

PAR-100 Pendulum Regulator and Controller

Turret clock conversion to automatic timekeeping

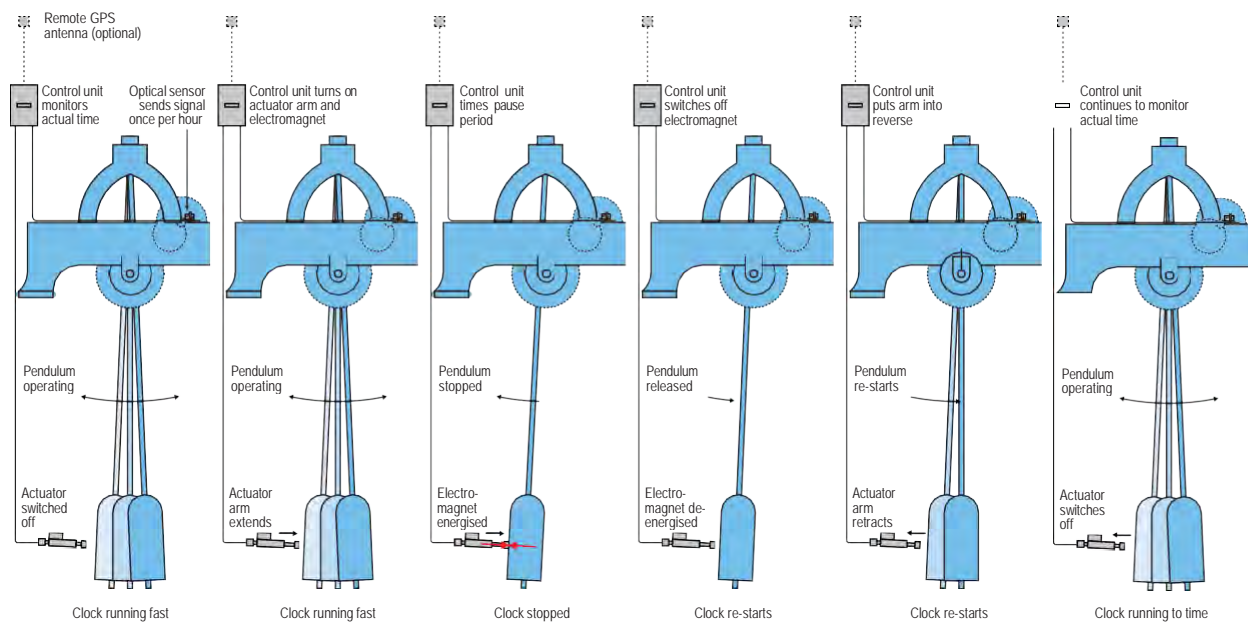
UK patent pending

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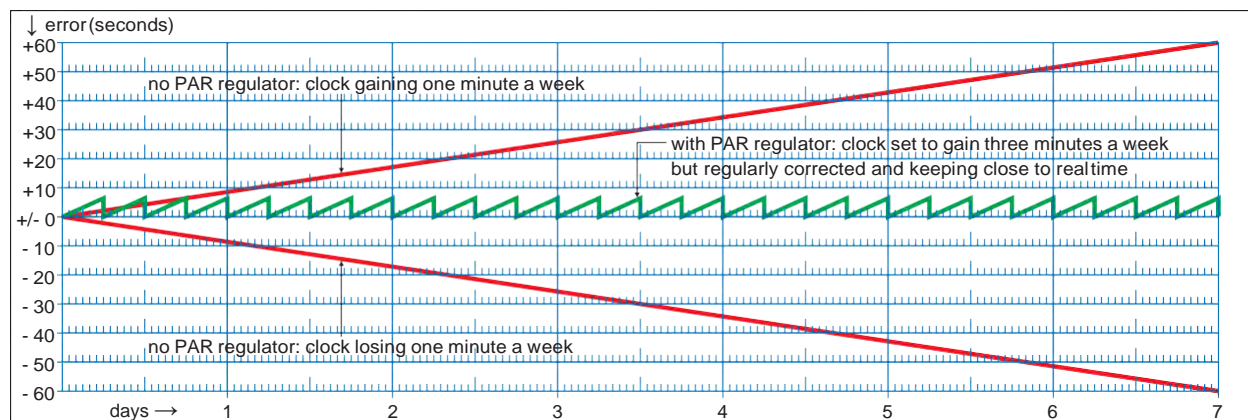
- The perfect timekeeping solution for traditional weight driven turret clocks.
- Accurate quartz controlled timekeeping.
- Integrates with Smith of Derby autowinding.
- Nil effect on the historical integrity of your clock.
- Automatic power failure backup and time correction.
- Excellent build quality giving many years of service.
- UK designed and manufactured.



