Phase Failure Relays

MKC - MKS Series

MKC-01

MKC-06

MKS-MKC phase failure relays are designed to monitor 3-phase motors against overheating and damage caused by phase faults and voltage unbalance at industrial sites.

CE

PRODUCT SELECTION TABLE

Product Code		Neutral Failure	Phase Failure	Phase Seq. Failure	PTC Protection	Fixed Asmmetry	Adjustable Asymmetry	Without Neutral	Switch On Delay	Switch Off Delay	1 C/O Contact	1 N/O Contact	DIN1 Rail Mounting	DIN2 Rail Mounting	Pcs / Box
MK-01	Phase Failure Relay	●	●			●					●				20
MKC-01	Phase Failure Relay	●	●			●					●			●	16
MKS-01	Phase Failure Relay	●	●			●						●	●		28
MKC-03	Phase Failure Relay	●	●	●		●					●			●	16
MKC-03P	Phase Failure Relay (with PTC3)	●	●	●	●	●					●			●	16
MKS-03	Phase Failure Relay	●	●	●		●						●	●		28
MKC-04	Phase Failure Relay		●	●		●		●			●			●	16
MKC-04-U69	Phase Failure Relay		●	●		●		●			●			●	16
MKC-05	Phase Failure Relay	●	●	●			○		●	●	●			●	16
MKC-05P	Phase Failure Relay (with PTC3)	●	●	●	●		○		●	●	●			●	16
MKC-06	Phase Failure Relay		●	●			○	●	●	●	●			●	16
MKC-06-U69	Phase Failure Relay		●	●			○	●	●	●	●			●	16
MKC-06P	Phase Failure Relay (with PTC3)		●	●	●		○	●	●	●	●			●	16
MKC-20	Phase Failure Relay		●	●			○			●	●		●		28

○ Can be switched off

1. Phase Absence
If all 3 phases are valid, the output relay is ON.
In case of a fault in any of the phases, the output relay is switched to OFF.

2. Phase Sequence Error
When the phase order is correct (L1, L2, L3 clockwise), the relay output is ON. However, if the order changes the output relay is switched to OFF.

3. PTC Protection
If coil temperatures in the motor exceed the value of PTC temperature limit, the output relay is automatically switched to OFF.

4. Fixed Asymmetry (Voltage Unbalance)
If Phase-Neutral voltage shows voltage unbalance above a fixed value (above 20% or 40%), the output relay is switched to OFF in 0,2 seconds.

5. Adjustable Asymmetry (Voltage Unbalance)
If Phase-Phase (MKC-06/06P) or Phase-Neutral (MKC-05/05P) voltage unbalance is below the value set the output relay is switched to ON.
If the unbalance value exceeds the user-specified limit (5% - 15%), the output relay is switched to OFF after the user-defined delay time (0,1... 20s).
If the fault is over within the delay time, the output relay is not switched to OFF and the motor continues to operate.
In addition to these features, if the L3 phase drops below 50% of the operating voltage of the device (MKC-05/05P), the relay is switched to OFF without delay. In this case, phase sequence and asymmetry LEDs start blinking.

