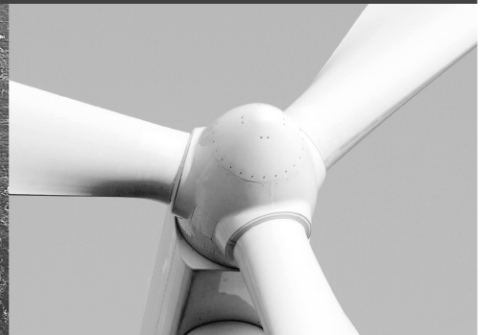




-power in control



## 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

### 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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Document no.: 4921240431B  
SW version: 3.06.x or later

## 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 \*.

### 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 compliance is limited to 50 Hz operation.

## Advanced Protection Unit, APU-4

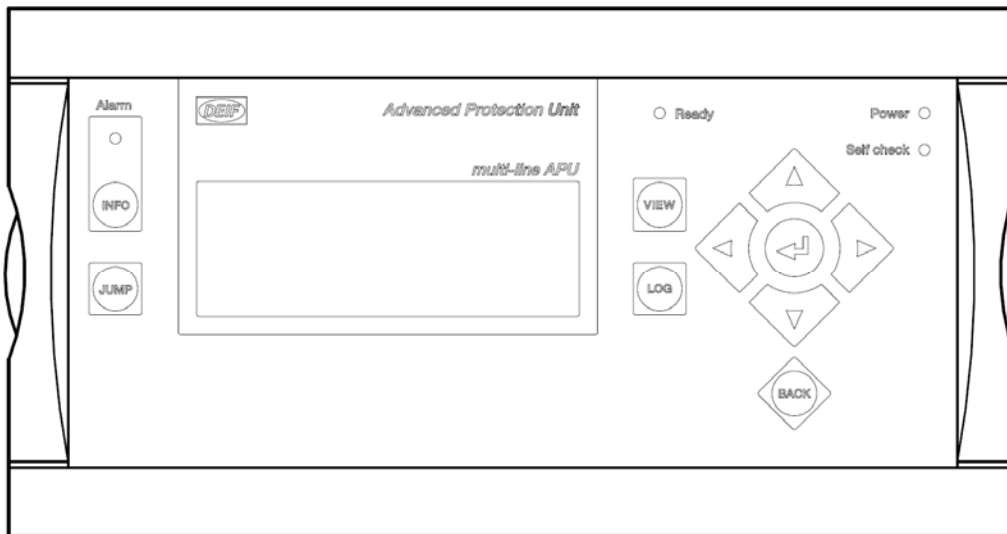
### M-Logic (Micro PLC)

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

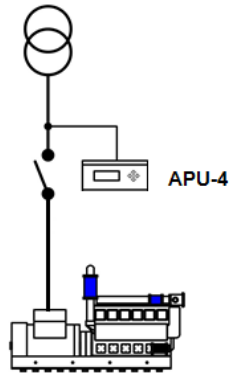
Setup is easily done via a menu structure in the display (password-protected) or via the USB PC connection and the Multi-line 2 Windows®-based PC utility software. The PC utility software can be downloaded free of charge from [www.deif.com/Software](http://www.deif.com/Software). The utility software 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 requirements

Available accessories

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

**Technical specifications**

<b>Accuracy:</b>	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 %*In  Analogue outputs: Class 1.0 according to total range	<b>Digital inputs:</b>	Optocoupler, bi-directional ON: 8 to 36 V DC Impedance: 4.7 kΩ OFF: <2 V DC
<b>Operating temp.:</b> With option N:	-25 to 70 °C (-13 to 158 °F) -25 to 60 °C (-13 to 140 °F)  (UL/cUL Listed: Max. surrounding air temp.: 55 °C/131 °F)	<b>Analogue inputs:</b>	0(4) to 20 mA  Impedance: 50 Ω Not galvanically separated  RPM (MPU): 2 to 70 V AC, 10 to 10000 Hz, max. 50 kΩ
<b>Storage temp.:</b>	-40 to 70 °C (-40 to 158 °F)	<b>Multi-inputs:</b>	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
<b>Climate:</b>	97 % RH to IEC 60068-2-30	<b>Relay outputs:</b>	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: tON = 5 sec., tOFF = 15 sec.  (Unit status output: 1 A)
<b>Operating altitude:</b>	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	<b>Open collector outputs:</b>	Supply: 8 to 36 V DC, max. 10 mA
<b>Meas. voltage:</b>	100 to 690 V AC +/-20 % (UL/cUL Listed: 600 V AC phase-phase)	<b>Analogue outputs:</b>	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		
<b>Meas. current:</b>	-/1 or -/5 A AC (UL/cUL Listed: From CTs 1-5 A)		
Consumption:	Max. 0.3 VA/phase		
<b>Current overload:</b>	4 × In continuously 20 × In, 10 sec. (max. 75 A) 80 × In, 1 sec. (max. 300 A)		
<b>Meas. frequency:</b>	30 to 70 Hz *1		
<b>Aux. supply:</b>	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  (UL/cUL Listed: AWG 24)		

\*1: G59/3 compliance at 50 Hz only.

