Digital Electric& Electronics System

DEESYS

Digital Intelligent Protective Relay

(Over Current Relay with Reclosing & Over Current Relay)

DIGITAL OVER CURRENT RELAY WITH RECLOSING

DIGITAL OVER CURRENT RELAY

DIGITAL RECLOSING RELAY

OVER CURRENT RELAY WITH RECLOSING & OVER CURRENT RELAY

Feature

DIPR–K210 / K211 is a relay manufactured based on Korea Electric Power Corporation's purchase specification as a digital protection relay equipped with a function to protect three phase lines such as MAIN TR. and 23KV D/L, unbalanced load on cable detection (UBOCR) and 50B (OLTC BLOCKING) functions and reclosing relay elements. This product is also equipped with disturbance recording, storing and analyzing functions to have enhance reliability.

Characteristics

- DIGITAL complete operational three phase over current, ground over current, unbalanced load OLTC blocking, reclosing relay
- Each necessary relay element can be separately enabled for selective use
- Output contact point maintaining time in a range of 0~200ms can be set up for each relay element
- Reliability has been secured through self–diagnostic functions and permanent monitoring function
- An interlocking mode is provided to enable setting any of 12 output contact points as necessary

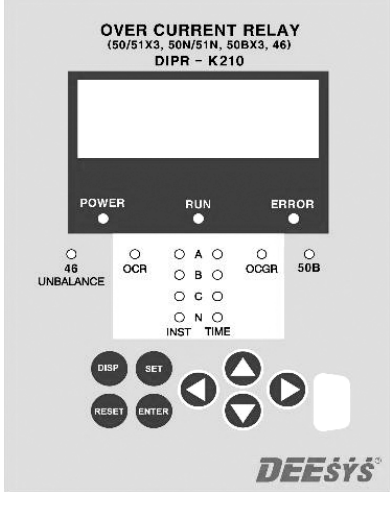
※ TRIP contact point (1a X 4 / 1b X 1), ALARM contact point (1aX7/1bX1 is fixed)

- Applied standard: over current relay purchase specification (ES 155 – 007)
- The reclosing function can be set ON/OFF and the number of times of reclosing can be freely designated up to three times
- The 50B function has been built–in so that the product can be used without separately configuring OLTC BLOCKING.
- Current sensing elements operate normally even under reclosing failure
- RS–232C and RS–485C communication methods are supported
- Draw Out Type case structure
- EMC and environmental resistance performances have been reinforced

Configuration

FRONT

The front panel was configured to enable easy identification of measuring and setting operation progresses by adopting 4X20 LCD considering H.M.I between the operator and the equipment. The front panel comprises 3–color LEDs for indicating individual faults and information, keypads and an RS–232C communication port for event and fault waveform analysis using the Manager program. Even during relay operation, the operation information can be identified using the keypads and RS–232C communication port and the relay element protection function will normally operate even in this case. Furthermore, a function can be set to allow only designated persons can change pick–up values by entering passwords.



LED (INDICATOR)

『PWR』 green: power source
『RUN』 green: relay operation state
『ERROR』 red: self trouble
『OCR.OCGR』 yellow: turned on at times of relay element operations
『INST』 red: turned on at times of instantaneous time trips
『TIME』 red: turned on at times of definite time trips
『46』 yellow: turned on at times of current unbalanced operations
『50B』 yellow: turned on at times of OLTC element operations

KEYPAD

『DISP』 KEY	Information such as metering, setting, events, fault views can be identified.
『SET』 KEY	Measurement elements' pick–up values and system set values can be changed. The setting function can be used after entering the password. The default value is [1111].
『ENTER』 KEY	Menus can be selected or various pick–up values can be changed or identified.
『RESET』 KEY	Fault information on the front panel can be reset without opening the front cover of the relay.
『↑』 KEY	Press this to move to upper menus or increase set values.
『↓』 KEY	Press this to move to remaining screens not indicated in the Menu or decrease set values.
『← / →』 KEY	Press this to move cursor positions.

OVER CURRENT RELAY WITH RECLOSING & OVER CURRENT RELAY

Relay specification

- Information at times of line failures including fault time is stored in real time as 512 events can be stored
- A Fault Recording function is built in so that fault waveforms can be stored at times of faults (up to 12 waveforms)
- Instantaneous time and definite time, two time curves under Korea Electric Power Corporation purchase specification are built in (inverse time, very inverse time)
- Relay's pick-up values and LOGIC configuration are permanently stored regardless of whether the control power is supplied
- Since the Manager program using the RS-232C communication port is used, pick-up value changes and event, fault waveform analyses are easy.

※Operation SOFTWARE: Device condition and relay elements can be set up,
EVENT and FAULT DATA inquiry SOFTWARE
※Fault analysis SOFTWARE: Fault waveform analysis SOFTWARE

- Diverse pieces of information on pick-up values and operation states are displayed through the LCD screen (4X20 LCD screen)

Scope of application (AMBIENT CONDITION)

- Ambient temperature: -10℃~ +55℃
- Relative humidity: Daily average 30% ~ 80%
- Altitude: 1,000m or lower

CASE

- Structure: square draw out type
- Color: Munsell No. N1.5 (black)
- Material: Steel and Aluminum

Ratings

Input	Rated current	AC 5A
	Rated frequency	60Hz
Control power	Rated input	110 ~ 220VAC / 110 ~220VDC
	Permissible range of input	88 ~ 264VAC / 88 ~ 264VDC (±20% of rated input)
	Output voltage	+5V / +15V / -15V / +24V
	Output current	2A / 0.5A / 0.5A / 1A
	Output burden	50VA

