

TOYO *Digital* UV+OV Protection Relay Operation Manual

3UV+3OV (27/59)

1. Models

TDOU - 33 (fixed type) TDOU - 33D (draw-out type)

2. Main Function

TOYO-TDOG protection relay is micro-processing type, with LCD display showing all information about the state of settings and input voltage value of each phase. Selectable operating time curves consist of **definite time** and **normal inverse time**. When activating, not only a signal will be generated to trip the breaker, also a RS485 output and a set of UV/OV contacts are provided for central monitoring, and the latest 32 trippings will be recorded. The power supply is AC/DC dual purpose. For draw-out type, disconnect the trip contacts before drawing out, do not insert PTT.

3. Panel Layout

4 x 20 LCD Display

Displaying all information about the state of settings and input current value of each phase.

LED Indicator

RUN	CPU running normally
PICKUP	turning on when fault occurs
COMM	RS-485 communicating
AB/BC/CA	indication of fault phase
INST	instantaneous fault indication
POWER	aux. power normal
UV/OV	indication of fault type

Control Key

MODE	enter main setup menu
ENTER	confirm / select / next item
ESC	cancel / return
▲ ▼ ◀ ▶	scroll / change values
CPU RESET	restart the CPU
TRIP RESET	clear lamp (reset tripping indications)



4. Setting Illustration

MAIN MENU

(press MODE once)

- | | |
|-----------------|---|
| 1. SYSTEM SETUP | 1. set up system frequency & PT ratio |
| 2. RELAY SETUP | 2. set up output contact ON time |
| 3. COMM SETUP | settings regarding protection such as UV/OV 、 instantaneous 、 lever 、 time curve selection...etc. |
| 4. FAULT MEMORY | settings of RS-485 communication |
| 5. SECURITY SET | check up tripping history |
| 6. TIME SET | set up password |
| 7. SELF TEST | set up date & time |
| | check the state of lamps & contact |

[MAIN MENU] #1/3
* 1. SYSTEM SETUP
2. RELAY SETUP
3. COMM SETUP

[MAIN MENU] #2/3
4. FAULT MEMORY
5. SECURITY SET
6. TIME SET

[MAIN MENU] #3/3
7. SELF TEST

Attention ! In the end of EACH setup item it will show up : **Are You Sure? [N]** ,
use **▲** 、 **▼** key to change N to [Y] and then press Enter ,
so that the new value can be saved and the setting be completed

• SYSTEM SETUP

(press ENTER at 「1. SYSTEM SETUP」 of the main menu)

[SYS SetUp]

1. Sys_SetUp_1
2. Sys_SetUp_2

[SYS Set 1 Menu]

SYS Freq [60] Hz
P/T Rat [380] / [110]

[SYS Set 2 Menu]

System Type [3P4L]

SYS Freq: frequency setup · use ▲ 、 ▼ key to select 50/60 Hz ◦

P/T Rat: PT ratio setup · use ▲ 、 ▼ 、 ◀ 、 ▶ key to set the PT ratio ◦

SYSTEM TYPE: 3P3L=3-phase-3-wire, 3P4L=3-phase-4-wire ◦

• RELAY SETUP

(press ENTER at 「2. RELAY SETUP」 of the main menu)

[RELAY SETUP]

- * 1. Time Delayed OVR
2. Time Delayed UVR
3. Inst UVR

1. OV Time Delay

(press ENTER at 「1. Time delay OVR」)

[Time OVR Set]	
CURVE [DT]	TOV [XXX]
LEVER [X.X]	LOCK? [N]

use ▲、▼、◀、▶ key to change setting values

DT (Definite Time)

NI (Normal Inverse)

CURVE: time curve—DT、NI； **TOV:** over voltage； **LEVER:** time curve lever；

LOCK: Y=locked、N=unlocked。

Caution ! If LOCK=Y, even when fault occurs, RELAY will NOT trip, LED lamps will NOT turn on, either.