How the system works

The Smith of Derby PAR-100 Pendulum Regulator System provides automated time adjustment for weight driven tower and church clocks.

Without regular adjustment all clocks vary in timekeeping accuracy due to temperature and climate. If left unchecked, timekeeping error will accumulate over weeks and months.



A loss or gain of one minute a week, if allowed to accumulate, would make your clock seem like a poor timekeeper. It is in fact an error of approximately 0.01 percent.

The PAR-100 works by monitoring the clock and checking it against real time every hour. Pausing the pendulum for short frequent intervals maintains accurate timekeeping in the long term. In practice the clock must be set to always “fast” so that there is always some margin of pause available. In other words the system is designed to pause the clock to “slow” it but is not designed to accelerate it.

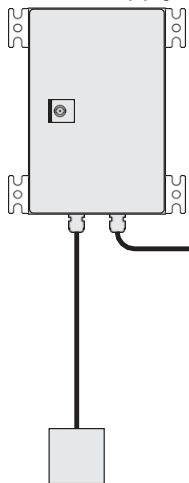
Integration with automatic winding

As it all but eliminates the need for regular manual adjustment, the PAR-100 is an ideal companion to the Smith of Derby autowind system. It shares the same power unit as AW8 models and upwards.

Summer/Winter Time Change

The PAR-100 also takes care of clock altering for summer/winter time changes. The dates and times are pre-programmed into the control unit, and your clock will pause for eleven hours (effectively forward by one hour) in the spring and one hour (back) in the autumn. If your clock has night silencing, the spring time change is programmed for 23 hours to maintain chiming continuity.

