

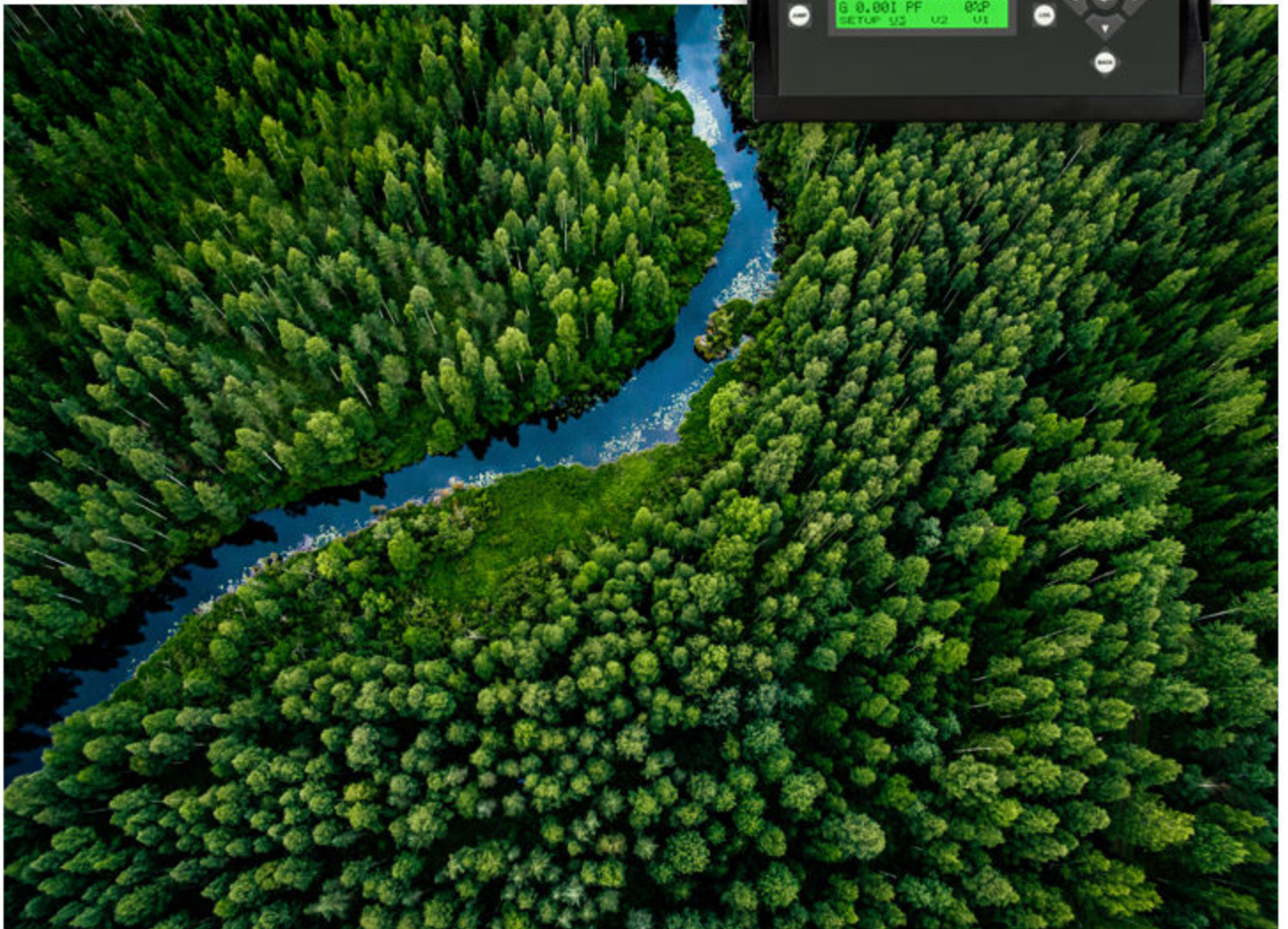
APU-4

Advanced Protection Unit

Data sheet



Improve
Tomorrow

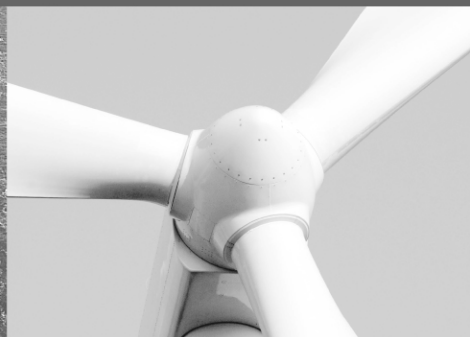




-power in control



Advanced Protection Unit, APU-4 DATA SHEET



Busbar protection (ANSI)

- 3 × over-voltage (59)
- 4 × under-voltage (27)
- 3 × over-frequency (81)
- 4 × under-frequency (81)
- ROCOF (rate of change of frequency)
- Vector shift
- Complies with ER G59/3
- Complies with ER G99

M-Logic (Micro PLC)

- Simple logic configuration tool
- Selectable input/output events

Display

- Status texts
- Info messages
- Alarm indication
- Prepared for remote mounting
- Prepared for additional remote displays

General

- USB interface to PC
- Free PC utility software for commissioning
- Programmable parameter, timer and alarms
- User-configurable texts



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Data sheet

Application

The Advanced Protection Unit, APU-4, is a compact microprocessor-based protection unit that contains all necessary functions for mains protection and complies with Engineering Recommendation G59/3 and G99*.