2. UV Time Delay

(press ENTER at 「2. Time delay UVR」)

[Time UVR Set]	
CURVE [DT]	TUV [XXX]
LEVER [X.X]	LOCK? [N]

use ▲、▼、◀、▶ key to change setting values

DT (Definite Time)

NI (Normal Inverse)

CURVE: time curve—DT、NI； **TUV:** under voltage； **LEVER:** time curve lever；

LOCK: Y=locked、N=unlocked。

Caution ! If LOCK=Y, even when fault occurs, RELAY will NOT trip, LED lamps will NOT turn on, either.

3. UV Instantaneous

(press ENTER at 「3. Inst UVR」)

[Inst UVR Set]	
IUV [XX]	LOCK? [N]

use ▲、▼、◀、▶ key to change setting values

IUV: instantaneous under voltage value；

LOCK: Y=locked、N=unlocked。

Caution ! If LOCK=Y, even when fault occurs, RELAY will NOT trip, LED lamps will NOT turn on, either.

• COMM SETUP

(press ENTER at 「3. COMM SETUP」 of the main menu)

[COMM Set Menu]	
DEVICE ID [XX]	
COMM SPEED [XXXX]	

use ▲、▼、◀、▶ key to change setting values

DEVICE ID: set up relay ID for RS485 communication。

COMM SPEED: set up communication baud rate (bps)。

• FAULT MEMORY

(press ENTER at 「4. FAULT MEMORY」 of the main menu)

[FAULT MEMORY]

1. FAULT RECORD
2. CLEAR FAULT MEM

按▲、▼鍵來選擇項目

1. Check up fault records

(press ENTER at 「1. FAULT RECORD」)

[FAULT REC] #01/32
FAULT TYPE {PHASE} = V
Op_Time = ms
<YY.MM.DD.hh.mm.ss>

use ▲、▼ key to select items

FAULT REC: up to 32 fault records (automatically overwrite the earliest one when >32)

FAULT TYPE: fault type ; T_OVR / T_UVR → OV/UV time delay ·

I_UVR → UV instantaneous °

{PHASE} = V: display the fault phase and the fault voltage value °

Op_Time: trip(delay) time in micro second ° °

<YY.MM...>: fault date ; year.month.day.hour.minute.second °

2. Clear fault records

(press ENTER at 「2. CLEAR FAULT MEM」)

[FAULT Clear]

Clear Fault REC? [N]

use ▲、▼ key to select N or Y

N: do not delet ; **Y:** delet **ALL** fault records °

• SECURITY SET

(press ENTER at 「5. SECURITY SET」 of the main menu)

[SECURITY PASSWORD]

PASSWORD [****]
set "0000" to disable

use ▲、▼、◀、▶ key to set up password

If do not use password · set 「0000」 °

To use password · set any four-digit number between 0001 ~ 9999 °

If password is set · password dialogue box will appear when pressing MODE key °

If password forgotton · set 「1183」 · and then the password will be reset to 「0000」 · that is, not using password °

- **TIME SET** (press ENTER at 「6. TIME SET」 of the main menu)

[TIME SET]
yy-mm-dd-hh-mm-ss
XX-XX-XX-XX-XX-XX

use ▲、▼、◀、▶ key to change setting values
sequence: 「year-month-day-hour-minute-second」

- **SELF TEST** (press ENTER at 「7. SELF TEST」 of the main menu)

[SELF TEST]
1. TEST LAMPTUP
2. TEST RELAY
3. TEST SWITCH

use ▲、▼、◀、▶ key to select items

1. **Lamp test** (press ENTER at 「1. TEST LAMP」)

[LAMP TEST]
[ENTER] to ALL LAMP
[ESC] to QUIT TEST

press ENTER · all LED lights up (check if any lamp malfunction) ◦
press ESC · quit testing and return to previous page ◦

2. **Relay test** (press ENTER at 「2. TEST RELAY」)

[RELAY TEST]
[LEFT] to OV TRIP
[RIGHT] to UV TRIP
[ESC] to QUIT TEST

press ◀ key · OV alarm contact Oa-Oc is ON ◦

press ▶ key · UV alarm contact Ua-Uc is ON ◦

(special: press ▲ key · trip contact Ta-Tc is ON)

press ESC · quit testing and return to previous page ◦

Caution !
This test will trip the breaker · be careful ! !