AW10/PAR-100
Power Supply Unit

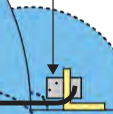


PAR-100C
Control Unit

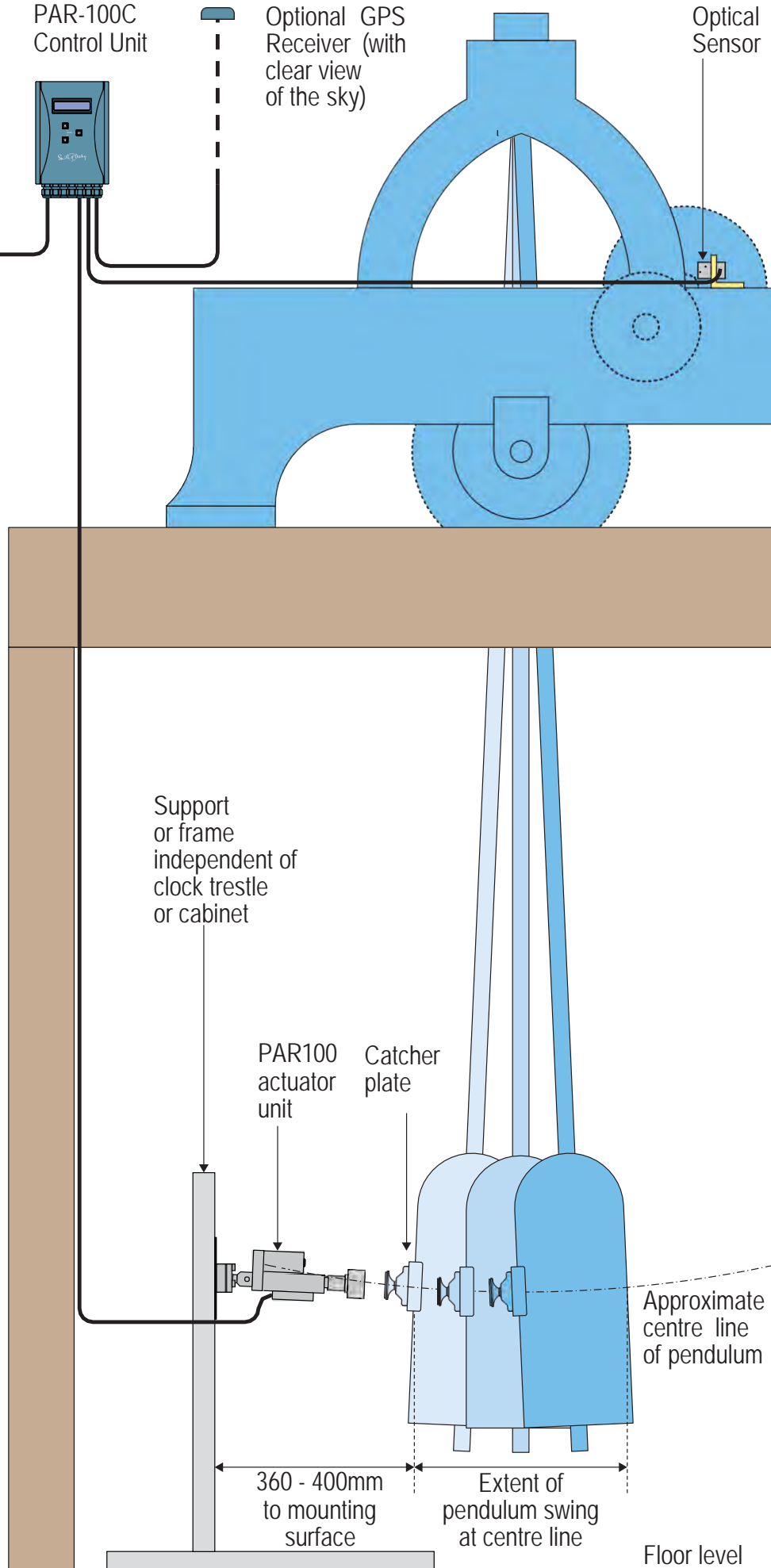


Optional GPS
Receiver (with
clear view
of the sky)

Optical
Sensor



Mains supply:
switched fused spur
provided by client



Support
or frame
independent of
clock trestle
or cabinet

PAR100
actuator
unit

Catcher
plate

Approximate
centre line
of pendulum

360 - 400mm
to mounting
surface

Extent of
pendulum swing
at centre line

Floor level

Elements of the system



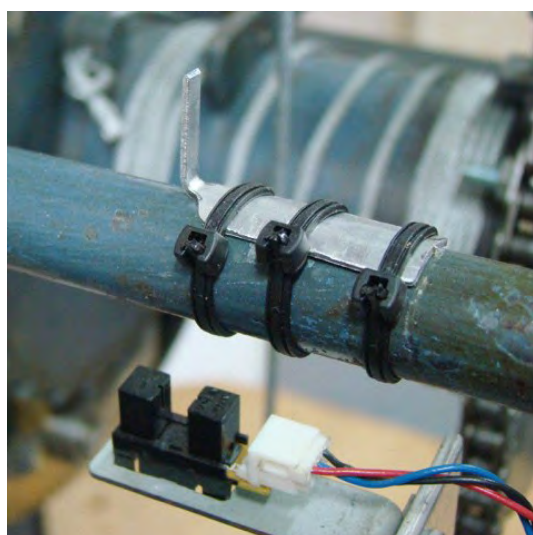
Pendulum height adjustment

When a PAR-100 system is installed, the clock will be adjusted to always gain time by a small amount, using the adjuster below the pendulum bob. This adjustment is calculated by our clockmakers to ensure that there will always be at least a small gain so that the PAR-100 system will operate.



PAR actuator unit and catcher plate

The PAR-100 actuator unit has an extending arm and electromagnet. This is the unit which "catches" the pendulum to pause it for the calculated time.



Sensor on clock movement

A sensor is fitted to one of the drive shafts (arbors). It sends a signal to the control unit exactly once an hour by clock time. The system calculates the gain compared to real time, which in turn activates the actuator arm and electromagnet.