** Please see page 98 for PTC Temperature graph*

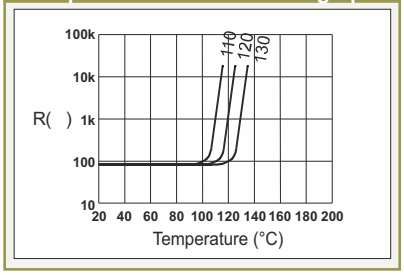
Phase Failure Relays

MKC - MKS Series

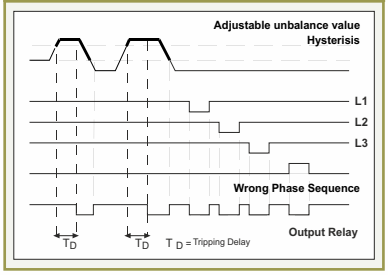
SPECIFICATIONS

	MK-01	MKS-01	MKS-03	MKC-01	MKC-03	MKC-03P	MKC-04	MKC-04-U69	MKC-05	MKC-05P	MKC-06	MKC-06-U69	MKC-06P	MKC-20
ENCLOSURE														
Dimensions	PK21	PK22		PK25 - PK28										PK22
Weight		0,1kg/pcs		0,3kg/pcs										0,1kg/pcs
MEASUREMENT														
Voltage Unbalance	%20 fixed		%40 fixed	%20 fixed	%40 fixed			%10 fixed	%5-%15 adjustable Can be switched off					%5-%25 adjustable Can be switched off
SUPPLY														
Operating Voltage	230 VAC						400 VAC	160-690 VAC	230 VAC	220 VAC	400 VAC	160-690 VAC	380 VAC	230 VAC
Operating Frequency	50/60 Hz													
OUTPUT														
Output Contact	1CO,8A, 2000 VA	1NO,8A,2000 VA		1CO,8A,2000 VA										1CO 5A,1250 VA
On Delay	0,2 sec. fixed								0,1-20 sec. adjustable					0,1 sec. fixed
Off Delay	0,2 sec. fixed								0,1-20 sec. adjustable					0,1-20 sec. adjustable
AMBIENT CONDITIONS														
Ambient Temperature ; Humidity	-5 / +55 °C ; %90													
Over Voltage Category	III													
CONNECTIONS														
Mounting	Rail mounting													
Connection Types	3 phase+neutral						3 phase		3 phase+neutral		3 phase			3 phase+neutral

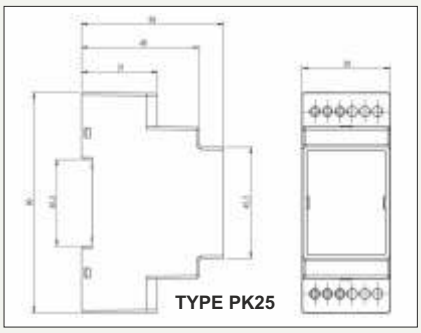
Typical resistance of PTC vs * temperature characteristics graph



Function Diagram

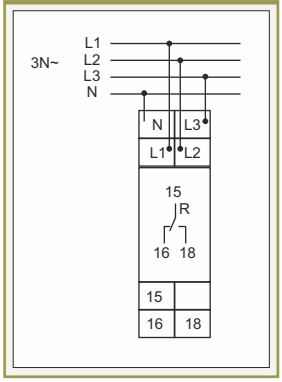


Dimensions

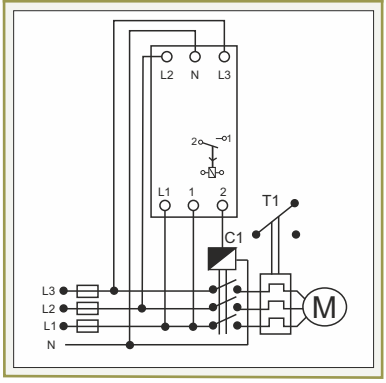


Connection Diagram

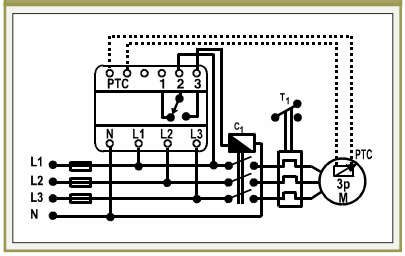
MKC-20



MKS-01 / MKS-03



MKC-03/05



No PTC input except MKC-05/06P

Connection diagrams are given for reference. Please always check the latest user manual given with product or download from www.entes.com.tr

Phase Sequence / Thermistor Relay

FR-02 / PT-01

FR-02 **PT-01**

FR-02

FR-02 Phase Sequence Relay controls the order of 3 phases feeding motors. If R, S and T phases are in correct order, the ON LED on the front panel is turned on. If the phase order is wrong, the ON LED is turned off and the output relay is switched to OFF.

PT-01

PT-01 Thermistor Relay is developed to protect motors with PTC.
If coil temperatures in the motor exceed the value of PTC temperature limit, the output relay is automatically switched to OFF.
Please refer to the following graph to see the heat characteristics of PTC at 3 different turnoff temperature degrees
(110°C, 120°C,and 130°C).