## Data sheet

<b>Galv. separation:</b>	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.
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### 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, $U_{r<}$	< 50 ms
Under-voltage and re-active power low, $U_{Q<}$	<250 ms

<b>Mounting:</b>	DIN-rail mount or base mount with six screws
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<b>Safety:</b>	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
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<b>EMC/CE:</b>	To EN 61000-6-2, EN 61000-6-4, IEC 60255-26
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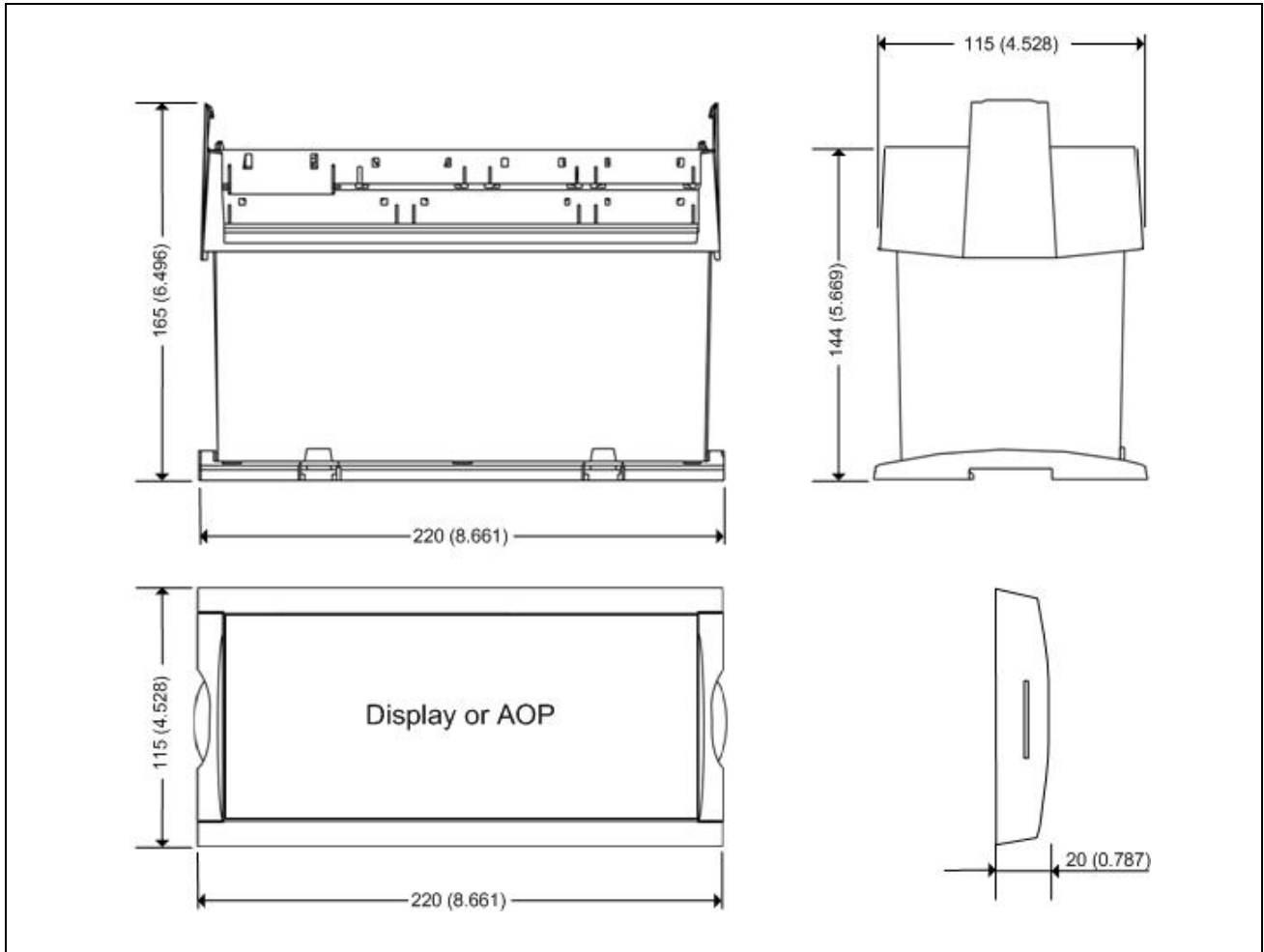
<b>Vibration:</b>	3 to 13.2 Hz: 2 mm <sub>pp</sub> 13.2 to 100 Hz: 0.7 g To IEC 60068-2-6 & IACS UR E10 10 to 60 Hz: 0.15 mm <sub>pp</sub> 60 to 150 Hz: 1 g To IEC 60255-21-1 Response (class 2) 10 to 150 Hz: 2 g To IEC 60255-21-1 Endurance (class 2)
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## Advanced Protection Unit, APU-4

<b>Shock (base mount):</b>	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
<b>Bump:</b>	20 g, 16 msec, half sine To IEC 60255-21-2 (class 2)
<b>Material:</b>	All plastic materials are self-extinguishing according to UL94 (V1)
<b>Plug connections:</b>	AC current: 0.2 to 4.0 mm <sup>2</sup> stranded wire (UL/cUL Listed: AWG 18) AC voltage: 0.2 to 2.5 mm <sup>2</sup> stranded wire (UL/cUL Listed: AWG 20) Relays: (UL/cUL Listed: AWG 22) Terminals 98-116: 0.2 to 1.5 mm <sup>2</sup> stranded wire (UL/cUL Listed: AWG 24) Other: 0.2 to 2.5 mm <sup>2</sup> stranded wire (UL/cUL Listed: AWG 24) Display: 9-pole sub-D female Service port: USB A-B
<b>Protection:</b>	Unit: IP20 Display: IP40 (IP54 with gasket: Option L) (UL/cUL Listed: Type Complete Device, Open Type) To IEC/EN 60529
<b>Weight:</b>	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: 6 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						

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



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