Instantaneous time short-circuit over current element (50)

Operation	Pick-up value	10.0 ~ 80.0A (0.1A STEP)
	Precision	Within ±5% of the pick-up value
	Time characteristics	Instantaneous time(40~50mS), definite time (0.04 ~ 10.00S / 0.01 STEP)
Return	Return value	At least 90% of the pick-up value
	Returning time	40mS or shorter
	Retardation time	20 ~ 200mS (0.01 STEP)

Instantaneous time ground over current element (50N)

Operation	Pick-up value	5.0 ~ 40.0A (0.1A STEP)
	Precision	Within ±5% of the pick-up value
	Time characteristics	Instantaneous time(40~50mS), definite time (0.04 ~ 10.00S / 0.01 STEP)
Return	Return value	At least 90% of the pick-up value
	Returning time	40mS or shorter
	Retardation time	20 ~ 200mS (0.01 STEP)

Definite time short-circuit over current element (51)

Operation	Pick-up value	0.5 ~ 12.0A (0.1A STEP)
	Precision	Within ±5% of the pick-up value
	Time characteristics	Inverse time
	T-lever	0.1 ~ 10.0S (0.1 STEP)
Return	Operating time precision	Within ±5% of time lever
	Return value	At least 90% of the pick-up value
	Returning time	100mS or shorter
	Retardation time	20 ~ 200mS (0.01 STEP)

Definite time ground over current element (51N)

Operation	Pick-up value	0.1 ~ 4.0A (0.1A STEP)
	Precision	Within ±5% of the pick-up value
	Time characteristics	Inverse time
	T-lever	0.1 ~ 10.0S (0.1 STEP)
Return	Operating time precision	Within ±5% of time lever
	Return value	At least 90% of the pick-up value
	Returning time	100mS or shorter
	Retardation time	20 ~ 200mS (0.01 STEP)

Load unbalance element (UBOCR)

Operation	Pick–up value	0.1 ~ 4.0A (0.1A STEP)
	Precision	Within ±5% of the pick–up value
	Time characteristics	Definite time
	Operating Time	0.1 ~ 10.0S (0.1 STEP)
Return	Operating time precision	Within ±5% of time lever
	Return value	At least 90% of the pick–up value
	Returning time	100mS or shorter
	Retardation time	20 ~ 200mS (0.01 STEP)

Load unbalance characteristics (46)

The load unbalance function is an alarm function to inform unbalance states of the load of the secondary side 23KV D/L of 154KV MAIN TR. Current unbalance sensing methods include zero–sequence current sensing methods that compare the waveform of the current flowing into the N phase CT of the relay with the fundamental waves and negative–sequence current sensing methods that operate the negative–sequence currents flowing into the A, B, C three phase CT to sense the current unbalance. The DIPR–210K relay uses a zero–sequence current sensing method to sense load unbalance.

This relay function has the same current pick–up value as the definite time ground over current element and its operating time characteristics are definite time characteristics (0.1 ~ 10.0SEC).

OLTC BLOCKING element (50B)

Operation	Pick–up value	5.0 ~ 80.0A (0.1A STEP)
	Precision	Within ±5% of the pick–up value
	Time characteristics	Instantaneous time, definite time
	Operating Time	Instantaneous time (30mS), definite time
		0.04 ~ 30.00S (0.01 STEP)
Return	Return value	At least 90% of the pick–up value
	Returning time	40mS or shorter
	Retardation time	20 ~ 200mS (0.01 STEP)

OLTC BLOCKING characteristics (50B)

The OLTC BLOCKING function is a function to block OLTC (ON LOAD TAP CHANGER) when secondary side 23KV D/L of 154KV MAIN TR. is in trouble to prevent burning due to the arcs generated in the process of transformer tap changing.
This relay function has current pick–up values of 5~ 80A and its operating time characteristics are basically instantaneous time characteristics (≒30ms).

In addition, by setting the definite time function, trip block signal transmission time can be changed in a range of 0.03 ~ 30.00SEC

Reclosing element (79)

Number of times or reclosing		Can be selected among 1~3 times
Instantaneous time blocking		YES / NO can be selected
Prepare Time	Operating time	60 ~ 180S (1 STEP)
	Precision	Within ±5% of the pick–up value
Reclaim Time	Operating time	60 ~ 180S (1 STEP)
	Precision	Within ±5% of the pick–up value
Input duration		0.1 ~ 2.0S (0.1 STEP)
Discrimination Time		0.1 ~ 30.0 (0.1 STEP)
1 time reclosing	Operating time	0.2 ~ 2.0S (0.1 STEP)
	Precision	Within ±5% of the pick–up value
2 times reclosing	Operating time	5.0 ~ 30.0S (0.1 STEP)
	Precision	Within ±5% of the pick–up value
3 times reclosing	Operating time	30.0 ~ 60.0S (0.1 STEP)
	Precision	Within ±5% of the pick–up value
Fail Pulse Signal Time		1 ~ 600S (1 STEP)

Reclosing characteristics (79)

The reclosing operation element basically operates at three phases. This is equipped a function to block the secondary side OLTC (ON LOAD TAP CHANGER) of the MAIN TR. and this function may be turned off when necessary.

Even if the reclosing element fails, it will not at all affect the over current and ground over current elements and thus the relay will maintain normal operation. During reclosing operations, the number of times of reclosing is displayed on the screen of the relay during the RECLAIM TIME.

The number of times of reclosing can be counted up to 65535 times and the user can initialize the value into 0.