CE

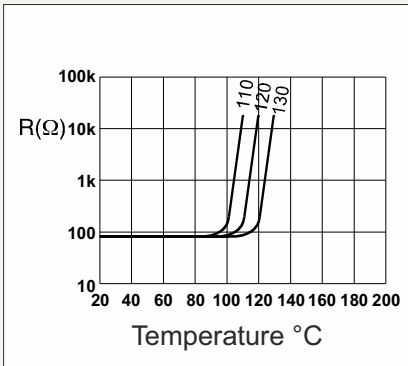
PRODUCT SELECTION TABLE

Product Code		Neutral Failure	Phase Failure	Phase Seq. Failure	PTC Protection	1 NO Contact	DIN2 Rail Mounting	Pcs. / Box
FR-02	Phase Sequence Protection Relay	●	●	●		●	●	16
PT-01	Thermistor Relay				●	●	●	16
PTC-3	Triple Thermistor Group							

Specifications

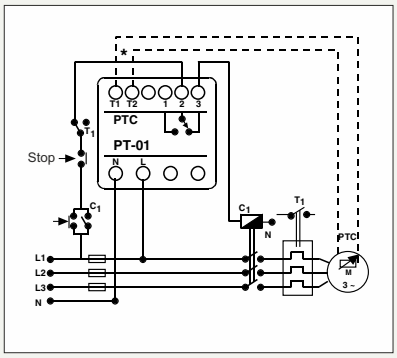
Operating Voltage	230 VAC; 50/60 Hz ±10%
Connection	3-phase / neutral (FR-02) / 1-phase/neutral (PT-01)
Output Contact	1 CO contact, 8 A, 2000 VA
Protection Class	IP 20
Ambient Temp. Range	-5 - +50°C
Dimensions	PK28 (FR-02, PT-01)
Mounting	Rail or Front Panel Mounting
Enclosure Weight	0,3 kg

Typical resistance of PTC vs * temperature characteristics graph

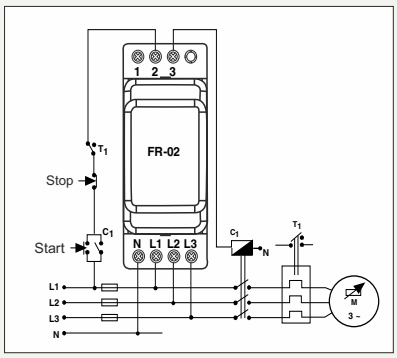


Connection Diagrams

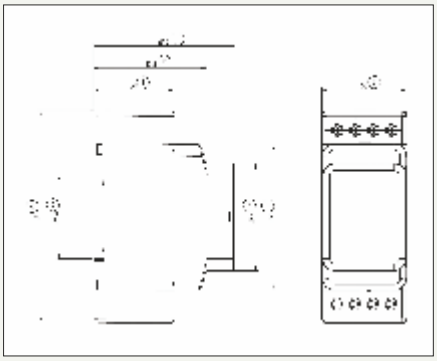
PT-01



FR-02



Dimensions



Connection diagrams are given for reference. Please always check the latest user manual given with product or download from www.entes.com.tr

Current Monitoring Relays

AKC Series

AKC-01D AKC-03D CT-25

AKC series Current Monitoring Relays measure system currents, and shut down systems when measured current values are below or above defined levels.

CE

Direct monitoring up to 60A with CT-25

PRODUCT SELECTION TABLE

Product Code		Under Current Protection	Over Current Protection	.../5A	CT-25	Pcs / Box
AKC-01D	Low Current Protection (0,5-5A)	●		●		16
AKC-01A	Over Current Protection (0,5-5A)		●	●		16
AKC-03D	Low Current Protection (between 1,5 and 60A with CT-25)	●			●	12
AKC-03A	Over Current Protection (between 1,5 and 60A with CT-25)		●		●	12