Display unit

The display unit is separate and can be installed directly on the main unit or in the front of the switchboard door (3 m display cable included). Up to two additional displays can be installed within 200 m.

The display unit shows all measured and calculated values as well as alarms and data from the event log.

Self-test

The APU-4 automatically carries out a cyclical self-test at start-up. If any errors are found, they will be displayed in clear text in the display and indicated with a relay output (status output).

**G59/3 and G99 compliance is limited to 50 Hz operation.*

Advanced Protection Unit, APU-4

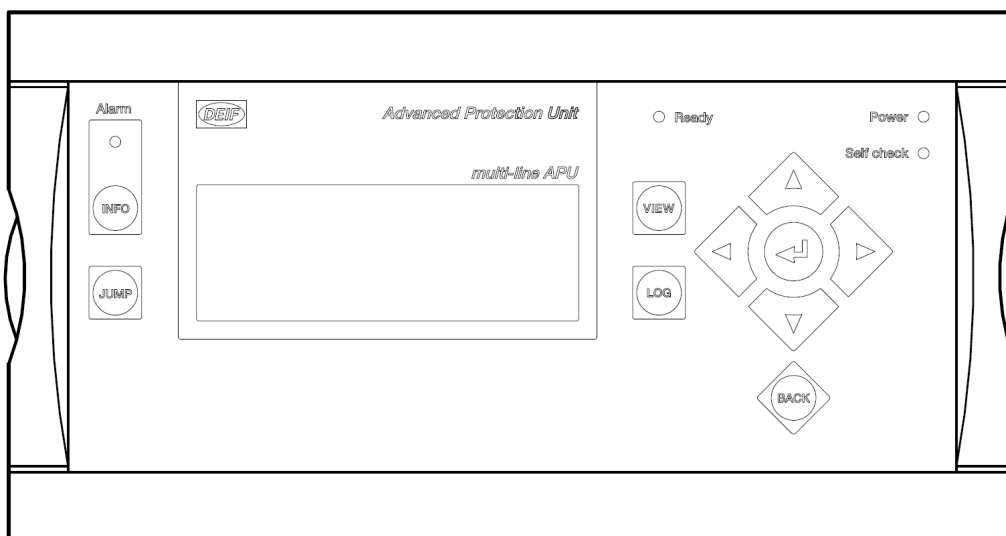
M-Logic (Micro PLC)

This configuration tool is part of the PC utility software which is free of charge. With this tool, it is possible to customise the application to your needs. It is possible to dedicate specific functions or logical conditions to different inputs and outputs.