3. **Key test** (press ENTER at 「3. TEST SWITCH」)

[SWITCH TEST]
[] ← Key Input
Press & check switch
[ESC] to QUIT TEST

except CPU RESET and MODE key · pressing any key will display following message in []:

▲ → [UP]

▼ → [DOWN]

◀ → [LEFT]

▶ → [RIGHT]

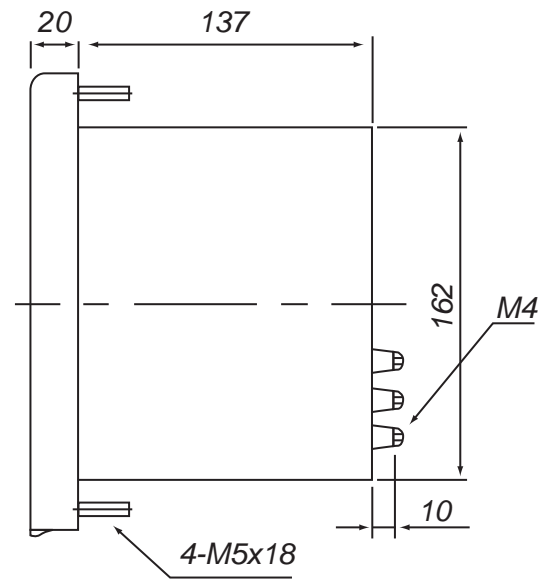
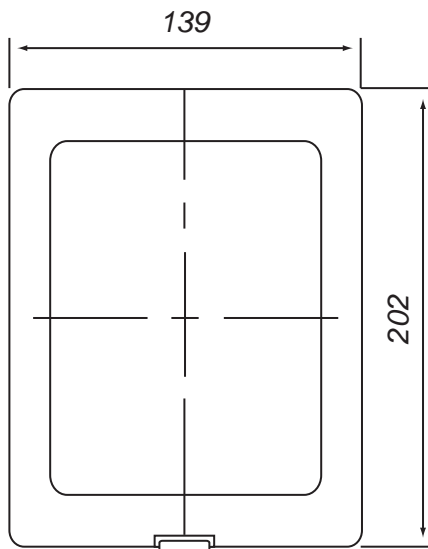
TRIP RESET → [CLEAR]

ENTER → [ENTER]

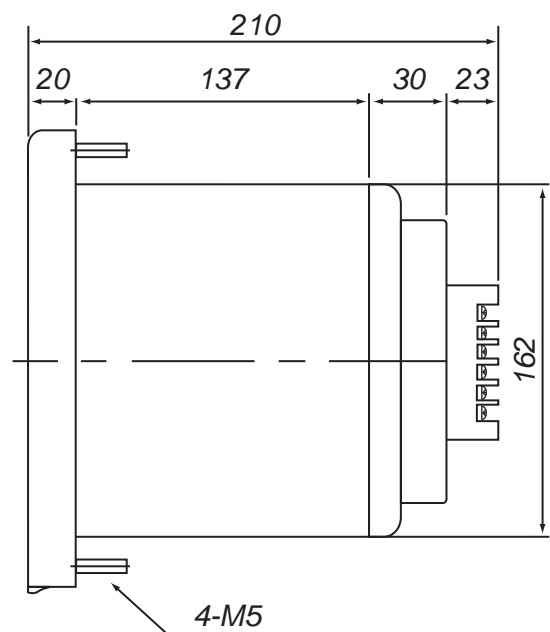
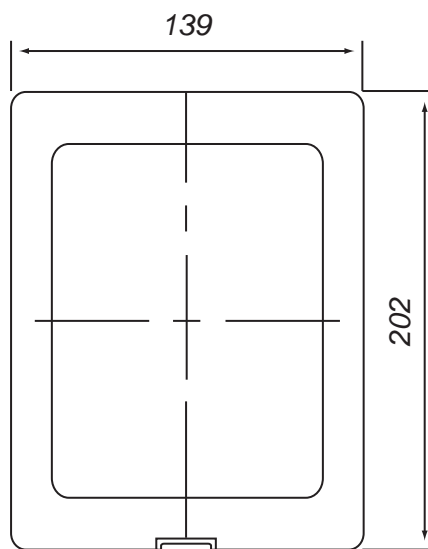
press ESC · quit testing and return to previous page ◦