** Please check page 80 for further information about CT-25.*

SPECIFICATIONS

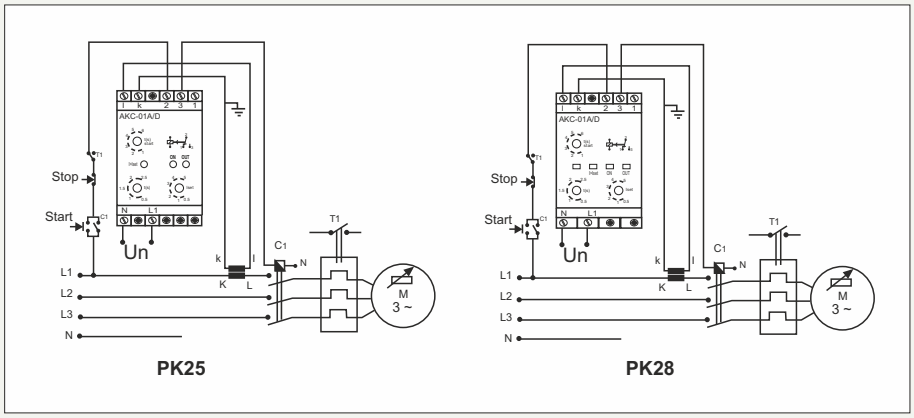
	AKC-01D	AKC-01A	AKC-03D	AKC-03A
ENCLOSURE				
Dimensions	DIN II TYPE PK28			
Weight	0,25kg / pcs.			
Protection Class	IP20			
MEASUREMENTS				
Current Adjustment Interval	0,5-5A		With 1 turn 6-60A / with 2 turn 3-30A With 3 turn 2-20A / with 4 turn 1,5-15A	
Current Transformer Ratio	.../5A		Defined ranges are for CT-25	
SUPPLY				
Operating Voltage	230 VAC±10%			
Operating Frequency	50/60 Hz			
OUTPUT				
Start-up Delay	1-6 s.			
Tripping Delay	0,5-2,5 s.			
Output Contact	1C/O 8A 2000VA			
AMBIENT CONDITIONS				
Ambient Temperature	-5 / +55°C ; 90%			
Over Voltage Category	III			
CONNECTIONS				
Mounting	Rail Mounting			
Connection Types	Single phase 2 wires (voltage) ; …/5A current transformer or with CT 25 (current)			
STANDARDS				
Applied Standards	EC 61010-1, IEC61000-6-2			

Current Monitoring Relays

AKC Series

Connection Diagrams

AKC-01A/AKC-01D



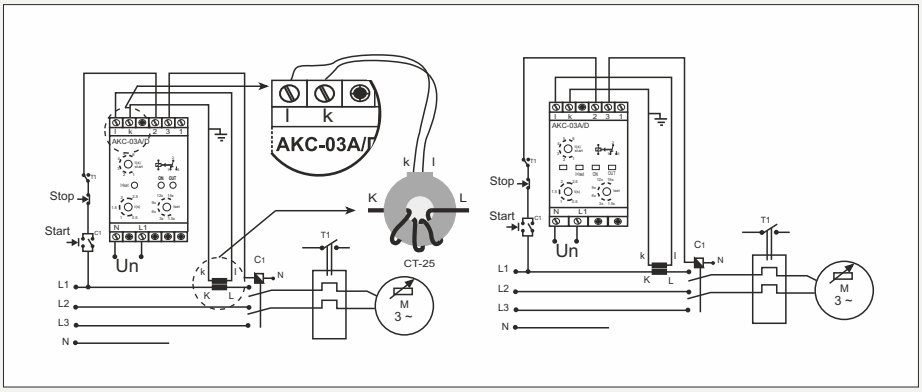
PK25 PK28

AKC-3A / AKC-3D series must be used if current exceeds 5A.

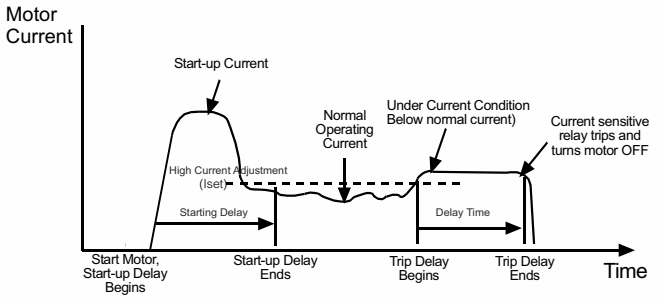
- 6 - 60A with 1 turn
- 3 - 30A with 2 turn
- 2 - 20A with 3 turn
- 1,5 - 15A with 4 turn

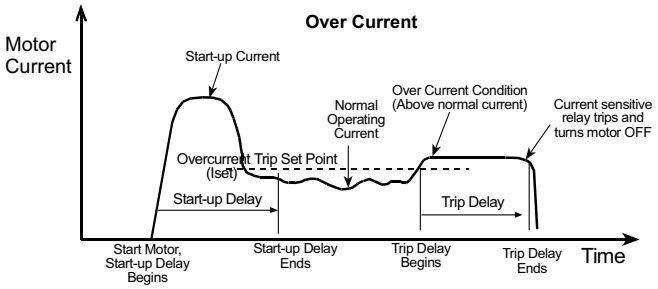
*Please check page 80 for further information about CT-25.