Setup

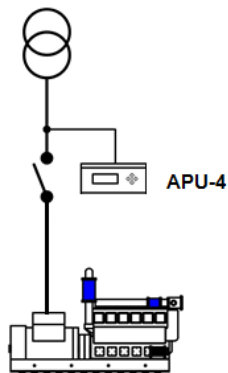
Setup is easily done via a menu structure in the display (password-protected) or via the USB PC connection and the Multi-line 2 Windows®-based PC utility software. The PC utility software can be downloaded free of charge from www.deif.com/Software. The utility software offers additional features such as monitoring of all relevant information during commissioning, saving and downloading of settings and downloading of software updates.

Display layout



Application example

Generator/mains protection



Available variants

Type	Variant no.	Description	Item no.	Note
APU-4	01	APU-4 with A1 and without display	2912211020	Based on G59/3 and G99 requirements

Available accessories

Accessory	Description	Item no.	Note
Cables			
USB cable, 3 m (J7)	For PC utility software	1022040065	

Technical specifications

Accuracy:	Class 1.0 -25 to 15 to 30 to 70 °C Temperature coefficient: +/-0.2 % of full scale per 10 °C Positive, negative and zero sequence alarms: Class 1 within 5 % voltage unbalance Class 1.0 for negative sequence current Fast over-current: 3 % of 350 % I_n Analogue outputs: Class 1.0 according to total range	Digital inputs:	(UL/cUL Listed: AWG 24) Optocoupler, bi-directional ON: 8 to 36 V DC Impedance: 4.7 k Ω OFF: <2 V DC
Operating temp.: With option N:	-25 to 70 °C (-13 to 158 °F) -25 to 60 °C (-13 to 140 °F) (UL/cUL Listed: Max. surround- ing air temp.: 55 °C/131 °F)	Analogue inputs:	0(4) to 20 mA Impedance: 50 Ω Not galvanically separated RPM (MPU): 2 to 70 V AC, 10 to 10000 Hz, max. 50 k Ω
Storage temp.:	-40 to 70 °C (-40 to 158 °F)	Multi-inputs:	0(4) to 20 mA: 0 to 20 mA, +/-1 % Not galvanically separated Binary: Max. resistance for ON detection: 100 Ω Not galvanically separated Pt100/1000: -40 to 250 °C, +/-1 % Not galvanically separated To IEC/EN 60751 RMI: 0 to 1700 Ω , +/-2 % Not galvanically separated V DC: 0 to 40 V DC, +/-1 % Not galvanically separated
Climate:	97 % RH to IEC 60068-2-30	Relay outputs:	Electrical rating: 250 V AC/30 V DC, 5 A (UL/cUL Listed: 250 V AC/24 V DC, 2 A resistive load) Thermal rating @ 50 °C: 2 A: Continuously 4 A: t_{ON} = 5 sec., t_{OFF} = 15 sec. (Unit status output: 1 A)
Operating altitude:	0 to 4000 m above sea level Derating 2001 to 4000 m above sea level: Max. 480 V AC phase-phase 3W4 measuring voltage Max. 690 V AC phase-phase 3W3 measuring voltage	Open collector outputs:	Supply: 8 to 36 V DC, max. 10 mA
Meas. voltage:	100 to 690 V AC +/-20 % (UL/cUL Listed: 600 V AC phase-phase)	Analogue outputs:	0(4) to 20 mA and +/-25 mA Galvanically separated Active output (internal supply) Load max. 500 Ω (UL/cUL Listed: Max. 20 mA output) Update rate: Transducer output: 250 ms Regulator output: 100 ms
Consumption:	Max. 0.25 VA/phase		
Meas. current:	-/1 or -/5 A AC (UL/cUL Listed: From CTs 1-5 A)		
Consumption:	Max. 0.3 VA/phase		
Current overload:	4 $\times I_n$ continuously 20 $\times I_n$, 10 sec. (max. 75 A) 80 $\times I_n$, 1 sec. (max. 300 A)		
Meas. frequency:	30 to 70 Hz*1		
Aux. supply:	Terminals 1 and 2: 12/24 V DC (8 to 36 V continuously, 6 V 1 sec.) Max. 11 W consumption Terminals 98 and 99: 12/24 V DC (8 to 36 V continuously, 6 V 1 sec.) Max. 5 W consumption The aux. supply inputs are to be protected by a 2 A slow-blow fuse		

*1 G59/3 and G99 compliance at 50 Hz only.