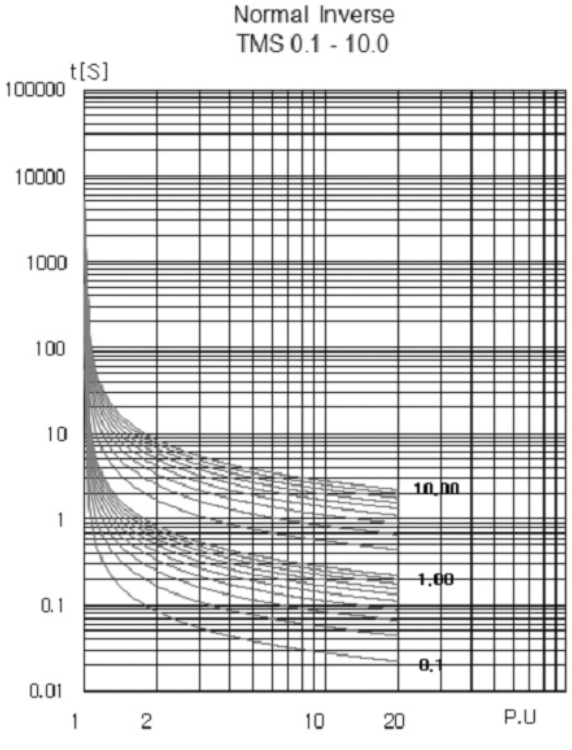
OVER CURRENT RELAY WITH RECLOSING & OVER CURRENT RELAY

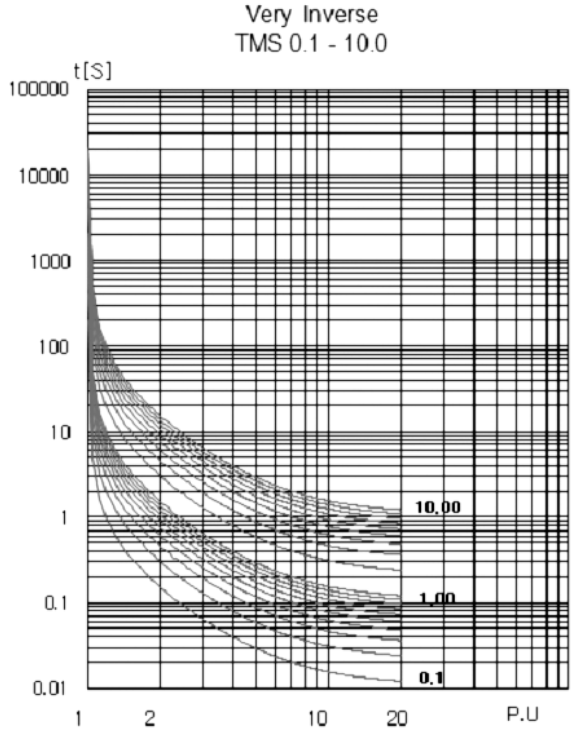
Protective operation characteristics

Current relay characteristics

The DIPR-K210 relay is equipped with a short-circuit over current protection element that senses short-circuit currents and over currents flowing through 3-phase lines and block the lines to protect the equipment and a ground over current protection element that senses ground fault currents and over currents flowing through ground lines and any of instantaneous time characteristics, definite time characteristics, inverse time characteristics and very inverse time characteristics can be selected and used.
The instantaneous time operation is maintained for around 30ms with a current input of 200% of the pick-up value and the operating time of definite time operation can be changed in a range of 0.03 ~ 10SEC at 0.01STEP with a current input of 120% of the pick-up value.
The operating time of inverse time characteristics and very inverse time characteristics is inverse proportional to the sizes of currents and thus as inflow currents increase the operating time decreases.
The operating time relational expression and definite time characteristics curves are as follows.

- t : operating time G : fault current Gb : current pick-up value tp : TIME LEVER
- a : characteristics curve index(inverse time : 0.02 / very inverse time : 1.95)
- k : relay characteristics value (inverse time : 0.11 / very inverse time : 39.85)
- C : relay characteristics value (inverse time : 0.42 / very inverse time : 1.084)





Added functions

Permanent monitoring function (self diagnosis)

In order to maintain its functions normally and quickly respond troubles in built-in hardware, the relay is added with a self diagnostic function to permanently monitor operation states. When any trouble has been sensed, the 『ERROR』 LED on the front side will be immediately turned on and the LCD window will display state messages. The contents of self-diagnosis will be recorded under the item EVENT.

Major diagnosis items and details of the permanent monitoring function

DC power failure monitoring	Cases where there is no DC input
	Cases where DC input is low voltage below 86V
CPU and memory failure monitoring	CPU / ROM / RAM operation failure
	CLOCK failure
	The signal line or control line has been cut
A/D converter failure monitoring	A/D CONTROL signal fault
	A/D control power dropped by more than 1V
DI / DO circuit failure monitoring	The control power was lost
	The signal line or control line has been cut
Pick-up value failure monitoring (set-up failure)	The set pick-up value was abnormally changed
	The set pick-up value is outside the setting limit.

EVENT function (EVENT RECORDING)

This is a function to record and check the history of changes in relay conditions beginning from the booting of the relay such as system variable changes, pick-up value changes and self-diagnosed conditions. Up to 512 events can be recorded and if the number of recorded events exceeds 512, the oldest record will be erased first to store new records. Records once stored are permanently maintained even when the control power is lost.

To identify stored events, press the 『DISPLAY』 KEY of the relay and move to 『3. [EVENT] ?』. Then, press the 『ENTER』 KEY to enter the screen. You can identify the 512 data using the 『←/→』 KEY.