AKC-03A/AKC-03D

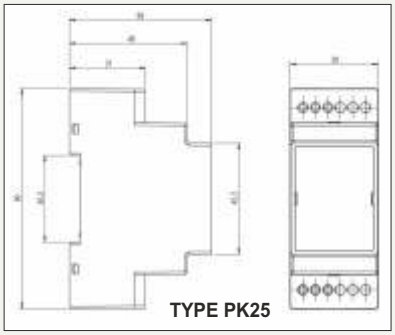


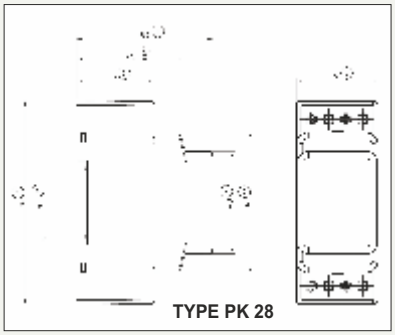
PK25 PK28

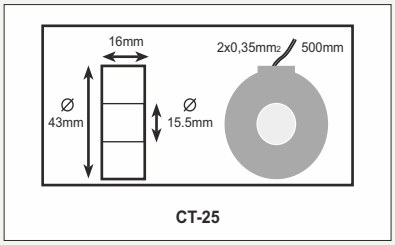




Dimensions







Connection diagrams are given for reference. Please always check the latest user manual given with product or download from www.entes.com.tr

Voltage Monitoring Relays

GKRC - DGRC - MCC Series

GKRC-02FA

GKRC-20F

GKRC-01

GKRC series Voltage Monitoring Relays are designed to protect single or three-phase systems against voltage changes and phase sequence faults.

When the nominal voltage of any phase increases or decreases by 50%, the relay is switched to OFF without delay.

DGRC series voltage protection relay is designed to protect single or three-phase systems in cases of permanent voltage drops.

CE

PRODUCT SELECTION TABLE

Product Code		Neutral Failure	3-Phase	Single Phase	Under Voltage	Over Voltage	Phase Failure	Phase Seq. Failure	Switch on Delay	Switch off Delay	Without Neutral	Auxiliary Supply	DIN1 Rail mounting	DIN2 Rail mounting	Pcs / Box
DGRC-01		●	●		■				●	●				●	16
GKRC-01		●	●			■			●	●				●	16
GKRC-02		●	●		■	■			●	●				●	16
GKRC-02F		●	●		■	■	●	●	●	●				●	16
GKRC-02FA			●		■	■	●	●	●	●	●	●		●	16
GKRC-03			●		■	■			●	●	●			●	16
GKRC-03F			●		■	■	●	●	●	●	●			●	16
GKRC-M2		●		●	■	■			●	●				●	16
MCC-1D	5-15 min OFF-Delay	●		●	●		●		●				●		28
MCC-3D	5-15 min OFF-Delay	●	●		●		●		●				●		28
GKRC-20F			●		○	○	●	●		●			●		10

● Adjustable.

■ Adjustable and can be switched off.

SPECIFICATIONS

	GKRC-02	GKRC-02F	GKRC-20F	GKRC-02FA	GKRC-03	GKRC-03F	GKRC-M2	GKRC-01	DGRC-01	MCC-1D	MCC-3D
ENCLOSURE											
Dimensions	PK28		PK22	PK28						Pk22	
Weight	0,25kg/pcs		0,1kg/pcs	0,25kg/pcs						0,1kg/pcs	
MEASUREMENTS											
Voltage											
Under Voltage Setting Range	150-210 VAC*		(0,70-1,2)xUn	270-370 VAC*			150-210 VAC*				
Over Voltage Setting Range	240-300 VAC*		(0,8-1,30)xUn	410-510 VAC*			240-300 VAC*				
Instant Tripping Value	0,5xUn 1,5xUn		-	0,5xUn 1,5xUn				0,5xUn		168 VAC	
Instant Tripping Time	100ms.										
Hysteresis	3%										
SUPPLY											
Operating Voltage	230 VAC±10%		230 VAC, 400 VAC±30%	Auxiliary Supply 190-260 VAC	400VAC ±10%		230 VAC±10%				
Operating Frequency	50/60 Hz										
OUTPUT/SETTINGS											
Output Contact	1CO 8A 2000VA cos =1									1NO 8A 2000VA cos =1	
On Delay	0,1 -20 s.		-	0,1 -20 s.						5-15 m. (1-5 m.)	
Off Delay	0,1 -20 s.										
AMBIENT CONDITIONS											
Ambient Temperature/Humidity	-5 / +55°C ; 90%										
Over Voltage Category	III										
CONNECTIONS											
Mounting	Rail Mounting; Terminal with Screw										
Connection Types	3 phase, neutral			3 phase, without neutral			1 phase, neutral	3 phase neutral		1 phase neutral	3 phase neutral
STANDARDS											
Standards	EC 60255-3, EC 60255-6, EC 60870-5, EC 60529										