5. Dimension & Panel Cut

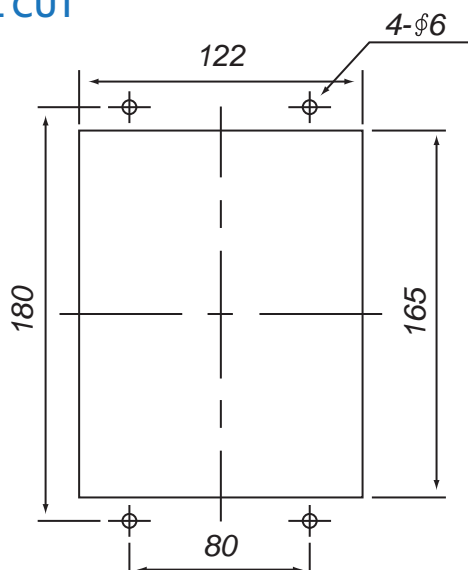
Fixed Type TDOU - 33



Draw-out Type TDOU - 33D



PANEL CUT

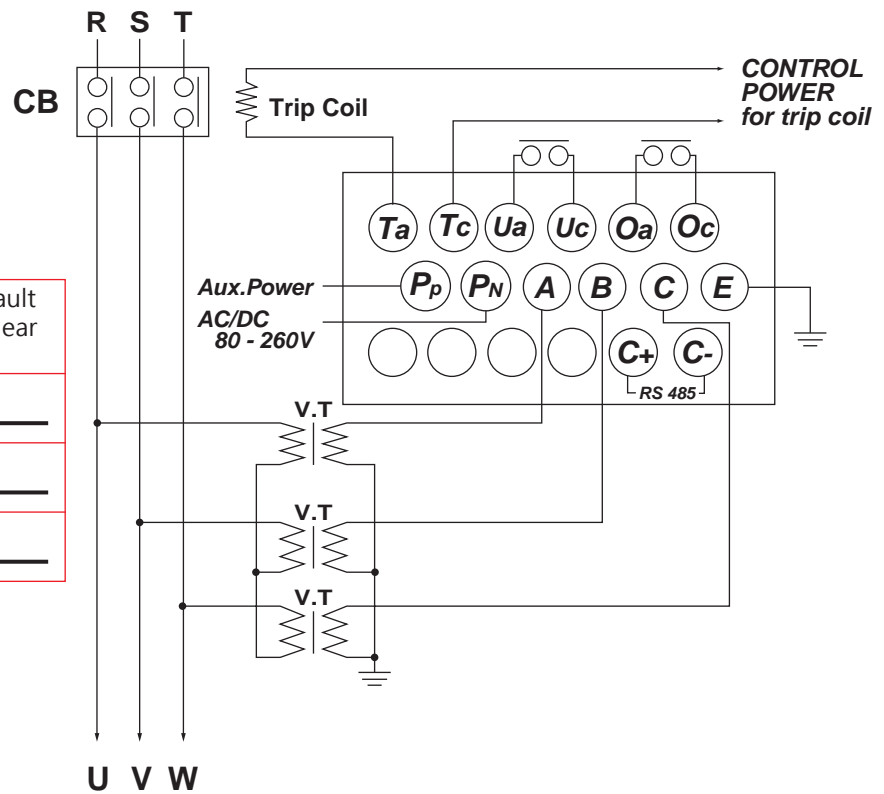


6. Wiring Diagram

Fixed Type TDOU - 33

Contact Operation:

