



SIPROTEC – Motor Protection

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Protection functions for various types of motor faults

Fault	Protection	ANSI - No.
<ul style="list-style-type: none"> ■ Stator thermal overload 	<ul style="list-style-type: none"> ■ Stator thermal overload protection 	49
<ul style="list-style-type: none"> ■ Rotor thermal overload during start <ul style="list-style-type: none"> ■ too long or blocked ■ too frequent 	<ul style="list-style-type: none"> ■ 2 Protection principles for the rotor overload protection <ul style="list-style-type: none"> ■ Motor starting time supervision ■ Restart inhibit 	48 66 49R
<ul style="list-style-type: none"> ■ Earth-fault 	<ul style="list-style-type: none"> ■ Earth-fault protection ($I_0 >$; $U_0 >$; $\angle(U_0, I_0)$) 	50G 64G 67G
<ul style="list-style-type: none"> ■ Short-circuit 	<ul style="list-style-type: none"> ■ Overcurrent time protection ■ Current differential protection 	50 51 87
<ul style="list-style-type: none"> ■ Loss of phase 	<ul style="list-style-type: none"> ■ Negative sequence protection (I_2/I_N) 	46
<ul style="list-style-type: none"> ■ Bearing overload 	<ul style="list-style-type: none"> ■ Temperature sensors (RTD's) 	38
<ul style="list-style-type: none"> ■ Overheating of plant on unloaded drives (Pumps, compressors) 	<ul style="list-style-type: none"> ■ Undercurrent protection, Active power protection ($P <$) 	37 32U
<ul style="list-style-type: none"> ■ Undervoltage (Starting torque not reached $M \sim U^2$ or start too long) 	<ul style="list-style-type: none"> ■ Undervoltage protection 	27
<ul style="list-style-type: none"> ■ Asynchronous operation (of a synchronous motor) 	<ul style="list-style-type: none"> ■ Underexcitation protection 	40



Scope of motor protection functions provided by SIPROTEC devices.

Protection functions	ANSI	7SJ60	7SJ61	7SJ62	7SJ63/64	7UM61	7UM62
Stator overload protection	49	X	X	X	X	X	X
Starting time supervision	48	X	X	X	X	X	X
Locked rotor protection	48	X	X	X	X	X	X
Restart inhibit	66, 49R	X	X	X	X	X	X
Earth-fault protection non-directional	64G 50G	X 1) X		X X	X X	X X	X X
directional	67G	X 1)		X	X	X	X
Overcurrent time protection	50, 51	X	X	X	X	X	X
Current differential protection	87						X
Negative sequence protection	46	X	X	X	X	X	X
Temperature supervision (via RTD - module)	38	X 1)		X	X	X	X
Undercurrent protection	37	X 1)	X	X	X	X	X
Active power protection (P<)	32U (37)					X	X
Undervoltage protection	27			X	X	X	X
Underexcitation protection	40					X	X
Frequency protection	81			X	X	X	X
Breaker failure protection	50BF	X 1)	X	X	X	X	X
Freely programmable logic (PLC)			X	X	X	X	X
Control functions		X	X	X	X	X	X
Measuring transducers					X		X
Flexible serial interfaces		1	2	2	2/3	2	3

¹⁾ in preparation (7SJ602)

A device that best suits your requirement can be selected

Motor protection selection table

Asynchronous Motor

100 kW - 500 kW

7SJ60
Basic device

7SJ61
+ more I/O's
+ control functions
+ flexible serial interfaces
+ better local HMI
(4line display; digital keyboard)

500 kW - (1-2) MW

7SJ62
Basic device
+ control functions

7UM61
+ more I/O's (7UM612)
+ control functions
+ high accuracy
+ high sensitivity
+ operating range in a wide
frequency band (11Hz - 68Hz)

or with control functions via
bay mimic diagram in graphic display

7SJ63
Basic device

7SJ64
+ synchro check function
+ high sensitivity
+ extensive control function
+ 1 serial interface more

> 2 MW

7UM62
+ differential protection
+ control functions
+ high accuracy
+ high sensitivity
+ operating range in a wide
frequency band (11Hz - 68Hz)

Synchronous Motor

< 2MW

7UM61
(Option:
Generator Basic)

< 10 MW

7UM62
(Option:
Generator Basic)

> 10 MW

+ **7UM61**
(Option:
Generator Basic)