PAR-C-100 control unit

Programmed for full automatic control of your PAR equipped clock. Equipped as standard with quartz controlled clock, timekeeping accurate to within ± 2 seconds/year at a temperature range of between -40 and $+85$ Celsius (military specification).



Power supply unit

With on-board battery to keep the system running during a power failure. If the clock is equipped with a Smith of Derby 24V autowind system (AW8 or higher), the PAR-100 can run off the same power supply unit, which is configured to run both systems together.



Optional GPS time control

A GPS receiver may be installed which sends a time signal to the on-board quartz clock to adjust the time if necessary. Timekeeping is governed by a GPS time signal clock, accurate to the UTC (atomic clock controlled) time signal.

Parameters

The system will not necessarily pause the clock every hour, but will maintain timekeeping to within a few seconds an hour so that long term accuracy is maintained. Gains and pauses are small enough not to be noticeable.

If the clock has become exceptionally fast for any reason, the PAR-100 will not pause the clock for more than three minutes, but will continue to pause on subsequent hours so as to bring it back to the correct time. If the clock has become exceptionally slow for any reason, the PAR will keep it running without pausing to bring it back to the correct time.

If a power failure is prolonged, backup power will be cut to preserve the battery. The clock will continue to operate until it runs out of weightfall. Should this occur, it will require re-setting. Programming memory is not affected by power failures.

Site requirements

Installation

The system must be installed by qualified personnel only in order that guarantees are not invalidated. It is for indoor use only and should be installed where it will not be subject to great temperature variations, or dampness, such as outside walls, window openings, or direct sunlight.

Before installation of the PAR system a preliminary site inspection by our engineer is required. This will ensure that information such as access, space for installation, power supply and any special requirements can be verified.

There must be sufficient space for the PAR mechanism and catcher plate. Please refer to the dimension diagram.

Sufficient space must also be allowed for access to and maintenance of the control unit and power unit.



Smith of Derby recommend and use a standard racking and frame system which uses 40 x 40mm galvanised channel. This is a versatile system suitable for PAR mechanisms and autowind units.

Electrical requirements

A power outlet to the correct specification must be provided by the client prior to installation of the PAR system. To comply with regulations this must be installed by an approved electrical contractor.

Maintenance

PAR series regulators must be serviced every 12 months by a qualified clock engineer. Please ask about our annual maintenance contract.