If the relay is connected to the PC using the RS-232C communication port on the front side to use DIPR-FAT, a communication operation PROGRAM provided by us, event data can be checked at a glance more conveniently.

Number of times of event recording	Up to 512 (first-in, first-out recording)
Operating time resolution	1ms
Display	EVENT TYPE
	Date and time of occurrence
Event Type	SYSTEM REBOOT SYSTEM fault EVENT - DI / DO CIRCUIT FAIL - MEMORY FAIL - AD CONVERTER FAIL - DC POWER FAIL - SETTING FAIL - SYSTEM OK RELAY PARAMETER RESET SYSTEM PARAMETER RESET Relay element EVENT D/I , D/O state change reclosing element SUCCESS / FAIL
Storage / Decode	Data are permanently stored even if the control power is lost
	Can be read using the communication operation program
	Stored as COMTRADE FILEs using the communication operation program

OVER CURRENT RELAY WITH RECLOSING & OVER CURRENT RELAY

Added functions

FAULT function (FAULT RECORDING)

This is a function to record and store operation elements, magnitudes of currents, operating time, phase and harmonic waveforms, etc. when the fault trigger condition set on the relay to enable the user to grasp the cause of the fault quickly.
Up to 12 faults can be recorded and if the number of recorded events exceeds 12, the oldest record will be erased first to store new records. Records once stored are permanently maintained even when the control power is lost.
To identify stored faults, press the 『DISPLAY』 KEY of the relay and press 『??』 KEY to move to 『4. [FAULT VIEW] ?』. You can identify the data using the 『←/→』 KEY.
Fault waveforms can be selected among three times (240CYCLE), six times (120CYCLE) and 12 times (60CYCLE) depending on the number of times of storage.
The fault position of waveform can be freely set in a range of 1 ~ 99% in accordance with site situations.

Number of times of fault recording	Up to 12 depending on setting (first-in, first-out recording)
	• 12 / 1 sec. (12 X 60CYCLE)
	• 6 / 2 sec. (6 X 120CYCLE)
	• 3 / 4 sec. (3 X 24CYCLE)
SAMPLING	36 SAMPLING / 1 CYCLE
Waveform storage display items	FAULT date and time display. Fault types and occurred phase display by element . Fault current and operating time display. Display current values of other phases that the fault phase at the time point of fault occurrence. Phase shift state and harmonic wave, VECTOR wave display. D/I , D/O state display Reclosing element' s READY, START, FAIL states display
STORAGE / DECODE	Data are permanently stored even if the control power is lost Can be read using the communication operation program Stored as COMTRADE FILEs using the communication operation program

Communication function

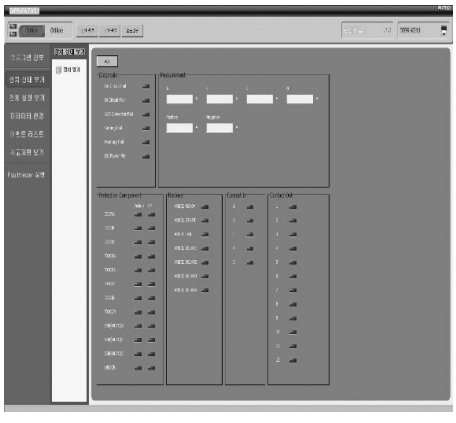
The DIPR-K210 relay provides two general-purpose communication methods having transmission speeds up to 115,200BPS.

The RS-232C communication on the front side is implemented as a function for direct interfaces with humans (H.M.I) and is used for local setting and data analysis after connection to the PC. The
RS-485C communication on the rear is used for SCADA communication.

RS-232C	Installed location	One port on the front side of the relay
	Use	Local Setting, Event and Fault waveform analysis
	Transmission method	HALF - DUPLEX
	Communication speed	9,600 ~ 115,200BPS
	Communication line, common	RS-232C CROSS CABLE
RS-485C	PROTOCOL	MODBUS PROTOCOL
	Installed location	One port on the rear of the relay
	Use	Distant SCADA control
	Transmission method	HALF - DUPLEX
	Communication speed	9,600 ~ 115,200BPS
	Communication line, common	RS-485C TWO-PAIR CABLE

Added functions

Metering function



A, B, C phase current (Ia / Ib , Ic)	Fundamental wave current virtual values by phase are expressed
	A phase current reference phase measuring
	Primary and secondary current values are simultaneously expressed through CT ratio setting
	Input current (CT) guarantee range : AC 0 ~ 250A
N phase current (In)	Fundamental wave current virtual value expression
	Primary and secondary current values are simultaneously expressed through CT ratio setting
	Input current (CT) guarantee range : AC 0 ~ 250A
Symmetric current (Ips / Ins)	Steady state, negative-sequence, zero-sequence current sizes and phases are measured
	Primary current value is expressed by converting the input current into CT ratio
	Input current (CT) guarantee range : AC 0 ~ 250A
(DIGITAL INPUT) Number of times of reclosing	The item being used among five D/I is expressed
	Reclosing operation accumulation is expressed up to 65535
Measuring precision	0.1CL