These features can be switched-off by user

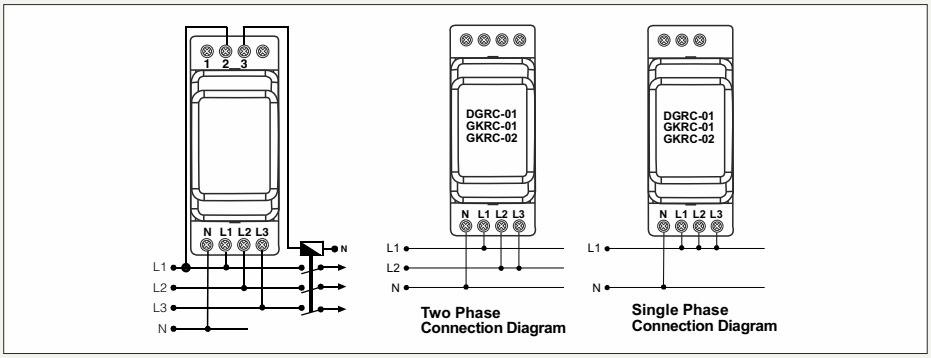
Print Date: 02.2016

Voltage Monitoring Relays

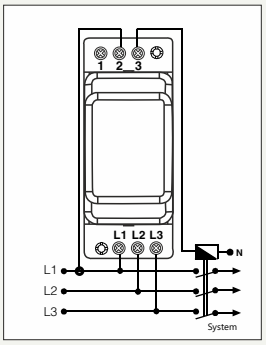
GKRC - DGRC - MCC Series

Connection Diagram

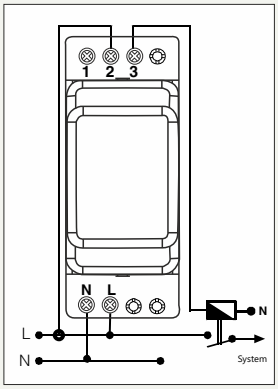
GKRC-01 / DGRC-01 / GKRC-02 / GKRC-02F



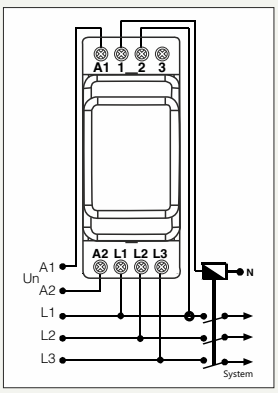
GKRC-03 / GKRC-03F



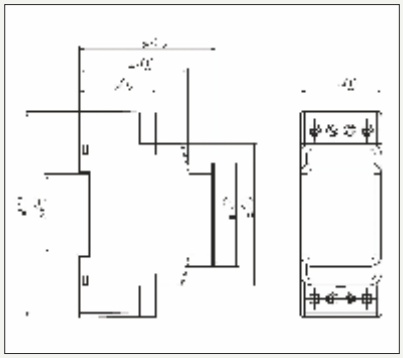
GKRC-M2

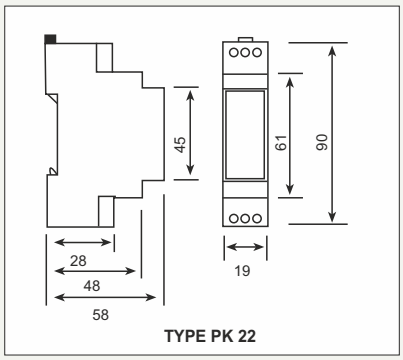


GKRC-02FA

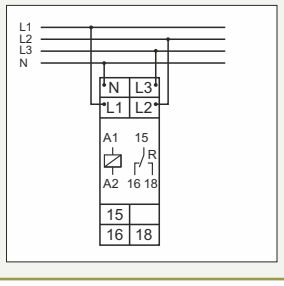


Dimensions

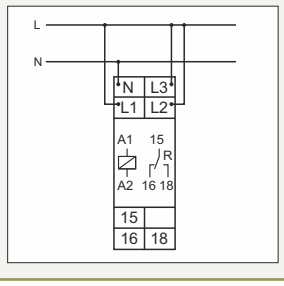




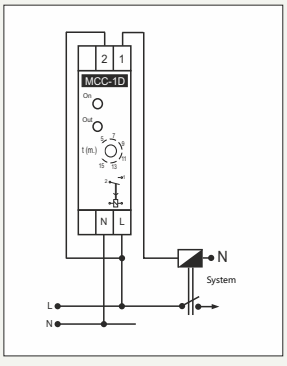
GKRC-20F



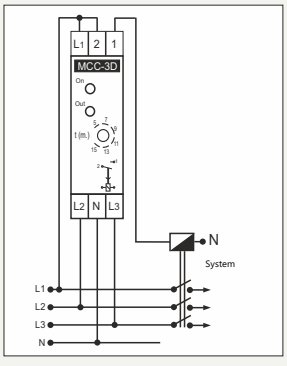
GKRC-20F



MCC-1D



MCC-3D



Connection diagrams are given for reference. Please always check the latest user manual given with product or download from www.entes.com.tr

Liquid Level Controller

SSRC-04

SSRC-04

SSRC-04 is used for controlling liquid levels in wells and liquid tanks at industrial sites.
Precision (resistivity/impedance between electrodes) can be adjusted between 5 and 50 kΩ for different liquids.

CE

PRODUCT SELECTION TABLE

