7-C5 Overload Relay to operate single logic routines. The function blocks are programmed using standard Boolean operators (e.g., AND, OR, XOR, and NOT) and plus timers, counters, and latches. In addition to allowing the use of the integral discrete inputs, protection functions can also be used as inputs to trigger outputs. For example, the Ground Fault Protection function could be used to control Output A of the CEP7-C5 Overload Relay for operation of a circuit breaker short-trip mechanism.

Diagnostic Functions

The CEP7-C5 Overload Relay allows the user to monitor the following operational data over the DeviceNet™ network:

- Device status
- Trip status
- Warning status
- Time to an overload trip
- Time to reset after an overload trip
- Trip snapshot
- History of past five trips
- History of positive warnings
- Hours of operation
- Number of starts

Inputs/Outputs

Inputs allow the connection of such devices as contactor and disconnect auxiliary contacts, pilot devices, limit switches, and float switches. Input

status can be monitored via the network and mapped to a controller’s input image table. Inputs are rated 24V DC and are current sinking. Power for the inputs is sourced from the DeviceNet™ network connection with convenient customer terminations at control terminals 5 and 6. Relay contact outputs can be controlled via the network or DeviceLogix™ function blocks for performing such tasks as contactor operation.

Status Indicators

The CEP7-C5 Overload Relay provides the following LED indicators:

- **Network Status** — This green/red LED indicates the status of the network connection.
- **TRIP/WARN** — This LED flashes an amber code under a warning condition and a red code when tripped.
- **OUT A & B** — These amber LEDs illuminate when the output contacts are commanded closed.
- **IN 1 - 4** — These amber LEDs illuminate when the user-connected device contact is closed.

Auxiliaries



EtherNet/IP Communications Auxiliary
DeviceNet™ to EtherNet/IP linking device.
See separate flyer for details.

	FOR USE WITH	CAT. NUMBER
Single port	CEP7-C5...	CEP7-DNENCAT
Dual port		CEP7-DNENCATR