Menu Tree
DISPLAY MENU

1.METER	1.CURR	Ia, Ib, Ic, In, Ips, Ins input values are display
	2.D / I	The D/I being used is displayed
	3.RECLOSE	Number of times of reclosing is displayed
2.SET	1.RLY_SET	1. 50 : OCR instantaneous time element set value identification
		2. 51 : OCR definite time element set value identification
		3.50N: OCGR instantaneous time element set value identification
		4. 51N : OCGR definite time element set value identification
		5. UBOCR : UBOCR element set value identification
		6. 50B : OLTC BLOCKING element set value identification
		7. 79 : reclosing element set value identification
	2.SYS_SET	[SELECT RELAYS]: individual relay element ENABLE state identification
		[CT RATIO]:CT RATIO set value identification
		[TIME SET]:RTC time set value c identification
		[ADDRESS SET]:ADDRESS value for communication setting identification
		[EVENT RESET]
		[AUX RELAY TEST]
		[PASSWORD SET]
		[FAULT RESET]
		[LCD LIGHT TIME]:LCD BACKLIGHT time identification
		[WAVE TRIGGER POSITION]:CAPTURE waveform point identification
		[WAVE RECORD TIME]:fault waveform length identification
		[RELAYOUT SELECT]: relay element designation for individual output contact points identification
		[RECLOSE RESET]
3.EVENT: Up to 512 events (use the left/right direction key to identify events)		
4.FAULT VIEW: up to 12 faults (use the left/right direction key to identify faults)		

OVER CURRENT RELAY WITH RECLOSING & OVER CURRENT RELAY

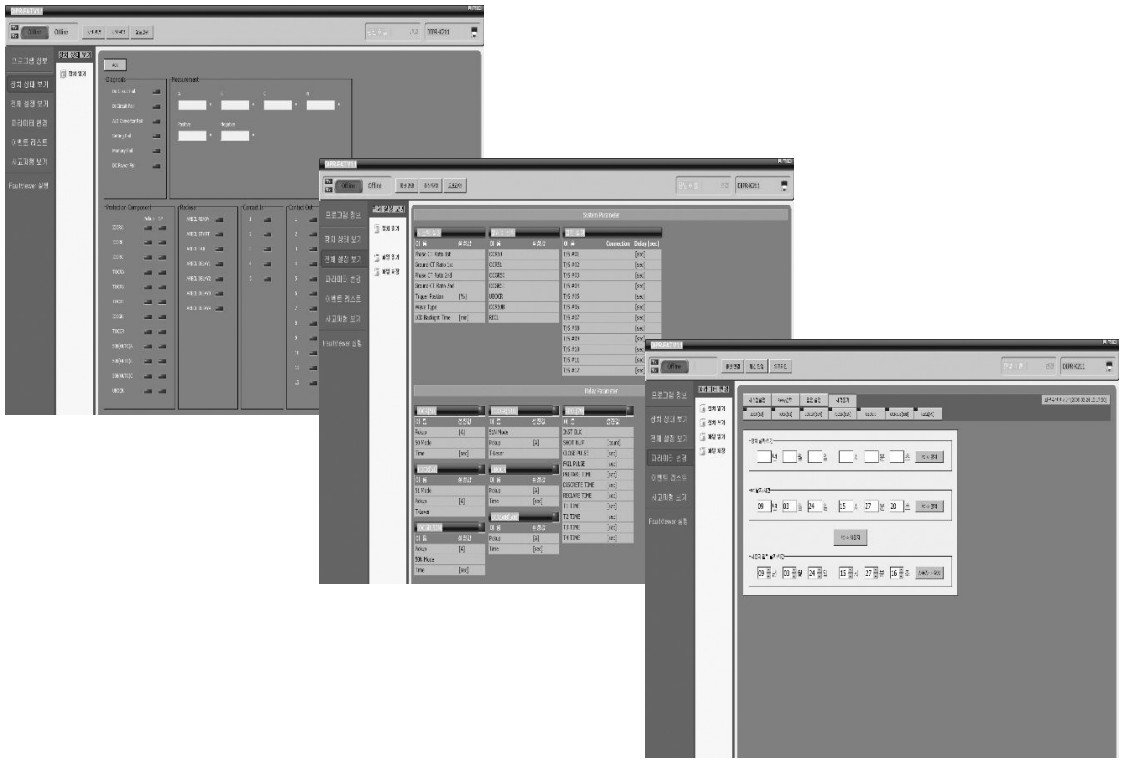
SOFTWARE: DIPR-FAT (Fault Analysis Tool)

DIPR-FAT is total application software that provides environments that can be conveniently used using PC.
Relay system monitoring through the device reading function
If this software is connected to the relay using communication, situations and current measured values of each phase can be identified and relay element operation states, event data, fault data and self diagnosis states, etc can be monitored in real time.

Through the device writing function, relay system setting and individual relay elements' ON / OFF and set values can be changed and using the file storage function, each relay set value can be stored separately with separate names.
These stored values are usefully used when multiple relays are installed with the same condition. In this case, if device writing is done on newly installed relays using the file reading function, the relays can be immediately changed.

Using this software, relays' self-diagnosis states as well as various event data and fault data can be stored and COMTRADE FILE change and GRAPHIC screen analysis functions for fault waveform analysis are supported. The GRAPHIC screen analysis function analyzes 36 SAMPLING waveforms per cycle to provide RMS current values over time, vector values by phase shifts, 1 ~ 17 harmonic wave analysis values related with harmonics, etc.

Device state view
Device state view items are divided into self monitoring, current measured value protection relay element operation, reclosing operation element, D/I contact point, D/O contact point items and the green lamp of each item indicates 'enabled'.
By pressing 'Read Device', the present state of the relay currently connected can be identified.