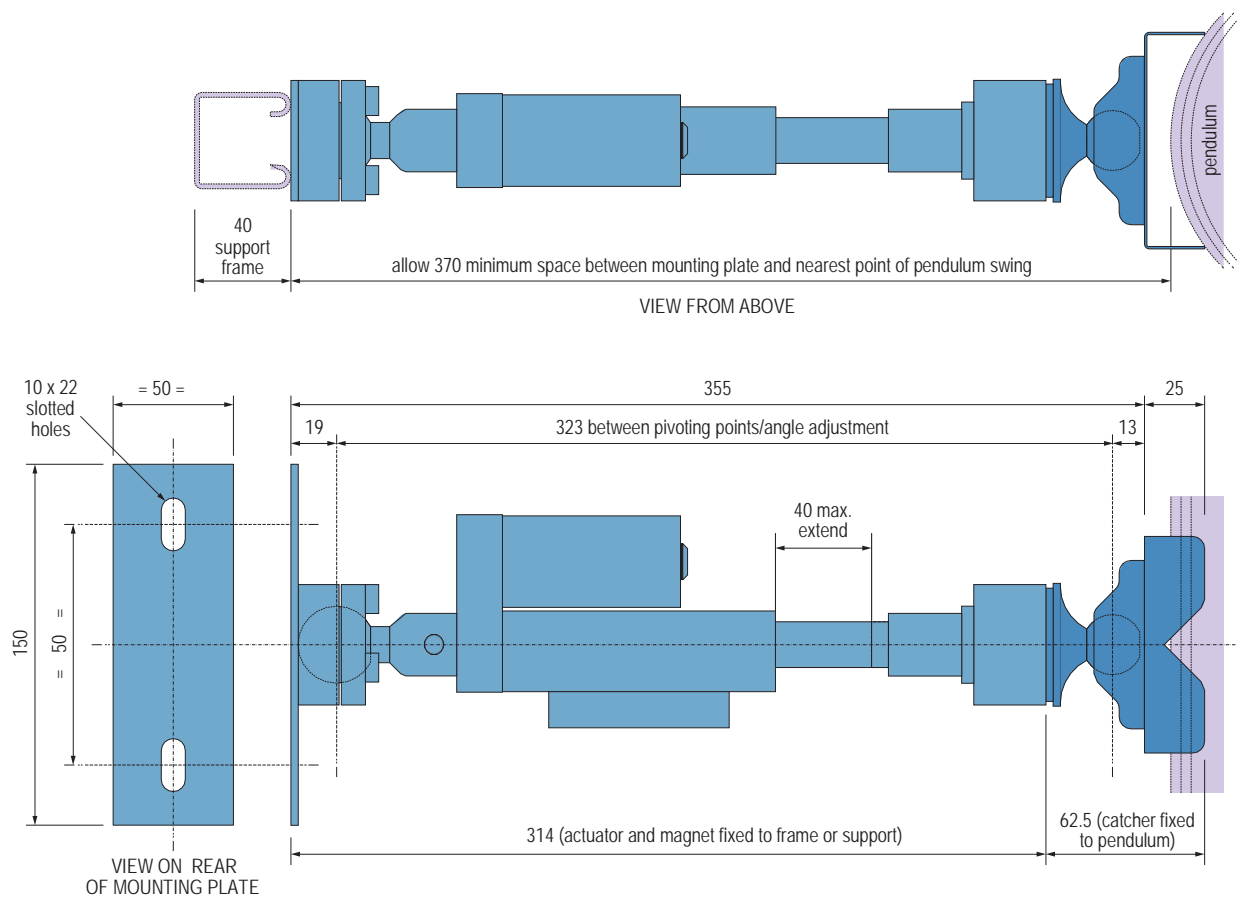
Guarantee

12 months warranty against failure through faulty workmanship or materials. Please see our full terms and conditions, available on our website or on request.

Heritage

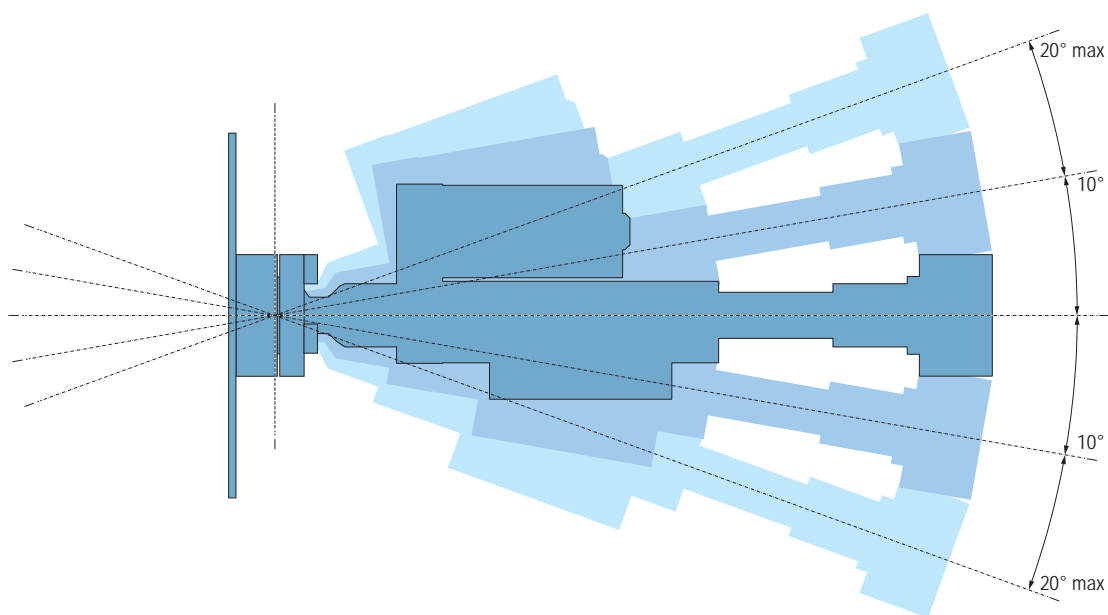
All Smith of Derby work on heritage clocks is fully conservation compliant, and does not involve drilling or modifying any part, nor the attachment of equipment that could not be subsequently removed. Your clock could if required be returned to its exact un-regulated (and un-auto-wound) condition.