Data sheet

Galv. separation: Between AC voltage and other I/Os:
3250 V, 50 Hz, 1 min.

Between AC current and other I/Os:
2200 V, 50 Hz, 1 min.

Between analogue outputs and other I/Os:
550 V, 50 Hz, 1 min.

Between binary input groups and other I/Os:
550 V, 50 Hz, 1 min.

Response times:
(Delay set to minimum)

Busbar:

Over-/under-voltage: < 50 ms
Over-/under-frequency: < 50 ms
Voltage unbalance: <200 ms

I/O interface:

Digital inputs: <250 ms
Emergency stop: <200 ms
Multi-inputs: <800 ms
Wire failure: <600 ms

Mains:

df/dt (ROCOF): <215 ms (6 periods)*²
Vector jump: < 40 ms
Positive sequence: < 60 ms
Time-dependent under-voltage, U_L : < 50 ms
Under-voltage and re-active power low, U_Q : <250 ms

Mounting: DIN-rail mount or base mount with six screws

Safety: To EN 61010-1, installation category (over-voltage category) III, 600 V, pollution degree 2

To UL 508 and CSA 22.2 no. 14-05, over-voltage category III, 600 V, pollution degree 2

EMC/CE: To EN 61000-6-2, EN 61000-6-4, IEC 60255-26

Vibration: 3 to 13.2 Hz: 2 mm_{pp}
13.2 to 100 Hz: 0.7 g
To IEC 60068-2-6 & IACS UR E10

10 to 60 Hz: 0.15 mm_{pp}
60 to 150 Hz: 1 g
To IEC 60255-21-1 Response (class 2)

10 to 150 Hz: 2 g
To IEC 60255-21-1 Endurance (class 2)

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Shock (base mount): 10 g, 11 msec, half sine
To IEC 60255-21-2 Response (class 2)

30 g, 11 msec, half sine
To IEC 60255-21-2 Endurance (class 2)

50 g, 11 msec, half sine
To IEC 60068-2-27

Bump: 20 g, 16 msec, half sine
To IEC 60255-21-2 (class 2)

Material: All plastic materials are self-extinguishing according to UL94 (V1)

Plug connections:

AC current:
0.2 to 4.0 mm² stranded wire
(UL/cUL Listed: AWG 18)

AC voltage:
0.2 to 2.5 mm² stranded wire
(UL/cUL Listed: AWG 20)

Relays:
(UL/cUL Listed: AWG 22)

Terminals 98-116:
0.2 to 1.5 mm² stranded wire
(UL/cUL Listed: AWG 24)

Other:
0.2 to 2.5 mm² stranded wire
(UL/cUL Listed: AWG 24)