Fault analysis software: [FAULT-VIEWER]

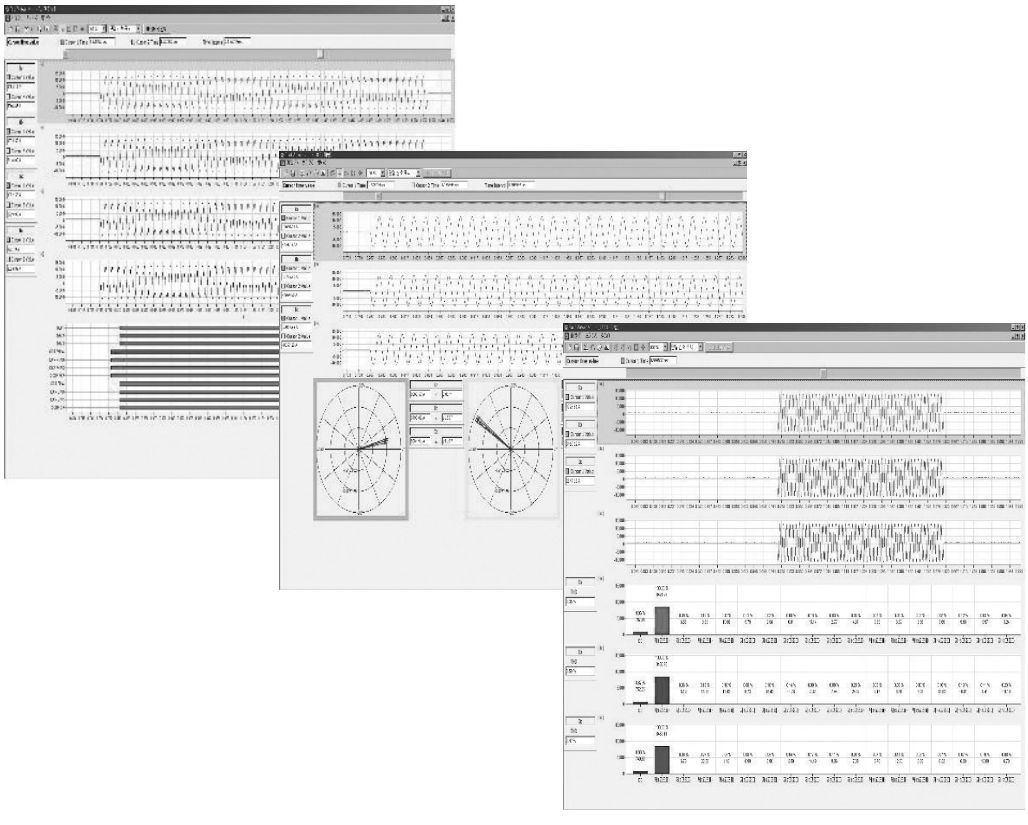
The FAULT-VIEWER is GRAPHIC analysis SOFTWARE that is used in the fault waveform display and analysis functions included in the operation PROGRAM DIPR-FAT set forth in item 9. This GRAPHIC analysis SOFTWARE enables users to display and compare time waveforms, virtual value waveforms, vector diagrams and harmonics waveforms to enable intuitive fault cause analysis

The operation process of the FAULT-VIEWER is as follows.

1. Download the raw waveform stored in the relay through DIPR-FAT.
   DIPR-FAT stores the downloaded data in the COMTRADE file format.
2. Drive the Fault-Viewer SOFTWARE to execute the stored file.
   The user may also select the downloaded file from DIPR-FAT and press VIEW.
3. The user analyzes the data through the executed FAULT-VIEWER SOFTWARE.
   The user may also execute the FAULT-VIEWER independently to directly select and open the stored data.

Major characteristics of FAULT-VIEWER are as follows.

- Time waveform display
- Virtual value waveform display
- Vector waveform display
- Harmonics graph display
- Support Com-trade file format [Applied standard : IEEE C37.111 (1999)]
- Support two graph cursors (graph value [Y], time value [X], time difference display)
- Graph zoom-in/out function
- Support graph movement function
- Printing function



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Rear

Structure and terminal arrangement on the rear

TRIP (1) – a	1	14	TRIP (1) – a		A (IN)	27	40	A (IN)
TRIP (2) – a	2	15	TRIP (2) – a		B (IN)	28	41	B (IN)
TRIP (3) – a	3	16	TRIP (3) – a		C (IN)	29	42	C (IN)
TRIP (4) – a	4	17	TRIP (4) – a		N (IN)	30	43	N (IN)
TRIP (5) – b	5	18	TRIP (5) – b		DI (1)	31	44	DI (1)
ALARM (1) – a	6	19	ALARM (1) – a		DI (2)	32	45	DI (2)
ALARM (2) – a	7	20	ALARM (2) – a		DI (3)	33	46	DI (3)
ALARM (3) – a	8	21	ALARM (3) – a		DI (4)	34	47	DI (4)
ALARM (4) – a	9	22	ALARM (4) – a		DI (5)	35	48	DI (5)
ALARM (5) – a	10	23	ALARM (5) – a			36	49	
ALARM (6) – a	11	24	ALARM (6) – a		485 (+)	37	50	485 (–)
ALARM (7) – a	12	25	ALARM (7) – a		AUX. POWER +	38	51	FG
ALARM (8) – b	13	26	ALARM (8) – b		AUX. POWER –	39	52	FG