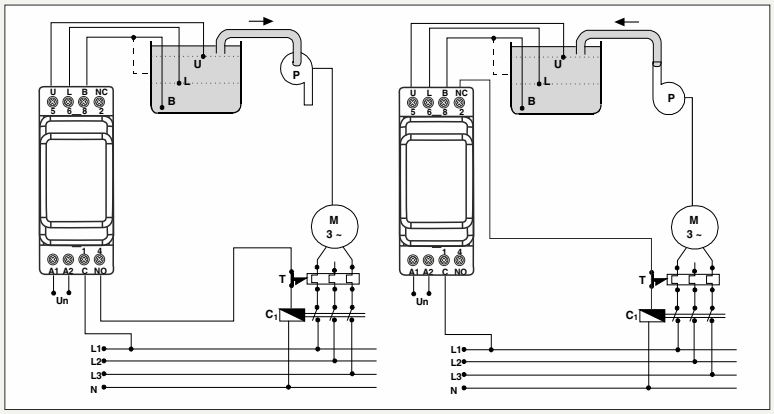
Product Code		5-50 k Adjustable	Small Electrode	Large Electrode	Pcs / Box
SSRC-04	Liquid Level Controller	●			16
LLS-01	Liquid Level Electrode		●		100
LLS-02	Liquid Level Electrode			●	100

⚠ *Liquid level electrodes cannot be used with inflammable and corrosive liquids and food products. The liquids that will be controlled for their levels must have electrical conductivity.*

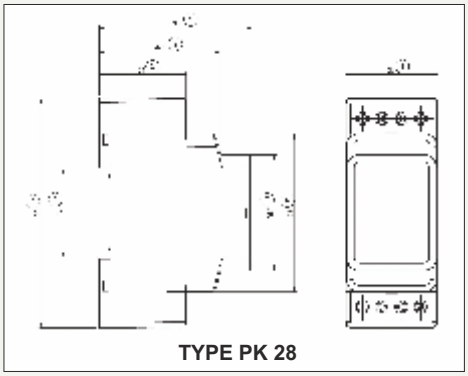
SPECIFICATIONS

	SSRC-04
ENCLOSURE	
Dimensions	Pk28
Protection Class	IP20
Weight	0,25kg/pcs
SUPPLY	
Operating Voltage	230 VAC±10%, 400 VAC±10%
Operating Frequency	50/60 Hz
Operating Range	(0,9-1,1)xUn
Sensitivity	5-50kΩ adjustable
Warning Light	Front panel LED
OUTPUT	
Contact Output	1CO 8A 2000 VA
AMBIENT CONDITION	
Ambient Temperature, Humidity	-5 / +50°C; 85 %
CONNECTIONS	
Mounting	Rail mounting; terminal with screw
Connection Types	Single Phase 2 Wires

Connection Diagram



Dimensions



TYPE PK 28

Connection diagrams are given for reference. Please always check the latest user manual given with product or download from www.entes.com.tr