Display:
9-pole sub-D female

Service port:
USB A-B

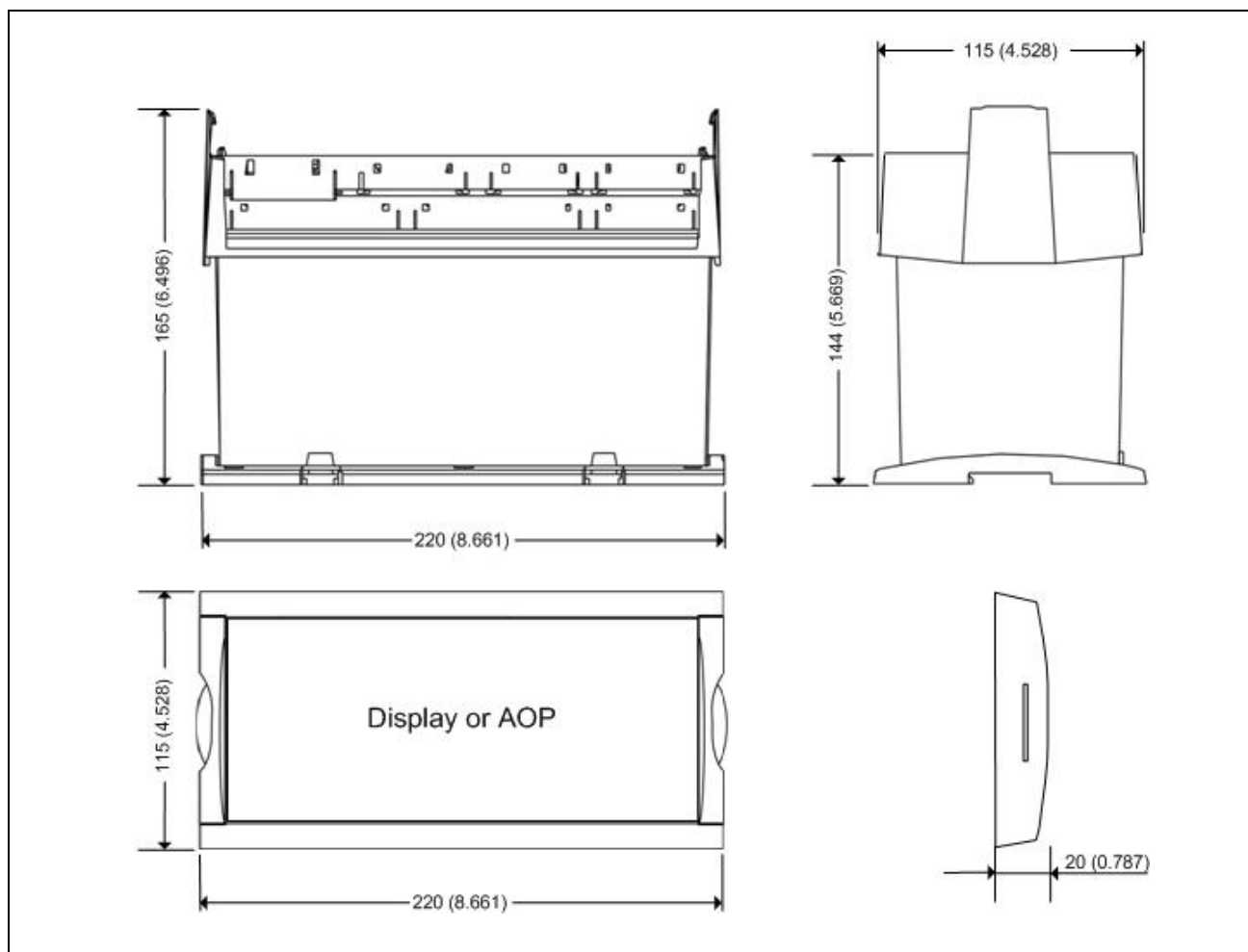
Protection: Unit: IP20
Display: IP40 (IP54 with gasket: Option L)
(UL/cUL Listed: Type Complete Device, Open Type)

To IEC/EN 60529

Weight: Base unit: 1.6 kg (3.5 lbs.)
Cable, 3 m: 0.2 kg (0.4 lbs.)
Cable, 6 m: 0.4 kg (0.9 lbs.)
Display: 0.4 kg (0.9 lbs.)

*² Six periods is the lowest setting.

Unit dimensions in mm (inches)



Order specifications

Variants

Mandatory information			Additional options to the standard variant					
Item no.	Type	Variant no.	Option	Option	Option	Option	Option	Option

Example:

Mandatory information			Additional options to the standard variant					
Item no.	Type	Variant no.	Option	Option	Option	Option	Option	Option
2912110020	APU-4	01						



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Due to our continuous development we reserve the right to supply equipment which may vary from the described.