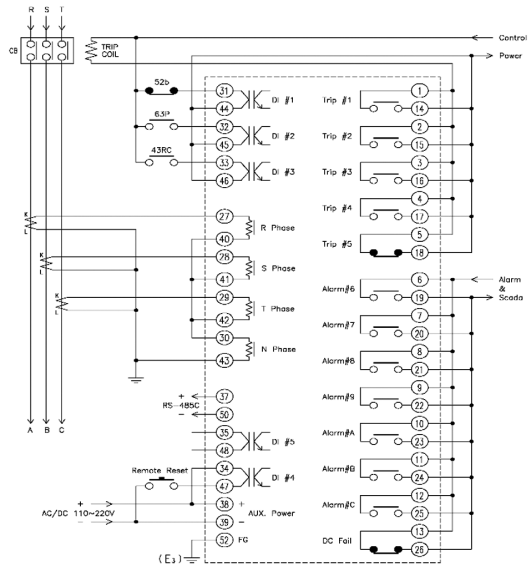
DI / DO contact point

Input contact point				Input condition	Description of set condition
DI (1)	31	44	DI (1)	52–b	DI (1) input : CB's 52 b contact point state checking
DI (2)	32	45	DI (2)	63P	DI (2) input : CB's 63 P contact point GAS pressure state checking
DI (3)	33	46	DI (3)	43RC	DI (3) input : switch for reclosing ON / OFF
DI (4)	34	47	DI (4)	REMOTE	DI (4) input : remote reset switch for relay return
DI (5)	35	48	DI (5)		DI (5) input : not used

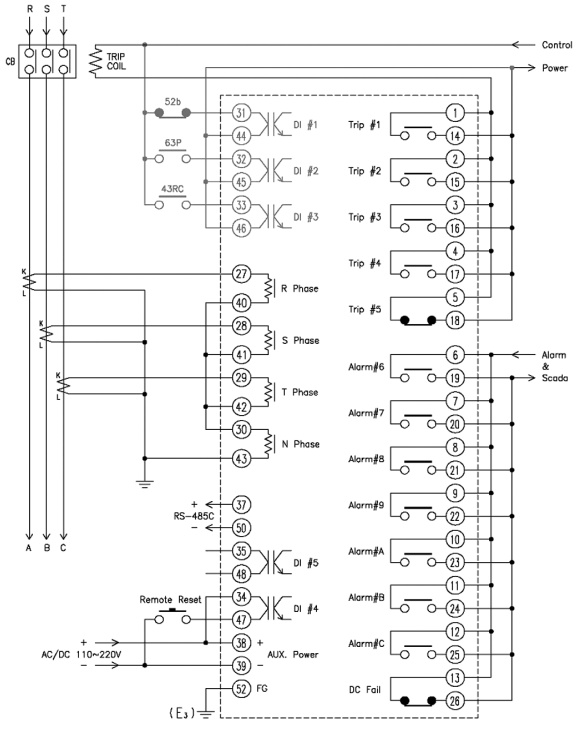
Output contact point				Output condition	Description of set condition
				OFF	Contact points are not used
				SYS ERROR	Output System error
				PROTO_OR	Output if even one of all relay elements operates
				IOC_OR	Output if even one of over current instantaneous time elements operates
				IOC_A	Output if over current instantaneous time element A phase operates
				OC_B	Output if over current instantaneous time element B phase operates
				IOC_C	Output if over current instantaneous time element C phase operates
				TOC_OR	Output if even one of over current definite time elements operates
TRIP (1)	1	14	TRIP (1)	TOC_A	Output if over current definite time element A phase operates
TRIP (2)	2	15	TRIP (2)	TOC_B	Output if over current definite time element B phase operates
TRIP (3)	3	16	TRIP (3)	TOC_C	Output if over current definite time element C phase operates
TRIP (4)	4	17	TRIP (4)	IOCG	Output if ground over current instantaneous time element operates
TRIP (5)	5	18	TRIP (5)	TOCG	Output if ground over current definite time element operates
ALARM (6)	6	19	ALARM (6)	OC_A_OR	Output if A phase of even one of over current instantaneous time element and definite time element operates
ALARM (7)	7	20	ALARM (7)	OC_B_OR	Output if B phase of even one of over current instantaneous time element and definite time element operates
ALARM (8)	8	21	ALARM (8)	OC_C_OR	Output if C phase of even one of over current instantaneous time element and definite time element operates
ALARM (9)	9	22	ALARM (9)	IOC+TOC	Output if even one of over current instantaneous time element and definite time element operates
ALARM (A)	10	23	ALARM (A)	IOC+IOCG	Output if even one of over current instantaneous time element and ground over current instantaneous time element operates
ALARM (B)	11	24	ALARM (B)	IOC+TOCG	Output if even one of over current instantaneous time element and ground over current definite time element operates
ALARM (C)	12	25	ALARM (C)	TOC+IOCG	Output if even one of over current definite time element and ground over current instantaneous time element operates
ALARM (D)	13	26	ALARM (D)	TOC+TOCG	Output if even one of over current definite time element and ground over current instantaneous time element operates
				IOCG+TOCG	Output if even one of over current definite time element and ground over current instantaneous time element operates
				50B_OR	Output if even one of OLTC BLOCKING over current instantaneous time elements operates
				50B_A	Output if OLTC BLOCKING over current instantaneous time element A phase operates
				50B_B	Output if OLTC BLOCKING over current instantaneous time element B phase operates
				50B_C	Output if OLTC BLOCKING over current instantaneous time element C phase operates
				UBOC	Output if current unbalance element operates
				79_RDY	Output when prepared for operation after reclosing element prepare time
				79_START	Output during the period from reclosing element starting to reclaim time
				79_FAIL	Output during fail pulse when reclosing element operation has failed
				OB_CLOSE	Output during CB close pulse at every time of reclosing element operations