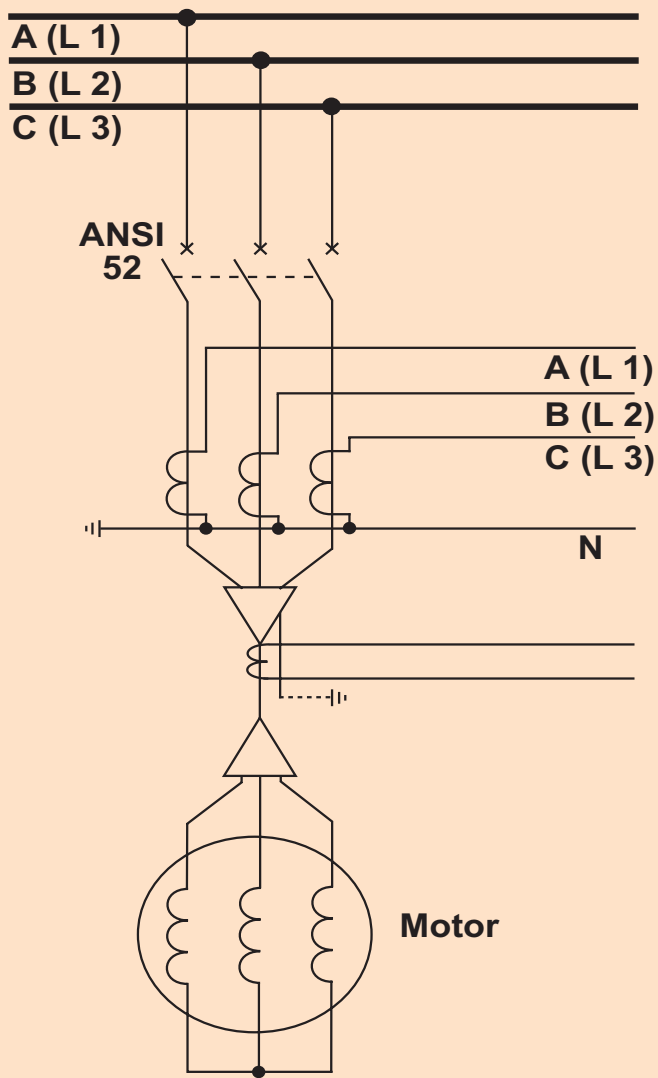
7UM62
(Option:
Generator Basic)

or with control functions
via bay mimic diagram
in graphic display

+ **7SJ64**
(Option:
Maximum functionality
+ Synchro check)

Application example: Protection of a small motor

100 kW - 500 kW

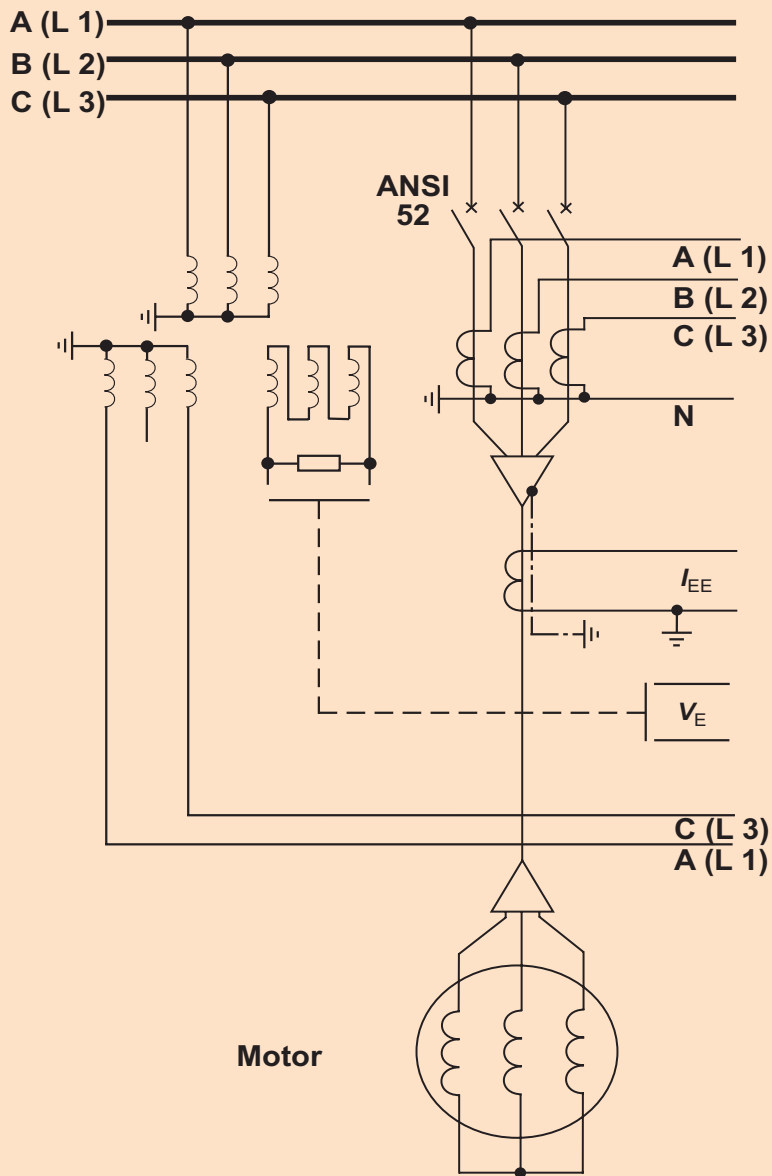


7SJ600/602

- Stator thermal overload protection 49
- Starting time supervision 48
- Earth-fault protection 50G
- Overcurrent time protection 50, 51
- Negative sequence protection 46