Dimensions and specification

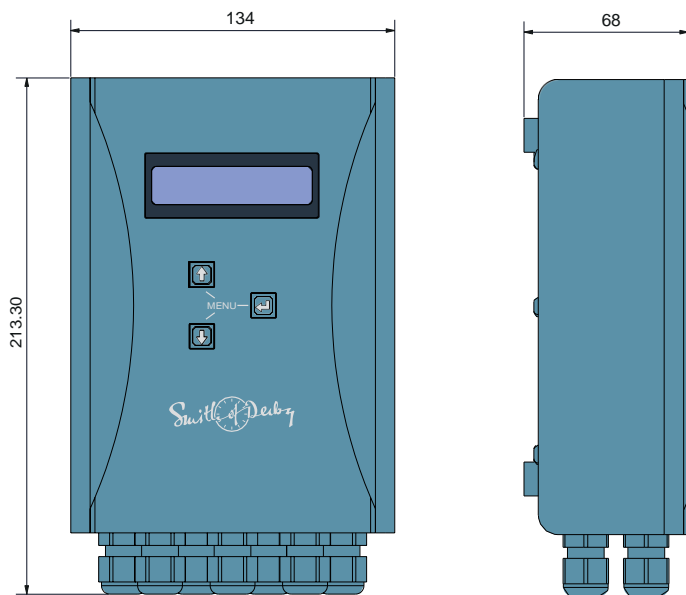


PAR-100 actuator unit and catcher plate overall dimensions and clearances. This diagram shows the unit in the extended position.

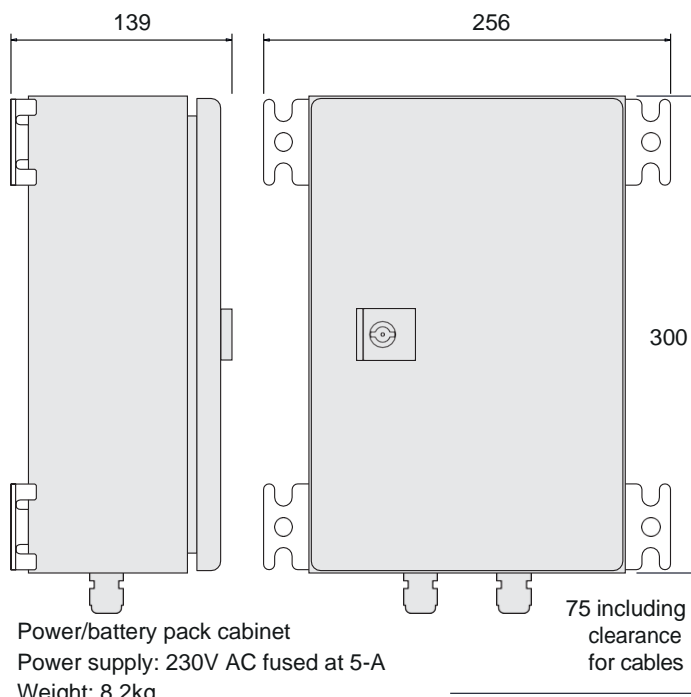
NOTE: site measurements must be compatible with PAR100 installation.



PAR-100 actuator unit swivel angles. In practice the unit will be fixed at 10 degrees or less from the horizontal, but in extreme circumstances the maximum pivot is 20 degrees.



PAR-100C control unit overall dimensions.



AW/PAR-100 power supply unit overall dimensions.

Technical specifications

Timekeeping accuracy	Quartz (standard):	+/- 2 sec/year
	GPS (optional):	+/- 20mS from UTC
Weights (nominal)	PAR100 actuator unit:	3.1kg
	PAR100C control unit:	600g
	AW/PAR power supply:	10kg
Power requirements	standard:	200-240V 50Hz AC
	special order:	100-120V 50/60Hz AC
	fuse rating:	5A
	power consumption:	5w

Operating temperature range -15 to +35 degrees Celsius