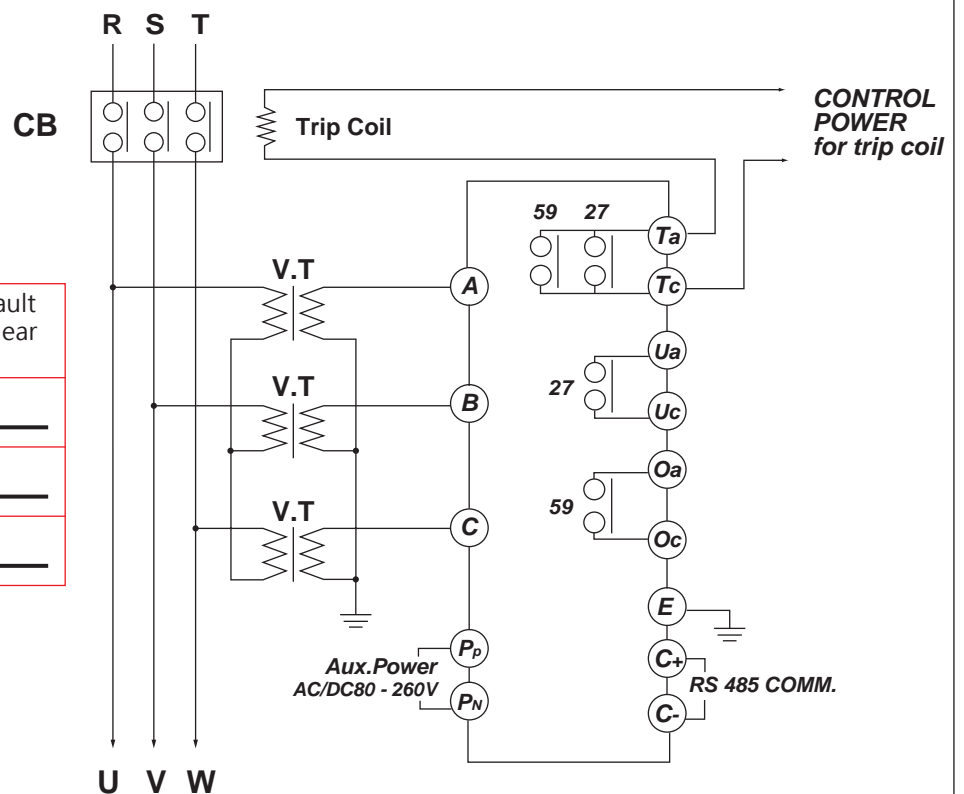
		Fault Occur (cont.)	Fault Clear
Ta-Tc			
Oa-Oc			
Ea-Ec			



Draw-out Type TDOU - 33D

Contact Operation:

		Fault Occur (cont.)	Fault Clear
Ta-Tc			
Oa-Oc			
Ea-Ec			



7. Specification

Rating		
Rated Voltage	AC 110V	
Rated Frequency	50/60Hz±5%	
Auxiliary Power	AC/DC 80~260V	
Ambient Temperature	-10C~60°C (without icing)	
Voltage Setting		
UV	UV Time Delay	50~120V (1V step)
	UV Instantaneous	20~90V (1V step)
OV	OV Time Delay	100~160V (1V step)
Time Setting & Curve		IEC 60255-3
Lever (t>)	0.1~10 (0.1 step)	
Inst. Trip Time	less than 60ms	
UV Normal Inverse	$t = \frac{-0.85}{(v/100)^{2.4} - 1} \times tp$	v = voltage V = voltage% (80%→0.8, 120%→1.2) tp = Lever (t>)
OV Normal Inverse	$t = \left(\frac{12.15}{V^2 - 1} + 0.35\right) \times \frac{tp}{10}$	
UV/OV Definite Time	$t = tp$	
Reset Value	UV : V>105% ; OV : V<95%	
Reset Time	<100ms	
Indicator		
RUN (green)	CPU operating normally	
COMM (yellow)	RS485 communicating	
PICKUP (red)	Lights up when fault (UV/OV) occurs	
AB,BC,CA / UV,OV / INST (red)	Trip (phase fault/instantaneous) indicators	
Memory		
	32 trip records	
RS485 Communication		
Protocol	Modbus	
Baud Rate	9600 / 19200 bps	
Parity	None	

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