**Application example:
Protection of a medium sized motor**

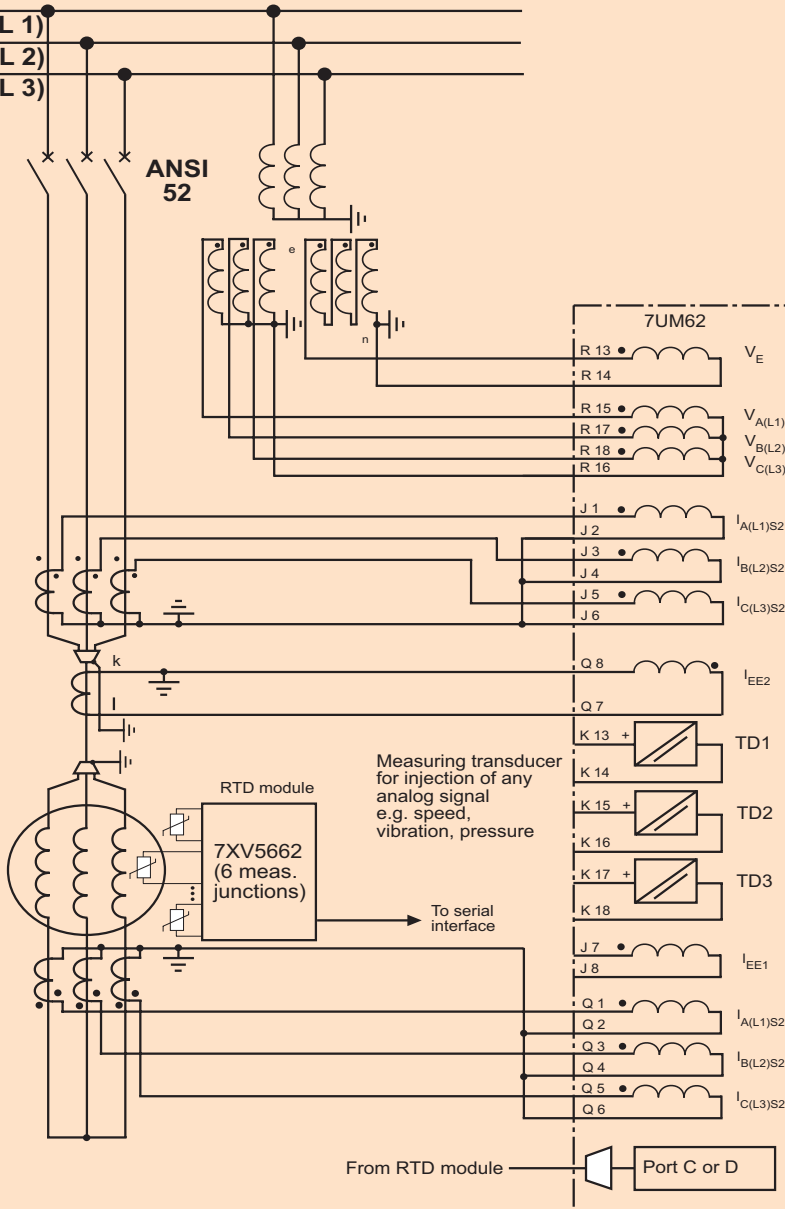
500 kW - (1-2) MW



7SJ62/63

- Stator thermal overload protection **49**
- Restart inhibit (rotor protection) **66, 49R**
- Starting time supervision **48**
- Earth-fault protection (non-directional, directional) **50G, 64G, 67G**
- Overcurrent time protection **50, 51**
- Negative sequence protection **46**
- Undervoltage protection **27**
- Undercurrent protection **37**
- Breaker failure protection **50BF**
- external RTD - module **38**

Application example:
Protection of a large motor
> 2 MW



7UM62

- Stator thermal overload protection **49**
- Restart inhibit (rotor protection) **66, 49R**
- Starting time supervision **48**
- Earth-fault protection **50G**
 (non-directional, directional) **64G**
67G
- Differential protection **87M**
- Overcurrent time protection **50, 51**
- Negative sequence protection **46**
- Undervoltage protection **27**
- Undercurrent protection **37**
- Active power protection **32U**
- Frequency protection **81**
- Breaker failure protection **50BF**



Siemens AG
Power Transmission
and Distribution
Power Automation Division
P.O. Box 48 06
90026 Nuremberg
Germany
www.siprotec.com



Editor and Layout:
Dept. Marketing Services
Power Automation Division