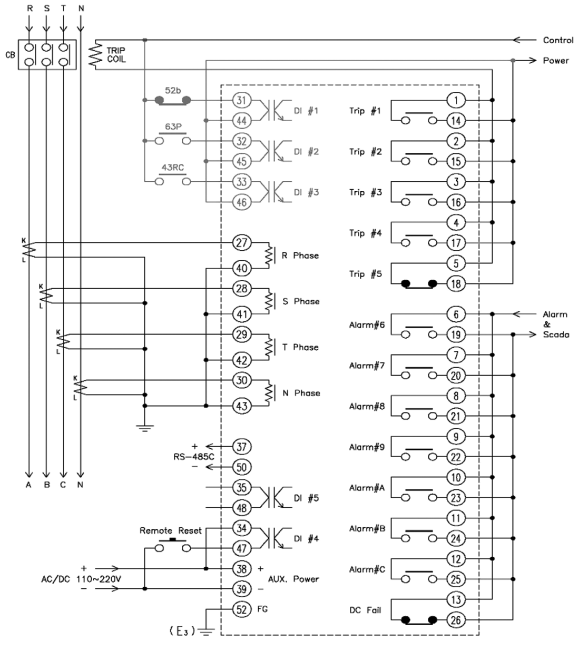
RECLOSING TIME CHART

For 23KV D/L protection
(when DIPR-K211 is applied)



For 23KV D/L protection (when DIPR-K210 is applied)
52b,63P,43RC are reclosing element items and exist only in DIPR-K211.
Do not connect.



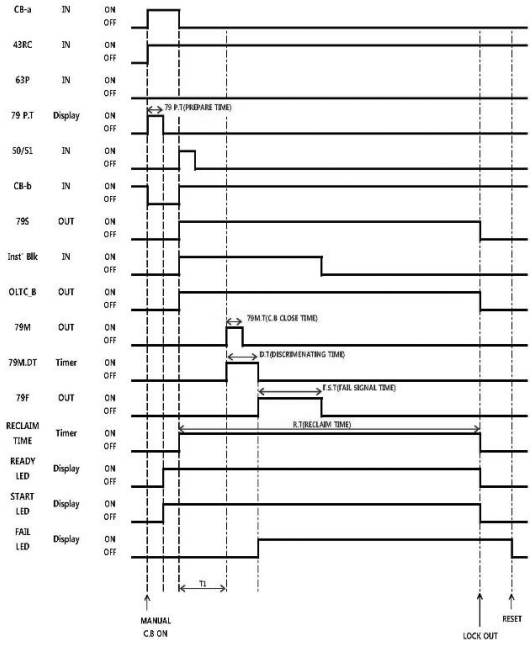


For 154KV MAIN TR. protection
(when DIPR-K210 is applied)
52b, 63P, 43RC are reclosing element items and exist only in DIPR-K211.
Do not connect.

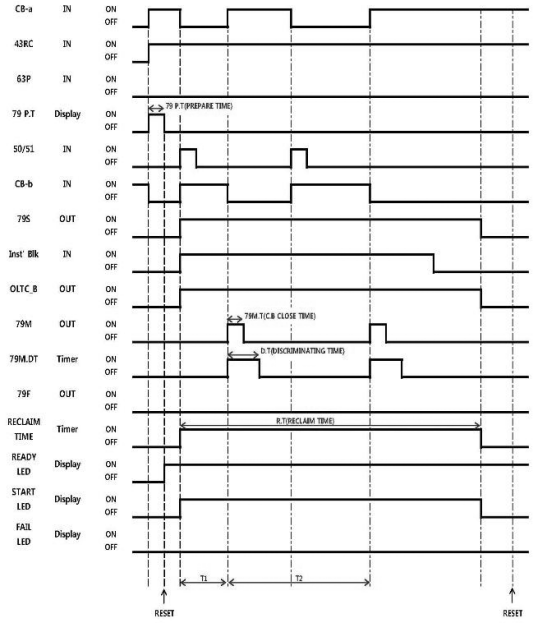
OVER CURRENT RELAY WITH RECLOSING & OVER CURRENT RELAY

RECLOSING TIME CHART

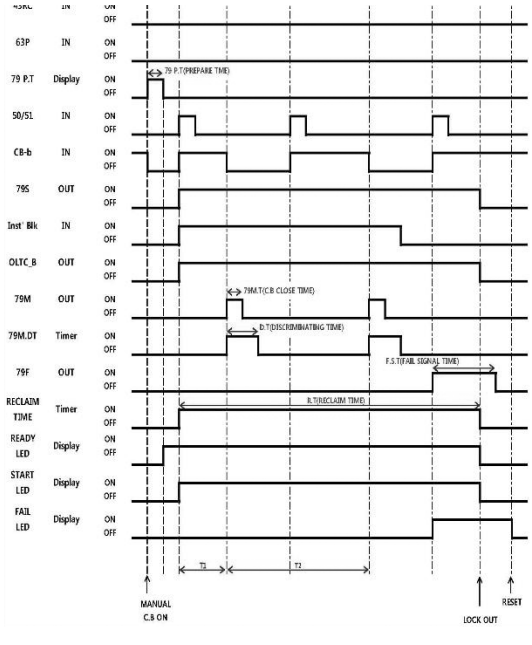
Time chart for CB input failure within D.T time after first time reclosing signals



Time chart for the first and second time reclosing success



Time chart for second time reclosing failure



Protective cover

An IEC 60529 standard IP54 GRADE transparent cover was attached to block fine dust inflows and achieve waterproof while preventing front side damage due to user carelessness.
A reset switch was attached to enable LED returns without separating the cover.

Case

The structure of the case is designed as a square draw out type to facilitate separation from and connection to the electric circuit on the distributing panel for convenience in replacement or repair work

Dimension